A DISSERTATION OF SURGICAL CONDITIONS SUBMITTED AS PART OF THE REQUIREMENTS FOR FULFILLMENT FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE (SURGERY) OF THE UNIVERSITY OF DAR ES SALAAM

1994

BY

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DECLARATION

I declare that this dissertation is my own work and has not been presented and is not currently been submitted for a degree in any other university.

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ABSTRACT

This dissertation partially fulfills the requirements of the award of master of medicine degree in Surgery of the University of Dar es Salaam. It consists of ten common surgical conditions as seen at the Muhimbili Medical Centre, in whose management the author has actively participated. It is divided into three parts.

Part one consists of five cases of general surgery, and these include Burns, Appendicitis, Spleen rupture, Kaposis Sarcoma, and Breast cancer. Part two consists of Urologic problems i.e. Benign Prostatic Hypertrophy, and Carcinoma of the Urinary bladder. Part three deals with Orthopedic and Trauma in which Chronic Osteomyelitis, Congenital Clubfoot, and Soft tissue knee injuries are discussed. In each condition a case is presented in detail, while the rest of the cases are summarised, relevant literature reviewed, and a discussion of each condition is presented.

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DEDICATION

To my wife Sarah and our daughter Lilian,

I extend my sincerest thanks and appreciation for their patience during long periods of my absence, and for their love, and support.

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BURN INJURY IN ADULTS

SUMMARY:

In the period between November 1991 and May 1993, 29 patients with burn injury were treated in Surgical firms II and III of Muhimbili Medical Centre. The commonest cause of burn injury was direct contact with open flame accounting for 21 cases of all burn injury whereas 8 were attributed to scalds. The majority of burn injuries took place at homes accounting for 19 out of 29 patients, whereas injury in 7 patients occurred at places of work and in 3 patients it resulted from recreational activities. The overall mortality was 28% (8 out of 29 patients). Burn shock occurred in 15 out of 29 patients whereas burn wound sepsis accounted for 11 patients.

INTRODUCTION:

Burn injury marks one of the most complex pathophysiological aspects in body metabolism associated with any injury. Over decades victims of burns were mismanaged due to ignorance of such pathophysiologic changes. It was not until 1893 that Baraduc quoted by Artzs(1) emphasized that the main cause of death from burn injury was a decrease in the circulating volume of body fluid. Thus fluid replacement has since then become the cornerstone of treatment of burn injury(5).

The predominant age group affected is young adults(8). There are multiple causes of burns and common ones include open flame, scalds, chemical and electric(7). Children are more prone to scalds whereas adults are affected more by open flame. The hospital stay is often prolonged while the number of school days lost is great, and absenteeism from work increases the risk of being terminated by the employer(4). Both morbidity and mortality is high in all age groups when the total body surface area (TBSA) burnt is more than 50% or depth of burn is as great as in 3rd or 4th degree burn(5). The extent and degree of burn and its complications(2) determine the outcome of a patient with the burn injury and hence this study.

CASE REPORT:

Mr X a twenty three year old man with IP No 722407 was admitted four hours after sustaining burn injury. He was lifting a tin of petrol in the house which caught fire and exploded because some hot ash from a cigarette which he was smoking dropped into the tin. He was burned on the chest, front and back aspects of the trunk, face, upper limbs and thighs. The relatives smeared some cooking oil over the burnt area and then rushed him to hospital. He was a vehicle mechanic attendant, and had attended primary school. His family, social, and past medical history were not significant.

When examined he was dehydrated and pale. He was not dyspnoeic or febrile. His pulse rate was 118 beats per minute, regular and of good volume. His blood pressure was 100/60 mmHg. He had 30 per cent total body surface area burn injury of both first and second degree. The central nervous system, respiratory, cardiovascular (except elevated pulse rate) and alimentary systems were normal.

A cutdown of the left great saphenous vein was done and a canula inserted. Samples of blood for grouping and cross-match and hematocrit estimation were taken, and fluid infusion with normal saline was started. Pethidine injection in a dose of 100mg i.m. eight hourly to a total of nine doses was administered. The burn wound was cleaned by Dettol, and tetanus toxoid injection 0.5ml was given. He was nursed under a bed cradle and mosquito net. A urethral catheter was inserted to monitor input and output of fluids. The vital signs which included pulse rate, blood pressure, and respiratory rate, were monitored two hourly in the first twelve hours of admission and four hourly thereafter. The temperature was monitored four hourly in the first twelve hours and then twelve hourly. The patient and relatives were reassured and Brookes formula was used to budget the fluid requirement. He weighed approximately 60kg and received 3.6 litres of normal saline and 3 litres of 5% dextrose solution in the first 24 hours. The fluid was budgeted to be given as follows: half of the fluid was given in the first eight

hours, a quarter in the next eight hours and another quarter in the last eight hours. Dextrose solution was distributed uniformly in every eight hour session of normal saline. The rate of administration (drop rate) was calculated according to the formula one ml is equivalent to 15 drops. Therefore 3l in the first eight hours was given at a rate of 100 drops per minute.

Urine output was 32 mls per hour in the first day, 37 mls per hour in the second day, 46 mls per hour in the third day and 40 mls per hour in the fourth day. His pulse rate remained on the average of 102 per minute and blood pressure stabilised at $^{120}/_{70}$ mmHg. The patient was encouraged to take in high protein, a high calorie diet and relatives were instructed to assist him on such diet in order to hasten tissue repair process. Physiotherapy was started early to avoid contractures. In between the first 24-96 hours he had fairly stable vital signs and started taking fluids orally and intra-venous fluids were stopped on the fifth day. The high protein and high calorie diet, continued wound care, body weight monitoring, observation of emerging complications were the cornerstone of treatment for the rest of 36 days he remained in the hospital. He was discharged after the burn wound had healed and was followed up in the outpatient clinic. The hospital stay lost had costed him a job as a vehicle mechanic attendant in one of the garages in the city, and he had to look for a job somewhere else.

THE RESULTS OF PATIENTS WHO SUSTAINED BURN INJURY:

Table 1: Shows the age and sex distribution

Age group	SEX		Total
	M	F	
11 - 20	4	7	11
21 - 30	8	5	13
31 - 40	2	2	4
41 - 50	1	-	1
Total	15	14	29

More than $^{3}/_{4}$ of burn victims (24 out of 29) were in the 2nd and 3rd decade of life. M:F ratio was aproximately I:I

Table II: The etiology of burn injury against sex.

Course	Sex		Total
	M	F	
Open flame	10	12	22
Scald	5	2	7
Total	15	14	29

About 3/4 of burn injury incidences were due to open flame, and there was no significant sexual different in terms of etiology.

Table III: The environment in which burn injury took place.

Environment	No. of Patients (n)
Home (residence)	19
Place of work (occupational)	7
Recreational	3
Total	29

Most of the victims had burn injury in their homes.

Table IV: The duration between injury and commencement of therapy.

Duration (hours)	No. of Patients (n)
1 - 3	8
4 - 6	14
7 - 9	4
10 - 12	1
>13	2
Total	29

About 75% (n=22) of patients had therapy started within 6 hours of injury.

Table V: Complications resulting from burn injury.

Complications	No. of Patients (n)
Shock	15
Burn wound sepsis	11
Contractures	7
Hypertrophic scars	5
Septicemia	3
Pneumonia	2
Paralytic ileus	1

Shock and burn wound sepsis were the commonest complications.

Table VI: Shows degree, extent and mortality rate.

No. of death (in sex)	Depth (degree)	Extent (TBSA %)	Duration of Injury (hours)
M	3°	35	9
F	1°	40	2
F	1° & 2°	83	3
M	1° & 2°	74	11
M	1° & 2°	89	4
M	2°	75	3
M	1° & 2°	93	3
M	1° & 2°	71	4

6 our of 8 patients who died presented with more than 40% of TBSA burn.

KEY: TBSA = Total Body Surface Area.
1°,2°, & 3° = first, second and third degree respectively.

DISCUSSION:

Epidemiology:

Burns is a world-wide problem. It is estimated that in North America 2 million people suffer from burn injury annually and out of these 300,000 get various degrees of disability(12). In this series the author attended 29 patients. About half of them (12 out of 29 patients) suffered from disability mainly in the form of contracture (Table V). The average hospital stay was 31 days. In Kenya it was found that 10.3% of all admissions in Kenyan hospitals were due to injuries of which burns constituted 11.3 per cent, with average hospital stay of 22.6 days(4). Most patients had prolonged hospital stay because of post burn injury complications.

In this series 19 out of 29 patient with burn injury occurred at the residence of victims, and 7 patients at their place of work. Recreational activities accounted for burns in 3 patients (Table III). Open flame and scalds were the most frequent source of burns. Open flame alone accounted for 22 cases out of 29.

In this study 8 patients died. Four patients died from open flame accident. All of them were in a vehicle where petrol in a tin caught fire and exploded as one of them had carelessly smoked a cigarette. Two of them died from open flame as a kerosene stove exploded. The remaining 2 victims had open flame injury caused by a burnt mattress as a result of careless smoking while drunk, and neglecting a burning candle near a mattress while asleep. Typhoon maji's son

For scalds involved were mainly hot water, cooking oil, tea, and hot porridge. The mechanism by which these patients sustained scald injury included spilling of hot liquid from a pot which was accidentally toppled over, splashing of cooking oil onto the face while in cooking process, and falling into a pot with hot liquid as one misses a step. Some workers in this field have reported that more that 50% of cases are readily preventable(5), and most of such incidences results from carelessness..

PATHOPHYSIOLOGY:

Burn injury is a coagulative skin necrosis and underlying tissue of varying degree due to transfer of heat to the body either by direct or indirect contact from a radiant source. Cellular death then occurs because of denaturation of protein and inactivation of critical enzyme systems(10). The degree of burn injury depends on factors such as temperature, duration of application of burn agent and tissue conductivity. The effect of thermal or burn injury can be categorised as follows:-

(a) The skin.

(b) the circulating blood volume,

(c) Red blood cells,

(d) the heart,

(e) the metabolic response.

A. Effects on skin:

The skin is a primary target organ for all types of burn injuries. It serves numerous physiological and immunological functions and indeed it is a vital intermediary between the internal organ systems and the external environment(10,11). Thus skin helps to protect from:

i) loss of body water, electrolytes, and plasma proteins,

ii) Infections,

iii) Injury from abnormal environmental temperature,

iv) Mechanical trauma, mechanical trn.

v) Entrance of toxic agents or substances,

vi) Injury from ultra-violet radiation and

vii) Electrical injury.

(i) Loss of body fluid:

It is stratum corneum which prevents loss of water, electrolytes, and plasma proteins through its hexane soluble complex. In a patient with third degree or a 50% total body surface area burn, water loss may increase from 250ml per 24 hours to more than 5 litres per 24 hours.

(ii) Infection:

The stratum corneum of normal skin is a good barrier against invasion by bacteria(10). The skin harbours a large population of body transient and resident bacteria especially in moist areas such as in axilla and intertriginous areas. Burns result in ischemic wounds of the stratum corneum including the epidermis, dermis, and subcutaneous tissue. This allows bacteria to reach such regions. Infection may or may not be established depending on local defensive status.

(iii) Thermal regulation:

When it is cold, heat loss from skin is by the way of convention, radiation, and conduction. Inflammatory process resulting from burn will bring more blood into skin and increase its temperature. Evaporation of water from the moist surface of burn will lower its temperature. Each gram of water equivalent to one ml of water results in a loss of approximately 0.575 kcal(9,12). In major burn (more than 25% surface area burn) total energy expenditure resulting from

increased evaporative water loss from the body surface may reach as high as 7000 kcal per day.

B. Effects of burn on circulating blood volume:

The picture that emerges in a burned patient is that of accumulating edema. Such marked fluid shift is a result of thermal injury to the capillary walls, and local changes in the micro circulation associated with erythrocytes aggregation, hemolysis, and plasma loss into the interstitium resulting from sieving of large molecules(5). Furthermore, increase in capillary permeability occurs due to release of vasoactive substances which include histamines, kinins, prostaglandins and serotonin which are mediators of acute inflammatory process(9).

C. Effects of Burn Injury on Red Cell Mass:

Red cell mass is reduced in burns and this is proportional to the body surface burned and depth(degree) of burn(1). It is estimated that every 1% burn is attended by a loss of 0.5 - 1% of red blood cells(5). Despite such destruction the loss rarely exceed 10% of the total red cell mass and blood transfusion is rarely needed in the first 24-72 hours. There are several causes of red cell loss[2].

1. Direct hemolysis by heat effect.
2. Loss of effective RBC mass due to sludging which is compounded by hemo-concentration resulting from marked plasma loss.

3. Alteration of red blood cell morphology caused by heat with subsequent sequestration by the reticuloendothelial system.
4. Trapping of red blood cell by thrombosis of blood vessel in the burn area resulting into destruction.

D. Effects of burn injury on the heart:

Among the most outstanding systemic responses to severe burn injury is the diminution in cardiac output in which the actual blood pressure remains near normal or even slightly elevated [9]. There is low stroke volume, and increased peripheral resistance. The cardiac output may fall between 30 and 50% of resting volume and return to normal values is not easy even after apparently adequate volume replacement(13). This accounts for most therapeutic failures and the high mortality in the early post burn period.

E. Metabolic response:

(i) Catabolic phase, and

(ii) Anabolic or reconstructive phase. Metabolic changes to burn injury are directly related to stress and the latter corresponds to the extent and depth of burn injury. Several factors influence the response. These include age, nutritional status, pre-existing disease, and the organs injured(14).

It is a state of hypercatabolism which is mediated through an intricate cascade of cortico-hypothalamo-pituitary-adrenal axis that elaborate quite a number of hormones in

order to effect a series of compensatory metabolic processes. Such hormones include increased levels of cortisol, insulin, and glucagon of which all reflect an increase in blood levels of glucose [2,15].

CLINICAL FEATURES:

The magnitude of burn injury is a function of depth and extent of surface area affected. This determines the extent of pathophysiological changes(1).

There are four degrees of burn injury(1,2):

(i) A first degree burn involves only the epidermis and is characterised by erythema, pain, slight edema. Healing takes place uneventfully in 5-10 days.

(ii) A second degree burn involves the whole of epidermis and most of corneum. Blisters, considerable edema, and pain are the chief characteristics. Epithelial regeneration takes place from the epithelial lining of the sweat glands and hair follicles in 25-35 days. Infection may convert a 1° burn to a 2° and so forth.

(iii) A third degree burn involves the entire dermis, and subcutaneous tissue and small vessels undergo thrombosis. The only method of epithelialisation is by the slow proliferation of wound edges. Healing takes place after months or years even with considerable scarring or disfigurement.

(iv) Fourth degree burn involves muscles and bones.

The majority of patients in this series, 19 out of 29 had major type of burn, whereas 10 patients had moderate type of burn injury. (Classification of burn into major, moderate and slight type is described below): There was none with slight degree of burn as this category of patients are not usually admitted into hospital.

All patients with total surface area of 15% and those with less than 15% but with burns involving critical areas were admitted. Normally all adults with less than 15% (children is less than 10%) are not admitted as this minor form of burn injury does not require intravenous fluids(2). All patients had pain whatever the degree of burn injury. The majority of patients complained of thirst and were also dehydrated and tachypnoeic. Edema in these patients was either local or generalised. A number of patients presented with fever right on the day of admission and some of them had positive blood slide for malaria parasites. In burn injury, core temperature is elevated due to changes in the central set point located in the hypothalamus. Patients with total surface area burn of 25% or more invariably showed features of wasting and has lost weight significantly. (That is a loss of 10% or more of their body weight).

Among the patients admitted, 22 had burn in the upper part of the body, face inclusive. They had burnt, singed hair on their head, nostrils, and sooth in the oropharynx. Four of

them had carbonaceous (blackish) sputum and were dyspnoeic, features which signify pulmonary injury. Pulmonary damage is one of the leading causes of death in burn and this may be attributable to smoke injury to the lung tissue, or carbon monoxide poisoning(17). In this series two patients died from pulmonary damage. Injury involved their face, were dysponoic, had course crepitation and rhonchi.

TREATMENT:

This will be dealt with in three parts:

(i) Resuscitation,

(ii) Wound care,

(iii) Critical burn areas.

(i) Resuscitation:

Burn injury is one of the clinical conditions in which pathophysiologic changes in the dynamics of the individual circulation occur which is termed clinically as burn shock. Immediately the patient is seen a cut-down to one of the peripheral veins or a large canula is placed in situ. All patients who had moderate and major types of burn had cutdown done to great saphenous vein or canula inserted into one of veins in the upper limb. The various formula for fluid administration consider or calculate fluid replacement according to the weight of the patient and percentage of the total body surface area burnt(2,5,17). These include the Evans formula, Moores Budget formula, Parkland Hospital

formula, and Brooke formula. The last one is commonly used as a modified Brooke formula. The quantity of fluid required was calculated by using the modified Brooke formula in which 2ml per kg body weight per percentage of surface area burn plus daily body fluid requirement was used. Normal saline was the fluid of choice. It is a crystalloid, easily available and by its osmotic effect raises the blood pressure early. Half of the calculated volume was given in the first eight hours of injury. Then a quarter of the fluid was given in the next eight hours and the other quarter in the last eight hours. That corrected the fluid deficit. The daily fluid requirement was met by administering three litres of dextrose 5% divided in three equal portions for twenty four hours. About $^{3}/_{4}$ of the patients were allowed to take oral fluids in the next forty eight hours. Much earlier administration may augment paralytic ileus. The input output chart, blood pressure, pulse rate, temperature, and respiratory rate were constantly monitored in order to ensure:

(i) adequate fluid therapy, and (ii) the state of renal function.

In this study group all patients with major burns of more than 40% of total surface area died despite aggressive resuscitation with fluids done. A mortality rate of 28% was noted by the author. Sinha(7) in his study, noted a mortality rate of nearly 90% in patients with 65% or more of total body surface area burnt.

(ii) Care of burn wound:

Next to hypovolemic shock, wound sepsis is an ever present threat. The mechanical barrier of the skin is destroyed and the surface immunoglobulins secreted by skin are absent. Furthermore the function of B and T-lymphocytes is reduced in patients with burn of 20% body surface area(21,27). This emphasizes the necessity of wound care. In superficial burns the aim is to provide a clean environment free of infection so that primary epithelialisation can take place. In a deep burn necrotic tissue is removed and plan for grafting is made early [28]. There are several methods of local wound treatment. Its choice depends on the surgeon, the location, size, and depth of the wound and economic factors.

A. Non surgical aspects:

(i) **Exposure method:** The wound is initially cleaned and the patient placed on clean sheets. The patient is observed till there is crust and eschar formation which is then gradually removed.

(ii) **Occlusive method:** Is used in small burns especially as an outpatient treatment. The dressing should be bulky and the inner layer should contain a non adhesive topical agent e.g. vaseline gauze.

(iii) **Open method:** This combines exposure method and use of topical agents(19). The main advantage is ease of wound inspection, an important fact in the early detection of burn wound sepsis, and allows full joint motion.

However it may delay healing [21].

The agents in general use are listed below:

(a) 5% silver nitrate solution:

This is started immediately after burn injury before bacterial proliferation. Dressings are kept wet by addition of the solution every four hours.

(b) Silver sulfadiazine: This combines the wide antimicrobial effect of silver ions, sulfadiazine with less side effects of either of them(19).

(c) Mafenide: (Para-amino methylbenzene sulfonamide acetate) Emergence of bacterial resistance is a major concern with this agent. In this study group, only 3 of our patients were put on this agent. Most of them had sofratulle dressings.

(d) Saline soaks: Due to high cost and non availability of above preparations an alternative to smaller hospitals and dispensaries in less developed countries has been suggested. This involves use of half strength saline soaks which are used to clean the wound every 4-6 hours. The solution is made by dissolving one tea spoonful of kitchen salt in one litre of warm tap water. The results have shown no significant differences from those of patients treated with more expensive agents(12).

B. Surgical aspects of burn wound care:

(i) Excision therapy and wound closure:

Early and timely closure of major burn wounds will allow

arrest of metabolic and septic consequences, as well as nutritional deficit, thus reducing the mortality and morbidity rates. This can be achieved by wound excision followed by grafting(28).

There are two types of excisional therapy:

(a) Eschar excision,

(b) fascial excision.

Eschar excision:

This is a method used in excision of eschars found in full thickness burn injury but without subcutaneous involvement. The permanent or temporary wound closure can then follow either in form of autografts or homografts.

Eleven out of 29 patients in this series required autograft and among them 7 underwent thin split thickness grafting. The remaining 4 patients were still waiting to receive skin graft. The biggest problem in the use of homograft is graft rejection. Graft rejection has led to the use of immunosuppressive therapy to prevent rejection but this predisposes to grave complications which include burn wound sepsis, septicemia, endotoxin shock, and death.

Fascial excision: This entails excision of entire thickness of destroyed skin and subcutaneous tissue down to the level of deep fascia. The wound is then grafted by autografts or homografts. This is practical only in burn of less than 15% of surface area body burn. However, the resulting large wound may compound initial injury and is a major procedure which

should be undertaken in a large well equipped hospitals, blood and skin banks must be available.

Antibiotics:

The use of antibiotics in the management of initial burn wound is controversial. Two schools of thought have been put forward(26). The first is the use of antibiotics as prophylaxis. However it is doubtful if antibiotics are of use in a standard hospital environment. As a prophylaxis antibiotics are indicated in grafting to prevent B-hemolytic streptococci which lead to destruction of the graft, and during wound excision to avoid bacteremia. The second school of thought is the use of antibiotic only when there is established infection or uncontrollable burn wound sepsis. This sounds quite reasonable as indiscriminate use of antibiotics leads to emergence of antibiotic resistant strains. Use of antibiotics should be guided by its broad spectrum, bacteriocidal effects, wound culture, and local pattern of bacterial sensitivity(1).

PROGNOSIS:

The treatment protocol of a burned patient must include from the very beginning, and spelled out clearly, with necessary priorities, patient involvement from the start, and a team approach(3).

(a) During acute and subacute phase fluid resuscitation, wound care, ambulation and self care is the aim.

Contractures are prevented at this stage by proper joint splinting outlined in previous section.

(b) In convalescent phase, continued wound care, exercises, and nutritional support is the goal.

(c) The final phase, which include psychosocial management, and rehabilitation is imperative.

CONCLUSION:

Burn injury is a surgical condition which carries a high mortality and morbidity as this study shows. Burn shock despite timely fluid administration apparently contributed much to such high mortality. The burn injury again as an accident is preventable if public health education is conducted. Among others, bad habits like use of kerosene or other cooking stoves which are not in good order, careless storage of petrol, cigarette smoking, and improper handling of hot liquids should be discouraged.

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ACUTE APPENDICITIS

SUMMARY:

In the period between October 1991 and June 1993 a total of 23 adult patients with acute appendicitis were managed in Surgical Firms I, II and III at Muhimbili Medical Centre. There were 13 males and 10 females and their age ranged from 12 to 56 years, with a peak incidence in the 3rd decade of life. Thirteen patients presented with features of peritonitis and 7 out of them were found to have perforated appendix. Three patients who were initially diagnosed as appendix peritonitis two were found to have ruptured ectopic gestation and one had ruptured ovarian cyst. Thirteenth of 20 patients presented for treatment more than 48 hours after onset of symptoms. Delay in diagnosis was mainly due to late presentation to a consultant hospital and that led to delay in treatment. Wound infection was the predominant complication, and it accounted for 6 patients. Other complications were pneumonia, fecal fistula, and septicemia.

INTRODUCTION:

In 1736 Claudius Ameliorate successfully removed an acutely inflamed appendix from a hernial sac of a young boy(14). Furthermore in 1886 Reginald Fitz coined the word appendicitis in his paper titled "Perforating Inflammation of the Vermiform Appendix", previously thought to be of cecal origin and known initially as typhlitis and perityphlitis(2).

duration, and vomiting of one day duration. He had been entirely well prior to illness. He admitted to have developed gradual onset of periumbilical pain which went on for several hours then shifted to right iliac fossa. It was associated with nausea and it was progressively severe and throbbing. He then developed fever and later on started vomiting as pain started spreading to other parts of abdomen other than right iliac fossa and become generalised. He had no dysuria, constipation or diarrhoea.

