NON-TRAUMATIC ARTHRITIDES : CAUSES AND OUTCOME IN PATIENTS ADMITTED TO MUHIMBILI MEDICAL CENTRE, DAR ES SALAAM, TANZANIA IN 1992

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MEDICINE (M.MED) IN INTERNAL MEDICINE IN THE MUHIMBILI UNIVERSITY COLLEGE OF HEALTH SCIENCES, 1993

I HAVE READ THE DISSERTATION AND APPROVE IT

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DECLARATION

I declare that the whole of this work has not been submitted for a degree in any other University.

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ABSTRACT

Objective To determine the causes of non-traumatic arthritides and their outcome in patients admitted to a national referral hospital.

Design Prospective study of all consecutive admissions with joint symptoms as the primary disorder or in whom the joint disorder was one of the presenting problems. Study period, 1 May to 31 December, 1992.

Setting Muhimbili Medical Centre, Dar es Salaam, Tanzania.

Patients 120 patients: 78 male, 42 female.

Results One percent of all medical and orthopaedic admissions during the study period were due to rheumatic diseases. The mean age of the patients was 36 years (range 8-76 years). There were more males (78 (65.0%)) than females (42 (35.0%)) ($p = 0.000$). Seventy nine (65.9%) patients were between 11 and 40 years of age.

The rheumatic disorders seen in descending order of frequency were: HIV arthropathy 32(26.7%), rheumatoid arthritis 20 (16.7%), septic arthritis 17 (14.2%), Reiter's disease 14 (11.6%), gout 7 (5.8%), osteoarthritis 7 (5.8%), acute rheumatic fever 3 (2.7%), palindromic rheumatism 3 (2.7%), haemarthrosis 2 (1.7%), hypertrophic pulmonary osteoarthropathy 2 (1.7%), systemic lupus erythematosus 1 (0.8%), psoriatic arthropathy 1 (0.8%), leukaemia 1 (0.8%) and tuberculous arthritis 1 (0.8%). In 9 (7.5%) patients no definite diagnosis was made.

More males than females suffered from HIV arthropathy and Reiter's disease, the male: female ratio being 2:1 and 3:1 respectively. More females than males suffered from rheumatoid arthritis, osteoarthritis, palindromic rheumatism and acute rheumatic fever though the differences were not statistically significant.

The mean age of patients with Reiter's disease was lowest (26 years) while the highest was of patients suffering from osteoarthritis (59.5 years). The mean ages of patients suffering from HIV arthropathy and rheumatoid arthritis were almost similar, 35 and 34 years respectively. The youngest patient (8 years) suffered from septic arthritis while the oldest patient (76 years) suffered from HIV arthropathy.

It was not possible to determine statistical associations between various rheumatic diseases and smoking, occupation, level of education and body mass index because of the small number of patients seen in each diagnostic category.

Ninety-eight (81.7%) patients presented to the hospital after three weeks had passed since the onset of symptoms, while 22 (18.3%) had an acute presentation. In only 5 (4.2%) patients was there evidence of familial clustering of rheumatic diseases.

The knee joint was involved in 102 (85%) patients while the ankle joint was involved in 42 (35%) patients. The wrist was the commonest joint involved in the upper limbs, being involved in 34 (28.3%) patients. The proximal interphalangeal joints were involved in 31 (25.8%) patients.

In HIV arthropathy, 17 (53.1%) patients had oligoarticular involvement of the joints while 8 (25.0%) presented with polyarthritis and 7 (21.9%) had monoarthritis. Fourteen (82.4%) patients with septic arthritis had a peripheral leucocyte count above 10,000 cells/cmm. In only four patients was it possible to isolate the causative organisms from the synovial fluid. There were two patients in whom beta-haemolytic streptococci were cultured, one had *Streptococcus pyogenes* infection and in the fourth *Klebsiella* species was found.

The extra-articular features in HIV arthropathy included lymph node enlargement (13/32), pustular skin lesions (2/32) and splenomegaly (2/32). The complications and extra-articular features in patients with rheumatoid arthritis were muscle wasting (3/20), ulnar deviation of fingers at the metacarpophalangeal joints (3/20), vasculitic lesions (2/20), lymph node enlargement (2/20), splenomegaly (2/20) and hepatomegaly (2/20). Only one patient with rheumatoid arthritis had skin nodules.

Eighty three (69.2%) of the 120 patients were unable to perform normal duties while 12 (10%) were able to carry out normal activities on admission. On discharge, 71 (60.1%) out of 118 patients were unable to perform normal duties while 37 (31.4%) were able to perform normal activities.

One hundred and two (86.4%) patients were followed up after 5.8 months after discharge. Of these 64 (62.7%) were able to perform normal duties, 28 (27.4%) were unable to work and 3 (2.9%) were severely incapacitated. There were 7 (6.9%) deaths: two in patients with HIV arthropathy, two in patients with rheumatoid arthritis, and three in patients, one each having acute rheumatic fever, leukaemia and systemic lupus erythematosus.

There were 82 patients in whom the Arthritis Impact Measurement Scale was completed at follow up. Ten (12.2%) patients were unable to use public transport, 5 (6.0%) needed help in doing household activities, 4 (4.9%) were completely unable to do household activities. Three (3.6%) patients were unable to take care of themselves (needing help in washing and going to the toilet).

Conclusion

The rheumatic diseases seen in developed countries are also encountered in medical practice in developing countries like Tanzania, affecting people in the productive years of life. While the prevalence of some rheumatic diseases like rheumatoid arthritis may, at present, be low, others like HIV arthropathy are likely to be seen with increasing frequency. The findings of this study suggest a need for increased awareness of rheumatic diseases within Tanzania, and consideration of how management of these diseases can be improved.

INTRODUCTION

Little research has been done on rheumatic diseases in tropical Africa. All the authors of earlier publications were struck by the rarity of rheumatic disorders and especially rheumatoid arthritis in tropical countries. Goodall in 1956 found only two cases of atypical rheumatoid arthritis in ninety patients with arthritis attending the Zomba African Hospital, Nyasaland[1]. Gelfand in 1957 commented that rheumatoid arthritis was rarely seen in Salisbury, Zimbabwe[2].

Malawista et al in 1959 found no arthritis in a survey of 230 people in Liberia[3]. In the same country in the same year Hijmans et al observed only three cases of rheumatoid arthritis in Liberia[4]. Harries in 1962 in Nairobi, Kenya, reported only a single case of rheumatoid arthritis which he thought merited a report[5]. Greenwood who carried out a study of rheumatic disease in 1969 at Ibadan University College found that rheumatoid arthritis was an uncommon cause of admission to that hospital[6]. Beighton, et al in 1975 found a prevalence of rheumatoid arthritis in a rural South African population of 0.8% and they concluded that this was low compared to that reported among Caucasians[7].

Juvenile rheumatoid arthritis has also been claimed to be so rare in tropical Africa that Anumonye in Ibadan, Nigeria, gave an account of four cases he saw in six years[8].

Systemic lupus erythematosus has also been found to be rare in Africa. In 1961 Shaper thought that the five cases of systemic lupus erythematosus he saw at Makerere, Kampala, Uganda merited case reports[9].

Gout which has been reported to be common among African-Americans in America was found in only two Kikuyus by Hall in a district hospital, Fort Hall, Kenya in 1959[10]. The same author in 1963 saw only three patients with gout out of 26,370 admissions to a hospital in Nairobi, Kenya[11]. Kibukamusoke in 1969 in Mulago, Kampala, Uganda described case histories of seven patients with gout seen over six years (1961 - 1966)[12]. Gelfand in 1969 in Harare Zimbabwe saw only six patients with gout over a six year period[13].

Goodall does not mention anything on acute rheumatic fever in the patients he studied[1]. Acute rheumatic fever was found to be the commonest rheumatic disorder among inpatients seen by Hall in 1963 in Nairobi, Kenya[11].

Reiter's disease, osteoarthritis and dermatomyositis are rarely mentioned in these earlier studies. There are several reasons given for the rarity of these rheumatic disorders in tropical Africa. One of the reasons could be the lack of expert experienced doctors in most of these hospitals. However, this is not a plausible explanation because most of the authors who saw these patients had come from centres where these disorders are common and they should, therefore, not have missed them.

Molenburgh et al considered that the low prevalence of rheumatic diseases could be explained by the high death rate in these patients from parasitic and other infections[14]. The recorded lower prevalence of rheumatoid arthritis could also be explained by the different criteria used to diagnose the disease; the Rome criteria is usually more discriminative than the American Rheumatic Association criteria. The former had been used by some of the authors.

The age structure of the population could also influence the prevalence of rheumatoid arthritis. The large younger population of Africans could dilute the prevalence if most of affected individuals were middle aged. Kelsey and Horchberg think that the difference in the distribution of the histocompatibility antigen, HLA-DR4, or closely related linked genes among different races could account for the lower prevalence of rheumatoid arthritis in blacks[15]. Lastly, environmental factors could also be responsible in determining the prevalence and expression of various rheumatic disorders[16].

What is striking about rheumatic disorders in Africa is that there have been reports over more recent years of an increase in the prevalence of these conditions.

There is no evidence to document the presence of rheumatoid arthritis in Africa before the

twentieth century either from old drawings, written or oral indigenous histories. Also, paleopathologists have failed to identify rheumatoid arthritis in skeletal remains from Africa that predate 1900[17].

Gelfand, following his first report in 1957 admitted in 1964 that rheumatoid arthritis was not altogether rare when he saw 11 patients with rheumatoid arthritis out of 115 patients with rheumatic disorders[13]. Solomon, et al in 1975 observed that in urbanized South African blacks the prevalence of rheumatoid arthritis approached that normally encountered in Western Europe[18]. Kanyerezi and Lutalo in 1980 described 404 Ugandan patients with classical rheumatoid arthritis at Mulago Hospital, Kampala, Uganda seen over a ten year period[19]. They commented that the disease was not uncommon and more severe in East Africa than it was in West Africa.

The trend in the prevalence of rheumatoid arthritis in Western countries is quite different from that in tropical Africa. It would appear as if rheumatoid arthritis has behaved as an epidermic in the west, but has now reached a peak and is now declining. Linos et al in Rochester, USA, showed evidence of a decline in rheumatoid arthritis among females from 93.3 to 39.7 per 100,000 in 1960 - 1964 and 1970 - 1974 respectively[20]. This trend in the fall in incidence of rheumatoid arthritis has also been echoed by some experienced rheumatologists who have the clinical impression that the incidence of new cases in Europe and North America is slowly declining but there is no epidemiological data to confirm this[21].