Review of system revealed no complaints. His past medical history and family history were uneventful. He looked sick, dehydrated, febrile with a temperature of 38°C. He was not pale and peripheral lymph nodes were not enlarged. His pulse rate was 110 beats per minute, of fairly good volume and his blood pressure was 100/70 mmHg. His abdomen was distended, moving with respiration. He had generalised tenderness which was maximum in the right iliac fossa. There was guarding but no rebound tenderness, and bowel sound were diminished. Hernial orifices were free of mass. Per rectal examination revealed tenderness, and there was no mass palpable. A provisional diagnosis of peritonitis due to perforated appendix was entertained. Plain chest and abdominal x-ray were requested and did not reveal gas under the diaphragm or other abnormalities. He was planned for explorative laparotomy and pre-operative orders were as follows; administration of two litres of normal saline and one

litres of 5% dextrose saline by a large bore canula over 2 hours before surgery. Blood grouping and x-match was done and two units of blood were prepared. Nasal gastric tube and urethral catheter were inserted for intermittent suction and monitoring of input and output respectively. Shaving of abdominal and pubic hair was done and consent obtained. Under general anaesthesia the abdomen was opened through a supra and subumbilical midline incision of about 10cm, and the following findings were noted. There was several pockets of pus with matted intestines and perforated retrocecal appendicular remnant was found. The mesoappendix was no longer identifiable. All pus pockets were gently broken using a finger and a sucker. The appendix was removed by ligating its base by a silk 2/0 and with a scalpel it was cut distal to ligature. Invagination of the stump was not done and hemostasis was assured. A corrugated rubber drain was inserted in the left paracolic gutter. Peritoneum and rectus sheath was closed as one layer with supramide no-0 then catgut 2/0 to subcutaneous tissue and nylon 2/0 to skin. Post operatively he was put on two litres of intravenous dextrose saline for 24 hours, injection pethidine 100mg i.v. 6 hourly for 24 hours, close monitoring of input and output chart, vital signs, continuation of aspiration by a nasogastric tube: Cefuroxime i.v. 750mg 8 hourly and metronidazole i.v. 500mg 8 hourly were added.

Fever subsided after three days and his urine output remained on the average of 50 mls per hour. His general condition steadily improved and the catheter was removed. On the 4th post-operative day the abdomen was soft, he was able to pass flatus and bowel sounds resumed to normal. The nasogastric aspirate was as little as 50ml per 24 hours. He was allowed to take oral fluids and the tube was removed. Intravenous infusion was stopped. On the sixth post-operative day he developed a fecal fistula which was managed conservatively, and closed spontaneously after 7 days. It discharged in the laparatomy wound. He continued to improve and was discharged home on the 16th post-operative day. On two subsequent visits at 3 weeks and 2 months to surgical outpatient clinic he had no more complaints.

4. RESULTS:

The following are the results of 2o patients with acute appendicitis attended by the author:

Table I: Age distribution.

Age group	M	F	TOTAL
11 - 20	1	2	3
21 - 30	7	4	11
31 - 40	1	1	2
41 - 50	1	2	3
>51	1	-	1
Total	11	9	20

Acute appendicitis is most common in the 3rd decade and the incidence is slightly higher in males.

Table II: Clinical manifestations.

Symptoms	No. of Patients (n)
1 Fever	20
2 Anorexia and nausea	19
3 Atypical abdominal pain	14
4 Constipation (relative)	14
5 Features of peritonitis	13
6 Vomiting	13
7 Classic abdominal pain	9
8 Dysuria	7
9 Diarrhoea	2

Atypical (non classic) abdominal pain is more common than the typical (classic) pain of appendicitis.

Table III: To show duration of symptoms prior to treatment.

Duration (hour/days)	No. of Patients (n)
1 - 24	3
24 - 48	4
48 - 72	8
3 - 5 (days)	3
>6 (days)	2
Total	20

Most patients presented after 48 hours of onset of symptoms.

Table IV: Operative findings.

Findings	No. of Patients (n)
Acutely inflamed appendix	6
Perforated appendix with peritonitis	7
Gangrenous appendix	3
Ruptured ovarian cyst	1
Ruptured right ectopic gestation	2
Appendicular abscess	2
Total	21

Perforated appendix was the most common intra-operative findings, (The condition with high morbidity and mortality).

Table V: Post-operative complications.

Complications	No. of Patients (n)
Wound infection	6
Pneumonia	2
Fecal fistula	2
Septicemia	1
Death	-
Total	11

The higher incidence of wound sepsis may be consistent with incidence of perforated and gangrenous appendix.

DISCUSSION:

Incidence

The age group most affected in this series fell in the 3rd decade of life, (Table I). Males were affected more than their female counterparts at a rate of 1.3:1. Acute appendicitis accounted for 0.38 percent of all surgical admissions per annum at Muhimbili Medical Centre(5).

Most workers in this field have found more males being affected than females with a higher incidence between 15-24 years of age and the lowest being 0-4 years(4,13).

In Africa acute appendicitis was believed to be rare and when it occurred the incidence was higher in urban than in rural areas(2). Burkitt reported low incidence among Africans living in rural areas and quoted doctors working in rural areas for more than 20 years as not having come across a patient with acute appendicitis(2). In Nairobi Kenya, acute appendicitis is the 3rd commonest surgical condition(5) and Hiza in 1971, analysing surgical admission to Muhimbili hospital reported incidence of acute appendicitis being as high as 0.4%. Shija(4) quoted Udeh and Davey who found acute appendicitis on the increase among Africans.

PATHOPHYSIOLOGY:

Proximal obstruction of appendiceal lumen either by hypertrophied lymphoid tissue or inspissation of foreign material plays a significant role in the development of acute appendicitis(2,4,14). The normal mucosal secretion continue to accumulate. This leads to distension which stimulates nerve endings of the visceral afferent fibres producing vague and diffuse pain around the umbilicus. It is distension that leads to reflex nausea and visceral pain being diffuse become more severe. As pressure in the luminal organ increases, capillaries and venules are occluded, but arteriolar inflow

continues resulting into engorgement and vascular congestion and acute inflammation sets in. It spreads to involve the muscular layers, the serosa and adjacent parietal peritoneum.

Involvement of the latter in inflammation is the basis for the shifting of visceral periumbilical pain to the right iliac region and it is now a well localised parietal pain(15).

CLINICAL FEATURES:

It is a common saying that nothing can be so simple and yet so difficult as the diagnosis of acute appendicitis(17). The usual picture of appendicitis is often not classical thus leaving many cases as a diagnostic problem.

Among the 23 patients attended by the author only 9 had classic shifting or typical abdominal pain of acute appendicitis (that is pain that shifts), and 14 of them had atypical abdominal pain located in the right iliac fossa from the very beginning(Table II). Twenty out of 21 patients had low grade fever and 13 patients had features of peritonism. Nausea and anorexia were present in 19 patients. Other symptoms were vomiting, constipation (relative), dysuria, and diarrhoea (Table II). More than half of our patients (14 out of 20) presented for treatment 48 hours or more after onset of symptoms(Table III). This implies prolonged hospital stay, increased cost of treatment, and increased morbidity rate.

In non obstructive acute appendicitis there are classically four specific features.

Abdominal pain that shifts: The pain begin in the epigastrium, periumbilical, or it may be generalised. This is vague visceral pain. In non obstructive cases the pain is constant as opposed to obstructive type where pain is colicky. After 4-8 hours the pain shifts to the right lower quadrant of abdomen where the inflamed appendix irritates the very sensitive peritoneum(14). This pain is parietal or somatic and is accurately localised and constant.

Upset of gastric function: Nausea, anorexia, a brown fur tongue and a foul smelling are the common gastrointestinal manifestations. They are due to protective pylorospasm(4). Vomiting is usually scanty and of short duration and stops as soon as the stomach is empty.

Localised tenderness at the site of the appendix:

The pain having shifted, very soon there is localised tenderness in the right lower quadrant maximum at McBurney's point or else the site where as determined by the site of appendix. This tenderness may be confined to the pelvis and therefore rectal examination must be done in every case of lower abdominal pain. Rovsing manoeuvre will cause movement of inflamed appendix and thus pain is elicited in the right iliac fossa as pressure is exerted in the left iliac region(3).

Rigidity in the right iliac fossa:

Accurate localisation becomes more difficult with passage of time because muscular rigidity sets in. Most surgeons

emphasize the value of positive release sign as an indicator of inflamed appendix adjacent to the parietal peritoneum of right iliac fossa and operate if this sign is positive.

DIAGNOSIS:

The diagnosis of acute appendicitis is usually based on history and clinical features(2,3,14,16). Laboratory and radiological assessment are of little help. There is usually moderate leucocytosis ranging from 10,000 - 18,000 per mm^3 with polymorphonuclear cells predominant. Sometimes there is a shift to the left especially when perforation has occured. This is non specific and up to $^1/_3$ of patients have normal white cells count.

Plain x-ray of abdomen does not show any pathognomonic sign. However ultrasonography (USS) of abdomen has proved to be useful in the diagnosis of acute appendicitis(19). It avoids a delay in diagnosis and or unnecessary laparotomy. The USS echos reveal the inflammatory exudate that accumulates in the appendiceal lumen in the early phase of the disease. Scoring system and computer analysis has been used to aid in the differential diagnosis of acute appendicitis and it has been found to carry an accuracy rate of 92%(14).

In children it is important to differentiate acute appendicitis from gastroenteritis, Mesenteric adenitis, pyelonephritis, Meckels diverticulitis, intussusception and primary peritonitis. In the young female ectopic pregnancy,

ovarian torsion, ruptured ovarian cyst, Mittelschmerz pain, salpingitis, endometriosis are the common differentials. In young males it is differentiated from acute regional enteritis, right renal colic, testicular torsion, testicular abscess, and acute epididymitis. In adults it is differentiated from perforated duodenal ulcer, gastric ulcer, acute cholecystitis and acute pancreatitis.

TREATMENT:

Surgical treatment of acute appendicitis is appendicectomy. In this series it was done on emergency basis in 17 patients. This was done after appendicular mass has been ruled out, and preparation compatible with safe operation were completed. That included insertion of nasal gastric tube and urethral catheter for intermittent suction and monitoring of input and output respectively. Crystalloids (normal saline or Hartman's solution was alternated with 5% dextrose intravenously to correct the fluid and electrolyte imbalance.

Prophylactic pre-operative i.v. ampicillin and metronidazole injections were given to patients who had acute non perforated appendicitis. In many studies preoperative antibiotics have been recommended not only in perforated appendicitis but also in acute non perforated appendicitis(21,22). The significance of prophylaxis lies mainly in reducing wound infection rather than prevention of intra-abdominal abscess. In this series all patients

diagnosed to have perforated appendicitis with peritonitis were given ampicillin and metronidazole intravenously in pre-operative period and continued in the post operative phase.

In this study 11 patients out of 23 underwent appendicectomy through the classic grid-iron incision(Table IV). Among the eleven patients 6 had acutely inflamed appendix, 3 had gangrenous appendix and 2 had appendicular abscess. 10 out of 23 patients were subjected to laparotomy. Seven patients out of 10 were found to have perforated appendix with peritonitis, 2 of them had ruptured ectopic gestation and 1 had ruptured ovarian cyst. The appendix in the last 3 patients was spared and salpingectomy and cystectomy were performed in them respectively. Two out of 23 patients had appendicular mass. These were managed conservatively and successfully according to Oshner Sherren regime.

APPENDICECTOMY:

Incision: When diagnosis is a clear one grid-iron incision is the best to be employed(18). But when diagnosis is doubtful the lower right paramedian or right lower median incision are preferred because it gives a good access to the pelvic organs in females and if need arise it can be readily extended upwards to deal with other unexpected intra-abdominal pathology(20). In this series all patients who had non perforated acute appendicitis or appendicitis with localised

peritonitis were subjected to grid-iron incision. Those in whom diagnosis was doubtful and of course had features of peritonitis a midline incision was the suitable approach.

The Rutherford Morison's incision:

It is useful if the appendix is retrocecal or paracecal and fixed(14,16). It is principally an oblique muscle cutting incision with its lower end over the McBurney's point and extending obliquely upward and laterally as necessary. All layers are divided in the line of incision.

REMOVAL OF THE APPENDIX:

Here it is assumed that the abdomen has been opened by a grid-iron incision. The appendix is identified by the aid of teniae coli over the cecum(14,20). The base of the mesoappendix is clamped, divided between hemostats and severed. Sometimes only one such manoeuvre free the whole of the mesoappendix, otherwise application of several hemostats may be needed. The appendix is now crushed near its junction with the cecum and then the hemostat is removed and reapplied just distal to the crushed portion. A catgut or silk ligature is tied around the crushed portion close to the cecum.

The fate of the appendicular stump is two fold. That is either the appendiceal stump is inverted or simply ligated. Analysis has revealed that stump inversion is associated with postoperative complications including bowel obstruction and local abscess following acute gangrenous appendicitis.

However simple ligation is as good as that and probably better than inversion of appendiceal stump(20,23). The former (simple ligation) was adopted in all of our patients.

THE MANAGEMENT OF APPENDICULAR MASS:

The standard treatment of appendicular mass is conservative therapy. That is the Oshner Sherren regime(14,16,20). This decision is based on the fact that nature has localised the lesion and it is very unwise to disturb the barrier. Surgery at this stage is difficult, bloody, dangerous and it may be impossible to find the appendix and occasionally a fecal fistula may form. It is necessary that the patient is prepared for surgery should nature fail to contain the infection. The regime consist of;

(i) Nursing the patient in propped position so as to encourage exudate gravitate towards the pelvis.

(ii) Parenteral antibiotics.

(iii) Naso-gastric tube is installed for intermittent suction

(iv) Adequate i.v. fluid crystalloids type is administered and oral intake is restricted to sips of water or rice.

(v) A careful record of pulse rate (PR) and temperature is kept. The PR is more important at the commencement of therapy and it should be recorded at hourly intervals.

(vi) The size of the mass is marked carefully and the extent of rigidity also noted.

Subsequent examination is done in 4 hours or so. After 24-48 hours provided the symptoms are subsiding fluid diet is commenced and gradually supplemented. Surgery is indicated if pulse rate is rising, persistently high, or if there is a swinging temperature, vomiting, copious amount of naso-gastric tube, increasing size of the mass, spreading pain, tenderness, or rigidity. Contraindication to conservative treatment include a situation in which a diagnosis cannot be made between acute appendicitis and some other intra-abdominal conditions normally requiring immediate surgery, when signs indicate that appendicular abscess has been formed, when a patient under 10 years of age or over age of 60 years as perforation is the most eminent danger(10).

COMPLICATIONS:

A total of 11 out of 23 patients developed complications of some kind. (Table V). Wound infection was the commonest complication occurring in 6 patients. Others were pneumonia in 2 patients, fecal fistula, and septicemia in 2 and 1 patients respectively. Gangrenous appendix and peritonitis in patients presenting late, or where diagnosis or treatment was delayed partly accounted for higher incidence of wound sepsis. Use of prophylactic antibiotics, abdominal packs and lavaging with either antibiotic impregnated or unimpregnanted irrigating fluids does reduce the bacterial load considerably and thus lessen the chance for wound sepsis. Most of these

patients had daily Eusol dressing for care of their wound. The patients who developed pneumonia and septicemia had their antibiotics and fluid schedule reviewed and received the necessary treatment. The conservative policy was adopted to patients who had fecal fistulae and all went on well. There were no recorded death among the patients who underwent appendicectomy.

CONCLUSION:

It is established that the prevalence of acute appendicitis is higher in westernised countries as compared to that in underdeveloping world. However studies in our locality are still casual and therefore prospective studies are needed to establish the real incidence in our area. More than 50 percent of patients in this study presented for treatment after more than 48 hours. Late presentation of patients with acute appendicitis has been associated with high morbidity. Therefore health education for our patients stressing the importance of reporting early to hospital, and also emphasis on continued education programmes for medical personnel. This will improve their knowledge of management of acute appendicitis and especially a prompt diagnosis of the disease.

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TRAUMATIC RUPTURE OF SPLEEN

SUMMARY:

Sixteen adult patients underwent splenectomy for traumatic rupture of the spleen between January 1992 to April 1993 in Surgical firms I, II and III at the Muhimbili Medical Centre. There were 11 males and 5 females thus constituting a M;F (ratio) of about 2:1. Their age range was between 11 and 36 years with a peak incidence in the age group with 11-20 years. Eight out of 16 patients had splenic rupture due to road traffic accident (RTA) (causing blunt trauma), 3 patients were assaulted, the other 3 fell from a height and 1 patient had injury during sports. The common clinical manifestations were abdominal pain, tenderness, distension, increased pulse rate and pallor. Eleven patients had associated injuries. Liver laceration was the commonest form of such injury occurring in 5 out of 11 patients. The commonest form of splenic injury was linear laceration which was seen in 8 out of 16 patients. Splenectomy was the surgical procedure performed in all patients and the average duration of hospital stay was 6 days.

INTRODUCTION:

Traumatic rupture of the spleen is an injury which leads to disruption of the splenic capsule, parenchyma, and blood supply. The spleen a friable vascular intra-abdominal organ

easily and commonly injured in blunt abdominal trauma(1). With an increasing number of automobile accidents blunt abdominal trauma and predisposition to visceral injury becomes a common emergency condition. The spleen and liver are the common organs involved in patients who have blunt abdominal trauma Hiza(2) while analysing surgical admissions to Muhimbili Medical Centre in 1971 found that blunt abdominal injuries accounted for about 2 per cent of all admissions due to trauma. Proximity to the chest wall, fixity, and consistency, renders the spleen more liable to injury. In blunt abdominal injuries, the spleen is the only organ injured in a substantial number of cases Schwartz(3) indicated that in all patients who had abdominal trauma 30 per cent have the spleen as the only injured organ. It is said that the spleen becomes more vulnerable to injury when it is enlarged(4). In the tropics 15 per cent of the adult population has splenic enlargement(4). However in their work in Nigeria, Anand and Davey(5) found no such association despite a higher prevalence of malaria.

Todate there is more evidence to suggest that the spleen is an important organ so far as it protects the patient from encapsulated organism like pneumococci, hemophilus influenza, and meningococci(7). In 1952 King and Shumacker reported an increase in susceptibility to infection and especially "overwhelming post-splenectomy infection" (OPSI) after splenectomy in children(8). It is a rare condition but one

associated with high morbidity and mortality(11,28,33). The move now is towards splenic conservation which include both nonoperative and operative (Splenorrhaphy)(13,14).

The increase in number of vehicles and careless driving is likely to be responsible for increase in number of accident and hence abdominal trauma(3). Blunt abdominal trauma is associated with higher mortality rate due to hemorrhagic shock. The causes of such trauma and treatment modalities which at present is becoming less and less radical has not been fully studied in our community, and hence this study.

CASE REPORT:

S.S. IPNO. 741662, a sixteen year old boy fell from a pawpaw tree and sustained injury to the left side of the abdomen three hours prior to admission. This was immediately attended by sharp excruciating abdominal pain, progressive, non radiating and later on became gripping in nature. He had no chest pain, shortness of breath, hematuria or loss of consciousness. His past medical and family history were unremarkable. He was an ex-standard VII who was still looking for a job in the city. He did not take alcohol.

Examination revealed a young boy in pain and not wasted. He was pale, not dyspnoeic, afebrile and he had no peripheral lymph node enlargement. His pulse rate was 104 per minute, of good volume and his blood pressure was $^{110}/_{70}$ mm Hg. The abdomen was moving with respiration, slightly distended, and

there was a single bruise over the left upper aspect of abdomen, there was abdominal tenderness which was generalised and maximal on the right upper quadrant of the abdomen, with guarding, rebound tenderness and shifting dullness. There was no mass in the renal angles or in the hypogastrium, and bowel sounds were diminished. Digital rectal examination revealed tenderness; otherwise there was no significant finding. Examination of the other systems was normal. A tentative diagnosis of intra-abdominal hemorrhage due to splenic rupture was made.

Resuscitation and preparation for explorative laparotomy was immediately started. Blood for grouping, cross-match, and hemoglobin estimation was taken and I.V. normal saline was started through a large bore plastic canula. Consent for surgery and anaesthesia was obtained, and a nasogastric tube, and urethral catheter were inserted. Laparotomy was planned under general anaesthesia. The abdomen was cleaned with iodine and spirit, and opened through an upper midline incision. Intra-abdominal findings were as follows; Hemoperitoneum of about 1.4 litres which was a hemolysed blood and thus was unfit for auto transfusion, linear laceration in the spleen starting from the pedicle towards the diaphragmatic surface with a big clot, a tear on the anterior surface of the left lobe of the liver measuring about 4 cm. The other intra-abdominal viscera, small and large intestines, pancreas, kidneys, urinary bladder, gall bladder and stomach were

normal. There was no retroperitoneal hematoma. The splenophrenic attachment was first released and then the spleen was delivered gently into the abdominal wound. The combined pedicle (peritoneal and vascular) in the lienorenal and gastrosplenic ligaments were respectively divided in small sections at a time from below upwards. The spleen was found to have a grade III rupture and was eventually removed. He was transfused two units of blood and more was requested. The liver was repaired by through and through sutures with catgut no 3/0 on a liver needle. Peritoneal lavage was done with copious amount of normal saline and a corrugated rubber drain was left in situ. The abdomen was closed in three layers with Catgut No 2/0 to peritoneum, prolene No-o to rectus sheath, and silk 3/0 to the skin. The spleen was sent for histopathology and post-operative management was as follows:

(a) Pulse rate, blood pressure, respiratory rate were monitored two hourly in the first twelve hours, and then six hourly. Temperature was monitored six hourly in the first 24 hours and 12 hourly thereafter.

(b) A strict input and output chart was maintained. The urinary output over twenty four hours was 1000 mls, (about 40 mls per hour).

(c) Intermittent nasogastric suction was done through a nasogastric tube and about 600 mls were aspirated in the first 24 hours.

(d) He was given I.V fluids in the form of 2 litres of Hartmans solution in the next 24 hours.

(e) He was also given injection pethidine 100mg i.m. 6 hourly for 24 hours. On the 3rd post-operative day the patient developed lobar pneumonia confirmed by features of consolidation on chest x-ray. Parenteral crystalline penicillin was administered and recovery was rapid. The i.v. dextrose saline was administered to correct the fluid deficit. On the 5th post-operative day, he noted flatus, as well as normal bowel sounds, and gastric aspiration was only 60mls for 24 hours. The urethral catheter was removed on the 2nd post operative day as was nasogastric tube and rubber drain. He was allowed to take oral fluids which included black tea, juice and other fluid foods. His pulse rate remained on the average of 80 per minute and BP stabilised at $^{120}/_{80}$ mm Hg. On the 7th post operative day, stitches were removed and patient was discharged. His subsequent visits at outpatient department at three weeks, 3 months and 6 months later revealed normal clinical findings.

DATA OF PATIENTS WHO UNDERWENT SPLENECTOMY FOR SPLENIC RUPTURE.

Table I: Shows age distribution.

	SEX		
Age group	M	F	Total
11 - 20	7	3	10
21 - 30	2	2	4
31 - 40	2	-	2
>41	-	-	-
Total	11	5	16

The youngsters are more vulnerable to splenic trauma.

Table II: Shows causes of injury in patients who sustained splenic trauma.

Cause	No. of Patients (n)
Road Traffic Accident (RTA)	9
Fall	4
Assault	2
Sports	1
Total	16

RTA ranked number one as the cause of splenic injury.

Table III: Displays Clinical presentation.