Buchanan and Murdoch hypothesized that rheumatoid arthritis by the end of the next century will be mild and rare or even non-existent[22]. Silman et al, in their series comprising 2088 patients with rheumatoid arthritis attending the London Hospital Medical College concluded that successive generations of patients with rheumatoid arthritis are likely to become progressively less seropositive, and to develop fewer joint erosions or subcutaneous nodules[23].

This changing pattern in the prevalence of rheumatoid arthritis and other rheumatic diseases noted

in the tropics could most likely implicate environmental factors and social changes as responsible. It has especially been noted that urbanization has an influence on the prevalence of rheumatic diseases[17,24].

Except for gout, no rheumatic disease has a specific diagnostic test. A clinician is required to take a good history and good clinical examination backed by a sound epidemiological knowledge to reach a correct diagnosis of these conditions. Todate, neither a population nor a hospital based study on rheumatic disorders has ever been done in Tanzania.

This fact, in addition to the increase in the prevalence of rheumatic disorders noted in other tropical countries has prompted me to do this hospital-based study. I hope that this will be a stimulus to other investigators in this field which is little known in Tanzania.

REVIEW OF LITERATURE

Studies on the pattern of rheumatic diseases are important in that they can give clues to the possible environmental or genetic causes of these diseases. There are many rheumatic disorders and I will limit my review to diseases which are important and common in the African context. I will start with classification of these diseases and then discuss separately the important ones.

For the purpose of discussion, the major rheumatic disorders are arbitrarily classified as follows:-

1. Rheumatoid arthritis
2. Juvenile chronic arthritis
3. Seronegative spondyarthropathies:-
   - Reiter's disease
   - Psoriatic arthritis
   - Enteropathic arthritis
   - Ankylosing spondylitis
4. Osteoarthritis

5. Systemic connective tissue disease:-
   - Systemic lupus erythematosus
   - Scleroderma
   - Polymyositis and dermatomyositis
   - Polyarteritis nodosa
   - Giant cell arteritis and polymyalgia rheumatica
6. Metabolic deposition arthritis:-
   - Gout
   - Pseudogout (pyrophosphate arthropathy)
   - Ochronosis
7. Infective arthritis
8. Rheumatic fever
9. Arthritis associated with the human immunodeficiency virus (HIV) infection
10. Less common rheumatic conditions:-
    - Hypertrophic pulmonary osteoarthropathy
    - Acromegaly
    - Leukaemia
    - Palindromic rheumatism

RHEUMATOID ARTHRITIS

Definition

This is a chronic or subacute, systemic inflammatory disorder principally involving the joints with peripheral symmetrical inflammatory non-suppurative arthritis. It pursues a prolonged course with exacerbations and remissions. Systemic manifestations include haematological, pulmonary, neurological and cardiovascular abnormalities.

Aetiology

The cause of rheumatoid arthritis is not known. The principal event in this disease is an immunological disorder characterised by the formation of immune complexes within the joint. Phagocytosis of immune complexes by neutrophils releases chemical mediators of inflammation. Chronic inflammation leads to stimulation of the synovium which proliferates as granulation tissue (pannus) and finally bone and cartilage are eroded. Extra-articular lesions are thought to represent systemic immunocomplex deposition. Characteristically the serum of these patients contains rheumatoid factors which are autoantibodies directed against immunoglobulin-**G** (IgG). Rheumatoid factors are non-specific for rheumatoid arthritis because they are also found in normal individuals, liver disease, subacute bacterial endocarditis and other chronic diseases.

What causes the formation of these autoantibodies is an enigma. The immunological response points to a provoking antigen but no one knows what it is. It is thought that rheumatoid arthritis is a result of infection by slow growing micro-organisms similar to mycobacteria because of[25]:-

1. The shared features of the diseases caused by slow growing organisms (for example, mycobacteria and spirochaetes). The shared features include arthritis, autoantibodies, rheumatoid factors and raised agalactosyl IgG. (Agalactosyl IgG lacks the terminal galactose from the conserved biantennary oligosaccharides situated on the CH_2 domain).
2. The importance of non-genetic environmental factors in rheumatoid arthritis shown by studies of twins
3. Serological changes found in the spouses of patient with rheumatoid arthritis.
4. Altered antibody and skin test responses to mycobacteria in rheumatoid arthritis.
5. Responses to the mycobacterial 65 kilodalton heat shock protein in most, perhaps all of the rodent models of arthritis.

It is also thought that this antigen could be a bacteria like mycoplasma[26,27]. It has also been noted that there is a higher frequency of the histocompatibility antigen HLA-DR_4 of about 75% for rheumatoid arthritis compared to 30% in the general population[28]. However, monozygotic twin studies have shown that the concordance rate for the disease is only 30%. Moreover, the prevalence of rheumatoid arthritis has been determined among different tribes in South Africa (the Zulu, Xhosa, Sotho and Tswana) which are genetically related, but a difference has been observed in the occurrence of the disease among urban and rural dwellers[7,14,29]. Thus genetic factors are less likely to be the most important factors in causation of the disease. It would appear logical to postulate that both environmental and genetic factors are important in the causation of rheumatoid arthritis. The genes within the HLA locus may modulate the immune response of the host when exposed to a microbe thus triggering the inflammatory reaction in this disease[30].

It has also been suggested that tropical infections may protect against the development of autoimmune diseases[31,32]. This would imply that the continuing control and eradication of infective diseases may lead to an increase in the incidence of rheumatoid arthritis. Adebajo further postulates that an increase in rheumatic disorders in Africa could be due to a recently introduced gene in the indigenous population[17].

If an infectious cause for rheumatoid arthritis is present this might explain the higher prevalence of rheumatoid arthritis in urban compared to rural dwellers as has been observed in African studies[7,24,33]. What is awaited anxiously is the possible isolation and identification of this infectious agent which will have great impact in the treatment and prevention of this disabling disease.

Epidemiology

It is difficult to determine the incidence and prevalence of rheumatoid arthritis because of its heterogeneity and the lack of a standard or reference diagnostic test. The current classification of the disease depends on the fulfillment of agreed criteria. The three systems used in epidemiological studies include the New York system, the Rome criteria and the American Rheumatism Association (see appendix A). Using population studies and with the limitations mentioned above the prevalence of rheumatoid arthritis in North America and western Europe has been found to be 1 - 3 percent[26,29,34]. The disease has been found to be three times more common in women compared to men and its prevalence increases with age[28].

In Africa, only six population studies have been done in South and West Africa to determine the prevalence of rheumatoid arthritis reporting a variable prevalence of 0% - 0.9%[7,18,29,35,36,37]. All the authors used the modified Rome criteria and they included all those patients falling into the 'definite' and 'probable' categories.

Most studies on rheumatic disorders carried out in Africa have shown that rheumatoid arthritis is the commonest rheumatic disease seen[6,38,39,40,41]. Rheumatoid arthritis was also found to be the commonest musculoskeletal disorder in outpatients attending the University Hospital of West Indies, Jamaica, which is in the sub-tropical zone[42].

These African studies have revealed a high prevalence of rheumatoid factor (RF) in apparently normal individuals! In Lesotho rheumatoid factor was positive in 12% of an age and sex matched control group and in 19% of a group suffering from tuberculosis[14].

In the South African study rheumatoid factor (by Latex) was found in 8.9%, 17% and 12.1% of normal Tswana, Xhosa and urban blacks respectively[24]. In Ibadan, Nigeria, all patients were negative for the rheumatoid factor[6]. If rheumatoid factor is important in the pathogenesis of rheumatoid arthritis we need an explanation for its high prevalence in the normal population despite the absence of the disease.

In South Africa rheumatoid arthritis has been found to be more prevalent in urban than in rural dwellers[24]. However, in Lesotho, 80% of patients with rheumatoid arthritis attending a district hospital came from rural areas[14]. In Sweden also, one study revealed that more patients with rheumatoid arthritis came from rural than urban regions though the difference was not significant[43].

The higher prevalence of rheumatoid arthritis in women has been noted in the Kenyan, Zimbabwe and South African studies[38,41,44,45]. The female preponderance has also been noted in Jamaicans and African-Americans in the USA[42,46]. Greenwood in Ibadan, western Nigeria found the opposite; more men were affected by rheumatoid arthritis compared to women in the ratio of 1:09[6]. Genetic studies in Africans in South Africa have shown an association (though weaker compared to that in Caucasians) between rheumatoid arthritis and the histocompatibility antigen, HLA-DR4[30,47]. An interesting finding in one of these studies in Africa was the significant increase in the frequency of HLA-B_8 in 38% of patients with the disease compared to 12.3% in controls[47].

Clinical features

The typical clinical features of rheumatoid arthritis can be found in classical textbooks of rheumatology. For the purpose of this study I will highlight the clinical features of the disease which are peculiar to Africans.

Many authors have commented that rheumatoid arthritis in Africans was less severe with fewer extra-articular manifestations and less morning stiffness compared to that seen in Caucasians[13,44,48]. Nevertheless, other authors have refuted this observation and they have commented that the disease was severe with joint erosions and many extra-articular manifestations comparable to that seen in Caucasians[14,18,38,39,41]. All of these studies were hospital based and thus the patients seen were those who were severely affected but the general consensus is that

rheumatoid arthritis is less severe in Africans. It has been argued that Africans do not live long enough to develop the severe type of the disease or extra-articular manifestations. It could also be true that the disease seen in Africans is quite different from that seen in Caucasians.

The commonest extra-articular manifestations of rheumatoid arthritis in African studies have been found to be anaemia and subcutaneous nodules[18,45]. In one study in Toronto, Canada, subcutaneous nodules were also found to be the commonest extra-articular feature followed by pulmonary fibrosis[49]. Anaemia was rare in this study.

Treatment

There is no cure for rheumatoid arthritis but much can be done to improve the life of these patients. The strategy of management includes pharmacological treatment and supportive therapy. The latter includes referral to appropriate voluntary organizations, education about the disease and its impact on family life, work, education and social opportunities, and provision of appropriate aids and appliances and physiotherapy. Thus the appropriate management of these patients needs proper coordination between the rheumatologist, orthopaedician, physiotherapist and occupational therapist.

Active exercises are for improving stability and range of movements. Warming or cooling can provide temporary relief of pain.

The non-steroidal anti-inflammatory drugs are meant to reduce pain, shorten early morning stiffness and lessen joint swelling. These drugs do not alter the course of the disease and are potentially dangerous in the elderly.