Feature	No. of patients (n)
Abdominal pain and tenderness	16
Abdominal distension	16
Increased PR (>100beats/min)	14
Guarding (LUQ)	13
Pallor	12
Rebound tenderness	11
Shifting dullness	8
Bruise(s)	8
Positive Kehr's sign	6
Low BP. (<100mmHg)	4

In splenic injury abdominal pain, tenderness, and increased pulse rate were constant features in patients in this study group.

Key: PR: - Pulse Rate,
LUQ: - Left Upper Quadrant

Table IV: Displays nature of injury as seen at laparotomy.

Type	No. of Patients (n)
Linear tear	9
Fragmentation	6
Avulsion of vascular pedicle	1
Subcapsular hematoma	-
Total	16

Class II categories of lesions were predominant (supravide).

Table V: Shows associated intra-and extra-abdominal injuries.

Injury	No. of Patients (n)
Liver laceration	5
Cut wounds	4
Brain contusion	2
Retroperitoneal hematoma	2
pneumothorax	2
Fracture base of skull	1
laceration of mesentery	1
Fracture (Ulna and radius)	1
Fracture of femur	1
Fracture pelvis	1
(Spleen rupture alone)	(11)

Lacerated liver was the commonest associated injured organ.

DISCUSSION:

CLINICAL FEATURES & DIAGNOSIS:

Rupture of the spleen is a surgical emergency. Among the 16 patients attended in this series 11 were males and the remaining 5 were females (Table I). Pitcher et al(33), recorded similar figure in their study of 286 cases. Apparently males are more involved in the community activities than females and hence stand a greater risk of sustaining trauma especially to the spleen. The peak incidence was in the second decade of life. (Table I). Patients below 10 years were not included because they are admitted to the Pediatric surgical ward. Wilkson found the highest incidence in the 3rd decade of life(19).

All patients presented with history of trauma. Road traffic accident was the commonest cause of splenic trauma in patients in this study group, accounting for 9 out of 16 patients (Table II). Pitcher et al(33), noted that in patient with blunt abdominal trauma 50% occurred as a result of road traffic accidents. Fall from a height either from a tree or

missing a step involved 4 patients, assault accounted for 2 patients and sports one patient. It is interesting to note that in all patients the nature of injury was blunt abdominal trauma rather than penetrating type. Moreover in about half of the patients there were neither bruises, or marks over the abdomen to indicate external violence. Traffic, and industrial accidents, fall and blows to the left upper abdomen are the usual causes of splenic rupture occurring as a result of blunt abdominal trauma(17,19). Spontaneous rupture of the spleen has been reported by some workers(15). But such an event is rare indeed and very often the pre-operative diagnosis is found to be a mere misdiagnosis at laparotomy(20).

Abdominal pain, tenderness increased pulse rate were the major presenting features in this study group. All patients (sixteen) had these complaints. (Table III). Peskin and Orloff had all their patients presenting with abdominal pain and tenderness(20). Other common clinical features in this study are distension of abdomen, guarding, pallor, rebound tenderness, shifting dullness, bruises over the left lower thorax, positive Kehr sign and systolic BP below 100mmHg in that order (Table III). Shifting dullness implies blood in the peritoneal cavity and is often demonstrable in about 50 percent of patients(17,20). Studies elsewhere reveal that abdominal guarding is present in more than 50 percent of cases and is more pronounced in the left upper quadrant. Abdominal distension commences about 3 hours after injury and is due to the irritative effect of blood in contact with the peritoneum which produces peritonism and ileus(17,27). Kehr sign is pain referred to the left shoulder. This sign may be elicited a quarter of an hour following elevation of the foot of the bed, and is due to the blood irritating the undersurface of diaphragm(17), the pain being mediated by the afferent fibres of the phrenic nerve and referred along the dermatome (C3, 4,5)(3). Per rectal examination often reveals tenderness and

sometimes a soft swelling is palpable due to blood, usually a clot in the rectovesical pouch or pouch of Douglous.

DIAGNOSIS:

Splenic rupture should be suspected following any trauma especially if there has been any direct injury to the left upper quadrant of abdomen from any angle(4,17). Less frequently a fall without direct trauma to the trunk can rupture the spleen. Pre-existing disease or enlargement increase proneness to rupture eg in infectious mononucleosis or malaria(6,12), but some other authors refute this(5). By history and physical examination most cases of splenic rupture will be diagnosed. The following investigations are often helpful.

1. **Ultra sonographic (USS) scanning:**

USS of spleen is the investigation of choice where there is difficulty in making a diagnosis of splenic rupture(14,17). The spleen is visualised and the surrounding hematoma or presence of fluid in the peritoneal cavity usually suggest rupture. Serial examinations showing change in the size may suggest subcapsular hematoma. In this series a pre-operative diagnosis was made clinically, and none of the patient recquired an US-Scan.

2. **Plain x-ray;**

A normal well outlined spleen on plain x-ray of upper abdomen is a reliable sign that the spleen is intact(14,20). The plain film does not carry pathognomonic features of a ruptured spleen. However the following radiological signs may have significance of some sort.

(i) Obliteration of splenic outline,
(ii) obliteration of renal outline and psoas shadows,
(iii) indentation of left side of gastric air bubble and displacement of the stomach to the right side,
(iv) increased density in the left hypochondrium,
(v) elevation of the left hemidiaphragm,

(vi) fracture of one or more of the lower ribs in the left side,

(vii) free fluid between gas filled intestinal coils, and

(viii) gastric dilatation.

3. Abdominal computerised tomography (Ct-Scan):

CT-scan is superior to USS and is very useful in delineating focal lesions and very accurate in the diagnosis of splenic rupture. Workers in various studies have established that CT-scan reveals abnormality in all study groups of patients with splenic trauma(14,17,23). CT-scan has found its greatest value in the monitoring of patients in whom splenic salvage either by splenorrhaphy or non operative approach has been the line of action.

4. Diagnostic peritoneal lavage (DPL) & Diagnostic paracentesis(DPC)

DPC is a 20 seconds bed side procedure performed on the lateral borders of each rectus muscle at the level of the umbilicus. It lacks sensitivity and when taps are negative results are not conclusive(14). The more sensitive but more time consuming DPL will probably confirm that the cause of unstable vital signs lies outside the peritoneal cavity(18). If the effluent from DPL consist of less than 10^5 red cell per mm^3, has a hematocrit of less than 1 percent or permits the reading of news print through a standard diameter tube then massive hemoperitoneum is absent. Although CT-scan may prove superior to DPL, the later occupies a unique place in the diagnosis of blunt abdominal trauma. When a patient presents with stable vital and a negative DPL, that rules out hemoperitoneum. When DPL is positive, hemoperitoneum is confirmed, but a judgement must be made about the presence or absence of hollow viscus injury. An elevated white cells count, increased amylase, presence of particulate matter or bacteria in the lavage effluent point to hollow viscus perforation. When there is no obvious hollow viscus injury, assessment is made for possible injury to the retroperitoneal

organs particularly the pancreas, duodenum and genitourinary organs. This can easily be resolved by CT-scan of abdomen(24).

DPL or CT-scan is also indicated in patients with altered level of consciousness on admission following brain contusion, alcohol or drug abuse, psychotics or mentally retarded individuals and multiple injury patients in order to diagnose splenic rupture and other associated visceral injuries. We do not have CT-scan in our locality and even DPL is seldom performed, but as I mentioned before diagnosis in all cases was clear. While DPL is recommended in few selected cases, the use of DPC is controversial and is indeed rarely employed.

PATHOLOGY:

Buntain and Gould(24) offered an excellent classification of splenic injury based on CT-scan. This is depicted in the Table below:-

Type	Signs
I	Subcapsular or intra-parenchymal hematoma without capsular disruption or parasplenic bleeding,
II	Open parenchymal tears or fractures which do not extend to the splenic hilum,
III	Large open fractures extending to the splenic hilum,
IV	Shattered or pulpified spleen with hilar disruption or avulsed fragments.

In class II, patient have free intraperitoneal blood which may spread beyond the left upper quandrant (LUQ). In class III hemoperitoneum is much bigger and in class IV splenic portion may be partially avulsed from its hilar attachment. The prognosis worsen down the scale. In this

series CT-scan was not performed but among the 16 patients who underwent splenectomy, 9 had lesions equivalent to class II above (Table IV), six had lesions equivalent to class III and the remaining one had partial avulsion of splenic mass around the hilum consistent with class IV. None had lesion pertaining to class I. This classification bears a great implication on the choice of candidates suitable for non-operative treatment and even categorises patients fit for splenic salvage.

TREATMENT

Once the diagnosis of splenic rupture is made, either splenectomy or splenorrhaphy is often the answer to the victim. All patients seen in this series had emergency splenectomy done. However the resuscitative measures are crucial 1-2 hours prior to surgery and this not associated with an increased mortality(25,26). In this series 4 patients who were in shock were resuscitated for sometime prior to surgery until their hemodynamic status improved markedly.

Definitive treatment:

This can be non operative or operative. The later entails either splenic conservation procedure (splenorrhaphy), partial splenectomy and total splenectomy with or without autotransplantation of splenic tissue.

Non operative therapy:

Before 1600, when splenic surgery was at its infancy non operative treatment for the splenic rupture was the rule and by then mortality rate was high(27). Non operative therapy continues to meet considerable resistance(4,14). This is because of fears of possible delay of post traumatic splenic cyst, generalised splenosis and failure to recognise other serious intra abdominal injuries has lead most surgeons to continue to support early operative intervention. There is wide variation in results of non operative therapy. Annergne, et al(28) in their study group had successful non operative management in 40 out 46 selected patients. Klin, et al(29) had 15 out of 45 patients who were selected for non operative management recovering uneventfully. Previously when principles for non operative therapy had not been established failure rate has been as high as 70%. Whatever the circumstances defined criteria which will predict a successful outcome must be established and made clear before subjecting a patient to non-operative management. CT-scan or scintigraphic studies must be available to assess extent of splenic lesion. Minor injuries, as in Class I according to Buntain classification(24), had successful non operative therapy in all patients. In Class II injuries success rate was 60 percent, in Class III only 7% and none of Class IV injuries(29). However, a question arise as to whether it is ethical to subject patients in class III and IV to non

operative treatment. Intensive care unit must be available to institute the following. Strict bed rest, nasogastric tube, serial hematocrit and follow up splenic imaging.

OPERATIVE:

Techniques of splenectomy:

A good exposure while performing splenectomy or splenorrhaphy is very important.

Incision:

The best access to the spleen is obtained by upper left rectus splitting paramedian incision or oblique subcostal incision. In this series the upper midline incision was utilised. This carries the advantage that it can be performed with minimal blood loss and other intra-abdominal injuries can be dealt with through the same incision(26), as well as increased speed.

Splenectomy:

Technique in case of rupture:

When splenectomy is being performed in case of a rupture a less deliberate exposure is acceptable(26). The abdomen is opened through the upper midline incision. Blood in the peritoneal cavity is tapped and considered for retransfusion if suitable. A hand is passed over the lateral surface of the spleen between it and diaphragm. The organ is gently lifted forward and medially and delivered at the incision and a hot moist pack is placed behind it. The pedicle that consist of

peritoneum and vessels is clamped and divided piece-meal from below upwards and transfixed with sutures. To avoid risk of injury to neighbouring organs especially the tail of pancreas, and stomach clamps are applied as close as possible to the splenic hilum. Other intra-abdominal organs are inspected carefully and their intergrity confirmed. The splenic bed is examined for bleeding and hemostasis is assured.

Splenorrhaphy:

Techniques for splenorrhaphy are similar to those used in hepatorrhaphy once fully mobilised, but more gentle handling for spleen is important. Morgenstern(31) has shown some highlights to such technique. Most workers in this field prefer use of absorbable sutures to obtain splenic hemostasis. Gently placed simple or figure of eight sutures of 3/0 absorbable material permits sufficient compression of the splenic parenchyma and ensure hemostasis in most instances. The intra parenchymal splenic vessels course parallel and perpendicular to hilar vessels and can be controlled by fine criss-crossing sutures using preferably 4/0 silk. None of our patient underwent such a procedure mainly due to lack of important facilities like CT-scan for postoperative monitoring.

Partial splenectomy:

When the spleen is badly injured for simple splenorrhaphy splenic salvage may be achieved by partial splenectomy(14). The amount of preserved splenic mass correlates with the

degree of resistance to infection. During partial splenectomy intra-parenchymal vessels and margin of resection are repaired by the technique outlined above. Hemostasis can also be achieved by use of electro-cautery or application of hemostatic agents like polyglycolic acid mesh wrapped around or sewed to the spleen itself(24).

Autotransplantation/reimplantation:

This is accomplished by cutting the excised spleen into small fragments measuring no more than 2mm in its largest dimension(14). Such fragments representing at least 25 percent of spleen mass are placed within omental pockets, and the omentum is folded on itself and held in position with through and through absorbable sutures. Moore et al(32) published a series of 43 patients treated by immediate reimplantation. The patients did well postoperatively but long term results are not available.

CONCLUSION:

Splenic trauma is a major surgical problem which needs prompt attendance by a surgeon. Diagnosis is in most situation a straight-forward clinical process. Therefore sophisticated investigations like USS, CT-scan, and scintigraphic studies should not be relied upon as they are scarce and therefore not immediately available in our locality. Recently, there has been a dramatic swing in the surgical community from radicalism to conservation surgery and

even further to the expectant therapy for splenic rupture. Therefore more studies are necessary to assess whether such an approach is feasible and of any advantage in our area. Meanwhile the routine treatment for splenic trauma in our patients should still be total splenectomy as opposed to conservative or expectant therapy despite its late risk.

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KAPOSIS SARCOMA (KS).

SUMMARY:

In between October 1991 and June 1993, 15 patients with Kaposis Sarcoma (KS) were attended by the author in Surgical firms I,II and III of Muhimbili Medical Centre.Their ages ranged from 18 to 54 years, and the peak age incidence was in the second decade of life. There were 14 males and 1 female. Nine out of 15 patients had typical lesions on either the upper or lower limbs or both whereas 6 patients had atypical widespread lesions. All 6 patients who had atypical manifestation tested seropositive for HIV while 6 out of 9 patients with typical KS lesions also tested positive. Diagnosis was confirmed by histological study in all patients and radiotherapy was the mainstay of treatment in all patients who had typical KS. Four patients with atypical KS had aggressive and widespread lesions. They were counselled and discharged home for terminal care, while palliative radiotherapy was offered to the other 2 patients.

INTRODUCTION:

In 1872 Moritz Kohn Kaposi, a Hungarian dermatologist described a tumor he called "Idiopathic multiple multicentric pigment sarcoma of skin"(1,4). It was later named after him as Kaposis sarcoma. He referred to it as curious and fatal and its main manifestations were multiple vascular nodules in the skin of one or more extremities but also else where, including internal organs(4,5). Kaposi also noted the tumor

to occur mainly in Ashkenazic Jews, Italians, and people of Mediterranean descent where it was endemic(1). In Africa the first case was described in West Africa in (1922) 1992(2). It is now known that equatorial Africa has the highest incidence in the world at a rate of 10-15% of all malignancies(4). From either side of equator i.e. as one moves away from the equator the incidence declines to give a continental average of 3 per cent of all malignancies(1). In U.S.A. the disease accounts for only 0.2% of malignant tumors(3). This geographical distribution implies that environmental factors are important in the etiology. Although no agent has been specifically identified, in U.S.A., KS is at least 20,000 times more common in persons with acquired immunodeficiency (AIDS) than in the general population(13). The incidence of KS ranges from 10% in men suffering from hemophilia to 21% in homosexual or bisexual men(3,13). Therefore KS in persons with AIDS may be caused by an unidentified infectious agent transmitted mainly by sexual contact. The mainstay treatment of KS is radiotherapy. The other treatment modalities are chemotherapy and surgery(16). The etiology and relationship between KS and immunodeficiency is still controversial(12,14). In this study the author aim at analysing the age incidence of patients with KS, its etiology, and pathogenesis. The clinical manifestations and management of atypical AIDS-related-KS and typical KS are also highlighted.

CASE REPORT:

Mr. N.S. 21 year old man was admitted in surgical firm III with 3 months history of rapidly progressive multiple swellings in the lower, and upper aspect of the trunk. The swelling started in both legs and upper limbs simultaneously and rapidly advanced cephalad. They were patchy, multiple, painless and non itching. Two months following the onset the lower and upper limbs became gradually swollen. This advanced upwards and at the time of admission the swelling had ascended up to the level of subcostal region, and it was now associated with a vague dull pain which was generalised. He had no history of fever or diarrhoea but he had lost weight. While in the ward he developed chest pain, dry cough and shortness of breath. He admitted to have two episodes of urethral discharge in the past which was treated successfully as sexually transmitted disease with antibiotics. He was married with one child, and he denied history of promiscuity and being involved in drug abuse.

He was moderately wasted, pale, with multiple patchy purple - pinkish lesions in the buccal cavity. He was afebrile and not dyspnoeic. His blood pressure was 120/70 mmHg and had a pulse rate of 104/minute, regular with good volume. He had mixed woody and pitting edema extending from both feet all the way upwards to the subcostal region. There were intertwining small multiple cutaneous nodules of variable size ranging from 0.2 - 0.5cm in greatest diameter.

Some were ovoid and others roundish, they were non tender and not ulcerated and the emptying sign was negative. He had no generalised lymphadenopathy. Examination of respiratory system, revealed centrally situated trachea, normal chest expansion, impaired percussion note and scattered fine crepitations heard bilaterally in the infra-mammary regions. The vocal resonance was normal and breath sound were vesicular. The abdomen, genito-urinary system, central nervous and cardiovascular systems were normal. A provisional diagnosis of Kaposis sarcoma atypical type in immunodeficiency (AIDS) was entertained and the following investigations were performed.

His hemoglobin was 8.2gm per dl, the white cell count differential and red cell morphology were normal. Urine and stool analysis were negative for ova. The chest x-ray revealed non-homogenous opacification in both lower and mid-zones bilaterally. Biopsy was taken from one of the nodules in the skin showed spindle shaped cells containing slit-like spaces filled with red cells, intermingled with vascular channels, and cells exhibited high degree of cellular atypia and polarity and generally cells were poorly differentiated. His serological status in regard to infection by HIV was positive.

The line of treatment for this patient was not a straight forward issue among the members of tumor board. However knowing that the prognosis of AIDS-related-KS is gloomy,

palliative radiotherapy for pain to lower and upper limbs and cytotoxic agents were given as well as antiretrovirus agent (Retrovir) was recommended. However this patient expired two days following a stat dose of radiotherapy, thus concluding the grim picture of KS-related-AIDS (epidemic variety).

RESULTS OF PATIENTS WITH KS:

Table I: Shows age versus sex distribution.

Age group	M	F	Total
<20	2	-	2
21 - 30	6	1	7
31 - 40	4	-	4
41 - 50	1	-	1
51 - 60	2	-	1
Total	14	1	15

KS predominantly affected young men.

Table II: Shows presentation of symptoms and signs.

Symptoms or signs	Number of patients (n)
Cutaneous lesions	15
Itching	10
Swelling of lower limbs	9
Facial and truncal swelling	8
Emptying sign of nodule	8
Oral lesion	7
Generalised lymphadenopathy	6
Pain	6
Respiratory symptoms and signs	5
PUO	3

All patients with KS presented with cutaneous lesions.

Table III: Shows site or distribution of lesions of KS.

Site	No. of patients (n)
Lower limbs only	6
Upper and lower limbs	4
Upper limbs only	5
Generalised including trunk	6
Oral cavity and face	4

Extremities are the commonest site for KS.

Table IV: Displays morphologic forms of KS.

Type	No. of Patients
Nodular (typical)	5
Plaque	2
Florid	1
Infiltrative	1
Atypical	6
Total	15

Atypical and nodular (typical) KS were the most frequent type.

Table V: To show histological variants of KS.

Type	No. of Patients (n)
Mixed cellularity	6
Monomorphic	4
Unspecified	3
Anaplastic	2
Total	15

Mixed cellularity was the most frequent histologic variant in KS.

DISCUSSION:

Incidence:

In this series the highest incidence was in the second decade of life, that is age range between 21 and 30 years (Table I). The male:female ratio was 14:1. There is marked geographical variation in the incidence of KS, and also a surge in AIDS-related-KS, makes KS gain momentum. While Kaposi noted that endemic KS was common in middle and older men of Eastern Europe(4), it was uncommon in United States accounting for only 0.02% of all malignant tumors. Today, in the U.S.A., KS is at least 20,000 times more common in persons with AIDS than in the general population.

Etiology:

The etiology of KS remain unsettled although various hypotheses have been suggested. This includes environmental factors, oncogenic expression and genetic predisposition. Epidemic AIDS-related-KS is found in approximately 30% of patients with immunodeficiecy, and it is more common in male homosexuals than in other groups at risk for AIDS(4). On March 1989, among the AIDS patients reported to CDC, 15%(13,16) had KS. KS was commoner among those who had acquired the human immunodeficiency virus (HIV) by sexual contact than parenterally. The percentage with KS range from 10% in men with hemophilia to 21% in homosexual or bisexual men. Women were more likely to have KS if their partners were bisexual men rather than i.v. drug users. Thus KS in persons with AIDS may be caused by an as yet unidentified infectious

agent transmitted mainly by sexual contact(13). A strong genetic predisposition is indicated by the fact that no case of KS is reported among Asians and Europeans living in endemic areas of Eastern Zaire, Western Uganda, and North Western Tanzania(1).

Pathogenesis of KS:

The pathogenesis of KS is still debatable. The epidemiological findings supports a viral etiology(4). Human immunodeficiency virus (HIV) is a cofactor in patients with AIDS, as suggested by the induction of KS-like lesions in transgenic mice with the HIV transactivating gene(19). Oncogene induced body cells deviate from normal pattern of growth and differentiation. Thus growth factors are released by retrovirus-infected CD4+ T-lymphocytes and by KS cells themselves. Such findings and association with AIDS and the increased frequency of KS in immunocompromised hosts, suggests an interplay between viral infection and deficient immunoregulation in the pathogenesis of this disorder(12).

Pathology:

Histologically, all types of KS are essentially similar. The histologic specimen of all patients in this study group was noted to possess "spindle shaped cells" containing slit-like spaces filled with red cells, plasma cells, lymphocytes and macrophages. Intermingling with spindle cells are "vascular channels" with new blood vessels proliferation lined with endothelium(1,4).

Histologically there are three types of KS., (a) Monocellular, (b) mixed cells type, and (c) anaplastic. The mixed type is the commonest. In this series 6 patients out of 15 had mixed form, 4 patients had monomorphic type, whereas 3 had unspecified and 2 had anaplastic variety (Table IV).

Clinical features and diagnosis:

Four categories of KS are recognized(4).

(a) **The classic form:**

Clinically this form consists of multiple red to purple skin plaque or nodules, primarily in the lower extremities, slowly increasing in size and number and spreading to more proximal sites(4). The tumor frequently remain localised to the skin but are locally aggressive, with variable course of relapse and remission. In endemic areas this is commonest form and most favorable(1,4,20). The nodules may exhibit emptying sign, a pathognomonic feature of KS nodule. The florid and infiltrative types pertain to this category. The former present as a pedunculated cauliflower mass usually in the trunk or extremities. In this series all patients (fifteen) presented with cutaneous lesions being nodule or plaques. Nodules with emptying sign was present in 8 patients (Table II).

(b) **Kaposis sarcoma associated with renal transplant.**

This form occurs in individuals receiving immunosuppressive therapy as it is for transplant

recipient, patients receiving steroids and so forth(3). The lesions are either confined to the skin or result in wide spread systemic involvement(4). This form of KS often regresses when immunosuppressive treatment is discontinued.

(c) **Epidemic Kaposi's sarcoma associated with AIDS (AIDS-KS).** This variant is found in approximately 40% of patients with AIDS and it is more common in male homosexuals than in other groups at risk for AIDS(13,14,17). The cutaneous lesions have no predilection for the lower extremities. They may present as few or many purple to pink patches, plaques, or nodules with a propensity to become widely disseminated early in the course involving,mucus membranes, gastrointestinal tract, lymph nodes and viscera(3,14).Raval et al.(21), reported a case of KS of G.I.tract presenting as acute appendicitis. Such tumors are responsive to cytotoxic agents and agents like alpha-interferon.Most patients will succumb to the infectious complications of AIDS rather than consequences of the tumor(3).

Since 1981 cases of AIDS-KS have been increasingly reported in U.S.A, (New York, Calfonia etc.) and in Africa (Tanzania) since 1983(17). The tendency to visceral involvement is quite high [13]. It includes respiratory, alimentary, brain, genitourinary, liver, bones and spleen(14). Usually HIV-serologic test is positive but negative results

are not uncommon. In this series the author noted 9 patients with typical lesion of KS,nodular and plaque being the most frequent variants (Table IV).The remaining 6 patients presented with atypical lesion, and buccal cavity/oropharyngeal lesions predominated the picture (Table III,IV).

Diagnosis of KS is essentially clinical but histologic study to confirm the diagnosis is mandatory especially before commencement of the treatment. The clinical presentation of KS has been described above. Some of the ancillary investigations which can prove of value in the management of KS patients with or without AIDS includes; chest radiograph which may exhibit non homogenous, patchy opacification to signifies pneumocystis carini pneumonia and pleural effusion or chlothorax in KS (10). Ultrasonographic and CT-scan will demonstrate visceral involvement, endoscopic biopsy, esophagal and bronchial washing of gastrointestinal. and respiratory tracts may help establish histologic and cytologic diagnosis in some cases. Lumbar puncture will diagnose opportunistic infections particularly cryptococcal meningitis(3). Bone radiograph may reveal small clear cut bone cysts, localised or generalised bone rarefaction, with loss of trabeculation and cortical erosion with periosteal sparing(1). Soft-tissue x-ray may reveal subcutaneous nodules which are otherwise not visible or palpable. Lymphopenia (depletion of CD4+ T-lymphocytes) signifies not only immunodefiency but poor

prognosis. Investigations in KS is dictated by clinical presentation and availability of relevant tests.

TREATMENT:

Two modalities of treatment are available though none is entirely satisfactory. It is either local or systemic. Local treatment is usually in the form of local radiotherapy or excision of solitary lesions of KS, whereas systemic treatment included administration of cytotoxic chemotherapeutic agents and extended radiotherapy. The choice of treatment in patients in this series was based on type, extent, and site of the lesion, general condition of the patient and availability of the facilities.

Radiotherapy:

Radiotherapy was the cornerstone of treatment and it was offered to all 9 patients with classic form of the disease, and to 4 patients with atypical form. Of the 9 patients with classic KS, 6 received $^{1}/_{2}$ body irradiation and 3 patients had extended radiotherapy administered. Radiotherapy for the classic variant was aimed at cure. Among patients with the atypical form, 4 received palliative radiotherapy whereas 2 of them were offered medical palliation and discharged home for terminal care. 4 patients were given an antiretrovirus agent (the retrovir) to combat the HIV so as to ameliorate effects of HIV infection. The immediate outcome was favourable except for AIDS-related-KS patients. However follow up of patients

was poor as attendance of patients to the outpatient department was irregular.

Local radiotherapy has been recommended as the most effective type of therapy in localised KS with cure rate of 35%(1,14). It has been used for palliation in obstructing lymphadenopathy, ulcerating, or fungating extensive skin lesions(17) with a response rate of about 30 per cent. Half body irradiation is recommended for lesions involving more than one limb and whole body irradiation is offered when both lower and upper limbs are involved.

Chemotherapy:

Combined chemotherapy with radiotherapy was administered to one patient with AIDS-KS for palliation. These were cyclophosphamide and methotraxate. In the initial days of therapy he exhibited satisfactory response and was discharged home. It was not possible to follow him up to know his fate after leaving the hospital. Chemotherapy is the best substitute when radiotherapy is not available or is contraindicated(2). Cytotoxic drugs can be used as a single drug or in combination. Some of which are currently in use include vincristine, actinomycin-D, vinblastine, methotrexate, bleomycin, cyclophosphamide and nitrogen mustard(2,16,17). Bleomycin, adriamycin, and vincristine have shown single drug benefit(16). Furthermore vincristine and bleomycin have been found to effect cure in 45% and stabilization of KS in 35% with minimal untoward effects including peripheral neuropathy

and myelosuppression(2). A combination of adriamycin, bleomycin, and vincristine has been noted to produce remission in advanced cases and good palliation can be achieved in over 50% with few side effects(22). In epidemic KS (AIDS-KS), a complete therapeutic response is difficult to achieve and if such a response is obtained by one of above combination, maintenance therapy is necessary. The overall prognosis and survival in patients with epidemic KS appears to depend on the severity of immune suppression and HIV infection rather than on the neoplastic proliferation and tumor load. Ultimately the ideal treatment for the AIDS-related-KS will be a combination of antiretroviral therapy to suppress further effects of HIV, biological therapy to reverse the immunologic defects, chemotherapy to control tumor development, and hematopoietic growth factors to ameliorate bone marrow suppression(23).

Local Surgical excision:

In classic (endemic/typical) KS surgical excision has little role to play, and if any it meant for palliation such as amputation of a crippled useless limb, tumor debulking, painful and ulcerated lesions, which are removed to make patients more comfortable(1). On the other hand in non classic (epidemic) KS, excision of solitary lesions has been found to be successful with minimal recurrence rate(17). When local excision or amputation is contemplated preoperative radiotherapy or chemotherapy is recommended(1).

CONCLUSION:

Epidemic KS (AIDS-KS) and endemic KS associated with HIV infection (HIV seropositive) predominantly affect young men in our environment and world-wide. Both types and particularly the AIDS-related-KS carries high morbidity and mortality rate. As this age group forms the major labour and task force at nation and globally, efforts should be concerted to effect studies on epidemiologic aspect, focusing especially the incidence, the environmental factors, oncogenetic, and genetic analysis hoping to identify the etiologic agent and therefore to effect cure or prevention of KS.

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BREAST CANCER

SUMMARY:

Twenty one patients were attended by the author in surgical firms I and III in the period between October, 1991 to November, 1993. All of them were females. The peak age was 31-40 years and their age ranged between 21-74 years. Involvement of upper outer quadrant occurred in 10 out of 21 patients, the lower outer quadrant 4 patients, whereas upper inner quadrant, lower inner quadrant, and central region, respectively accounted for 2, 2, and 4 patients. More than $^{3}/_{4}$ of patients (n=18) presented to the hospital six months or more following onset of symptoms. The main presenting symptom was swelling in the breast which accounted for 18 out of 21 patients. The majority had late breast disease that constituted 15 patients. Simple mastectomy/axillary sampling and radiotherapy were the most frequent modalities of treatment offered.

INTRODUCTION:

The term breast cancer is an unqualified term which means a carcinoma originating in the ductal and glandular structure of the breast. Breast cancer has a variable world wide incidence. It is the commonest and most dreadful disease in female in most parts of the world including U.S.A. where the death rate is approximately 20% of all cancer death, in females (1,2,11,13). It is understandable that breast cancer

has received a great deal of appropriate publicity and financial investment especially in societies with good economic status like U.S.A. and has been a focus of intensive study relative to its treatment which has been highly controversial (7). Despite all such efforts little ground has been gained and the age adjusted death rates from breast cancer in female in U.S.A. has in fact remained stable over the past 30 years and 115,000 new cases (27%) of all cancers in female) have been reported annually (3). One of every 11 women in U.S.A. will develop breast cancer in her life time (1). In Tanzania the incidence is not known but it is a common disease and it occurs in all parts of the country (4). The etiology of breast cancer is still debatable but several factors have been attributable to the disease. These include environmental, genetic, hormonal, and nutritional factors (1,11).

In this study group the author's aim was to study the age incidence among the affected group, diagnosis, and different treatment modalities in correlation with the stage of the disease.

CASE REPORT:

Mrs. P.X. IP No 747403, a 26 years old female was referred from Temeke due to progressive painless right breast swelling which she noted 3 weeks before she presented at the surgical outpatient clinic. It was not associated with nipple

discharge, trauma, fever or weight loss. She also denied history of back, chest or bone pains, and she had no headache, impairment of vision, cough, or abdominal swelling. She had her menarche at 15 years of age and her menstrual periods were regular and of normal flow. She was married and she had given birth to 3 children. She had her first child when she was 18 years. She breastfed all her children for an average of $1^1/_2$ years. Her past medical and family history were uneventful and she was a peasant's housewife.

Examination revealed a young slim woman, she was not wasted, not pale, or afebrile. The right axillary lymph nodes were moderately enlarged, about 4cm in diameter, discrete, non tender and mobile. The pulse rate was 86 beats per minute, regular, and the blood pressure was 130/70 mmHg. On examination of the breasts, right nipple was retracted and was skin dimpling over the upper outer quadrant. She had no peau d'orange, ulceration, nipple discharge or a fissure. A single non tender ovoid mass of about 3 x 5 cm was palpable in the right upper outer quadrant, it was irregular, hard, with uniform consistency, and ill-defined margin, mobile, not fixed to skin, muscle, or chest wall, Three axillary lymph nodes were enlarged, ranging from 2-4cm, hard, mobile, non matted, and non tender. The infraclavicular and cervical lymph nodes were not palpable. The contralateral breast and axilla were normal. The abdomen was not distended, there was no hepatomegaly or other masses palpable. Vaginal and rectal

examination were normal. The respiratory system, musculoskeletal, genitourinary, cardiovascular and central nervous systems were normal. A provisional diagnosis of breast cancer T2N1BMX was made and she was investigated as follows:-

1. Fine needle aspiration cytology (FNAC), revealed malignant cells.
2. The hemogram showed hemoglobin of 10.3 $gmdl^{-1}$, normal white blood cell count and differential, and normochromic normocytic red cells.
3. The plain anteroposterior view of chest x-ray did not reveal metastasis.
4. Alkaline phosphatase and serum creatinine were 84 IUL^{-1} and 110 $umoll^{-1}$ respectively. These are normal levels.
5. Ultrasonographic study of abdomen was normal .

She was counselled and consent for operation obtained and she was scheduled for simple mastectomy and axillary nodal sampling.

Operation: Under general anaesthesia and patient in supine position, the breast and chest were cleaned with iodine and spirit and draping was done under aseptic technique. Two right transverse elliptical skin incision were made. This included the breast, nipple, and tumor in the centre, extending from the anterior aspect 0.5cm from the sternal margin towards axillary fold in the mid axillary line. Care was taken to assure at least a 5cm safety margin, (a distance from the palpable tumor margin and incision). Thin skin flaps were

undermined and raised by sharp dissection down to the pectoralis fascia. The pectoralis major and fascia were left intact after being found free of infiltration by malignant process. The dissection was carried down to lower border of pectoralis major and this together with pectoralis minor muscle were retracted upward. By blunt dissection the clavipectoral fascia was separated from axillary neurovascular bundle and as much as possible lymph nodes and fat were cleared from the axilla. The breast and lymph nodes specimen were excised and were sent for histopathologic studies. Hemostasis was achieved and a corrugated rubber drain was inserted through lateral end of the wound and left in situ. The edges of the skin were stitched without tension. Post-operative orders included i.v. dextrose saline 2 litres for 24 hours, injection pethidine 100mg 6 hourly for 24 hours; monitoring of the blood pressure, pulse rate, and respiratory rate was done $^{1}/_{2}$ hourly until full recovery, and then 6 hourly thereafter. Temperature was recorded 4 hourly for 12 hours and then 12 hourly thereafter. There was no significant complication experienced and stitches were removed on 6th day. Histopathologic studies of post mastectomy specimen was reported as infiltrating ductal carcinoma and nodes were positive for malignant process. Three weeks later the patient was subjected to local radiation to control the disease locally, and radiation oophorectomy as a means of controlling the disease systemically. A total of 2,800 cGy at a rate of

400 x 8 was given locally and a total of 2400cGy was given to the ovaries at a rate of 400x6. The above treatment was well tolerated by the patient and she was discharged on Tamoxifen 10mg od for 12 months. She was seen in the surgical out patient clinic on two subsequent visits at 6 weeks and 3 months. She had no evidence of metastasis, recurrence, or radiation complication. However, I was not able to see her in the subsequent visit planned at 6 months.

THE RESULTS OF PATIENTS WITH BREAST CANCER:

Table 1: Shows age distribution.

Age in years	No. of patients (n)
21 - 30	5
31 - 40	10
41 - 50	3
>51	3
Total	21

Breast cancer was predominant in the young females.

Table II: Shows duration of symptoms at initial presentation.

Duration (in month)	No. of patients (n)
<1	1
1 - 5	2
6 - 12	10
13+	8
Total	21

Majority of patients (>3/4) presented after 6 months following onset of symptoms

Table III: Shows quadrant involvement.

Quadrant	No. of patients (n)
UOQ	10
UIQ	4
LOQ	2
LIQ	1
Central (areola and nipple	4
Total	21

Upper outer quadrant was involved in about 50% of cases.

Key:
UOQ - Upper Outer Quadrant
UIQ - Upper Inner Quadrant
LOQ - Lower Outer Quadrant
LIQ - Lower inner Quadrant

Table IV: To show clinical manifestation.

Manifestation	No of patients
Swelling in the breast	18
Breast ulceration	7
Nipple discharge	3
Swelling in the axilla	8
Breast pain	1

Swelling in the breast was the most frequent symptom observed.

Table V: To show stage of the disease.

Stage	No of patients (n)
I	2
II	4
III	10
IV	5
Total	21

The majority of patients (15 out of 21) presented with late breast disease.

Table VI: Shows modality of treatment in form of primary and adjuvant therapy.

Treatment	No of patient (n)
Simple MCT and AS	9
Toilet MCT and AS	5
Modified radical MCT and AD	1
Radiotherapy (Adjuvant and primary)	17
Cytotoxic chemotherapy (Adjuvant)	2
Hormonal therapy (Adjuvant and Primary)	7

Adjuvant radiotherapy, simple mastectomy plus axillary sampling were the most frequent treatment modality offered to the patients.

Key: MCT - Mastectomy
AS - Axillary Sampling
AD - Axillary Dissection

DISCUSSION

INCIDENCE:

Carcinoma of the breast is rare before the age of 20 but then rises steadily to the time of menopause followed by a slower rise throughout life (1,3). In this series the incidence was high in the 4^{th} decade of life (table I). The majority of patients (13 out of 21) were premenopausal women, whereas perimenopausal and postmenopausal females were 5 and 3 respectively. The breast is the primary site for malignancy in 10% of human cancers(1). The highest incidence is in North America $62.3/10^5$, whereas in Tanzania in 1976 Hiza(4) found breast cancer to be the commonest malignant disease in females at the Muhimbili Medical Centre with exception of the carcinoma of the cervix.

ETIOLOGY:

Like in most malignant disease, the origin of breast cancer still remains a mystery. However, the following factors have been attributable to the disease. These include genetic, hormonal, environmental, and nutritional factors (1,3,12,19).

Genetic factors: Breast cancer in a first degree relative increases the risk by two or three folds. It is even more marked if more than one relative is affected or if the affected relative had a bilateral disease (1). In this series 4 out of 21 patients had family history of breast cancer.

Environmental factors:

Repetitive radiation exposure being diagnostic, therapeutic or accidental as in survivors of Hiroshima and Nagasaka atomic bomb is associated with high incidence of breast cancer(1). It is approximately four times more common in the victims than in the general population. Bittner in 1936 (16) reported a viral agent transmitted through mother's milk causing breast cancer in suckling mice. This was the mouse mammary tumor virus (MMTV). The amplification of HER-2/Neogene(18) (the oncogene) has been either associated with aggressiveness of the tumor or high risk of breast cancer.

PATHOLOGY:

Staging of breast cancer:

Staging is an important method of documenting the extent of the tumor, enable to standardize comparison of results of various therapeutic modalities among clinics and forms the

basis of treatment of breast cancer. The staging is according to recommendation from Union International Contra Cancer (UICC) (1).

TNM system of classification: T - stands for primary tumor:

To - No clinically demonstrable tumor.

Tis - No clinically palpable tumor; Histologically the tumor does not extend beyond lamina propria.

T1 - Tumor less than 2cm.

T1a - Tumor not fixed to skin or underlying structures.

T1b - Tumor fixed to underlying structures with or without nipple retraction or skin changes.

T2 - Tumor 2-5 cm.

T2a - Tumor not fixed to underlying structures.

T2b - Tumor fixed to underlying structures.

T3 - Tumor more than 5 cm.

T3a - Tumor not fixed to underlying structures.

T3b - Tumor fixed to underlying structures.

T4 - Tumor of any size.

T4a - Fixation to chest wall, No skin changes.

T4b - Fixation to chest wall, plus edema of the arm, peau d'orange, satellite skin nodules, but disease confined to chest wall.

T4c - T4b plus extension to the contralateral breast or chest wall

N - **Stands for regional lymph nodes:**

NO - No palpable axillary nodes.

N1 - Mobile, non matted homolateral axillary nodes.

N1a - Nodes histologically negative.

N1b - Nodes histologically positive.

N_2 - Homolateral axillary nodes matted together, or fixed to other structures, or contralateral lymph node involvement.

N3 - Infraclavicular or supraclavicular nodes involvement.

M - **Stand for distant metastasis:**

MO - No evidence of distant metastasis.

MX - No means of excluding distant metastasis.

M1 - Distant metastasis present including skin beyond the breast area.

STAGING:

Stage I : T1 No N1a MO

Stage IIa: T1 N1b Mo.

b: T2 N1a N1b Mo

Stage III A1 : T3 No N1a N1b Mo

A2 : T1 T2 T3 N2 Mo,

B1 : T1 T2 T3 N3 Mo,

B2 : T4 (any nodal status)Mo.

Stage IV: Any T any N, M1.

Stage I or II is early breast disease (EBD), and

Stage III or IV is late breast disease (LBD).

CLINICAL COURSE:

Cancers of the breast are usually first discovered by the patient or clinician as a solitary, painless mass in the breast (1,5,12,13). The older the patient with a single breast swelling or mass the more likely it is to be a malignant process. In this series 18 out 21 patients had breast swelling at initial presentation (Table IV). 8 patients had associated swelling in the axilla (lymph node), whereas breast ulceration accounted for 7 patients. Many cancers, are first detected by the patient during self examination. On the average such lesions range from 3-5 cm in diameter when first found (10). Approximately 2/3 of these lesions have spread to axillary or other nodes when first seen (1). In this series the author found that late breast disease (LBD) accounted for 16 out of 21 patients (Table V). The upper outer quadrant was involved most (10 out 21 cases) (Table III). Baum (10) reported that the upper outer quadrant was involved in 50% of his cases, a finding consistent with results in this series. Intraductal lesions rarely produce palpable mass. Instead these usually come to attention by the appearance of nipple discharge (sometimes hemorrhagic) (13). Accordingly, the differential diagnosis include all variants of fibrocystic disease, fat necrosis, scarring of an abscess, hematoma, galactocele, acute mastitis, TB of the breast, actinomycosis of the breast and diffuse syphilitic mastitis.

It will be seen later that nodal involvement seriously prejudice the prognosis. The exact sequence of nodal involvement is still controversial. Initially it was thought that the lower axillary nodes were involved first and then upper members in orderly manner. However, the situation is not as straight forward as that and the fact is that even the infraclavicular and supraclavicular nodes may be involved without axillary nodal involvement(21).

DIAGNOSIS:

Early diagnosis is mandatory. Currently emphasis is put on more frequent, regular medical examinations. Mammography, Xeroradio-graphy and thermography are commonly used as screening techniques (1,6,13). Mammography in particular can detect small and early cancers and indeed has disclosed a good number of carcinomas in situ or cases of "minimal cancer". For diagnostic purposes biopsy is a valuable armament. This consist of fine needle aspiration cytology (FNAC), open biopsy and frozen section (FS)(12). The FNAC is highly recommended and some workers in this field have reported a diagnostic accuracy which may exceed 90%(7): Some workers advocate to proceed to definitive breast surgery when FNAC is positive but some feel that definitive tissue diagnosis is prudent(23). FS of a breast lump helps to determine the course of action of a surgeon. Currently the advent of lumpectomy followed by irradiation of the breast as an alternative to mastectomy for treatment of breast cancer, has modified the need for

immediate pathologic assessment of the biopsy specimen in FS(22). Other investigations which may particularly aid in the establishment of metastasis are ultrasonographic studies of abdomen which may reveal involvement of the liver, computerised tomographic scanning (CT-scan), chest x-ray, skeletal survey, radioisotope studies with technetium 99_{mTc} or I^{131}, and liver biochemistry eg. alkaline phosphatase assay.

TREATMENT:

For many decades breast cancer treatment was based on the belief that the greatest cure rate would be achieved by radical surgery with or without postoperative radiotherapy (10). Therefore Halsted radical mastectomy was accepted as a biblical form of treatment of breast cancer (24). The major issue is micrometastasis which occur very early even in early breast disease (stage I & II) (12). Currently there is no agreement about what is the best, most proper or correct operation for breast cancer. However, there is more open attitude to less radicalistic operations(10) as it will be mentioned later. A number of treatment modalities is mainly based on clinical staging, age of the patient and even menopausal status (7). These include, surgery, radiotherapy (RT), Hormonal therapy (HT), cytotoxic chemotherapy (CCT), and immunotherapy (IT) (9). Very often a combination of two or more forms of treatment is employed.

In this study 9 patient had simple mastectomy and axillary sampling whereas 5 patients had toilet mastectomy and

axillary sampling, and one patient underwent modified radical mastectomy and axillary clearance. Seventeen out of 21 patients received radiotherapy. Of the 17 patients 12 were offered adjuvant radiotherapy following mastectomy, whereas remaining 5 patients had radiotherapy as palliative and primary. Seven out of 21 patients received hormonal therapy, whereas cytotoxic therapy was administered to 2 patients.

The various surgical options that have been in practise are the following:-

(i) Radical mastectomy (classic)

(ii) Extended radical mastectomy

(iii) Modified radical mastectomy

(iv) Simple mastectomy, and

(v) Segmentectomy/lumpectomy

Treatment of operable breast cancer; (early breast disease)

Curative surgery is recommended in localised breast disease at stage I and II(25). In advanced disease that is stage III and IV surgery is palliative. Mastectomy is not readily acceptable by many patients due to its physical, social, and psychological effects. This may contribute to a delay in reporting to hospital but on the other hand it acted as a root that guided the pioneers of conservation surgery for the treatment of early breast cancer(26). Conservation surgery coupled with modern radiotherapy has been found to be as effective as mastectomy in the treatment of early breast disease(10). There is no difference in survival rates and

local control(25). Conservation surgery is associated with low incidence of complication and yield excellent cosmetic results(36). Breast conservation surgery has been defined as complete excision of the primary tumor with or without axillary dissection that is segmentectomy or quadrantectomy(26). Axillary node dissection is currently important for histological staging of the nodes. Prophylactic treatment of clinically negative nodes by either surgical extirpation or radiotherapy does not improve survival in comparison with the policy of observation and treatment at the time of clinical progression. Local recurrence following such approach can be well treated by re-excision of the local tumor with good prognosis(10). It must be emphasized that breast conservation recquires "expert radiotherapy" and "suitable equipment". If these are not available, attempt at breast conservation is inadvisable. It is true that in our centre we do not have a suitable equipment for such modern radiotherapy and therefore none of our patients underwent such therapy. Most of our patients were offered simple mastectomy and axillary sampling (supravide)(Table VI).

Treatment of locally inoperable breast cancer: (late breast disease).