Slow-acting drugs such as gold, sulphasalazine, penicillamine, hydroxy-chloroquine and immunosuppressives (azathioprine, cyclophosphamide, chlorambucil and more recently cyclosporine-A) lack analgesic properties. They bring a gradual reduction in disease activity over a period of months. They are very toxic and need strict monitoring. They are indicated in

patients with erosions and particularly those who are seropositive with a high ESR and who fail to respond to non-steroidal anti-inflammatory drugs or steroid therapy[50]. Steroids can be used as intra-articular injections or systemically in small doses (7.5-10 mg/day) to control symptoms during the acute phase or when the pain is intolerable. Their cumulative side effects makes it necessary to take extra caution in their use.

Patients should have access to a range of appropriate surgical interventions including replacement of major joints, hand surgery and foot surgery.

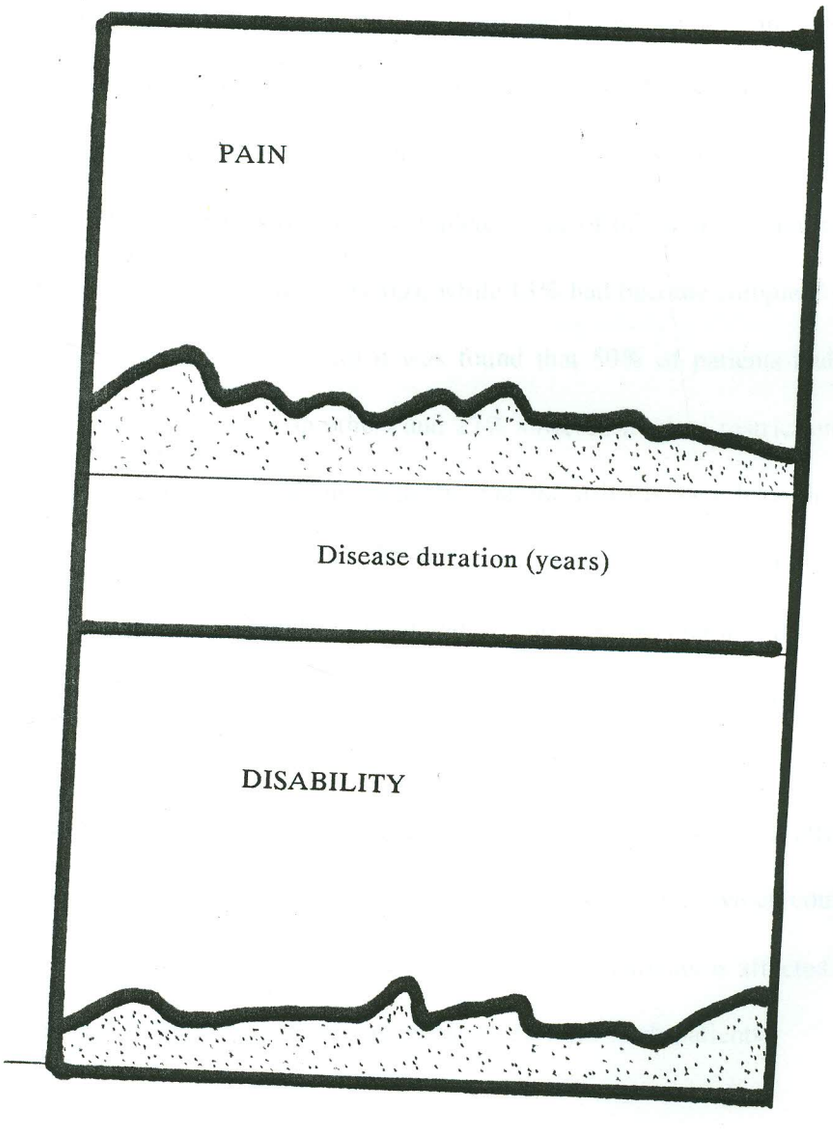
There should be a defined policy for treating rheumatoid arthritis which should be known by junior medical staff, nurses and paramedical staff.

Patients should have access to occupational therapists and should have appropriate aids and appliances, including footwear. What we can offer to rheumatoid patients in Tanzania is very limited and we have got a long way to go in order to offer at least a little to such needy patients. In the first place the magnitude of the problem is not known. We have no rheumatologist in the whole country. There is a general lack of drugs including the non-steroidal anti-inflammatory drugs and the disease modifying drugs (gold and penicillamine) are unheard of in our pharmacies. Even if they were present most patients could not afford to buy them as this problem is a lifetime one. The adverse effects associated with the use of these drugs has not been studied in Africa. There are few medical centres in Tanzania which can offer appropriate physiotherapy to such patients. The implication of all these observations is that rheumatoid patients get very little help from medical personnel in this country and this will increase the sufferings of these patients and reduce their quality of life.

Outcome

Rheumatoid arthritis is a chronic illness and measuring its outcome is very difficult. It is particularly difficult to measure the outcome at a single point in time because the disease is characterised by remissions and exacerbations.

The diagrams below illustrate such difficulties.



Mortality seems to be increased in patients with rheumatoid arthritis though the cause of death is probably not due to the disease directly. Mitchell et al found that there was an increase of 50% in the standardized mortality ratio, and life expectancy was reduced by 4 years in men and by 10 years in women[51]. Most deaths were due to cardiovascular and malignant diseases. Deaths from infection and rheumatoid related causes (vasculitis, pericarditis) were increased while gastrointestinal, respiratory and renal/urogenital causes are also important.

There are two recommended methods for assessing the disease severity and activity. These are the Health Assessment Questionnaire and the Arthritis Impact Measurement Scale.

In one Canadian study after 15 years of follow up of patients with rheumatoid arthritis it was found that only 10% of patients remained completely free of functional disability as measured by the Health Assessment Questionnaire (HAQ), while 13% had become completely incapacitated[52]. In the UK, after 9 years of follow up it was found that 50% of patients had mild functional impairment with no dependency on others and 27% suffered marked restriction in function[53].

Only two follow up studies of patients with rheumatoid arthritis have been done in Africa. In Lesotho it has been reported that only three patients, out of 32 seen required readmission to hospital[14]. Greenwood compared the clinical and radiological findings at follow up of his patients with a group of Scottish patients[6]. He found that his patients fared better than the Scottish patients according to three criteria he used in assessment (grade of disability, activity of arthritis and change in arthritis). The benign course of illness was maintained even after 5 years.

In general it can be said that there are no follow up studies in Africa which could determine the outcome of this disease and how the quality of life of these patients is affected. Without these studies no one can see the need of having specialist care for such patients.

GOUT

Definition

This is a heterogenous group of genetic and acquired diseases characterized by hyperuricaemia and a characteristic recurrent acute inflammatory arthritis. The other presentations which can occur singly or in combination include aggregation of crystals of monosodium urate monohydrate in and around the joints of the extremities (tophi) which can lead to joint destruction and severe crippling, chronic interstitial nephropathy, and urolithiasis due to uric acid stones.

Aetiology

The inflammatory process in gout is presumed to result from the interaction between polymorphonuclear leucocytes and the microcrystals of urate. The crystals within the joint are coated with protein, including immunoglobulin **IgG**. This activates the complement system which in turn attracts polymorphs. Phagocytosis of these crystals releases inflammatory mediators and death of polymorphs releases lysosomal enzymes and other inflammatory substances.

No one knows what precipitates or terminates (if untreated) these attacks. The high urate level in serum is undoubtedly an essential requirement for development of gout. The cause of a high serum uric acid level could be inborn or environmental.

There are two specific x-linked genetic abnormalities which lead to hyperuricaemia; deficiency of hypoxanthine guanine phosphoribosyl transferase (Lesch-Nyhan-Syndrome) and 5-phosphoribosyl-1-pyrophosphate synthetase overactivity. Otherwise genetic inheritance in gout is poorly understood and is thought to be multifactorial or autosomal dominant. Environmental causes of hyperuricaemia are multiple and it is not the purpose of this study to discuss them all. Diets rich in purines (liver, kidney, shellfish), alcohol consumption, social class, drugs, lead poisoning, ketosis etc. are some of the environmental factors causing hyperuricemia. However, no explanation has yet been obtained how such factors bring about an attack of gout because not all cases of hyperuricemia have gout[28].

Epidemiology

It is difficult to accurately determine the prevalence of gout. Hyperuricaemia varies between different populations and changes (owing to environmental factors) may occur in the same population over quite a short period of time.

Hyperuricaemia is defined as the mean serum urate plus two standard deviations in a healthy population matched for age and sex[27]. In most epidemiological studies the upper limit is about 420 micromols/litre (7.0 mg/dl) in men and 360 micromols/l (6.0 mg/dl) in women. Hyperuricaemia is rarely found in pre-puberty girls and boys. The prevalence of hyperuricaemia according to the above definition is 2 - 18 percent in various population studies carried in USA and Europe[26,27]. The prevalence of gout is substantially less than that of hyperuricaemia and in western Europe it varies from 0.13 - 0.37% of the population[27]. In Germany gout accounted for 6.3% of rheumatic diseases seen at a hospital clinic[54]. In England, Currie found that 10% of the cases of gout he saw were believed to be secondary with induction by diuretics being the commonest cause[55].

Only one population study has been done to determine the prevalence of gout and hyperuricaemia in Africa.

Beighton et al in South Africa found no gout in three Bantu or black groups while the prevalence among the urban Caucasians was 1.3% in men and 0.3% in women[56]. It was found that acculturation played an important role in hyperuricaemia. However, Moody and Naidoo found 19 African black patients with gout in five years (1977 - 1981) attending a hospital in Natal, Durban, South Africa[57]. It is interesting to note that gout was one of the commonest rheumatic disease seen by Lutalo in Gwere hospital, Zimbabwe, comprising about 28.8% of all rheumatic patients seen[41]. In this series alcohol was the most common precipitating factor and social class was not found to be an important factor in determining the occurrence of gout.

It would appear as if gout is increasing in Africa and some of the risk factors for hyperuricaemia (like upper social class) which are important in the western world are apparently unimportant here. It will be vital to look for factors which are likely to be the causes for hyperuricaemia in Africa.

Clinical features

The presentation of gout in Africans is as that seen elsewhere[41] and needs no special mention.

Treatment

The treatment of gout has two strategies, one is terminating the acute attack and the second is the prevention of further attacks and continued tissue deposition of urate.

Acute gouty attacks can be treated by colchicine, indomethacin, phenylbutazone or naproxen. Urate lowering drugs are indicated in tophaceous gout, frequent acute attacks, gout with renal damage and gout with plasma urate levels above 480 micromol/l. Allopurinol which inhibits the enzyme xanthine oxidase is the drug of choice. Uricosuric drugs (such as probenecid, ethebenecid and sulphinpyrazone) are sometimes also used. All these measures should be accompanied by attempts to reduce the risk factors for hyperuricaemia (obesity, alcohol intake, diet etc).

Outcome

No studies have been done in Africa to follow up patients with gout. It is generally believed that the urate lowering drugs, particularly allopurinol have greatly improved the prognosis for these patients[34]. The prevention of gout by the use of urate lowering drugs is life-long and tolerance of such drugs is important in order to achieve compliance. How these drugs are tolerated in Africans is not known.

MUSCULOSKELETAL DISORDERS ASSOCIATED WITH THE HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION

It is not possible to give a simple single definition of rheumatic disorders associated with the human immunodeficiency virus type 1 (HIV-1) infection because there are many rheumatological disorders occurring in this infection. The primary immunological disorder in HIV infection is the failure in the function of T cells of the CD_4 lineage. This results in a myriad of opportunistic infections including those involving the musculoskeletal system. Autoimmune diseases in which CD_4. T cells are thought to play an important etiological role have been found to be rare among HIV infected patients[58,59,60,61]. These include rheumatoid arthritis and systemic lupus erythematosus. In contrast, certain rheumatic disorders such as Reiter's syndrome and psoriatic arthropathy are found frequently in more severe forms among HIV infected individuals emphasizing their distinct mechanisms of immunological drive independent from the CD_4 lineage[55,56]. Thus there are three categories of rheumatic disorders which can occur in individuals infected with HIV:

(a) Those arising as a direct consequence of a deficient arm of the immune response associated with CD_4 T cell depletion eg. infectious arthritis.

(b) Disorders considered to have an immunopathogenesis yet occurring with the same or enhanced intensity in individuals with selective depletion of CD_4 lineage T cells eg. Reiter's disease and psoriatic arthritis.

(c) Diseases apparently occurring as a direct result of the host response to HIV infection eg. polymyositis, vasculitides, diffuse infiltrative lymphocytosis syndrome (DILS).

Aetiology

The exact cause of rheumatic disease in HIV infected individuals is not known. The factors which are thought to be important in causing rheumatic diseases in these patients include[62].

(a) **Direct involvement by the virus:**

It has been noted that a **retrovirus** related to HIV has been isolated from the synovium of goats with chronic arthritis (caprine arthritis caused by encephalitis syndrome-visna virus)[63]. HIV has also been isolated from synovial fluid of patients with arthritis[64,65], though this may merely reflect widespread dissemination of the virus. However, other investigators have failed to isolate HIV in tissues of such patients. Direct effect of HIV on skin has been demonstrated in patients with psoriasis[66]. Thus the assumption that HIV could be a direct cause of rheumatic diseases is still controversial.

(b) **Indirect effect of HIV infection:**

The altered cellular function by the HIV genome could disregulate immune function and alter cellular function. It has been found that tumour necrosis factor and alpha and gamma interferons (α and γ - IFN) are increased in patients with AIDS. It has been demonstrated that γ - IFN enhances the expression of class II major histocompatibility complex antigens and high levels are associated with the onset or exacerbation of psoriatic arthritis in HIV infected patients.

(c) **Reactive immune mechanisms:**

Antinuclear antibodies, anticardiolipin antibodies and circulating immune complexes have been frequently found in HIV-infected patients[67,68]. It is presumed that the presence of these autoantibodies is related to the underlying presence of opportunistic infections. Repeated opportunistic infections caused by HIV-induced immunodeficiency may trigger reactive arthritis[69]. HIV antigens have also been demonstrated in the synovial membrane of patients with reactive arthritis, and psoriatic arthritis, in muscle from patients with polymyositis and dermatomyositis, and in vasculitis lesions[70,71]. These HIV antigens may stimulate immune cells, resulting in the triggering of an immune reaction and eventual tissue damage.

Which among these mechanisms is important in causing rheumatic disorders in HIV infected patients still remains an enigma. It is only through well planned epidemiological studies that this problem will be solved.

Epidemiology

As many cases of AIDS are being reported worldwide so are its varied manifestations being noted. Psoriasis occurring in association with AIDS was reported in 1985[72] and in 1987 Winchester and coworkers from New York reported the co-occurrence of AIDS and Reiter's syndrome[73].

By comparing two populations at risk for HIV infection, Berman and colleagues found rheumatological diseases in 66.1% out of 89 individuals who were HIV positive compared to only 5 out of 80 individuals who were HIV negative[74].

In this series the common rheumatic disorders seen in HIV patients included arthralgia, Reiter's syndrome, Achilles tendinitis, psoriatic arthritis, Sjogren's-syndrome, myopathy, septic arthritis and lupus-like illness.

In Zimbabwe, Davis et al described 13 patients with reactive arthritis and HIV infection[75]. Nine patients had classic or partial Reiter's syndrome; none were positive for HLA-B27. This observation represented a surprising increase in the incidence of Reiter's syndrome or reactive arthritis which was thought to be related to HIV infection. However, in Winchester et al's series out of the 13 patients with Reiter's syndrome and HIV infection, nine had HLA-B27 antigen[73]. From these observations it is difficult to determine the role of genetics (HLA-B27) or HIV in the causation of Reiter's disease.

Further studies in Zimbabwe have shown the magnitude of HIV associated musculoskeletal disorders. In a series of 411 patients, 26 (6%) individuals with the human immunodeficiency virus infection were found to have musculoskeletal diseases[39]. The spectrum of these diseases included Reiter's syndrome (16), reactive arthritis (6), hypertrophic osteoarthropathy (1), myopathy (1), pyomyositis (1) and septic arthritis in a patient with sickle cell disease. In Kigali, Rwanda, Blanche et al found HIV infection in 52 out of 76 patients with rheumatological

disorders[76]. In this series, of those with septic arthritis 33 (68.7%) were HIV positive. The bacteria isolated included N. gonorrhoea 4 (4 HIV+), S. aureus 7(4 HIV+), Salmonella B 2 (2 HIV+), S. pneumoniae 5 (5 HIV+), M. tuberculosis 4 (2 HIV+). The other musculoskeletal disorders were metabolic 6 (2/5 HIV+) and spondyloarthropathy 19 (15 HIV+).

Reactive arthritis is the most common rheumatic disease found in HIV infected individuals[59]. The clinical manifestations of Reiter's syndrome may precede, occur concomitant with, or (most commonly) follow the onset of immunodeficiency[62]. The prevalence of rheumatic disorders associated with HIV infection will definitely depend on the prevalence of the latter disease in the community. Further epidemiological studies on this subject are important in improving understanding of the possible interaction of genetic, immunological and microbiological factors in the pathogenesis of rheumatic diseases.

Psoriasiform lesions, with or without arthritis, may be the first clinical manifestations of HIV. HIV infection may exacerbate psoriasis[77].

Clinical presentation

The spectrum of rheumatic diseases associated with HIV infection is very wide as is the clinical presentation[75].

Bileckot et al after examining 26 patients with rheumatological disorders who were HIV infected found the following presentation: oligoarthritis (5), polyarthritis (13), pyomyositis (2), spondyloarthropathy (2) and septic arthritis (2)[78].

Arthralgias are frequently seen as is the case with several types of acute viral infections. As many as one third of patients with HIV infection manifest arthralgia[67]. The pain is of moderate intensity, frequently intermittent in nature, and involves 2 or more joints. Espinoza et al, however, noted the existence of a painful articular syndrome in some patients characterized by the presence of severe articular pain which was incapacitating and unresponsive to oral

nonsteroidal and analgesic medications[62].

The findings in HIV infected individuals with Reiter's syndrome is severe arthritis and enthesopathy (painful heels and Achilles tendinitis) nail and skin disease. The joints can be involved in an accumulative or intermittent pattern[77]. The foot and ankle are the most commonly affected. The prevalence of axial involvement is less common than in the HIV negative forms. The cutaneous manifestations of HIV associated Reiter's syndrome are often sustained and conspicuous including keratoderma blenorrhagica, (a papulosquamous and pustular eruption in the soles and feet). Conjunctivitis and iritis appear to be much less prominent than in HIV negative Reiter's syndrome[62].

The musculoskeletal manifestations in HIV-related psoriatic arthropathy are generally similar to Reiter's syndrome but also includes individuals with preponderant distal interphalangeal joint disease, enthesopathy, dactylitis, especially of the foot and onychodystrophy.

Diffuse infiltrative lymphocytosis syndrome presents as bilateral parotid gland enlargement in 90% of patients, with enlarged submandibular glands, xerostomia, xerophthalmia and keratoconjunctivitis sicca.

Myopathy in HIV infected individuals presents with proximal muscle weakness, atrophy, pain, fever and weight loss may be present.

Necrotizing vasculitis has been shown by various investigators[67,71]. The central nervous system and peripheral nerves (mononeuritis multiplex, sensorimotor poly-neuropathy) were affected in these series.

Treatment

Therapy for rheumatic manifestations in patients with HIV infection is not well defined[79]. Most patients presenting with arthralgias, myalgia, and reactive arthritis respond to nonsteroidal anti-inflammatory drugs and analgesic drugs. Some patients with Reiter's syndrome and psoriatic

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arthropathy are refractory to the conventional drugs and these are problematic because the use of immunosuppressive drugs has been reported to lead to the development of Kaposi's sarcoma, Pneumocystic carinii pneumonia and progression to AIDS[80].

Phenylbutazone has been found to be effective in controlling pain in patients with Reiter's syndrome[77].

Sulfasalazine has also been used to control the symptoms in patients with Reiter's disease who do not respond to nonsteroidal anti-inflammatory drugs[77,80].

Prolonged, aggressive and appropriate antibiotic therapy is recommended in cases of septic arthritis in these patients to diminish microbial persistence.

The diffuse infiltrative lymphocytosis syndrome is treated by using 40-60 mg of prednisolone daily and chlorambucil for 8 - 12 weeks.

A prospective study of the use of immunosuppressive drugs is needed to assess their efficacy and side effects in this population. Lower dosages of immunosuppressive agents may be needed in order to prevent undesirable side effects.

Outcome

The outcome of rheumatic diseases in HIV infected patients is not well studied. Such patients might progress to AIDS and then rheumatic disorders become overshadowed by other medical problems like opportunistic infections. It has been noted that the appearance of Reiter's syndrome is an unfavourable prognostic sign with many patients developing their first opportunistic infection within several months after the initial manifestations of Reiter's syndrome[77].