In the presence of stage III and IV in other words **late breast disease** even the most radical approach will fail to control the disease. In such patients administration of systemic therapy is a suitable approach. That is usually done

with either tamoxifen (an antiestrogen), or cytotoxic chemotherapy(13). Sometimes even the most advanced disease will respond dramatically with disappearance of all palpable disease and healing of malignant ulceration (10). If response to systemic therapy is incomplete selected patients should benefit from radiotherapy. Salvage surgery is reserved for those cases impossible to control locally by either chemotherapy or radiotherapy and those that show no evidence of distant metastasis on careful investigation(24). None of patients in these series had salvage surgery.

Radiotherapy:

Radiotherapy is used for local and regional treatment and it is recommended for curative purposes in "Early Breast Disease"(10). Therefore in local-regional management of operable disease radiotherapy and surgery are very often complimentary(12). Where conservation surgery is practised radiotherapy plays a major role-in treating those areas which are not included in the operative field, that is the remaining breast(26). Radiotherapy is often administered after simple mastectomy both to the local site and axilla if axillary nodal status has proved positive at histology. It is still the most effective for palliation of pain, extensive ulceration, and bleeding(8).

Adjuvant systemic therapy:

It is now widely agreed that the outcome of treatment is predetermined by the extent of micrometastatic disease present

at the time of diagnosis(10). Selection of adjuvant systemic therapy is highly controversial but tumor characteristics including estrogen receptor dependency, axillary nodal status, account for response rates in therapeutic manipulation.

Hormonal therapy:

Breast cancer which are estrogen receptor (ER) positive have been reported to exhibit high response rate to endocrine manipulation (1,13). The response is up to 60% and 10% in ER-positive and ER-negative respectively. Either surgical oophorectomy or radiation oophorectomy is the most effective single method of treating endocrine dependence breast cancer (27). Tamoxifen, an anti-estrogen, has revolutionised treatment of breast cancer. It act by competition at the cellular level and appears to be effective in both pre-and postmenopausal women(10). Tamoxifen possess anti-tumor effect a.nd is recommended after the menopause when estrogen receptors are present in significant amount. It is also effective in patients with recurrences, and has fewer side effects. Surgical or radiation oophorectomy is recommended in premenopausal patients as estrogen receptors are few(10). Prednisolone is also effective after menopause(15).

Cytotoxic chemotherapy:

Adjuvant chemotherapy is recommended in premenopausal patients with poor prognosis as judged by positive axillary nodes especially when more than 4 nodes with a tumor size of more than 3cm in diameter (29). It is also more beneficial in

patients with ER-positive compared to ER-negative (27). Duration of treatment, dose, and time interval of starting chemotherapy with respect to surgery or radiotherapy are not yet clear. The combination currently used in most centres include CMF (cyclophosphamide, methotrexate, and 5-fluorouracil), CMFVP, CMFA, and CMFVA (13). (V for vincristine, P for prednisolone, and A for adriamycin). The latest world overview shows a 30% decrease in the risk of relapse over a 10 year period for premenopause patients treated for 6 months by CMF after initial surgical treatment (28).

CONCLUSION:

Breast cancer, affects predominantly young female in our locality. Therefore epidemiologic studies need be carried out to establish both regional and national incidence in order to rationalise priority setting to this disease. It has been found that our patients present late with advanced breast disease (stage III and IV). Therefore health education campaign is mandatory to educate them about the importance of early reporting to the clinician for treatment. Lastly the etiology and cell biology (behavior) of breast cancer needs further studies and research as part of efforts to search for curative measures.

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BENIGN PROSTATIC HYPERTROPHY

SUMMARY:

Nineteen patients with benign prostatic hypertrophy were attended and operated in surgical firms I and III at Muhimbili Medical Centre in the period between October 1991 and April 1993. About half of them were in the fifth and sixth decade of life with a peak age incidence in the 6th decade. Fourteen patients out of 19 presented with acute retention of urine, 4 patients had chronic retention with uremia and only one presented with symptoms of prostatism. Fourteen patients had their urine retention relieved by urethral catheterisation and the remaining 5 patients were relieved by suprapubic cystoscopy and catheterisation. Twelve patients had associated anemia, whereas 5 patients had urinary tract infection, and 4 had hypertension. Nine patients underwent retropubic prostatectomy, while transvesical and transurethral resection prostatectomy were performed in 7 and 3 patients respectively. Post operative complications included secondary hemorrhage with clot retention found in 9 patients, wound sepsis occurred in 8 patients, suprapubic urinary fistula in 4 patients, and orchitis in one patient.

INTRODUCTION:

Benign prostatic hypertrophy is a common surgical condition of elderly male over age fifty(1). The incidence rises with age until at 80 years when about 30% of all males

will acquire the disease(2). The etiology of benign prostatic hypertrophy is controversial but neoplastic, hormonal, inflammatory and arteriosclerotic theories have been postulated(3). The pathologic changes are usually accompanied by an increase in size of the prostate and this causes bladder neck obstruction. Most old men with prostatic hypertrophy have the morbidity associated with prostatic hyperplasia only when outflow obstruction of urine and its sequelae arise(4).

It has been estimated that 10% of all men will eventually require surgery to overcome such complications(2). Prostatectomy is considered safe and still a suitable surgical technique in the treatment of benign enlargement of Prostate. Relief of acute retention of urine is done by urethral catheterisation, and when this method fails suprapubic cystostomy is indicated(4). In this study, the author aims to study different surgical procedures in the treatment of benign prostatic hypertrophy, its complications, and clinical manifestations of benign prostatic hypertrophy.

CASE REPORT:

(a) Clinical assessment:

Mr X, IPNO 701346, a fifty three years old male was admitted in the male surgical ward complaining of inability to pass urine for one day. The event had been of sudden onset and unprovoked. However he admitted having had frequency with nocturia, hesitancy, weak stream of urine that worsened on

straining, urgency, and dysuria. He had no history of terminal dribbling or urethral discharge. He also denied history of cough, chest pain, bony pain, abdominal swelling, loin pain, loss of appetite, weight loss, or fever. This was the first episode of urinary retention and he had not been previously admitted to hospital. He was a small scale farmer and his past medical and family history were uneventful except that he had hematuria diagnosed and treated as schistosomiasis in his childhood. He looked elderly, he was in pain and pale, afebrile, not wasted, not dyspnoeic and he had no pitting pedal or sacral edema or peripheral lymph node enlargement. His pulse rate (PR) was 106 beats per minute, of good volume but regularly-irregular, and he had blood pressure (BP) 170/110 mmHg. In two consecutive readings his BP remained elevated. Examination of the abdomen revealed hypogastric mass consistent with distended urinary bladder up to the level of the umbilicus. The liver and spleen were not palpable and renal angles were free of mass and tenderness. Genitalia and perineum were also normal.

The Jugular venous pressure was not raised, the apex beat was in the fifth intercostal space, and mid clavicular line, heart rate was 110 beats per minute regularly irregular, with associated extra systolic beats but he had no significant pulse deficit. The rest of the systems were normal. A two way Foley catheter size 20F was introduced and drained about 1.5 litres of clear urine. The digital rectal examination was

then performed and that revealed enlarged prostate grade III, firm, smooth, with freely mobile rectal mucosa over it, and median sulcus was not obliterated. The following provisional diagnosis was made. Acute retention of urine due to benign prostatic hyperplasia, moderately severe hypertension, anemia and cardiac arrhythmias. He was maintained on bladder drainage with indwelling catheter.

The following are investigations which were done:

1. Hemogram:
   (a) His hemoglobin was 8.2gdl^{-1}, the blood film revealed hypochromic microcytic red cells with anisocytosis. Such a picture is consistent with iron deficiency anemia(IDA).
   (b) The white blood cell count was 7500 per mm^3, and differential for neutrophils, lymphocytes, and eosinophils (Polymorphonuclear leukocytes), monocytes, and basophils was normal.
   (c) Erythrocyte sedimentation rate (ESR) was 10mm in one hour (by Westergren method). This was within normal range.
2. Serum creatinine was 160 umol-l^{-1}, this figure was obtained after bladder decompression by a catheter, and it is normal.
3. The acid and alkaline phosphatase were within normal range of 5IUL^{-1} and 112 IUL^{-1} respectively.
4. Urinalysis for proteins, sugar, red cells, casts, and

ova, was normal except for the specific gravity of 1050 and plus one (+) pus cells. Urine for culture revealed proteus species sensitive to Nitrofurantoin, Gentamicin, and cefuroxime. He received furadantin tablets.

5. The chest and pelvic x-ray were normal.
6. Electrocardiogram (ECG) revealed supraventricular systolic ectopic beats.
7. Intra-venous urogram(IVU) was normal.
8. Cystoscopy revealed median and lateral prostatic lobes enlargement.t trabeculation of the bladder, and hyperemia of the urothelium to suggest cystitis.
9. Stool examination was negative for ova.

The patient was started on Brinerdin which is an antihypertensive drug containing clopamide (diuretic) 5mg and reserpine 0.5mg) one tablet twice daily, propranolol tablets 40mg once daily, and BP and PR were charted twice daily. He was also transfused two units of blood and then maintained on hematenics, i.e ferrous sulphate 200mg thrice daily and folic acid 5mg once daily, and he was advised on high protein and high calorie diet in order to combat the anemia.

After one week the blood pressure had stabilised at 150/90 mmHg and after four weeks the hemoglobin had corrected to 10.8gm per dl. Red cell morphology also resumed to normal picture (normochromic normocytic). After treatment with nitrofurantoin tablets for urinary tract infection the subsequent urine culture yielded in-significant mixed growth

of organisms. Consultation with physician and anesthesiologist were made to review the patients cardiac status and fitness for anaesthesia respectively. He was found stabilised and anaesthetist concluded that spinal anaesthesia was appropriate for him. He was at this point considered fit for retropubic prostatectomy. Three units of blood were requested and prepared. The anti-hypertensive drugs and hematenics were continued and in the morning of operation he was given 10mg diazepam injection intramuscularly to allay anxiety.

(b) Operation:

The patient was given spinal anaesthesia and then abdomen was cleaned with iodine, spirit, and draped. The retropubic space was approached through a sub-umbilical median incision. The latter was deepened and rectus sheath was incised through the same plane. The rectus abdominis muscles were separated in the midline and laterally retracted using self retaining retractor. By use of blunt dissection the retropubic space was well developed and prostatic capsule identified. Two transverse stay sutures of No.O chromic catgut was put in the prostatic capsule. The tip of cutting diathermy was used to make a transverse incision between the stay sutures until the adenoma was visualised. The prostate was enucleated by both blunt digital separation and sharp dissection using long Mayo (curved) scissors. The adenoma was gradually rolled anteriorly and delivered through the capsular incision. Both

median and lateral lobes were removed en block by completing sharp dissection with scissors. A roll of warm gauze was packed in the prostatic bed for ten minutes to control hemorrhage. Plain catgut number 1 stitches were placed at the corners of the prostatic capsule. The rest of bleeders in the prostatic bed were coagulated with diathermy. A three way Foley's catheter F.G. size 24 was introduced through the urethra into the urinary bladder. The baloon was inflated with 30ml of normal saline and left in the urinary bladder. The incision in the prostatic bed was closed using chromic catgut number zero in two layers. The first one was continuous while the second layer was interrupted. A continuous bladder irrigation with normal saline was immediately instituted and maintained an absolutely uninterrupted flow of fluid from the urinary bladder. A corrugated rubber drain was inserted into the retropubic space and brought to the exterior through a different stab wound in the anterior abdominal wall.

The wound was closed in layers. The linea alba was reconstituted by proline number zero, plain catgut number one for the subcutaneous tissue, and silk number 2/0 for the skin. Continuous bladder drainage was rechecked and maintained. The prostatic gland was sent for histopathological examination.

(c) **Post operative care:**

1. Blood pressure (BP), Pulse rate (PR) and respiratory rate(RR) were checked quarter hourly until full recovery,

and then two hourly thereafter for twenty four hours. The temperature was monitored four hourly over forty eight hours and then it was done routinely twelve hourly thereafter.

2. He was transfused two units of whole blood and one of them was given intra-operatively. This was followed by three litres of normal saline for twenty four hours after blood transfusion.
3. Continuous bladder irrigation with normal saline was carried out carefully, and this was monitored regularly to ensure the patency of the catheter.
4. Injection pethidine 100mg i.m. six-hourly for twenty four hours was given to the patient.
5. Strict input and output chart was recorded and kept neat.
6. Injection Gentamicin 160mg i.m. statum was given intraoperatively. This was meant for prophylaxis.
7. The patient was put in Trendelenburg's position after spinal anaesthesia for several hours in order to maintain the circulation.

The post operative period was uneventful and on third post operative day the bladder irrigation was stopped as the outflow was now found clear, and the patient was instructed to empty the bladder through the catheter regularly. The intravenous fluids were stopped as well, patient ambulated and light diet was started on the second day. On the same third post operative day the rubber drain was also removed also

while sutures were removed on the seventh day. The urethral catheter was removed on the seventh day as well, and his micturition pattern was found satisfactory. He was discharged home on the following day, and instructed to report to the surgical outpatient clinic for the follow up after 3 weeks. He reported to have developed retrograde ejaculation and his histopathologic report revealed nodular benign prostatic hyperplasia without malignant features. He was educated and counselled for above complication of prostatectomy. He was then followed up at sixth weeks, and at third months, and for a duration of six months follow up, he was free of complaint except for retrograde ejaculation.

RESULTS OF PATIENTS WHO HAD BENIGN PROSTATIC HYPERPLASIA

Table 1: Shows age incidence.

Age group	No. of patients
41 - 50	1
51 - 60	8
61 - 70	6
71 - 80	3
81 - 90	0
>91	1
Total	19

Most patients had benign prostatic hyperplasia in their 6th and 7th decade of life.

Table II: Shows clinical presentation.

Symptoms	No. of Patients
Acute retention of urine	14
Terminal dribbling	14
Increased frequency	13
Hesitance	12
Weak stream	10
Urgency	8
Dysuria	7
Chronic retention	4
Hematuria	2

Acute retention, frequency, and terminal dribbling were the commonest presenting symptoms.

Table III: Displays symptoms that brought patient to seek treatment for the first time.

Symptoms	No. of Patients
Acute retention	15
Chronic retention	4
Total	19

Acute retention of urine was the commonest symptom at initial presentation.

Table IV: Shows types of operation performed.

Operation	No. of Patients
Retropubic (RP)	9
Transvesical (TV)	7
Transurethral resection (TURP)	3
Total	19

Retropubic prostatectomy was the most frequently performed type of prostatectomy.

Table V: Shows post-operative complications.

Complications	No. of Patients
Hemorrhage with clot retention	9
Wound sepsis	8
Supra pubic urinary fistula	4
Orchitis	1
Pyelonephritis	1
Death	1
No complications	8

Hemorrhage with clot retention and wound sepsis were the commonest complications.

DISCUSSION:

Incidence:

Benign prostatic hyperplasia is a disease of the old age and is unknown before the age of twenty(3). Autopsy studies revealed prostatic hyperplasia in 17% of men in their fourth decade, and more conspicuously in 85% of men aged 80 or more (2,7). It is said that a forty year old man stands a 10% chance of undergoing prostatectomy if he lives to the age 80(12). In this series the peak age incidence fell between 51 and 60 year, and their age range was 41 to 100 years (Table I). Although this figure is casual, such age incidence is a bit earlier as compared to that in European community. Muguti et al(9,10), had a peak age incidence of 60-71 years which does not differ from peak incidence of Europeans.

Pathophysiology:

In benign prostatic hyperplasia it is the outflow obstruction of the urine that affects the health of the patient. As resistance increases compensatory changes set in,

mainly as bladder hypertrophy(1,8). Coarsening and thickening of the individual interlacing strands of bladder muscle occur in areas seen as trabeculation. As the voiding pressure increases, the lining of the bladder mucosa pushes out into gaps between trabeculation to form saccules(3). The latter then blow outside the bladder to form a diverticulum. Diverticula do not empty completely when voiding so it leads to residual urine with subsequent infection, stone formation, metaplasia of the urothelium to squamous epithelium which is associated with carcinoma in 3.6% of cases(1). As time goes on, the bladder losses its ability to empty completely, a process which is initially reversible but later on irreversible as the detrusor is replaced by fibrous tissue. Prolonged obstruction leads to thinning out of bladder muscles, a feature of a decompensated bladder(18). Under such circumstances the patient may develop a huge amount of urine in the bladder unknowingly and small movements force out only a few drops of urine. This is now overflow incontinence which soil the clothes and makes the patient untidy and very uncomfortable. Residual urine is often infected and this jeorpadises the results of operation. There is no volume of residual urine that is considered safe or acceptable but most workers regard residual urine of 100ml as significant. Acute retention of urine represent the most dramatic form of residual urine. It is rewarding to offer operation before this emergency situation develops. Gradually obstruction to

the ureteric flow occurs. It is believed that nipping of the ureter occurs as it transverses the hypertrophied bladder wall and reflux of urine occurs from bladder to ureters. Dilatation and elongation of ureters will occur leading to hydronephrosis(1,2,8). This results into increased intrapelvic pressure which may damage the renal parenchyma with impairment of concentrating ability of the kidney. This subsequently gives rise to obligatory diuresis, salt wasting, dehydration and acidosis. It may as well lead to "uremia", a devastating and most dangerous acid-base disturbance, and also alarming anemia ensues.

Clinical features:

The presence of obstructive, and/or irritative symptoms, total outflow obstruction, residual urine, cystoscopic and radiologic findings were mainly the criteria for admission of patients with benign prostatic hyperplasia for prostatectomy.

The author in this study noted 14 out of 19 patients that presented with acute retention of urine, whereas 4 patients had chronic retention, and only one patient presented with prostatism, that is increased frequency, weak stream, hesitance, urgency, and terminal dribbling (Table II and III). Prostatism is partly thought to be due to vesical introversion of the sensitive prostatic mucosae by the intravesical enlargement of the gland mainly median lobe. The presence of residual urine and infection increase the sensitivity of the bladder mucosae and also contribute to frequency(8,14).

Later on as the internal sphincter becomes stretched, and incompetent, a little urine escapes into normally empty prostatic urethra thus adding urgency to the frequency. Many elderly male regard these symptoms as natural and may not seek medical advice until acute retention sets in. This may also be the first manifestation in about 30-40% of cases(8). The author found that acute retention of urine occurred in 15 patients, and chronic retention in 4 of them (Table III). The common precipitating factors of acute retention of urine are postponement of micturition, indulgence in alcohol, and intercurrent illness. Many African patients do not seek relief of their urinary problems until acute retention occurs. This has been well documented by a number of workers in Africa Kambal had a series of four hundred and three (403) patients in Sudan, whereby 76% presented with acute retention(14). In Burkholf series of 1352 patients from London only 29% had urinary retention when first seen(19). Muguti in Bulawayo also noted that 73.7% of black patients present with acute retention of urine whereas only 18% of white patients had acute retention when first seen (10,11). Some patients may present with chronic retention of urine with overflow incontinence in which a non tender urinary bladder may be found distended up to the umbilicus or even higher and urine dribbles intermittently(1). Four out of nineteen patients in this series presented like this and biochemistry profile revealed elevated levels of serum creatinine and urea.

Examination of a patient with benign prostatic hyperplasia must include a rectal examination and thorough general and systemic examination. Rectal examination will confirm the presence of an enlarged prostate, estimate its size and establish its consistency. An enlarged benign prostate projects towards the examining finger, it is smooth, firm, non tender, median sulcus is not obliterated and rectal mucosae is freely mobile over the prostate. All patients seen by the author in this series, underwent this examination.

Cystoscopy is essential in all cases and is a routine procedure in transurethral resection of prostate(TURP)(13). Cystoscopy also enables inspection of the bladder mucosa and ascertains any tumor, stone or other lesions in the bladder. Median lobe enlargement is readily diagnosed by cystoscopy as opposed to digital examination. The author had four such patients. Three of them were found to have median lobe enlargement, and one had no median lobe enlargement despite obstruction. Estimation of the size of prostate should be done with an empty bladder and is best done by bimanual palpation under anaesthesia (EUA) and may be combined with cystoscopy(1).

TREATMENT:

(a) **Acute retention of urine:**

There is controversy as to whether patients who present with acute retention of urine for the first time should be

subject to emergency prostatectomy or not. Some authors advise immediate prostatectomy to avoid risk of infection which commonly follows catheterisation(5). Another school of thought is to relieve the urinary obstruction then appropriately investigate, and the patient is prepared for prostatectomy. The latter is what was adopted by the author in this series to patients who presented with acute retention of urine. A small plastic catheter number 14,16 or 18 is used as indwelling catheter. If urethral catheterisation fails even under analgesia the bladder was drained through suprapubic cystostomy. This was employed in five of the patients in this series who presented with urinary retention.

(b) **Chronic retention of urine:**

The urinary bladder is slowly decompressed in chronic retention of urine. This can be achieved by applying a gate clip to the drainage system or by joining a catheter to a bottle or urine bag placed about 20cm above the pubis so that the urine flows in when the patient coughs or moves. The bag or a bottle is then lowered gradually. This avoids the risk of torrential hemorrhage from the bladder.

OPERATION:

Some workers in the field advocate immediate prostatectomy and dismiss elective surgery. Odonoghue(5), thinks that if serum creatinine is raised then urinary bladder drainage is mandatory but the best way of doing this is by performing prostatectomy. Blandy(1) himself, thinks that the

patient should have continuous bladder drainage before prostatectomy. Definitive operation depends upon the patients general condition, presence of complications and concomitant disease(s). Should one of this be present it must be dealt with and corrected first. The choice as to which type of operation one should perform depends on the individual patient. This includes indication, size of the prostate, advantage and disadvantage of the operation adopted, training and skills of the surgeon performing the operation.

Methods of prostatectomy:

Prostatectomy can be classified into two broad groups. The open and closed variety(1,4). The open category is the following:

1 - Retro pubic (RP)

2 - Transvesical (TV)

3 - Transperineal (TP).

The closed category include transurethral (TUR) approach, and cryoprostatectomy(6,22).

A criteria to a particular type of operation is still controversial. Size is an important factor which enables the urologist or surgeon to decide on the type of operation. E.g. TURP is the most suitable approach when the prostate is a small one. The cut off point will depend on the training and skill of the surgeon and presence of previous inflammation or surgery to the patient.

The author in this series had 7 patients in whom TV prostatectomy was performed (Table IV) whereas 9 patients underwent RP. Prostatectomy, and 3 patients were offered TURP, and none had transperineal prostatectomy. The RP prostatectomy is commonly employed in our urology department. It has the advantage over the TV prostatectomy in that hemorrhage can be controlled effectively because it is done under direct vision. According to Millin who described it in 1945, it has stood the test of time in that although a bit difficult to perform it removes all obstructing tissue, it is associated with low morbidity and mortality rate and is relatively free of late sequelae(15,20).

Complications:

1. **Clot retention and hemorrhage:**

This was the commonest complication envisaged and it was serious when it was not detected early and dealt with immediately. It may occur with any type of prostatectomy. The author had 9 out of 19 patients with this complication. (Table V). Small amount of clots were evacuated by a bladder syringe or just milking the catheter. When this also fails then reopening is necessary. Two patients were also sent back to theatre for reopening and evacuation of clots.

Infection:

Wound infection was the commonest infection, that was encountered in 8 patients. Epididymitis is also not uncommon as well as pyelonephritis resulting from ascending infection

from the bladder. Each one of these were found in one patient respectively.

Supra pubic urinary leakage:

This was observed in 4 out of 19 of our patients. It subsided within 3 to 5 days following maintenance of bed side continuous bladder drainage. Other complications of prostatectomy that were not encountered in this series are; urethral stricture, perforation of the prostatic capsule, TUR-syndrome, resulting from extravasation of fluid into tissues, impotence, urinary incontinence, deep vein thrombosis, osteitis pubis (very rare), bladder neck contracture and rectovesical fistulae (RVF).