In Winchester and colleague's series, the course of Reiter's disease in HIV infected patients was progressive in five patients with an additive clinical pattern of joint involvement[73]. Eight of their patients showed a remittent pattern and recrudescence typically involved the same joints.

Winchester[70] et al and Foster et al[81] suggested that with progression of HIV disease and the development of more marked immunological abnormalities and AIDS, joint symptoms become persistent and possibly more severe. However, other investigators had found that the joint symptoms did not progress with the worsening of immunodeficiency[82].

It will be critically important to do follow up studies in this group of patients because the outcome will have therapeutic importance. If it is found that the rheumatic disorders are progressive it will be important to devise effective therapeutic measures so as to improve the quality of life of such patients.

THE OTHER RHEUMATIC DISEASES

In this group I will briefly describe some of the seronegative spondarthritides, systemic lupus erythematosus and rheumatic fever.

Seronegative spondarthritides are defined as seronegative (rheumatoid factor negative) arthritides showing clinical features, central to which is ankylosing spondylitis. They are characterized by the presence of radiological sacroiliitis, with or without ankylosing spondylitis, and a seronegative, anodular, inflammatory peripheral arthritis. Included in this group are the following diseases: ankylosing spondylitis, psoriatic arthritis, Reiter's disease, ulcerative colitis, Crohn's disease, Whipple's disease and Behcet's disease. Genetic factors seem to be important in the causation of these diseases. The frequency of the histocompatibility antigen, HLA-B27 in these patients is higher than can be explained by chance[28].

Ankylosing spondylitis, Reiter's disease and all the other HLA-B27 associated spondyloarthropathies have been reported to be rare in black Africans[13,41,83].

The reason for this rarity is presumed to be the low prevalence of the HLA-B27 antigen in Africans; it was reported to be 0.007% in blood donors in Zimbabwe[84]. That there are patients with Reiter's disease and ankylosing spondylitis who are HLA-B27 negative being reported raises

a lot of questions. Are there other genes besides the HLA-B27 locus which are important in disease causation? What is the role of environmental factors in causing these diseases? Is Reiter's HLA-B27 negative disease different in any way from Reiter's HLA-B27 positive disease seen commonly in Caucasians?

Systematic lupus erythematosus

This is a chronic, inflammatory disease of unknown cause which may affect the skin, joints, kidneys, nervous system, serous membranes, or other organs of the body. It is characterized by periods of remissions and relapses.

The pathogenesis is thought to depend on the deposition of immune complexes containing autoantibodies to nuclear antigens[26,27,34].

In Africa systemic lupus erythematosus is less common than rheumatoid arthritis but is the most common connective tissue disease[37]. From the year 1960 it has been reported with increasing frequency is some parts of Africa[9,85,86,87]. In these series photosensitivity and Raynaud's phenomenon were reported to be of low frequency while the incidence of renal involvement was high.

It is thought that there is underdiagnosis of systemic lupus erythematosus in Africa. The prevalence of systemic lupus erythematosus exceeded 1:250 in black females over the age of 15 years in one community in the USA[88]. Systemic lupus erythematosus was found to be the second commonest cause of admission among patients with rheumatic diseases in Jamaica[42]. 93 out of 95 patients with systemic lupus erythematosus seen were black.

It is thus apparent that the prevalence of systemic lupus erythematosus is very low in blacks in Africa while it is very high in those living in USA and Jamaica. This stresses the importance of the role of environmental factors in causation of this connective tissue disease. No one knows what this environmental factor(s) might be. It is only through carefully planned epidemiological

studies that we might identify this factor.

Rheumatic fever

Rheumatic fever is also thought to be one of the 'reactive arthritides' just like Reiter's syndrome or disease. It is presumed to arise from previous pharyngeal infection with a group A beta-hemolytic streptococcus which sets off an immunological reaction. The clinical picture includes polyarthritis, fever, carditis, Sydenham's chorea, erythema marginatum and subcutaneous nodules. It commonly affects children between 6 and 15 years. Recurrences can occur and these lead to heart valve damage. Diagnosis is made by fulfillment of the modified Jones criteria (see appendix). The prevalence of rheumatic fever is reported to be declining in Western Europe and USA because of improved housing, antibiotic use and improvement in the delivery of health care[89]. In Africa rheumatic fever has been found to be one of the common causes of rheumatic diseases among hospital admission[6,11,13]. Whether the prevalence is increasing or decreasing no one knows. It is be important to know the trend in the incidence of this disease especially because of its long term sequelae.

BROAD OBJECTIVE

To determine the causes of non-traumatic joint diseases in patients admitted to Muhimbili Medical Centre and to assess the outcome of these diseases.

Specific objectives

1. To determine the prevalence of joint diseases in patients admitted to the orthopaedic and medical wards and their association with:-
   - (a) age
   - (b) sex
   - (c) occupation
   - (d) level of education
   - (e) body mass index (BMI)
   - (f) family history of joint disease
   - (g) smoking habits
   - (h) drinking habits (alcohol)
2. To determine the causes of joint diseases.
3. To determine the prevalence of rheumatoid factor (RF) and LE latex in all patients.
4. To determine the causative bacteria and antibiotic sensitivity in cases of infective arthritis.
5. To determine the complications associated with various arthritides.
6. To determine the natural history of these joint disease by doing follow up 3-9 months after discharge from hospital.

Materials and methods

Muhimbili Medical Centre is the largest referral hospital in Tanzania. It serves the residents of Dar es Salaam city, its neighbourhood and patients referred from other regions of the country. The city is situated on the shores of the Indian ocean, in the east of the country, south of the

Equator on latitude 7° and longitude 39° 4'E. The inhabitants of the city, according to the 1988 census, number 1.3 million. The climate is hot and humid throughout the year. The Centre offers free medical services. There are three large private hospitals which mostly offer services to people of higher income. Thus, most patients who come to Muhimbili Medical Centre are of low income.

Patients included in this study were all consecutive admissions to medical and orthopaedic wards with joint disorder as the primary disorder or in whom the joint disorder was one of the presenting problems in the patient. Exclusion criteria were the following:-

(a) previous history of joint trauma

(b) patients below the age of 8 years

(c) any patient with backache as the only complaint

The study period took 8 months starting from May to December, 1992. Informed consent was obtained from each patient, a history was taken and physical examination performed on each patient, the details of which are seen in the questionnaire (appendix C). Careful examination was made for the presence of neurological, cardiovascular, eye and pulmonary complications.

The following haematological and biochemical investigations were done:-

(a) haemoglobin level

(b) white blood cell count - using a Coulter Counter

(c) erythrocyte sedimentation rate - Westergreen method

(d) serum uric acid

(e) rheumatoid factor

(f) LE latex

(g) HIV-1 test (Western Blot)

(h) Anti-streptolysin O-titre in those suspected to have rheumatic fever.

Lateral and anteroposterior views of the joints affected were also taken when films were available. Whenever lung or cardiovascular complications were suspected a posteroanterior chest X-ray, an electrocardiogram and echocardiography were done.

Large joint effusions were aspirated whenever possible and the fluid examined for appearance, cell count, culture and sensitivity and compensated polarizing light microscopy. The latter investigation was done in the United Kingdom at the University of Newcastle upon Tyne.

Serum samples were frozen and stored at -20°C to be examined for rheumatoid factor and lupus erythematosus latex at the University of Newcastle upon Tyne, United Kingdom.

Joint radiographs were read by one radiologist. For each patient the Karnofsky performance scale was scored on admission and discharge (see appendix B). Also, a questionnaire for Arthritis Impact Measurements (AIM) was filled for each patient to assess the impact of the disease on the psychosocioeconomic life of the individual.

The diagnosis of rheumatoid arthritis was based on the American Rheumatism Association 1987 revised criteria.

Septic arthritis was diagnosed if an organism was cultured from synovial fluid or if aspiration yielded purulent fluid and the condition responded to antimicrobial therapy. Rheumatic fever was diagnosed in patients fulfilling the World Health Organization Modified Jones criteria (see appendix D). Arthritis associated with human immunodeficiency virus (HIV) infection was diagnosed with a single unequivocally positive ELISA test confirmed by Western Blot in the presence of suggestive physical signs (chronic persistent lymphadenopathy, diarrhoea, weight loss and Kaposi's sarcoma) not explained by another illness. Accepted criteria were used for diagnosis of systemic lupus erythematosus (SLE) and Reiter's syndrome (appendix E). Hyperuricaemia was defined as serum uric acid level above 420 micromol/l in males and 360 micromol/l in females. Gout was diagnosed in patients with uric acid crystals in the synovial

fluid. Non-specific arthritis was diagnosed in patients with acute or chronic arthritis not fulfilling criteria for recognized rheumatic conditions. In patients in whom the diagnosis was difficult a second opinion was sought.

Patients were followed up daily in the wards before discharge. Following discharge they were followed up once after three to nine months. During these home visits complications were noted and the Arthritis Impact Measurement questionnaire was completed for each patient. Symptoms and signs were noted in the questionnaire.

Rheumatoid factor, lupus erythematosus latex and polarizing light microscopy results of the joint aspirates could not be obtained in time before presentation of dissertation because of a delay in sending the specimens to United Kingdom.

RESULTS

I saw 120 patients consecutively who had musculoskeletal disorders during the eight months of study. During this time there were 11,539 admissions in six medical and two orthopaedic wards. Thus rheumatic disorders comprise about 1.04% of all admissions in these wards. The other results are as tabulated below:-

Table 1: Distribution of arthritides by sex and age

AGE (years)	SEX		TOTAL (%)
	Males (%)	Female (%)	
8-10	3 (2.5)	-	3 (2.5)
11-20	12 (57.1)	9 (42.3)	21 (17.5)
21-30	13 (44.8)	16 (55.2)	29 (24.2)
31-40	22 (75.9)	7 (24.1)	29 (24.2)
41-50	7 (58.3)	5 (41.7)	12 (10.0)
51-60	8 (80.0)	2 (20.0)	10 (8.3)
60+	13 (81.3)	3 (18.7)	16 (13.3)
TOTAL	78 (65.0)	42 (35.0)	120 (100)

Mean age = 36 years

Range: = 8-76 years

Men were almost twice as many as women.

The 21 - 40 year age group comprised almost a half (48.4%) of the total number of patients seen. In the 31 - 40 year age group the number of males seen was significantly higher than females ($p = 0.001$). However, in the 21 - 30 year age group more females were affected compared to males, but the difference was not significant. In all other age groups there was a preponderance of males. No female below the age of 11 years was seen with a rheumatic disease.