CONCLUSION:

Benign prostatic hyperplasia is a common problem in Dar-es-Salaam as seen in our central hospital, Muhimbili Medical Centre. Most of our patients do present with acute retention of urine rather than symptoms of prostatism when first seen in hospital. Studies should be conducted to ascertain reasons why most of our patients present late with urinary retention rather than symptoms of prostatism. Furthermore. abstinence from sex by the patient, post operative UTI and bladder failure are among the devastating sequelae of catheterisation and prostatic obstruction respectively. Therefore early detection of prostatic obstruction is mandatory to avert suffering and great costs to our patients.

While it has been learned that alternatives to conventional prostatectomy are still limited, my feeling is that retropubic approach is the most ideal and should be the procedure of choice which all general surgeons should learn and master.

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CARCINOMA OF THE URINARY BLADDER

SUMMARY:

In the period between October 1992 and April 1993, the author attended 13 patients who had histologically proven carcinoma of the urinary bladder in Urology Unit of Muhimbili Medical Centre. Ten patients were males and three were females. That gave a (M:F) ratio of about 3:1. Their age range was between 23 and 65 years. Twelve out of 13 patients presented with painless hematuria, 10 patients with lower abdominal pain and 9 patients had suprapubic mass whereas 8 patients presented with increased frequency of micturition. Two patients had bladder cancer staged as T1 tumor, one patient had T2 tumor, and the rest of the patients (11 out of 13) had T3 and T4 tumors. The frequently encountered histological variants of bladder cancer were squamous cell carcinoma (8 patients) (n=13), transitional cell carcinoma (2 patients), adenocarcinoma (2 patients), and anaplastic carcinoma (one patient). Eight patients had palliative radiotherapy, whereas only 2 patients had curative surgery.

INTRODUCTION:

The development of bladder cancer and its association with occupational exposure and certain chemicals was first suspected by a German physician Rehn in 1894(1,9) when he recorded a series of tumors in workers in aniline dye factory. In areas where schistosoma hematobium is endemic especially in

Arabia, North, and East Africa bladder cancer is more common and tends to be squamous in type whereas transitional cell carcinoma is associated with exposure to chemical dyes(1,6).

The carcinoma arising within the urinary bladder is mainly of four histological types. Transitional (greater than 90%), squamous (30-40% in schistosomal endemic areas), adenocarcinoma, 5% and anaplastic variants 2%(1,4). Bladder cancer may take one of the following morphological features. The superficial papillary form usually has good prognosis, an infiltrating solid type that often disseminates with grave prognosis, and carcinoma in situ(7). The pathogenesis and evolution of these various manifestation of urothelial disease remain unclear still. Painless hematuria is the most frequent symptom and when reported by a patient should be regarded as pointing to bladder carcinoma until proved otherwise(1,10). The main modalities of treatment are surgery, radiotherapy, chemotherapy or their combination. However despite aggressive form of therapy approximately half of the patients die of bladder cancer within two years(8).

In this study the author aims at analysing the anatomic and histologic staging of bladder cancer in correlation with its treatment modalities.

CASE REPORT:

S.A. IP No. 738378 a 31 year old male, presented with two months history of painless total hematuria. He had been well

prior to the onset. The hematuria was not associated with lower abdominal pain, passage of threads, or clots. He had no episodes of retention of urine, frequency or dysuria. He admitted suffering from schistosomiasis in the past which was treated with drugs and declared cured. He had not lost weight and his past medical history was uneventful. He was a small scale businessman in Morogoro region. He smoked cigarettes, about a packet and half per day, but stopped 3 years ago. Used to take moderate amount of beer, on the average of two bottles per day. Examination revealed a young man who was moderately pale, not wasted, afebrile and had no peripheral lymph node enlargement. His pulse rate was 82 beats per minute and regular, and his blood pressure was $^{140}/_{90}$ mmHg. The abdomen was not distended, he had no hepatomegaly, the renal angles and hypogastrium were free of mass and tenderness. The genital and digital rectal examination were normal. The other systems were also normal. A clinical diagnosis of carcinoma of the urinary bladder was provisionally made and patients subjected to the following investigations. Urine specimen was taken for cytology, direct smear microscopy and culture. There was no malignant cells in the sample but there were red blood cells, white cells and pieces of necrotic tissue. There was no bacterial growth or schistosomal ova. He had a hemoglobin of 8.3mgdl-1; and ESR of 45 mm in 1 hour, blood film was that of microcytic hypochromic pattern, and moderate degree of anisocytosis. Blood was also taken for grouping and

x-match, and he was put on ferrous sulphate and folic acid tablets in order to correct the iron deficiency anemia. His serum creatinine was 82 umol per litre. The IVU was normal, and cystoscopy revealed papillary, finger like projection in the bladder wall near right ureteric orifice. There was no cystoscopic features to suggest previous schistosomal lesions. Bimanual examination under anaesthesia revealed a normal bladder wall and there was no mass palpable. Three bites of biopsy tissue were taken from the site and he was staged as TINxMx. Histopathologic studies revealed features of transitional cell carcinoma, well differentiated and consistent with grade I disease. The patient was counselled about the disease and its surgical aspect of management. In the pre-operative period he was transfused 2 units of blood and maintained on hematenics and his subsequent hemoglobin was 10.5 $mgdl^{-1}$, the red cell morphology was resumed to normal pattern. Three weeks later he was subjected to transurethral resection and electrofulguration of the tumor. There were three papillary tumors occupying the right lateral wall of the bladder. Resection and electrofulguration by cystodiathermy was done. Care was taken to leave a normal bladder resected margin, and specimen was submitted for histopathologic studies. This showed again transitional cell carcinoma, grade I and non invasive. Three months later he was admitted for recystoscopy which revealed bladder wall free of tumor. He had no more hematuria. He was discharged and instructed to

come back for follow up cystoscopy in 6 months time. He was seen again after 9 months from initial surgery. Hematuria had disappeared otherwise he was asymptomatic and repeat cystoscopy still revealed normal urinary bladder. He was now instructed for follow up cystoscopy 6 monthly for 2 years and then annually.

RESULTS:

The results below in the form of tabulation summarises the main features of the patients in the study group.

Table 1: Shows age versus sex distribution.

Age group	M	F	Total
21 - 30	1	-	1
31 - 40	2	-	2
41 - 50	4	1	5
51 - 60	1	2	3
61 - 70	2	-	2
Total	10	3	13

The peak age incidence was in the 4th decade of life and male patients predominated.

Table II: Shows Clinical features

Symptoms	No. of patients (n)
Hematuria ✓	12
Lower abdominal pain ✓	10
Suprapubic mass ✓	10
Increased frequency ✓	8
Anemia (HB < 10mgdl^{-1}) ✓	7
Passage of necrotic tissue ✓	8
Urgency ✓	5
Weight loss ✓	6
Dysuria ✓	7

Hematuria is the most common symptom in bladder carcinoma.

Table III: Displays the histological type of the tumor.

	No. of Patients (n)
Squamous cell carcinoma	8
Transitional cell carcinoma	2
Adeno carcinoma	2
Anaplastic	1
Total	13

The squamous cell carcinoma dominated the picture.

Table IV: Shows treatment modalities.

Treatment	No. of Patients (n)
Palliative radiotherapy	8
Curative Surgery	2
Chemotherapy & radiotherapy	1
No treatment	2
Total	13

Most patients received palliative radiotherapy for advanced bladder malignancy.

Table V: Shows stages of the tumor (T-status).

Stages (T)	No. of Patients (n)
T1	1
T2	2
T3	3
T4	7
Total	13

More than $^{3}/_{4}$ of patients had T3 and T4 lesions.

DISCUSSION:

Incidence:

Carcinoma of the urinary bladder is a world wide disease but its incidence varies in different parts of the world. It is more common in males than females. The male:females ratio for transitional cell carcinoma is 3:1 whereas that for squamous cell carcinoma approaches 3:2(7).

The author in this study group had a male:female ratio of 3:1 regardless of the histological type of the tumor. The peak age incidence in this series was between 41 and 50 years (Table 1). This implies that many young patient are involved in our area but statistical interpretation is difficult because of small number of patients in this study group. In Tanzania bladder cancer constitutes 4% of all urological malignancies and it accounts for 3.3% of all neoplasms(2,3). The figure mentioned here is low when it is compared with 11.3% from Egypt(12), 9.7% from Zambia(13).

Etiology:

A multitude of environmental factors are now known to increase the risk of bladder cancer(14). Occupational exposure to beta-naphthylamine, 4-aminobiphenyl, and auramine, has been demonstrated to be carcinogenic. These compounds are intermediaries in the synthesis of azo dyes and pigments used in textile, printing, plastic rubber, hairdressers and cable industries. Bladder cancer occur after mean exposure of about 20 years, accounting for up to a 50 fold increased incidence in those exposed.

There is increased incidence of carcinoma of the bladder in patients with schistosoma hematobium infection in their bladder(1,6). It is not known whether the parasite elaborates a carcinogenic agent or instead cause local irritation and inflammation with subsequent hyperplasia and eventually neoplastic changes in the bladder mucosa. The risk of bladder cancer is two to four times greater among male cigarette smokers than among nonsmokers. In this study group, 6 patients had suffered from urinary schistosomiasis during their childhood, 10 patients admitted of being smokers of cigarette. Most smoked between 6 to 24 cigarettes per day. None of the patients had worked in industry dealing with chemicals implicated in bladder cancer.

PATHOLOGY:

Carcinoma arising within the bladder are usually of three cell types and are urothelial in origin. These are

transitional, squamous, and adenocarcinoma (1,7). The vast majority (more than 90%) is transitional in origin. However in schistosomal endemic areas squamous cell carcinoma accounts for 30-40%(16).

In this series squamous cell carcinoma accounted for 8 patients, (n=13), transitional cell carcinoma 2 patients, whereas adeno carcinoma and anaplastic type accounted for 2 and 1 patient respectively (Table III). The higher incidence of squamous cell carcinoma is explained by schistosomal endemicity in our area.

Staging of Urinary bladder cancer.

Jewett	TNM (T)	Biopsy (histology)	Bimanual palpation (EUA)
0	Tis	Carcinoma in situ (limited to the mucosa)	Normal bladder
A	T1	Lamina propria invaded but not muscularis	Palpable/impalpable small mobile bladder mass
B1	T2	Superficial muscle layer involved	Indurated (rubbery) bladder wall.
B2	T3A	Deep muscle layer involved	Nodular, hard, and mobile mass
C	T3B	Involvement of perivesical region	
D1	T4A	Involvement of prostate, vagina, uterus, or rectum (Regional metastasis)	Fixed mass to the prostate, uterus, vagina or pelvic wall.
D2	T4B	Invasion of the bony pelvis and distant metastasis	

N - Nodal status:
No - No lymph node involvement
N1 - Single homolateral regional lymph node involvement,

N2 - Contralateral or bilateral or multiple regional involvement.
N3 - Fixed mass on pelvic wall separate from bladder.
N4 - Involvement of the iliac and para-aortic lymph nodes (Juxta-regional nodes).

M - Metastasis:
Mo - No evidence of metastasis
M1 - Presence of metastasis.
M1a - Occult metastasis as determined by biochemical or other tests.
M1b - Single metastasis in single organ site,
M1c - Multiple metastasis in single organ site, and
M1d - Metastasis in multiple organs.

CLINICAL FEATURES AND DIAGNOSIS:

In this series, 12 out of 13 patients presented with hematuria, and 10 patients presented with hypogastric pain (Table II). Other symptoms observed were increased frequency of micturition, urgency, passage of necrotic tissue and suprapubic pain. All bladder carcinomas usually produce painless hematuria. This is the dominant and sometimes the only clinical manifestation(1,7,10). The hematuria may occur on only one or two occasions, and because the urine becomes once again clear patients often fail to declare the symptoms to their practitioner. All patients with hematuria should be subjected to cystoscopy early even if schistosoma ova are found in the urine(3). In patients with more solid tumors, pain in the pelvis usually heralds extravesical spread. Pain in the loin may suggest presence of ureteric obstruction with the development of hydronephrosis(1). A late manifestation

due to nerve involvement is pain referred to the suprapubic region, the groins, perineum, the anus and into the thigh. The triad of hematuria, pain and frequency was present in 9 patients (n=13), yet more than $^{3}/_{4}$ of patients presented with T3 and T4 bladder tumors (Table V). In early bladder cancer, physical findings are minimal but as our patients presented late, anemia, wasting, and dehydration were common. Moreover 10 out of 13 patients had suprapubic mass(Table II).

Urine analysis determines the presence of infection as evidenced by pus cells. It also determines microscopic hematuria and diabetes mellitus.

The diagnosis of the carcinoma of urinary bladder depends on cystoscopic and histopathologic examination. The majority of the tumor arise in the lateral walls, base, the trigone, around the vesical orifice, so these areas should be scoped thoroughly(16). Multiple biopsies are taken and negative ones in the presence of clinically apparent carcinoma is repeated. Bimanual palpation under anaesthesia is done after cystoscopy to determine the extent of the lesion. In this series 10 out of 13 patients had palpable bladder mass, and in more than $^{1}/_{2}$ of the patients the tumor was involving more than 50% of the bladder. However lateral walls were most commonly affected by the tumor. Some workers in this field observed that lateral walls and trigone of the bladder are most frequently involved(1), Kirei(3), also observed that lateral walls and the base were frequently affected. Other investigations are

urine culture which will confirm infection, serum creatinine will be elevated in the presence of obstructive process, Plain chest radiograph may reveal lung metastasis, and plain abdominal x-ray may demonstrate bladder calcification mainly due to schistosomiasis. An IVU may reveal renal damage, ureteric tumors, hydronephrosis, bladder tumor or diverticulum. All of these does influence patient management. An Angiography may define tumor limits by showing changes in its vascularisation.

Ultrasonography and computed tomographic scanning may help in the assessment of degree of invasiveness and staging, while liver and osseous scan are useful in the evaluation of metastasis(1,17).

TREATMENT:

Surgical intervention is the mainstay of the treatment of carcinoma of urinary bladder, but for surgery to be effective the disease must not be too advanced(2,16). In this series more than $^{3}/_{4}$ (that is 10 out of 13 patients), presented with advanced T3 and T4 bladder lesion (Table v). All of them received palliative radiotherapy. Unfortunately none of them reported for follow up. Two patients who had T2 lesion were subjected to curative radiotherapy. They appeared once in the follow up clinic and had no recurrence. The remaining one was the index patient who had T1 lesion. He was treated by resection and electrofulguration and prognosis was good as

explained above. The best results therefore follow early diagnosis (Tis, T1) and prompt adequate treatment. The selection of a particular method to be employed depends on the stage of the disease, the histological type, and grade of the tumor. For the convenience of planning the treatment of bladder cancer, three categories are proposed.

(a) Carcinoma in situ (Tis),

(b) Superficial (non-invasive) carcinoma not extending beyond lamina propria (T1), and

(c) Invasive carcinoma (T2-4 lesion).

Carcinoma in situ:

The natural history of carcinoma in situ of the bladder is unpredictable and its treatment is still controversial. In most detailed studies, about 55% of patients with in situ lesions had developed invasive carcinoma within five years(20). Furthermore the likelihood that the patient with carcinoma in situ will suffer an invasive lesion in future range from 20-85% depending on the site of the lesion and the degree of atypicality(16). The control can usually be achieved with the judicious use of chemotherapeutic agents. These include intravenous cyclophosphamide, intravesical thiotepa, mitomycin,adriamycin, or doxorubicin. The remission rates ranging between 50-90% have been obtained(21). Should these measures fail cystectomy has been advocated(23).

Superficial (non-invasive) carcinoma (T1).

In this series there was only one patient with T_1 lesion

(non invasive carcinoma) Table V). He was treated successfully by resection and electrofulguration using cystodiathermy. Until when the author was writing, the subsequent clinical follow up was uneventful. The treatment of superficial bladder tumor aim at transurethral resection or electrofulguration of all visible and suspicious lesions(23). Surgical excision enables to control the primary tumor, confirms the superficial nature of the disease provides histologic assessment characteristic for prognostic significance(1). However, papillary tumor exhibit recurrence rate ranging from 30% for solitary tumors to 90% for multiple tumors. Therefore intravesical chemotherapeutic agents like doxorubicin, thiotepa and epodyl have been added to control the primary tumor and to reduce recurrence(22). Tumors that are too large, too many, and inaccessible for resection can either be treated with intravesical thiotepa, or external beam radiation at 6000 rads in 6 weeks(1).

Invasive carcinoma:

The majority of patients in this series had T3-T4 lesions (10 out of 13 patients). Two had T2 lesion and one had T1 lesion. In this study group 8 patients received palliative radiotherapy, 2 had curative radiotherapy, whereas the only one with T1 lesion underwent transurethral resection and 2 refused treatment.

The treatment of cancer with proven muscle invasion remains a subject for debate. Whatever the modality of

treatment, few centres have 5 year survival rate of more than 40% of the patients(1,8). The controversy existing is whether primary surgery (total cystectomy), radical radiotherapy, or a combination of the two offers the best results(24). At our centre the modalities of treatment available are surgery and external radiation while chemotherapy is rarely used. These modalities are used either separately or in combination. When radiotherapy and surgery is used in combination the 5 year survival rate range from 30-50%(24,25). Various regimens of preoperative radiotherapy have been used ranging from 2000 rads in 4 days to 5000 rads in 5 weeks(8).

Preoperative radiation ranging from 4000 - 5000 rads significantly lowers the stage of the tumor in at least 50% of the patients and this is associated with increased 5 year survival rate. For small invasive lesions, local radiotherapy can be delivered by open placement of a radioactive tantalum wire (^{182}Ta) or by implantation of radioactive gold grains ^{198}Au(1). In deep external beam X-ray therapy the cobalt 60 machine has now been extended by utilisation of series of high powered machines (linear accelerator), which deliver the radiotherapy(1). As mentioned above, radical radiotherapy giving 60 Gray (Gy) over a 4-6 week will cause the cancer to melt away in just over 50% of the patients(1,7). (1 Gray is equal to 100 rads).

The great advances has been made in recent years in operative and perioperative care. However cystectomy and

urinary diversion continue to be associated with significant morbidity(8). Partial cystectomy ensuring removal of a 2 cm margin of normal bladder around the tumor has a limited place in the choice of options(23). Before contemplating radical cystectomy (ie removal of bladder, prostate, seminal vesical urethrae), it is important to establish evidence by appropriate investigations that surgical cure is attainable(1). In patients who have received preoperative radiotherapy internal anastomosis of the ureters can pose a problem due to poor healing and it is adviced to exteriorate the ureters onto the skin. Untoward effect at the stoma site include excoriation, encrustation, chronic irritation, and hyperkeratosis which subsequently leads to stomal stenosis(26). The method of urine diversion via a continent ileal reservoir (kock pouch) enable patients to remain continent without the use of external collecting device and thus avoiding problems with stoma or parastomal skin(27). The classic form of internal diversion is ureterosigmoidostomy which has tested popularity for a longer time but its use has been limited by late complications like pyelonephritis, ureteral obstruction, nephrolithiasis, electrolyte disturbances, systemic acidosis and primary neoplasm at the site of the anastomosis(26).

Follow up following treatment for bladder cancer is imperative(1). More than $^{1}/_{2}$ of the patients with superficial lesions will develop single or multiple recurrences either at

the original site or at other parts of the bladder. Therefore follow up cystoscopies is of great value. This is initially performed at 3 monthly intervals over the 1st year, thereafter time interval between cystoscopies is determined as to whether there is presence or absence of the disease. In the former cystoscopy once annually will suffice.

CONCLUSION:

The carcinoma of the urinary bladder is predominant among the young individuals and squamous cell carcinoma is the most frequent histologic variant encountered in our locality. Its prognosis among our patients is gloomy because patients present to their practitioner and urologist late, second squamous cell carcinoma is usually associated with poor prognosis, and third the misdiagnosis is common when the patient is first seen either in the dispensary or at any other level of health care. Therefore health education on the natural history of bladder cancer to rural medical aids (RMA's) medical assistants (MA's) and even to practitioners should be conducted, and all clinicians should be encouraged to raise more concern and hence establish high diagnostic index for the bladder cancer.

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CHRONIC OSTEOMYELITIS:

SUMMARY:

Twenty five patients with chronic osteomyelitis were attended by the author in the period between June 1993 and November 1993 in the orthopaedic and trauma department of Muhimbili Medical Centre. There were 19 males and 6 females with a male to female ratio of 3:1. The most affected age group ranged between ranging 11 to 20 years. Hematogenous type of osteomyelitis was encountered most at a rate of 14 out of 25 patients, while open fractures accounted for 7 patients and the remaining four patients had osteomyelitis arising from trauma and surgery. All patients had localised bone swelling while discharging sinus and localised pain were present in 21 and 16 patients respectively. The average duration of symptoms was 6 months with the range of 5 weeks to 17 years. Staphyloccocus aureas was the commonest organism encountered in 10 out of 18 patients investigated. Chronic discharging sinuses, pathological fractures and contractures were among the complications encountered. The majority of patients, 15 out of 25 underwent saucerisation, and 5 of them had no discharging sinus after two months of follow up.

INTRODUCTION:

Osteomyelitis refers to an infective process of bone. In Muhimbili Medical Centre which is the biggest national and referral hospital, an average of 135 patients per annum are

admitted in ward 10 where infected orthopedic conditions are managed. This figure does not take into account outpatient attendance. That is approximately 4.7 percent of all admissions in the orthopaedic and trauma department. Most of the victims were those in their first and second decades of life(6). (Data source from departmental annual report).

It is unfortunate that most of the patients initially present with chronic osteomyelitis(2). However, it is a fact that most of these patients had an acute phase of osteomyelitis which for one reason or another did not come to medical attention earlier either because the victim reported to traditional healers first or were misdiagnosed in our hospitals (11). Most workers in this field often ask that; is osteomyelitis in our area a community problem?(5).

The answer is not forthcoming and assessment by randomised clinical prospective studies which are lacking may give a clue.

Treatment of chronic osteomyelitis may present a very difficult therapeutic problem(2). However the discovery of antibiotics and its wide use has significantly altered the incidence and course of the disease. Where there is antibiotic failure surgery is the cornerstone of management being it acute or chronic form(10). The large number of patients affected not to mention the main productive hours lost in treatment and the additional prolonged morbidity, prompted the author to study osteomyelitis at least its

clinical, etiologic and management aspect in order to highlight the understanding of this crippling disease of young people.

CASE REPORT:

Mr Y IP No 585599 a 13 year old male was admitted into orthopaedic and trauma ward due to a painful swelling in the proximal third of the right leg of four months duration. He narrated that he had spontaneous, unprovoked throbbing pain in the respective limb. This was progressive, very severe and non radiating. It was later on accompanied with a swelling which was also progressive. He had intermittent low grade fever with loss of appetite. He was treated with local herbs at the onset then with antibiotics in Temeke hospital. The poor progress necessitated referral to our centre. Review of systems did not reveal any problems, and his past medical history was uneventful. He was a Std V pupil with irregular school attendance due to the current disease. Examination revealed a young boy with an antalgic gait, pale, not wasted and not febrile. He had no lymphadenopathy and his pulse rate was 86 beats per minute and regular. The proximal $^{2}/_{3}$ of right leg was thickened, moderately tender with a serosanguinous discharging sinus in the proximal $^{2}/_{3}$ of the anterolateral aspect of the right leg. He had contracture at both right knee and hip joint of 30° and 20° respectively. Examination of other systems was normal. A tentative diagnosis of chronic

osteomyelitis was made and investigations performed revealed the following:

X-ray of proximal $^{2}/_{3}$ of right tibia demonstrated irregular thickened cortex with osteolytic process, sequestrum and a gradually evolving involucrum. The blood picture revealed elevated ESR of up to 54 mm in 1hr (Westergren method) and a normal white blood cells count of 9600 mm^3. He had mild anemia with hemoglobin of 8.5 gdl^{-1}.