Table 2: Sex distribution of rheumatic diseases

Disease	SEX		TOTAL (%)
	Male (%)	Female (%)	
HIV arthropathy	21 (65.6)	11 (34.4)	32 (26.7)
Rheumatoid arthritis	9 (45.0)	11 (55.0)	20 (16.7)
Septic arthritis	13 (76.5)	4 (23.5)	17 (14.2)
Reiter's disease	12 (85.7)	2 (14.3)	14 (11.6)
Gout	5 (71.4)	2 (28.6)	7 (5.8)
Osteoarthritis	3 (42.9)	4 (57.1)	7 (5.8)
Palindromic rheumatism	1 (33.3)	2 (66.7)	3 (2.7)
Acute rheumatic fever	1 (33.3)	2 (66.7)	3 (2.7)
Haemarthrosis	2 (100)	-	2 (1.7)
Hypertrophic pulmonary osteoarthropathy	2 (100)	-	2 (1.7)
Leukaemia	-	1 (100)	1 (0.8)
Psoriatic arthropathy	1 (100)	-	1 (0.8)
Systemic lupus erythematosus	1 (100)	-	1 (0.8)
TB arthritis	1 (100)	-	1 (0.8)
Unspecified diagnosis	6 (66.7)	3 (33.3)	9 (7.5)
Total	78 (65.0)	42 (35.0)	120 (100)

The commonest rheumatic disorder seen was human immunodeficiency virus (HIV) infection associated arthropathy occurring in 32 (26.7%) patients. Rheumatoid arthritis was the second commonest occurring in 20 (16.7%) patients. Septic arthritis was the third commonest, seen in 17 (14.2%) patients. Reiter's disease was the fourth commonest occurring in 14 (11.6%) patients. In 9 (7.5%) patients I could not establish the diagnosis.

Significantly more males than females had HIV arthropathy and Reiter's disease. More females than males suffered from rheumatoid arthritis.

Table 3: The mean age and ranges for specific rheumatic diseases

Disease	Mean age (yrs)	Range (yrs)
HIV arthropathy	35	20-76
Rheumatoid arthritis	34	9-70
Septic arthritis	39	8-72
Reiter's disease	26	14-35
Gout	48	35-62
Osteoarthritis	59.5	40-70

The mean age of patients suffering from Reiter's disease was lowest (26 yrs) while the highest was that of patients suffering from osteoarthritis (59.5 yrs). The mean ages of patients suffering from HIV arthropathy and rheumatoid arthritis was almost the same (34 and 35 yrs), while that of patients with septic arthritis was 39 yrs. The mean age of patients with gout was lower (48 years) than that of patients with osteoarthritis.

The youngest patient seen was 8 years old and suffered from septic arthritis. The oldest patient seen was 76 years old and suffered from HIV arthropathy.

Table 4: Education level and the distribution of Rheumatic diseases

DISEASE	EDUCATION LEVEL					TOTAL (%)
	None (%)	Adult (%)	Prim. (%)	Sec. (%)	Sec+	
HIV arthropathy	5 (15.6)	1 (3.1)	20 (62.5)	6 (18.8)	-	32 (26.7)
Rheumatoid arthritis	5 (25.0)	3 (15.0)	9 (45.0)	3 (15.0)	-	20 (16.7)
Septic arthritis	8 (47.1)	4 (23.5)	4 (23.5)	1 (5.9)	-	17 (14.2)
Reiter's disease	1 (7.1)	1 (7.1)	9 (64.3)	2 (4.2)	1 (7.1)	14 (11.5)
Gout	3 (42.9)	-	1 (14.3)	1 (14.3)	2 (28.6)	7 (5.8)
Osteoarthritis	3 (42.9)	1 (14.3)	2 (28.6)	-	1 (14.3)	7 (5.8)
Palindromic rheumatism	1 (33.3)	-	-	-	2 (66.7)	3 (2.5)
Acute rheumatic fever	-	-	3 (100)	-	-	3 (2.5)
Haemarthrosis	2 (100)	-	-	-	-	-
Hypertrophic pulmonary osteoarthropathy	-	-	-	1	1 (50)	2 (1.7)
Leukaemia	-	-	-	-	1 (100)	1 (0.8)
Psoriatic arthropathy	-	-	-	1	-	1 (0.8)
SLE	1 (100)	-	-	-	-	1 (0.8)
TB arthritis	1 (100)	-	-	-	-	1 (0.8)
Unspecified diagnosis	1 (11.1)	1 (11.1)	4 (53.0)	3 (33.3)	-	9 (7.5)
TOTAL	31 (25.8)	11 (9.2)	53 (44.2)	20 (16.7)	5 (4.2)	120 (100)

Among patients with HIV arthropathy more than a half (62.5%) were primary school leavers. This same trend was observed in patients with rheumatoid arthritis (45.0%) and Reiter's disease (64.3%) and this probably reflects the educational status of the patients seen at Muhimbili Medical Centre.

Table 5: Cigarette smoking and the distribution of rheumatic diseases

DIAGNOSIS	SMOKING HABIT				TOTAL (%)
	NEVER (%)	STOP > 6M (%)	1-10/DAY (%)	OVER 10/DAY (%)	
HIV arthropathy	21 (65.6)	7 (21.9)	2 (6.3)	2 (6.2)	32 (26.7)
Rheumatoid arthritis	14 (70.0)	4 (20.0)	2 (10.0)	-	20 (16.7)
Septic arthritis	9 (52.9)	5 (29.4)	3 (17.6)	-	17 (14.2)
Reiter's disease	9 (64.2)	2 (14.3)	3 (21.4)	-	14 (11.7)
Gout	5 (71.4)	2 (28.6)	-	-	7 (5.8)
Osteoarthritis	4 (57.1)	3 (42.9)	-	-	7 (5.8)
Palindromic rheumatism	2 (66.7)	-	1 (33.3)	-	3 (2.5)
Acute rheumatic fever	3 (100)	-	-	-	3 (2.5)
Haemarthrosis	-	1 (50)	1 (50)	-	2 (1.7)
Hypertrophic pulmonary osteoarthropathy	1 (50)	1 (50)	-	-	2 (1.7)
Leukaemia	1 (100)	-	-	-	1 (0.8)
Psoriatic arthropathy	1 (100)	-	-	-	1 (0.8)
SLE	-	1 (100)	-	-	1 (0.8)
TB arthritis	-	-	1 (100)	-	1 (0.8)
Unspecified arthritis	6 (66.7)	2 (22.2)	1 (11.1)	-	9 (7.5)
TOTAL	76 (66.3)	28 (33.3)	14 (11.7)	2 (1.7)	120 (100)

In this series there were 76 (63.3%) patients who had never smoked. In almost all rheumatic diseases, more patients had never smoked compared to those who had.

Table 6: **Body mass index and distribution of rheumatic disorders**

	BODY MASS INDEX				
Disease	< 19 (%)	19-25 (%)	26 - 29 (%)	> 30 (%)	Total (%)
HIV arthropathy	6 (18.8)	20 (62.5)	4 (12.5)	2 (6.3)	32 (26.7)
Rheumatoid arthritis	5 (25.0)	10 (50.0)	2 (10.0)	3 (15.0)	20 (16.7)
Septic arthritis	1 (5.9)	12 (70.6)	1 (5.9)	3 (17.6)	17 (14.2)
Reiter's disease	5 (35.7)	8 (57.1)	1 (7.1)	-	14 (11.7)
Gout	-	3 (42.9)	-	4 (57.1)	7 (5.8)
Osteoarthritis	-	1 (14.3)	5 (71.4)	1 (14.3)	7 (5.8)
Palindromic rheumatism	1 (33.3)	2 (66.7)	-	-	3 (2.5)
Acute rheumatic fever	-	3 (100)	-	-	3 (3.5)
Haemarthrosis	-	2 (100)	-	-	2 (1.7)
Hypertrophic pulmonary osteoarthropathy	-	2 (100)	-	-	2 (1.7)
Leukaemia	-	1 (100)	-	-	1 (0.8)
Psoriatic arthropathy	-	1 (100)	-	-	1 (0.8)
SLE	-	1 (100)	-	-	1 (0.8)
TB arthritis	-	1 (100)	-	-	1 (0.8)
Unspecified diagnosis	2 (22.2)	5 (55.5)	-	2 (22.2)	9 (7.5)
TOTAL	20 (16.7)	72 (60.0)	13 (10.8)	15 (12.5)	120 (100)

The proportion of patients who were overweight or obese was higher in those with gout and osteorthritis compared to the rest of the patients. The proportion of patients with HIV arthropathy who were underweight was almost the same as that for patients with rheumatoid arthritis.

Table 7: Occupation and the distribution of rheumatic diseases

Disease	OCCUPATION						
	M/W (%)	PEAS (%)	H/W (%)	OFF/W/N (%)	OFF/W/S (%)	NMW (%)	TOTAL (%)
HIV arthritis	6 (18.8)	2 (6.3)	12 (37.5)	7 (21.9)	2 (6.3)	3 (9.4)	32 (26.7)
Rheumatoid arthritis	7 (35.0)	3 (15.0)	5 (25.0)	3 (15.0)	-	2 (10.0)	20 (16.7)
Septic arthritis	3 (17.6)	3 (17.6)	4 (23.5)	4 (23.5)	2 (11.8)	1 (5.9)	17 (14.2)
Reiter's disease	6 (42.8)	-	3 (21.4)	2 (14.3)	2 (14.3)	1 (7.1)	14 (11.7)
Gout	-	2 (28.6)	2 (28.6)	2 (28.6)	1 (14.3)	-	7 (5.8)
Osteoarthritis	1 (14.3)	2 (28.6)	4 (57.1)	-	-	-	7 (5.8)
Palindromic rheumatism	-	1 (33.3)	-	1 (33.3)	1 (33.3)	-	3 (2.5)
Acute rheumatic fever	-	-	-	1 (33.3)	2 (66.7)	-	3 (2.5)
Haemarthrosis	-	-	-	-	1 (50)	1 (50)	2 (1.7)
Leukaemia	-	-	-	1 (100)	-	-	1 (0.8)
Psoriatic arthropathy	1 (100)	-	-	-	-	-	1 (0.8)
SLE	1 (100)	-	-	-	-	-	1 (0.8)
TB arthritis	-	1 (100)	-	-	-	-	1 (0.8)
Unspecified diagnosis	-	1 (11.1)	2 (22.2)	2 (22.2)	4 (44.4)	-	9 (7.5)
TOTAL	26 (21.7)	16 (13.3)	32 (26.7)	23 (19.2)	15 (12.5)	8 (6.7)	120 (100)

Note: M/W = Manual Worker
H/W = Housewife
PEAS = Peasant
OFF/W/N = Officer worker non-sitting
OFF/W/S = Office worker seated
NMW = Non manual worker

Of the 32 patients who had HIV arthropathy 12 (37.5%) were housewives while 7 (21.9%) were office workers and 6 (18.8%) were manual workers. Out of 20 patients who had rheumatoid arthritis 7 (35.0%) were peasants while 5 (25.0%) were housewives. Gout was present in 2 (28.5%) patients who were peasants. The distribution of septic arthritis was almost uniform in all categories of occupation. Osteoarthritis was commonest among housewives, occurring in 4 (57.1%) patients. The numbers were too small for statistical testing.