At surgery an 8cm long anterolateral incision was made in the proximal $2/_{3}$ of the leg and a tunnel developed between a sequestrum and soft tissue through which the sequestrum was extruded. In this way the marrow cavity was exposed and pus locules broken and marrow cavity extensively curetted. The necrotic tissue in the vicinity were removed and sinus tracts were excised. The pus swab sent for culture, yielded staphloccocus aureus sensitive to cephalosporines, erythromycin and cloxacillin. The patient was put on erythromycin tablets 500mg thrice daily for three weeks. Saucerisation was effected that is deroofing and bevelling of the margin cavity. Irrigation with hydrogen peroxide and normal saline was performed, the wound left open, dressed with vaseline gauze and a compression bandage applied firmly. His postoperative period was uneventful, and dressing changed on the third day and thereafter on alternate days. He was discharged on the third post operative day and his two consecutive follow up at outpatient clinic in 3 weeks and 6

weeks interval revealed good progress. He had a steadily good recovery and the wound now looked small with gradual epithelialisation creeping from the margins. There was no discharge and it was judged that the wound would close spontaneously.

RESULTS OF PATIENTS WHO HAD CHRONIC OSTEOMYELITIS:

NB: (Children below ten years are not included).

Table I: Shows age and sex distribution.

Age group (years)	SEX		Total
	M	F	
11 - 20	11	4	15
21 - 30	5	2	7
31 - 40	3	-	3
41 - 50	-	-	-
>51	-	-	-
Total	19	6	25

Osteomyelitis is a disease of young age group and affected males predominantly (M:F of 3:1)

Table II: Shows predisposing factors to osteomyelitis.

Factors	No. of patients (n)
Hematogenous	14
Open fractures	7
Post operative	2
Trivial injury	2
Total	25

Hematogenous source accounted for more than half of the chronic osteomyelitis cases.

Table III: Shows initial presenting symptoms and signs.

Symptoms/signs	No. of patients (n)
Localised swelling	25
Localised pain	16
Discharging sinus	21

The symptoms or signs of chronic osteomyelitis are mainly localised rather than systemic.

Table IV: Displays bones involved in chronic osteomyelitis.

	Body side affected	
Bone	RT	LT
- Tibia	2	4
- Femur	6	7
- Humerus	4	1
- Radius	1	1
- Ulna	-	1
- Calcaneum	2	-

The Femur was the commonest bone involved.

Table V: Shows organisms isolated from culture of pus.

Organism	No. of patients (n)
Staphloccocus aureus	10
Proteus spps	3
Pseudomonas aureginosa	1
Escherechia coli	1
No growth	1
	2
Total	18

Staphloccocus aureus was found to be the commonest causative agent in chronic osteomyelitis, regardless of the predisposing factor.

Table VI: Shows modalities of treatment.

Mode of treatment	No. of patients (n)
Saucerisation and Antibiotics	15
Sequestrectomy and saucerisation and Antibiotics	4
Antibiotics alone	2
EF and Bone graft after saucerisation and sequestrectomy	4
Total	25

Saucerisation was the most common performed surgical procedure.

EF = External Fixator.

DISCUSSION:

Incidence:

Osteomyelitis constitute about 5 percent of all admissions in the orthopedic and trauma wards of Muhimbili Medical Centre. This is apparently a higher prevalence as compared to a decade ago when Kessi(3) reported an incidence of 1%. In this series the age group that was most affected was in the first and second decades of life (Table 1). In most studies it has been shown that the disease affect all age groups but the most common are those aged 10-11 years(5), and 9-10 years(11) in a study by Nade(6). Males were affected more than females at a ratio of 3:1 (Table 1).

Therefore, while there is no age group that is immune, osteomyelitis seems to be dominant in the younger age groups.

Etiology:

Very often the commonest bacteria incriminated in osteomyelitis is staphloccocus aureus. Most studies reveal that in more than 80 percent this organism was responsible(6,11). In this series staphloccocus aureus accounted for 10 out of 18 patients with positive cultures

(Table V). Other organism encountered in this series were proteus spps. 3 out of 18 patients, Escherichia Coli and Pseudomonas aureginosa 1 patient each and there was no bacterial growth in 3 patients. In the rest pus swabs were not taken mainly because of lack of necessary material. The source of such organism was apparently an infectious process of either hematogenous or post traumatic source (Table II). Fourteen out of 25 patients had hematogenous osteomyelitis whereas, 7 had osteomyelitis as a result of an open fracture, 2 of them had osteomyelitis post-operatively, and the other 2 had trivial trauma without obvious features of a major trauma (Table II). The femur was the commonest bone involved accounting 13 out 29 (Table IV). Other bones which were involved in osteomyelitis were tibia, humerus, radius, calcaneum and ulna.

PATHOPHYSIOLOGY:

The relationship between host and parasite determines the clinical course in osteomyelitis(4). Host factors which bears clinical impact include anatomical properties of a bone, cellular and humoral immune mechanism, and reparative power. Bacterial factors entail area of entry into the host, localization of infection and virulence of the micro-organism. Pathway through which bacteria reach the bone include:-

(i) hematogenous route from a distant focus of infection.

(ii) post traumatic or post operative, that is external source.

(iii) Extension from adjacent soft tissue infection.

The source or predisposing factors to osteomyelitis has been outlined in table II on page 147 Pathogenesis in hematogenous osteomyelitis is a function of age(6). In children of age range 1 to 16 years hematogenous type occur in metaphysis of long bones. Blood vessels and capillaries hyperangulate at the growth plate as they lead to wider veins. The latter drains into bone marrow sinuses which has a larger

caliber and eventually encourage stasis and tendency to bacterial emboli(5).

Blood borne bacteria, now lodge in the vessels in metaphyses where infection is established and an inflammatory process takes place between the growing bony columns. As there is no room between rigid bony walls and accumulating inflammatory exudate, thrombosis of nutrient vessels occur(1). Edema in the area force fluid and organisms through haversian and volkmann's canals and lift the periosteum thus interfering with the vascular connection of the cortex. Thus the inner cortex become ischemic due to thromboses of the nutrient artery and outer cortex become ischemic due to periosteal lifting. This leads to death of cortical bone and formation of sequestrum if the inflammatory process is allowed to proceed. Joints may be involved through trans-epiphyseal vessels but normally epiphysis and joints are protected from this process by natural anatomical barrier that is cartilage and joint capsule(6). In infants, infection starts in the metaphysis then spreads to the shaft, epiphysis and joint space rapidly leading to pan osteomyelitis. Pus penetrate through the periosteum to form an extraperiosteal abscess.

In a newborn period the common portal of entry is the umbilical cord. Bacteria in this age group transverses very well the transphyseal vessels. It is now established that neonatal growth plate (physis) are not resistant barrier as classically taught. These transphyseal vessels disappear later in childhood(5,6,20).

In adults hematogenous osteomyelitis is almost unknown. Absence of growth plate, free communication between metaphyseal and epiphysial vascular system and few venous sinuses makes provision of vascular stasis rare indeed. When it does occur it frequently affect the spine(6) and pattern of spread is different as growth plate barrier is no longer present, so joints are frequently affected and much bone substance may be involved making them more vulnerable to

pathological fractures(4). In adults periosteum is firmly bound to the underlying bone and metaphyseal cortex is thicker, such factors discourages subperiosteal abscess but rather formation of extra-osseous or soft tissue abscess and fistula as the pus erodes through the periosteum.

Harris and Kirkaldy(7), described a primary subacute pyogenic osteomyelitis whereby he questioned existence of a well famous but a rare condition narrated by Garrie in 1893, of sclerosing non-suppurative osteomyelitis. There is also thickening without tendency to sequestration or fistula formation. The pathophysiology of post-traumatic osteomyelitis lie on the following four factors(16).

(a) Extent of soft tissue damage and impairment of blood supply,
(b) Inoculation of bacterial flora,
(c) Instability of the fracture site and
(d) general defensive aspect of the host.

CLINICAL FEATURES AND DIAGNOSIS:

Chronic osteomyelitis is a common sequelae of acute osteomyelitis especially so when the latter is mismanaged or misdiagnosed(4). Therefore acute osteomyelitis is a condition which a clinician needs to exercise a high degree of suspicion in the diagnostic process which is essentially clinical(6).

Diagnosis of acute osteomyelitis is made on the basis of acute local bone tenderness and a positive blood culture, or in the absence of the latter, increase in body temperature, local bone tenderness, local limb swelling and at least one of the following local signs, that is local erythema, local increase in skin temperature and decrease in range of movement of adjacent joints(6).

"Any unwell infant or child with an area of local bone tenderness has an acute osteomyelitis until proved otherwise and should be treated as such".

In this series 25 patients were attended by the author.

Among them, all presented with localised limb swelling, whereas 21 had discharging sinuses, and 16 of them had localised pain (table III). It will be revealed later in the discussion that the above symptoms or signs of osteomyelitis are indeed long standing, mutilating and devastating to our patients because not even the most radical surgical intervention will guarantee complete cure, but instead remission and recurrence is very common in these victims. Patients or relatives often wonder and ask if complete cure is at all possible(2).

One of our patient in this study had **"chronic recurrent multifocal osteomyelitis"**. This is an unusual inflammatory process involving multiple osseous sites often recurrently. Antibiotics and anti-inflammatory agents are not useful. It is a self limiting condition but exacerbations can occur. Hemogram and histopathological studies are non specific, and children are predominantly affected(9).

Nade quoted Harris and Kirkaldy(6), who described a primary subacute pyogenic osteomyelitis and in doing so questioned the existence of a rare condition described by Garé in 1893 of sclerosing non suppurative osteomyelitis.

INVESTIGATIONS:

Bacteriology

Pus swabs from pus discharging sinuses, abscesses, or fistula may provide a satisfactory clue as regards the offending organism but negative cultures are not uncommon. In this series pus swabs were taken pre-operatively in 18 patients and staphloccocus aureus was the predominant isolate(Table V). Studies by other workers in this field reveal that Staphlococcus aureus is involved in about 80% of cases(6).

Hematology:

Erythrocytes sedimentation rate (ESR) is usually elevated as is the white blood cells count (WBC) which generally shows

a neutrophil leucocytosis. About three quarter ($^3/_4$) of our patients had significantly raised ESR and WBC results were difficult to interpret. In 6 patients in whom follow up was possible ESR dropped after surgical and antibiotic intervention.

Radiology:

Although there is no radiological bone manifestations until in about 10 days, careful attention to soft tissue shadows may give a clue towards the diagnosis(6). Acute septic arthritis can be differentiated from acute osteomyelitis in this way. In the former distension of joint space is evident. In cellulitis the soft tissue density is beneath the skin and at a distance from the bone. The first radiological feature in osteomyelitis is periosteal new bone formation then follows bone destruction, osteoporosis and formation of sequestrum.

The majority of our patients in this series had the above classic radiologic features of osteomyelitis. Four out of 25 patients had just bone thickening and sclerosing. Perhaps this is the sub acute pyogenic type argued by Harris and Kirkaldy(7).

Histopathology:

Biopsy is quite a useful armamentarium, particularly in situation in which osteomyelitis is to be differentiated from a neoplastic process. None of our patient presented a diagnostic problem and therefore no histopathologic studies were done.

Radionuclide imaging:

This type of sophisticated investigation may improve diagnostic accuracy but it is also associated with false negative and positive results as well as technical limitations. Technetium 99^m (labeled methlene diphosphonate), (^{99m}Tc-MDP) is commonly employed, but Ga-citrate is more specific as far as infection is concerned(6).

Serology:

The contribution of these tests to the diagnosis of osteomyelitis is questionable as regards their sensitivity and specificity. Therefore are not commonly used for diagnostic purposes.

TREATMENT:

Until todate, in our clinical set up most patients with acute osteomyelitis will almost certainly proceed to chronic osteomyelitis. This is due to the deficiency in the management as already narrated above. Therefore treatment of acute osteomyelitis is a critical step as regards prevention of its chronic counterpart(6).

Over decades treatment of acute osteomyelitis has been a matter of great controversy. The most debatable issue which most workers in this field ask is **"Is surgery necessary"?** in the acute form(6).

Update radicalism is loosing grounds and as such minimal surgery is done after localisation of an abscess(11). This include an incision centered on the point of maximum tenderness to allow release of pus in the soft tissue and beneath the periosteum and excising of necrotic tissue without removal of the bone. In this protocol antibiotics is a supreme adjunct that control infection. Gillespie and Mayo indicated that 80 percent of patients with acute hematogenous osteomyelitis were cured by primary treatment, that is conservative approach(10). This include antibiotics, immobilisation (limb on pillows), and general supportive treatment. Their study disputed the conventional teaching that early surgical intervention is associated with fewer complications, and indeed it is inescapable to deny that the rate of failure was higher in those children who underwent surgery(11). This was the form of treatment advocated by Mollar and Piggot(11). Furthermore Cole et al(22), demonstrated clearly that non operative treatment was curative

in 78 percent of patients and therefore the views of Mollar and Piggot cannot be supported.

However this being the situation in acute osteomyelitis the protocol in chronic form is essentially surgical i.e.saucerisation/sequestrectomy. This takes the form of adequate excision of diseased tissue (including bone itself), obliteration of dead space by plastic reconstruction, skin coverage where suitable, and stabilisation of the diseased bone either by a plaster cast or a metal fixation as dictated by the situation (6,23). Fifteen out of 25 patients had saucerisation done, whereas 4 patients underwent saucerisation and sequestrectomy. All patients had antibiotics added to surgery and 2 received antibiotics alone (Table VI). 4 patients required external fixation for bone stabilisation and 3 out of those 4 had iliac cancellous bone graft performed after healing of the bone from osteomyelitis. The predominant isolate was Staphloccocus aureus and was sensitive to penicillinase or B-lactamase resistant penicillin (semisynthetics) like cloxacillin, flucloxacillin and methicillin. The organism (Staphloccocus) was also sensitive to erythromycin and 19 patients received erythromycin while the remaining has cloxacillin administered to them.

COMPLICATIONS:

Affection of Limb Growth:

Some workers in osteomyelitis have followed patients from infancy all the way to adolescent and found that shortening affect each of them. However shortening is important clinically when it is 5cm or more, and affect only a portion of growth plate or one member of the pair of bones in the forearm or leg giving rise to angular deformity in the limb(17). Correction of limb shortening of more than 5cm can be effected by Ilazarov's or other types of external fixators by distraction-compression technique(20).

Deformity:

Unequal destruction of lower femoral epiphysis leads to valgum, varus, or recurvatum deformity(17). Other deformities are contracture of adjacent joints, and excuvatum. All interfere with normal bone growth. Valgum and varus deformity are treated by corrective osteotomy (c.o.) at cessation of growth. Two boys were found to have valgum and one had varus deformity and were awaiting appropriate treatment. Five boys and 1 girl had contractures at knee joint. They were put on plaster cast after manipulation under general anaesthesia. Two of them had already shown good result and the remaining were still on treatment. Excuvatum and recuvatum are also treated by corrective osteotomy at age when epiphysis has fused. One boy had genu recuvatum and he was scheduled for corrective osteotomy at appropriate age. Other complications are joint effusion and chronic suppurative arthritis, chronic sinus, amyloidosis, and malignant changes.

Prognosis:

The risk of infection falls rapidly as long as the duration free of infection increase(6). Mayo and Gillespie(10) found that if the recurrence rate was 20 percent, then a child who had no recurrence by 6 months has only 6-8 percent chance of further trouble, and if no recurrence by a year then a risk of further trouble is as low as 3-6 percent. Osteomyelitis involving the tibia, lower femur and metatarsal is associated with high failure rate at treatment(6). Such findings are important in patient and relative counselling process. However chance of cure also depend on virulence of the organism, host defence immune status, antibiotic choice and duration of treatment with it, and promptness of instituting proper therapy after onset of symptoms.

CONCLUSION:

Update more cases of chronic osteomyelitis are still seen in our clinical set up than acute type. The implication is that either patients suffering from acute osteomyelitis are being mismanaged, or victims themselves are ignorant of the disease. Therefore health education to our community is important and more emphasis to junior clinicians in training and inservice, to lift up their ability towards diagnosing and managing the acute form of this disease appropriately and timely.

Road traffic accidents in our community is apparently on the increase. Therefore sustained efforts to educate both drivers and traffic personnels on the means of curbing down motor accidents should be initiated and encouraged. Furthermore meticulous, aseptic, and atraumatic orthopedic technique should be emphasized to our surgeons and orthopedic surgeons performing bone surgery.

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THE MANAGEMENT OF CONGENITAL CLUB FOOT AT MUHIMBILI MEDICAL CENTRE

SUMMARY:

Fifty one patients with club feet were attended at the Rehabilitation Centre in Muhimbili Medical Centre, in the period between August and November 1993. There were 35 males and 16 females with a (M:F) ratio of approximately 2:1. Their age ranged between 3 weeks and 19 years. Nineteen out of 51 patients had bilateral talipes equinovarus deformity (TEV). There were 23 patients (n=51) with moderate degree of club foot (CF), and 21 with mild degree, whereas only 7 patients had severe form of CF. Of the 44 and 17 patients subjected to conservative and operative treatment respectively, 22 and 11 had satisfactory results. Among the 22 feet, 11 underwent elongation of tendo achilles (ETA) and Posteromedial release (PMR), whereas 7 feet were subjected to ETA and posterior capsulectomy (PC). ETA alone was performed in 3 feet, and complete subtalar release (CSTR) in 1 feet.

INTRODUCTION:

Club foot (CF) denotes a loose term used to describe a number of different abnormalities pertaining to the shape of the foot. There are four components of CF(1,19).

(a) The hind foot cannot be fully dorsoflexed and so is fixed in a position of plantar flexion. Such a deformity is described as equinus,

(b) the hindfoot is also fixed in a varus position. The sole is drawn inward and looks medially and upwards,

(c) the forefoot is adducted and inverted, (d) the forefoot is supinated and externally rotated.

The synonym for club foot is talipes and descriptive nomenclature for clubfoot combines this term and above deformities in a latin manner and the term "Talipes Equinovarus" (TEV) have been adopted.

The incidence of TEV in our community is apparently high. In their study Ikler and Kessi(5) had 92 patients over 8 months duration at Muhimbili Medical Centre which is a central (referral) hospital. However incidence in the country is not known. Nunes and Dutra(6) found an incidence of 4.2 per 10,000 live birth in a collaborative Latin American study of congenital malformations. The etiology of CF is still controversial. The most favourable theory holds that there is imbalance between invertor plantar flexor and evertor-dorsiflexor muscles(7,8). It has been proposed that osseous defects especially to the neck of talus is the principle defect(14).

The treatment of TEV is two fold. Conservative (non operative) and operative approach(12). The mild and often the moderate forms of deformity are amenable to conservative treatment whereas severe forms are subject to operative intervention(9). The earlier the age at which surgery or treatment is offered the better the quality of results(19).

In this study the author aims at studying the effect of different treatment modalities in relation to severity or degree of CF.

CASE REPORT:

X.M. IP No 763423, a 2 months old female was referred to clubfoot clinic from pediatric surgical outpatient clinic because of deformity of both feet. The mother had uneventful full term vaginal delivery but she noticed that the feet of her son were deformed such that the dorsum of the feet and sole were facing anteriorly and medially respectively. She had a normal antenatal history. The child had normal birth weight, weight gain, and had no other malformations. The other siblings and family members were alive and well.

Examination revealed a baby who was healthy. The occipital frontal circumference (OFC) was 35cm and all primitive reflexes were normal. The lower limbs had normal tone, power, sensation, as well as spinal contour was normal. Both feet were adducted, supinated, and inverted, such that the soles were facing medially and dorsum anteriorly. By manipulation of the feet into normal position the deformity corrected partially. The rest of the regions and systems were normal. A diagnosis of moderately severe congenital, bilateral TEV was made. He was subjected to treatment in the form of manipulation and serial plaster cast (P.O.P.) application pending reconstructive surgery. The child was

placed in supine position and deformity was corrected as described below, and maintained in above knee P.O.P. The following technique was adopted. To the right foot, the adduction and inversion deformity was corrected by gentle abduction and eversion forces exerted by the right hand of the clinician, and the equina-supination deformity of the hindfoot was corrected by plantargrading and pronation forces. The left hand was used to correct the varus deformity towards position of valgus. The knee was flexed at 70° and serial P.O.P. applications were performed fortnightly, the aim being to minimize deformity by making the foot supple and ease subsequent surgery. After six series of plaster casting the forefoot deformity was considerably corrected but hindfoot deformity persisted. The patient was then planned and prepared for ETA and posterior capsulectomy. His hemoglobin and full blood picture (FBP) were normal and sickling test was negative. Both lower limbs were disinfected for two consecutive days before the day of surgery, and afterwards disinfected again and wrapped in a sterile towel before going to operation theatre. About 6cm in length posteromedial longitudinal incision was made on each lower limb approximately a centimetre medial to achilles tendon as far as down to the upper aspect of the heel. By sharp dissection using a scalpel and scissor tendo achilles was isolated. The Z-plasty procedure was performed as follows. Through its central aspect a longitudinal incision was carried out

downward the heel. The medial sleeve was cut inwards at its distal end whereas lateral sleeve was cut outwards at its proximal end. Posterior capsule was released by use of a scissor. The correction was found satisfactory when the foot resumed to normal position by manipulation. The tendon was now lengthened and the end of the two sleeves were apposed together and sutured using vicryl no 3/0. The primary closure of the wound was done and correction of the deformity was maintained in an above knee plaster cast with both knees at 70° of flexion. The P.O.P. was changed after 2 weeks and stitches were also removed. Thereafter it was changed fortnightly and the deformity was gradually manipulated and corrected to normal position. After 5 sessions of such manipulation the feet assumed a normal attitude and position without plaster cast in situ. The infant had not started walking so the mother was instructed on daily physiotherapy which kept the feet in normal position until when he will be fitted with dynamic splints as he starts walking. The mother was directed to bring the child to the club foot clinic for follow up. It is generally adviced to monitor the child up to the age of 7 years. Her two subsequent visits at 6 weeks and 3 months after surgery did not reveal a problem.

RESULTS OF PATIENTS WHO HAD CONGENITAL CLUB FOOT:

Table I: Shows age versus sex distribution.

Age group (months)	Sex		Total
	M	F	
0 - 4	15	8	23
5 - 9	10	3	13
10 - 14	4	3	7
15 - 19	3	1	4
>20	3	1	4
	35	16	51

More than 50% of children presented with clubfoot in their first 5 months of life.

Table II: To show age at initial presentation to the clinic in relation to the degree of TEV.

	0- 4	5 - 9	10-14	15-19	≥20	Total
Mild	14	5	2	-	-	21
Moderate	7	6	4	3	3	23
Severe	2	2	1	1	1	7
Total	23	13	7	4	4	51

More than 40% of the children who presented in the first six months of life had mild to moderate degree of clubfoot.

Table III: Shows result of conservative treatment.

Outcome	Degree of deformity		
	Mild (n)	Moderate (n)	Total
Excellent	9	3	12
Good	5	5	10
Poor	3	7	10
On treatment	3	6	9
Lost to follow up	1	2	3
	21	23	44

60% (per cent) of children (26 out of 44) had satisfactory results.

Key:

Where the outcome was excellent and good, results were considered as being satisfactory, and poor results as unsatisfactory or failure.

Excellent=Normal function and appearance of the foot.
Good = Normal function and plantigrade foot. No fixed deformity and there is ability to dorsoflex and evert the foot into a neutral position.
Poor = Activity of the foot is limited in any way. There is residual fixed deformity of hindfoot equinus, heel inversion and forefoot varus.

Table IV: Shows results of operative treatment.

Outcome	Degree of deformity		
	Moderate (n)	Severe (n)	Total
Excellent	1	3	4
Good	3	4	7
Poor	2	1	3
On treatment	1	-	1
Absconded	1	-	1
Lost to follow up	-	1	1
Total	8	9	17

About 70 per cent of children (11 out of 17) had satisfactory operative results.

Table V: Shows mode of surgical procedure performed.

Procedure	Number of feet (n)
ETA and PMR	11
ETA and PC	7
ETA	3
CSTR	1
Bone surgery	-
Total	22

The ETA and PMR was the most frequently orthopedic procedure carried out.