Table 8: Presentation of rheumatic diseases on admission

Disease	Total (n)	Patients with acute presentation (%)	Patients with chronic presentation (%)
HIV arthritis	32	8 (25.0)	24 (75.0)
Rheumatoid arthritis	20	2 (10.0)	18 (90.0)
Septic arthritis	17	2 (11.7)	15 (88.3)
Reiter's disease	14	3 (21.4)	11 (78.6)
Gout	7	-	7
Osteoarthritis	7	2 (40.0)	5 (60.0)
Palindromic rheumatism	3	-	3 (100)
Acute rheumatic fever	3	1 (33.3)	2 (66.7)
Haemarthrosis	2	1 (50)	1 (50)
Hypertrophic pulmonary osteoarthropathy	2	-	2 (100)
Leukaemia	1	1 (100)	-
Psoriatic arthropathy	1	-	1 (100)
TB arthritis	1	-	1 (100)
SLE	1	-	1 (100)
Unspecified diagnosis	9	2 (22.2)	7 (77.8)
TOTAL	120	22 (18.3)	98 (81.7)

In almost all the patients seen, most presented with a chronic presentation. In patients with HIV arthropathy only 8 (25.0%) come with acute symptoms while in patients with rheumatoid arthritis only two (10%) patients came with acute symptoms. In patients with septic arthritis two (11.7%) presented with acute symptoms. In patients with Reiter's disease 3 (21.4%) presented with acute symptoms. All patients with gout presented after the symptoms had persisted for longer than three weeks. 7 (77.8%) patients with unknown rheumatic diseases come to hospital after more than three weeks had passed from the onset of the symptoms.

Table 9: Average duration of stay in hospital

Disease	Average duration of stay (days)	Range of hospital stay (days)
HIV arthropathy	9.1	2-10
Rheumatoid arthritis	8.6	4-13
Septic arthritis	11.9	5-15
Reiter's disease	8.0	3-14
Gout	11.8	5-12
Osteoarthritis	6.6	5-11
Acute rheumatic fever	6.7	4-10
Palindromic rheumatism	5.5	2-7
Unestablished diagnosis	9.3	3-10

The average duration of hospital stay was longest in patients with septic arthritis and gout (11.9 and 11.8 days respectively). The range of hospital stay was 5-15 days for patients with septic arthritis and 5-12 days for those with gout.

Patients with palindromic rheumatism had the shortest average duration of stay (5.5 days) the range being 2-7 days. Patients with HIV arthropathy and those with undetermined diagnosis had almost the same average duration of stay of 9.1 and 9.3 days respectively. However, the range of stay differed in these diseases, being 2-10 days in HIV patients and 3-10 days in those with undetermined diagnosis.

In rheumatoid arthritis and Reiter's disease the average duration of stay was 8.6 and 8.0 days respectively. The range of stay in rheumatoid arthritis patients was 4-13 days while it was 3-14 days in those with Reiter's disease.

Table 10: Patients with history of any joint disease in other family members

Disease	Patients (number)	Number of patients having other family members with joint illness
Septic arthritis	17	2
Reiter's disease	14	1
Osteoarthritis	7	1
Gout	7	1

In two patients with septic arthritis there was a history of joint disease in other family members. One patient each gave a history of joint disease occurring in other family members in those suffering from Reiter's disease, osteoarthritis and gout.

Table 11: Joint involvement in various arthritides

	JOINTS INVOLVED											
Disease	Toes	Ankle	Knee	Hip	DIP	PIP	MP	IC	WRIST	ELBOW	SH	TM
HIV arthropathy	7	12	28	1	-	8	-	1	8	3	2	1
Rheumatoid arthritis	4	9	13	-	2	18	2	-	14	8	2	-
Septic arthritis	1	1	17	-	-	2	-	-	1	1	-	-
Reiter's disease	1	10	12	-	-	1	-	-	3	2	-	-
Gout	4	2	6	-	-	-	-	-	1	-	-	-
Osteoarthritis	-	-	7	-	-	1	-	-	1	-	-	-
Palindromic rheumatism	-	3	2	-	-	-	-	-	2	-	2	-
Acute rheumatic fever	-	1	2	-	-	-	-	-	1	-	1	-
Haemarthrosis	-	-	2	-	-	-	-	-	-	-	-	-
Hypertrophic pulmonary osteoarthropathy	-	2	1	-	1	1	-	-	2	1	-	-
Leukaemia	-	-	1	-	-	-	-	-	-	1	-	-
Psoriatic arthropathy	-	-	1	-	-	-	-	-	1	-	1	-
SLE	-	-	1	-	-	-	-	-	-	-	-	-
TB arthritis	-	-	1	-	-	-	-	-	-	-	-	-
Unspecified diagnosis	-	2	8	-	-	-	-	-	-	-	-	-
TOTAL	17	42	102	1	3	31	2	1	34	16	8	1

Key to table 11:

DIP = Distal interphalangeal joint
PIP = Proximal interphalangeal joint
MP = Metacarpophalangeal joint
IC = Intercarpal joint
SH = Shoulder joint
TM = Temporomandibular joint

The knee joint was the commonly involved in patients suffering from HIV arthropathy. It was involved in 28 out of 32 patients. The ankle joint was the next common joint involved. It was affected in 12 out of 32 patients. The proximal interphalangeal joints and wrists were involved in 8 patients. The toes were involved in 7 patients. The elbow was involved in three patients. The hip, intercarpal, shoulder and temporomandibular joints were rarely involved.

The proximal interphalangeal joints were the most commonly affected, being involved in 18 out of 20 patients with rheumatoid arthritis. The wrist became involved in 14 out of 20 patients. Thirteen patients with rheumatoid arthritis had knee involvement. The ankle and elbow joints were involved in 9 and 8 patients respectively. Rarely involved joints included the great toe, distal interphalangeal, metacarpophalangeal and shoulder joint.

The knee joint was involved in all patients with septic arthritis. Very rarely the proximal interphalangeal joints, toe, ankle, wrist and elbow were involved in septic arthritis.

The knee joint was involved in 12 out of 14 patients with Reiter's disease while the ankle joint became involved in 10 patients. The wrist was the site of involvement in 3 of these patients. Joints which were rarely involved were the elbow, toe and proximal interphalangeal.

Six out of 7 patients with gout had involvement of the knee joint. The toe was affected in four patients and the ankle in two patients. The wrist was involved in one patient.

The knee joint was involved in all patients with osteoarthritis. The proximal interphalangeal joint was involved in only one patient.

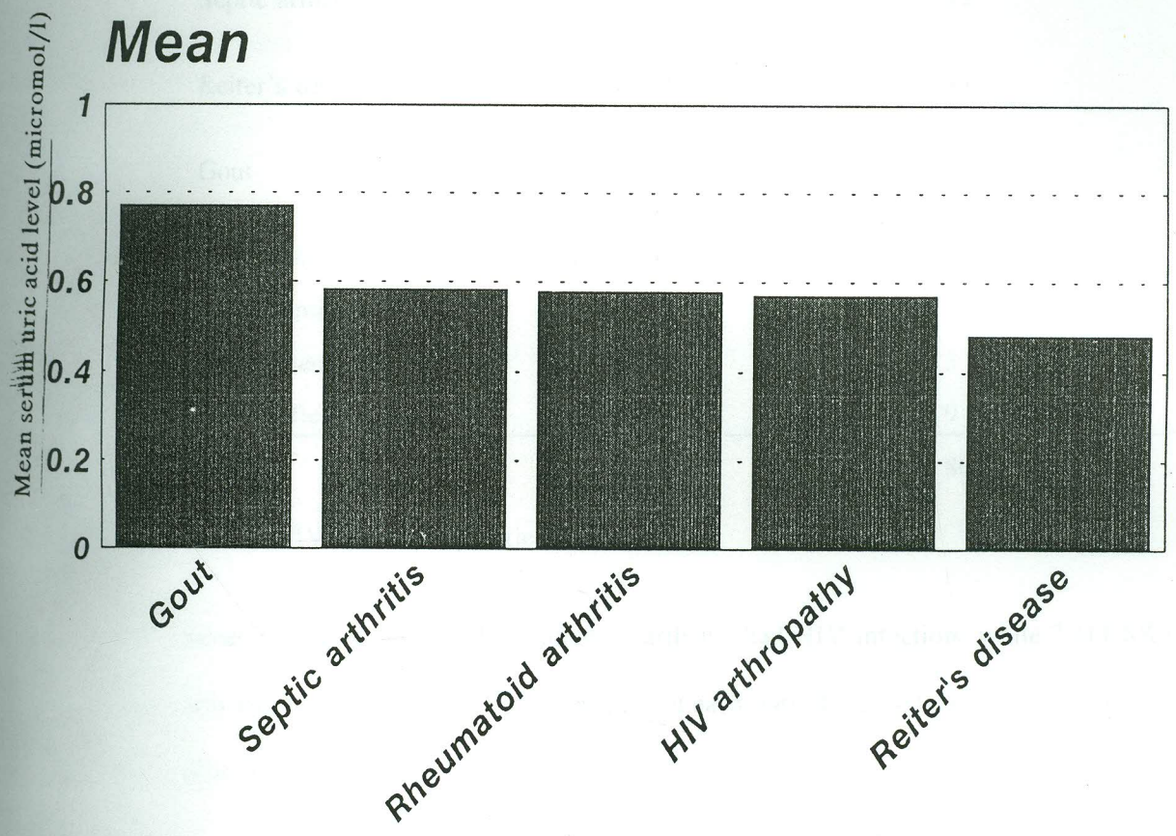
In 8 patients out of 9 with unspecified diagnosis there was knee joint involvement while in only two patients the ankle joint was involved.