KEY:
ETA = Elongation of tendo-achilles.
PC = Posterior capsulectomy.
PMR = Posteromedial release.
CSTR = Complete subtalar release.

DISCUSSION:

Incidence and epidemiology:

In this study the author attended a total of 51 patients with congenital club foot in a duration of 6 weeks. There were 35 males and 16 females. That constitute a ratio of about 2:1 (Table I), and their age ranged between 1 and 37 months. Nunes et al(6) in a retrospective study noted the same ratio. There were 19 (n=51) patients with bilateral CF whereas the remaining 32 were unilateral. CF is a widespread orthopedic condition. Its incidence at birth varies in different studies. It is 1 in 10^3 in Stewarts(2) survey to 3 in 10^3 in Alberman's(3) study, and Parekhy from Zambia reported that it is the commonest congenital orthopedic deformity(4). At MMC a series of 92 cases were reported by

Kessi et Ikler(5). It is now such a common problem that a clubfoot clinic is established under a joint supervision of both pediatric surgery and orthopedic surgical firms at Muhimbili. Todate the clinic receives about 190 new cases in a year and a total of about 550 cases are attended in the clinic per annum.

CLINICAL FEATURES AND DIAGNOSIS:

Congenital clubfoot is readily diagnosed at birth. If the deformity is severe the diagnosis is even more obvious, but mild deformities may prove difficult to distinguish from the normal because a newborn infant tends to posture the feet in a position of equinovarus(1). In the first four months of life, the author noted 23 patients (n=51) with clubfoot. Fourteen had mild form whereas 7 had moderate degree and 2 of them had severe form of club foot (Table II).

An approach to treatment varies with the severity or degree of club foot(12). The deformity of mild degree is easily correctable by simple manipulation and serial P.O.p. casting. Those of moderate degree only forefoot deformity can be corrected by manipulation whereas severe form of deformity neither forefoot nor hind foot deformity can be corrected by manipulation. Neglected club foot in older children and resistant or rigid arthrogrypotic and myelodysplastic clubfoot may only be controlled by surgery(9,15,16). By overall, 44 out of 51 patients seen in this series had mild and moderate

degree of club foot. While 21 patients had mild 23 had moderate form. The remainder that is 7 patients had severe degree of club foot (Table II).

Unilateral club foot (CF) was noted in 32 patients whereas 19 patients had bilateral type. It has been observed that where the clubfoot was bilateral the degree of severity was even greater than in its unilateral counterpart.

TEV can be put into two groups;

(a) The idiopathic or congenital variety and

(b) rigid or stiff variety.

The last one may be associated with neurogenic conditions and is difficult to correct by non-operative means. The first variety account for 75% of cases and does yield rather easily to conservative treatment(9,15). The second type is associated with small OS calcis, small heel, and there is transverse crease in the mid-foot due to contracture of plantar aponeurosis. The author in this series noted 48 patients with idiopathic CF whereas only 3 were rigid variants of CF. Among the rigid type 1 was arythrogrypotic CF and 2 were myelodysplastic type with spinal bifida.

Clinically in both type the foot is held in right angle to the ankle and long axis of tibia. The heel prominence is lost and if the infant is held erect and supported the weight is borne on the dorsolateral aspect of the foot rather than on the plantar surface. As mentioned earlier diagnosis of TEV is usually a straight forward process. A normal newborn foot has

a greater range of dorsiflexion and eversion than a normal adult foot as it can be dorsi flexed until the dorsum touches the anterior aspect of the shin(1,19). If this is impossible a minor degree of CF exist. So as part of examination of a new born the feet should be subjected to full range of movement. If CF is detected, the spine, other joints, and central nervous system should be examined thoroughly to exclude myelodysplasia, arthrogryposis and other neurological conditions respectively. Approximately 70% of patients in this series were diagnosed immediately at birth by birth attendants, and referred to CF-clinic. This should be encouraged especially when taking into consideration that treatment of CF at late age is a difficult task. Because the bones of the foot are at this early stage largely cartilaginous radiograph is useless in diagnosis. In older children and in adult patients diagnosis depends on the presence of deformities already mentioned in the section above. However the radiographs to assess the malalignment and realignment in pre-operative and post-operative period offers a useful guidance. In this study group, all patients aged one year and above had radiographs of lower limbs taken to assess the above parameters.

TREATMENT:

The approach to club foot treatment is either conservative or operative.

Conservative approach:

Of the 51 patients 44 were subjected to conservative treatment. Among the 44 patients, 21 and 23 had mild and moderate degree of club foot respectively. Of 32 patients who had received treatment 22 had satisfactory results (Table II). Nine patients had unsatisfactory results, whereas 12 patients were still on treatment, and 3 patients were lost in follow up. The implication from above results is that the milder and moderate forms of TEV are readily responsive to conservation therapy (non operative), but nevertheless some are resistant to this approach and operative measures has to be undertaken as it did happen in this study group. Lovell et al;(11) noted that more than 80% of their patients had satisfactory results following conservation therapy. Success requires that the foot show correction both clinically and roentgenographically. It also implies that the foot is fully flexible, normal in appearance, painless, and accept conventional shoes(9,11). In corrected clubfoot there should be no restriction of motion at the subtalar joint with a dorsiflexion of 15°-20° and heel is slightly valgus. The forefoot can also be abducted slightly beyond midline. If affection is unilateral its appearance should be similar to the contralateral foot. Deviation outside these parameters need correction. Sixteen patients in this series, were seen at CF-clinic with such good results that they were able to put on conventional shoes and function of their feet resumed to normal.

Treatment should be initiated as early as possible preferably within the first 3 months of life. In this study group more than 80% of children whose treatment was instituted in the first nine months of life had satisfactory results. Millie(27) in his retrospective study noted about 90% success rate in children with mild and moderate CF. All presented in their first 6 months of life.

OPERATIVE TREATMENT:

The operative approach is two fold in CF surgery. This include;

(a) soft tissue surgery, and

(b) Bone surgery.

Indications for surgical intervention include failure in conservative treatment, recurrent, and neglected severe degree of CF, rigid or stiff club foot commonly associated with arthrogryposis, myelodysplasia and other neurological disorders like cerebral palsy(10). Very often soft tissue surgery will suffice in correcting CF deformity and only rarely bone operation will be indicated. The latter is particularly indicated in long standing neglected, and severe degree of CF, and where soft tissue operation has failed(15).

Soft tissue surgery: Some workers in CF surgery advocates multi-stage surgical release of defective elements in idiopathic CF(17). So corrected first is the forefoot adduction and hind-food varus. The argument being that if

dorsiflexion (equina) is corrected before forefoot deformity is dealt with, the foot may develop Rockerbottom deformity(11). However most authors now advocates a single stage surgical release of all defective elements of club foot(16). Such procedures have been achieved to correct all deformities and results into flexible plantigrade foot. Principally there are three groups of contracture in CF which must be corrected. These are posterior, medial, and subtalar contractures.

(a) **Posterior contracture:** Involve posterior capsule (PC) of ankle and subtalar joints, achilles tendon, posterior talofibular and calcaneofibular ligaments.

(b) **Medial contracture:** This involve deltoid, and calcaneofibular ligaments, talonavicular joint, the capsule, and tendon sheath of posterior tibial, flexor halluces longus, and flexor digitorum longus.

(c) **Subtalar contracture:** This involve anterior talocalcaneal and talonavicular capsules, interosseous and bifurcated ligaments.

In this series, of the 17 patients subjected to surgery 11 had satisfactory results, whereas 3 patients had poor results (Table IV). ETA and posteromedial release were performed in 11 feet, (n=22) whereas 7 feet were subjected to ETA and posterior capsulectomy, 3 feet to ETA alone, and 1 foot to complete subtalar release (CSTR). In his prospective study De Rosa(22) reported 103 successful operations performed in

children. Most of those operations were ETA and posteromedial release.

SURGICAL PROCEDURES IN SOFT TISSUE SURGERY:

(i) **Posterior Release (PR):** Posterior release alone is indicated in congenital TEV. Through medial incision in the posteromedial aspect of ankle joint, sectioning of components of posterior contracture (supra vide), allows correction of equina deformity of talus and permit anterior end of calcaneum and talus to ascend with restoration of "**talocalcaneal**" angle(15). The guarding principle as regards the extent of surgery is that each time one component is released the foot is manipulated to see if deformity has been corrected in which case no more release is performed. The forefoot adduction is corrected by manipulation and maintained in a POP cast. Following PR-surgery above knee POP is applied to maintain the correction. The ankle joint is kept at 90° for 6 weeks then followed by foot stretching exercises together with application of night splints, in order to maintain the foot in constant anatomical position. The optimum age as an upper limit in this procedure is 7 years. The younger the child the better the results(21).

(ii) **Posteromedial release (PMR):** PMR is indicated in congenital CF as well as resistant or recalcitrant CF(16,21). Very often the procedure is combined with ETA

and PC in difficult cases in order to achieve better results. All components of medial contracture are released and severed tendons are lengthened by Z-plasty technique as described above.

(iii) **Complete subtalar release (CSTR):**

CSTR is a release of the subtalar joint (talo calcaneum) and the talonavicular joint that corrects calcaneal rotation, a major deforming force in CF as well as other deformities of the forefoot and hind foot(23). Indication for CSTR include failure of conservative treatment, unsatisfactory surgical results with resistant varus deformity and resistant CF. Contraindications include radiographic evidence of flat top talus, and uncorrected anterior ankle contractures. The key steps include marking the knee for later alignment with the foot, superficial medial dissection, posterior dissection, lateral dissection, and deep medial dissection. CSTR may be supplemented by one or more of the following procedures. Metatarsal osteotomy, calcaneocuboid capsulectomy, calcaneal wedge osteotomy, and plantar release. Pinning of bone segments with Krischner wire fixation, casting, and follow up as mentioned above completes the procedure.

(iv) **Complete Plantar Release (CPR):**

This consist of release of adductor halluces tendon, plantar aponeurosis, the short toe flexors, and abductor

digiti minimi at their attachment to the calcaneum(17). It is indicated in resistant and neglected CF and as a supplemental procedure in CSTR. Medial incision is found appropriate.

(v) **Transfer of tendons:** Tendon transfer in CF surgery is indicated in spastic CF of cerebral palsy and other neurological disorders associated with club foot, relapsed and recalcitrant CF(11). Tibialis tendon is transferred to the dorsum foot in the region of 5th metatarsal base. This is done after correction of forefoot adduction and other structural deformities. The latter can be achieved by serial POP casting and wedging. A split anterior tibial tendon transfer is found more appropriate. This is done by detaching and moving the lateral half of the tendon to the 2nd and 3rd cuneiform bones(19). Another tendon which may be transferred is posterior tibialis tendon. The tendon is transplanted through interosseus membrane anteriorly on 3rd cuneiform. Lovell(11) found that the insertion of tibialis posterior tendon were abnormal in 56 recurrent CF. Resection and retransplanting to 3rd cuneiform together with posterior release approach were found to be useful in one seating to correct the equina(24).

COMPLICATIONS:

(i) **Avascular necrosis of the talus or whole foot.** Anomaly of the blood vessel may exist with absence of anterior vessels (Dorsalis pedis artery). In this situation when posterior tibial vessels are compromised then catastrophes like avascular necrosis may occur and cause amputations. Therefore during surgery neurovascular bundle should be carefully safeguarded.

(ii) **Valgus hind food (calcaneal deformity).** This result from over correction. To avoid this interosseous talocalcaneal ligament is not sectioned and also posterior tibial tendon is not sacrificed but lengthened by Z-plasty technique. Correction of this deformity may require transfer of tibialis anterior tendon, to the heal or calcaneal wedge osteotomy.

(iii) **Translocation or dislocation of hind foot.**

This is associated with extensive subtalar release and treatment is subtalar arthrodesis.

(iv) **Relapse or residual deformity.** This is in most cases a consequence of insufficient primary surgery. The less sufficient the surgery the more severe the relapse or residual deformity. Relapse may occur also from the fact that the foot was originally rigid or stiff and such foot may require multi-stage operations. This may be corrected by soft tissue surgery but when severe bone surgery is indicated.

CONCLUSION:

Etiology of congenital CF is still unknown. Further research is therefore encouraged to search for etiological factors. This will enable improve results of treatment or even prevent occurrence of this condition. However, currently, early reporting to the hospital for treatment is attended with better results.Therefore health education should be conducted to parents or guardians to bring their children to hospital early. Lastly community oriented studies are recommended in future so as to establish a regional and national incidence of this handicapping orthopedic condition. This will enable both local and international authorities pay attention and ameliorate the situation in terms of advice and material.

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SOFT TISSUE INJURY OF THE KNEE JOINT

SUMMARY:

In the period between September and November 1993, 27 patients with knee injuries were attended in the orthopedic and trauma department of Muhimbili Medical Centre. There were 20 males and 7 females. Their age range was between 12 and 56 years with a mean age of 26 years. Road traffic accident was the commonest cause of knee injury accounting for 12 out of 27 patients. Falling down either from a height or after missing a step constituted 6 patients, sports 4 patients, assault 3 patients, and 2 patients had injury as a result of occupational activities. Swollen joint accounted for 21 patients (n=27), whereas pain constituted 18 patients. The other symptoms were locking of the joint and giving way. By overall ligamentous injury accounted for 12 cases whereas 7 patients had features of meniscus tear. The operative therapy was offered to 8 patients while 6 of them were subjected to conservative therapy.

INTRODUCTION:

The knee is the most complex synovial ball and socket joint and among the most injured weight bearing joints in the body(1). It is true that there is no joint that sustain a wide range of injury as does the knee and hence the term "Internal Derangement" of the Knee joint (IDK) which

originated from William Hey in 1784. IDK is a loosely applied term to various affection in the intra-articular or extra-articular or both usually caused by trauma that interferes with joint function(3). The nature of knee injuries include, ligamentous injury, meniscal tear, and injury to articular surface or cartilage. Some workers in this field(9) have reported a 1.1% incidence of knee injuries, in a hospital based study, and during a one year period every one hundredth inhabitant sort medical consultation from a physician because of knee injury. The knee ligaments and menisci were the common injuries. The diagnosis of the IDK due to meniscus tear and ligamentous injury may prove difficult even for the experienced orthopedic surgeon. However joint swelling with hemarthrosis, pain, and locking are the most frequent symptoms encountered(1).

Arthrotomy and arthroscopy are valuable diagnostic and explorative procedures which will confirm the diagnosis(12). Due to the functional importance of the knee joint, delay in treatment and misdiagnosis is a source of considerable disability and morbidity(1). The treatment of IDK range from conservative to operative therapy and the latter include both open and closed arthroscopic surgical procedures(13,14). In this study the objective is to discuss a case report, and analyse the age incidence, etiology, diagnosis, and various treatment modalities as regards IDK.

CASES REPORT:

Mr. M.S. a 27 year old male was involved in a road traffic accident and sustained injury to the right knee joint and multiple small cut wounds and bruises in both lower and upper limbs. He presented 5 hours after injury with a painful swollen knee joint and could not execute movement at this joint. There was no history of locking or giving way. The wounds were not actively bleeding and he did not loose consciousness. There were no other injuries. This was the first instance of being involved in a road traffic accident and his past medical history was uneventful. Examination revealed a young man, screaming of pain and could not stand on the affected limb. He was not dyspnoeic and not pale. His pulse rate was 108 beats per minute and of good volume, and the blood pressure was 130/70 mmHg. The head, neck and other regions were normal. The cardiopulmonary system, abdomen, genitourinary, and central nervous systems were also normal. The right knee was swollen (generalised), it had assumed a semi-flexed position at about 30° and there was no bruises. It was inquisitively tender, soft, and fluctuant. No attempt to establish range of movement was done due to pain and there was no neurovascular deficit distally. Except for the few small cut wounds and bruises in the upper and lower limbs, other parameters of the musculoskeletal system were normal. Diagnostic aspiration revealed hemorrhagic effusion with admixture of fatty globules. A provisional diagnosis of

intra-articular fracture and ligamentous tear with hemarthrosis was entertained and plain x-ray of the right knee joint was urgently requested. It disclosed no fracture but demonstrated increase in circumference of soft tissue shadow to signify an extensive soft tissue injury. Therapeutic aspiration was done under aseptic condition and approximately 250 c.c. of blood was removed. The limb was immobilised in a groin to toe back slab with the knee at 5° of flexion to relieve the hemarthrosis so as to ameliorate pain. Tear of anterior cruciate ligament (ACL) was established by use of both clinically and by arthroscopy as well as tear in the peripheral portion of medial meniscus by arthroscopic approach. He was scheduled for repair of ACL and further exploration of the knee joint. The knee was cleaned by iodine and spirit and an above knee tourniquet applied. Arthrotomy was aimed through a 15cm long anteromedial incision, and skin, subcutaneous tissue and superficial fascia were reflected as a single layer off the deep fascia taking care to avoid damage to the infra patellar branches of the saphenous nerve.

The arthrotomy incision was made anteromedially through the extensor expansion, the anteromedial joint capsule, and the synovium, avoiding to incise the anterior horn of the meniscus at the tibial margin. On opening the joint, the hemarthrosis was evacuated, irrigation with normal saline and suction done. The following structures were carefully inspected. The articular surfaces of femoral and tibial

condyles, the undersurface of the patella (patellofemoral surface), the supra patellar pouch, the medial and lateral meniscus, the intercondylar notches and anterior and posterior cruciate ligaments. The anterior cruciate ligament was found torn through its substance in the mid portion, and a longitudinal tear was found in the peripheral part of the medial meniscus. The anteromedial portion of the capsule was partially disrupted as well. The rest of the structures were normal.

The diagnosis of ACL and medial meniscus disruption was confirmed. The repair of the longitudinal tear in the periphery of the medial meniscus was effected as follows; The extremity was held by an assistant, abducted to the side of the table, and the knee was slightly flexed while valgus strain was applied as well. A thin retractor (langenburg) was inserted behind the tibial collateral ligament and anterior two third of the medial meniscus was inspected where a peripheral, longitudinal tear was confirmed. The reconstruction of the tear was effected by placement of few nonabsorbable sutures of supramide no 4/0. The anteromedial incision was extended proximally to expose the quadriceps tendon on the superior pole of patella and distally to the lower margin of the pes anserinus insertion on the anteromedial tibia. The medial collateral ligament and medial capsular ligament were examined for hemorrhage or injury by raising posterior skin flap off the medial supporting

structures. In order to effect the reconstruction of the ACL the patella was displaced laterally so as to expose the intercondylar notch completely and knee joint was flexed beyond 90° with the patella displaced. The cruciate was reconstructed by transfer of a piece of ligamentum patella tendon. The tendon was harvested with its bony blocks attached to both proximal and distal ends of the inferior pole of patella and tibial tubercle respectively.

Drill holes were then installed, one from the anteromedial surface of the upper end of tibia to the anterior intercondylar area, and the other one was tracked obliquely from the posteromedial surface of the lateral femoral condyle to its posterolateral surface. The harvested ligamentum patella was inserted into the holes and transfixed into their respective bony regions by means of cancellous screws and threaded with non absorbable sutures. Thus ultimately a strong bone-tendon-bone reconstruction was effected. (The reconstructed ligament was taut when the knee was flexed and slack with knee extended). The anteromedial portion of the capsule which was partially disrupted was reconstructed by absorbable sutures of vicryl no 3/0. The knee was closed in layers and a tube drain was left in situ for over 48 hours. It was protected in above knee cylinder POP cast at 10° of flexion and he was instructed to put off weight bearing for 6 weeks. Of great importance, the patient was encouraged to carry on regular "isometric" exercises to the quadriceps and

hamstring muscle groups during immobilization period. He was allowed home and followed up at outpatient clinic for orthopedic and trauma. At the end of 6 weeks he reported at the clinic, the cast was removed and patient stayed on crutches and only touchdown weight bearing was allowed for 4 weeks. Concentric exercises to the quadriceps and hamstrings were continued and encouraged up to 90° of flexion.

At the end of 12 weeks the patient was allowed to put on more weight, but was not allowed crutch-free weight bearing until motion was at least from 10° short of full extension to 90° of flexion. After a follow up of 5 months, knee flexion was possible up to 100° and extension fell short of 5 degrees. He was now allowed to him execute full weight bearing without crutches. It was not possible for me to continue following him up at the end of 5 months but it is true that return and execution of normal activities take on the average of 12 months after cruciate ligament reconstruction.

THE RESULTS OF PATIENTS WHO SUSTAINED KNEE INJURIES:

Table I: Shows age versus sex distribution.

Age group	M	F
11 - 15	2	-
16 - 20	2	1
21 - 25	3	-
26 - 30	6	2
31 - 35	3	1
36 - 40	2	2
41 - 45	1	-
>46	1	1
Total	20	7

The peak age incidence occurred in the 3rd decade of life with a M:F ratio of 3:1.

Table II: Shows causes of knee injury.

Causes	No. of Patients (n)
RTA	12
Fall	5
Sports	5
Assault	3
Occupational	2
Total	27

The most frequent causes of knee injury was RTA.

Table III: Shows nature of knee injury.

Type of injury	No. of Patients (n)
Sprain	11
Tear of ACL and MM.	6
Tear of ACL alone	2
Tear of MCL and MM.	5
Tear of LCL	1
Patella fracture	4
Tear of meniscus alone	3
Knee dislocation	1
Femoral condyle#	4
Tibial plateau#	7
Epiphysiolysis	4

Soft tissue injury was the most frequent form of IDK.

Key:
ACL = Anterior cruciate ligament
MCL = Medial collateral ligament
LCL = Lateral collateral ligament
MM = Medial meniscus
# = Fracture.

Table IV: Depicts presenting symptoms and signs.

Symptom or sign	No. of patient (n)
Swollen knee	21
pain	18
Locking	3
Giving way	4
Anterior drawer sign	4
Posterior drawers sign	1
MC - Murray sign	3
Steinmann I and II	3 and 4
Pivot test	2

Locking is not a constant feature of meniscal injury.

smooth function of the knee joint. The deranged structures must be reconstructed as closely as possible to reproduce the original anatomy if optimal function is to be restored to the injured joint.

INCIDENCE AND ETIOLOGY.

The knee is among the most frequently injured joint in the human body. In the year 1992/93 a total of 1560 patients were admitted in the traumatology ward of Muhimbili Medical Centre (MMC) on emergency basis. Of these patients, 190 (12%) incidence per annum presented with knee injuries (data source from departmental registry annual report). In this series the author attended 27 patients with acute internal derangement of the knee (Table I). He also noted a male:female ratio of 3:1. The male preponderance may imply that, there is more males involved in community activities including sports, and travelling with vehicles and hence accidents. Karnus and Arvinen(9), reported an incidence rate of knee injuries of 1.1%, far low compared with the one reported above.

In this study group, there were several causes of knee injuries. Road traffic accidents (RTA) accounted for 12 cases, fall and sports constituted 5 cases each, assault 3 cases, and occupational accidents accounted for 2 cases (Table II). Kannus(9) note that among his patients 48 per cent of the knee injuries were sustained in sports activities. The injuries in his patients affected mostly knee ligaments and/or

All patients who needed ACL reconstruction were subjected to a procedure similar to that of modified Jones except that instead of fashioning an "over the top" tunnel on the lateral femoral condyle, a tunnel was drilled through the normal position of ACL in the lateral femoral condyle as described above.

CONCLUSION:

The diagnosis of Internal Derangement of the Knee (IDK) is not a straight forward exercise. It demands, meticulous history, physical examination, and plain radiograph so as to reach early diagnosis and treatment. Therefore at least x-ray facilities should be made available not only at the central hospital but also in the peripheral hospitals or dispensaries where majority of these victims are seen before they are referred to the central hospital. Road traffic accidents, sports, and falling contribute considerably to the occurrence of IDK in our community. Therefore public health education to the drivers and public in general on the importance of safe driving, safe use of the roads and observation of laid down sport's regulations may reduce or prevent such ailments in our community.

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