Table 12: Hyperuricaemia and the associated rheumatic diseases

Disease	Total number of patients	Patients with hyperuricaemia without gout (%)	Patients without hyperuricaemia (%)
HIV arthropathy	32	7 (21.9)	25 (78.1)
Rheumatoid arthritis	20	8 (40.0)	12 (60.0)
Septic arthritis	17	5 (29.4)	12 (70.6)
Reiter's disease	14	4 (28.6)	10 (71.4)
Osteoarthritis	7	2 (28.6)	5 (71.4)
Palindromic rheumatism	3	1 (33.3)	2 (66.7)
Acute rheumatic fever	3	2 (66.7)	1 (33.3)
Haemarthrosis	2	1 (50)	1 (50)
Hypertrophic pulmonary osteoarthropathy	2	1 (50)	1 (50)
Leukaemia	1	1 (100)	-
Psoriatic arthropathy	1	1 (100)	-
TB arthritis	1	1 (100)	-
Unspecified diagnosis	9	1 (11.1)	8 (88.9)
TOTAL	119	42 (35.3)	73 (64.8)

Hyperuricaemia was present in 7 (21.9%) patients with HIV arthropathy, 8 (40.0%) patients with rheumatoid arthritis, 5 (29.4%) patients with septic arthritis, 4 (28.6%) patients with Reiter's disease, 2 (28.6%) patient with osteoarthritis and 1 (11.1%) patient with unspecified diagnosis. Two out of three patients with acute rheumatic fever had hyperuricaemia. In all, 42 (35.3%) patients seen had hyperuricaemia (excluding those with the diagnosis of gout).

Figure 1: **Mean serum uric acid levels in hyperuricaemic patients in various diseases**



The mean serum uric acid level was highest in gouty patients, being 0.77 mmol/l (range = 0.636). It was lowest in patients with Reiter's disease, being 0.482 mmol/l (range = 0.133). The mean serum uric acid levels in hyperuricaemic patients with septic arthritis, rheumatoid arthritis and HIV arthropathy was lower than that in gouty patients.

Table 13: Prevalence of HIV infection in various rheumatic diseases

Disease	HIV STATUS		Total number of patients
	Negative (%)	Positive (%)	
Rheumatoid arthritis	13 (65.0)	7 (35.0)	20
Septic arthritis	15 (82.2)	2 (11.8)	17
Reiter's disease	13 (92.9)	1 (7.1)	14
Gout	7 (100.0)	-	7
Osteoarthritis	6 (85.7)	1 (14.3)	7
Palindromic rheumatism	3 (100.0)	-	3
Acute rheumatic fever	3 (100.0)	-	3
Unspecified diagnosis	9 (100.0)	-	9
TOTAL	69 (86.3)	11 (13.7)	80

Note: HIV arthropathy patients excluded.

Seven (35%) patients with rheumatoid arthritis had HIV infection, while 2 (11.8%) with septic arthritis had HIV disease. Only one patient each with Reiter's disease and osteoarthritis had HIV disease.

Table 14: Number of joints involved in HIV arthropathy

Pattern of joint involvement	Number (%)
Monoarticular	7 (21.9)
Oligoarticular	17 (53.1)
Polyarticular	8 (25.0)
TOTAL	32 (26.7)

The commonest pattern of joint involvement in HIV arthropathy was oligoarticular (4 or less joints involved). Polyarticular involvement occurred in 8 (25%) patients and monoarticular involvement was present in 7 (21.9%) patients.

Table 15: Complications and extra-articular manifestations in various rheumatic diseases

COMPLICATIONS	DISEASE									TOTAL
	HIV arthr	RA	SA	RD	PR	ARF	HO	SLE	TB arthr	
Subluxation MP joint	-	1	-	-	-	-	-	-	-	1
Thickened flexor tendons	-	1	-	-	-	-	-	-	-	1
Ulnar deviation	-	3	-	-	-	-	-	-	-	3
Swan neck deformity	-	1	-	-	-	-	-	-	-	1
Muscular wasting	-	3	-	1	-	-	-	-	-	4
Nodules	-	1	-	-	-	-	-	-	-	1
Pustules	2	1	1	-	-	-	-	-	-	4
Vascular lesions	-	2	-	-	-	-	-	-	-	2
Erythematous butterfly rash	-	-	-	-	-	-	-	1	-	1
Conjuctivitis	-	1	-	-	-	-	-	-	-	1
Heart valve involvement	-	-	-	1	-	-	-	-	-	1
Fibrosing alveolitis	1	-	-	-	-	-	-	-	-	1
Psychiatric disease	-	-	-	-	-	-	1	-	-	1
Peripheral neuropathy	1	-	-	-	-	-	-	-	-	1
Lymphadenopathy	13	2	2	2	1	1	-	-	-	21
Splenomegaly	2	2	2	-	-	-	1	-	-	7
Hepatomegaly	1	2	1	-	-	-	-	-	1	5
TOTAL	20	20	6	4	1	1	1	2	1	56

Key: RA = Rheumatoid arthritis
SA = Septic arthritis
RD = Reiter's disease
PR = Palindromic rheumatism
ARF = Acute rheumatic fever
HO = Hypertrophic Pulmonary osteoarthropathy

There were no joint deformities in patients with HIV arthropathy. The commonest extra-articular manifestation was lymph node swelling (commonly the cervical nodes). In two patients each there were pustules and splenomegaly. The commonest joint deformity seen in patients with rheumatoid arthritis were ulnar deviation of the hand at the wrist joint and muscle wasting. In two patients there were vasculitic lesions, lymph node enlargement, splenomegaly and hepatomegaly. Only one patient with nodules was seen. Among patients with septic arthritis, in two there was lymph node enlargement and splenomegaly. One patient each had hepatomegaly and pustular lesions. Lymph nodes were palpable in two patients with Reiter's disease. In one patient with Reiter's disease a bivalvular aortic valve was detected by echocardiography.

Table 16: Karnofsky Performance Scale on admission and discharge for various rheumatic diseases

Disease	UNABLE TO CARE FOR SELF (0-40)			UNABLE TO WORK (50-70)			NORMAL ACTIVITY (80-100)		
	Admission	Discharge	Total	Admission	Discharge	Total	Admission	Discharge	Total
HIV arthropathy	6	1	7	23	20	53	3	11	14
Rheumatoid arthritis	5	2	7	15	15	30	-	3	3
Septic arthritis	3	-	3	14	12	26	-	5	5
Reiter's disease	2	-	2	9	8	17	2	5	7
Gout	1	-	1	5	5	10	1	2	3
Osteoarthritis	2	-	2	5	5	10	3	3	6
Acute rheumatic fever	-	1	1	3	1	4	-	1	1
Psoriatic arthropathy	-	-	-	2	2	4	1	1	2
Unspecified diagnosis	-	-	-	7	3	10	2	6	8
TOTAL	19	4	23	83	71	154	12	37	49

Out of 7 patients with HIV arthropathy who were unable to take care of themselves on admission, only one was discharged in the same state of incapacitation.

In patients with rheumatoid arthritis 2 out of 7 did not improve on discharge and were still unable to take care of themselves.

In patients with septic arthritis, Reiter's disease, osteoarthritis and gout all had improved on discharge and none were incapacitated to the extent of failing to take care for self.

On discharge 20 out of 32 patients with HIV were unable to work while 15 out of 20 patients with rheumatoid arthritis were unable to work. 12 out of 17 patients with septic arthritis were unable to work and 8 out of 14 patients with Reiter's disease were also unable to work on discharge.

Table 17: Episodes of septic arthritis, total peripheral WBC, synovial fluid differential WBC and bacteria isolated from synovial fluid

Serial No	16	26	28	37	42	50	59	64	79	80	81	98	107	113	116	121	122
Peripheral total WBC (cell/cmm X 1000	17.0	16.5	12.4	22.4	20.2	8.1	8.2	3.1	10.3	11.5	14.5	15.1	10.2	11.0	12.1	11.1	13.1
Polymorphs (%) Synovial fluid differential WBC	-	-	10	-	97	-	-	98	99	99	-	-	99	99	90	94	-
Lymphocytes (%)			90		3			2	1	1			1	1	10	6	
Bacteria isolated	-	-	-	-	-	-	beta strepto cocci	-	-	-	Klebsiella	-	beta strepto cocci	-	-	-	Stepto coccus pyoge nes

Mean total white blood cell count = 12,164 cells/cmm SD = 5,434
Range (3100 - 22,400).

Except in three patients (17.6%) the total peripheral white cell count was above 10,000 cells/cmm in patients with septic arthritis. It was possible to do synovial fluid examination in only 9 out of 17 patients. In 8 out of 9 patients the polymorph leucocyte differential count was 90% or above. In only one patient the differential lymphocyte count was 90%. It was possible to isolate causative organisms in only 4 (23.5%) patients. In two patients beta-haemolytic streptococci were isolated. In one patient ***Streptococcus pyogenes*** was found to cause arthritis while Klebsiella species was isolated in one patient.

Table 18: Conditions associated with septic arthritis

CONDITION	Patients (n) (%)
Alcohol intake	5 (29.4)
Previous use of antibiotics	3 (17.6)
Elderly (above 55 yrs)	2 (11.8)
HIV infection	2 (11.8)
Diabetes mellitus	1 (5.9)
Sickle cell anaemia	1 (5.9)
Young (below 10 yrs)	1 (5.9)

Note: There were 17 patients with septic arthritis.

Five (29.4%) patients with septic arthritis were taking alcohol and 3 (17.6%) had used antibiotics before being seen. Two patients were aged above 55 years and 2 had HIV infection. One patient each had diabetes mellitus and sickle cell anaemia. One patient was aged 8 years.

Table 19: Outcome of Rheumatic disease on follow up after 5.8 months of discharge

DISEASE	KARNOFSKY PERFORMANCE SCALE				
	Normal activity (80-100) (%)	Unable to work (50-70) (%)	Unable to care for self (0 -40) (%)	DEATHS (%)	TOTAL (%)
HIV arthropathy	19 (67.8%)	6 (21.4)	1 (3.6)	2 (7.1)	28 (27.4)
Rheumatoid arthritis	7 (43.7)	6 (37.5)	1 (6.3)	2 (12.5)	16 (15.7)
Septic arthritis	9 (60.0)	6 (40.0)	-	-	15 (14.7)
Reiter's disease	10 (71.4)	4 (28.6)	-	-	14 (13.7)
Gout	4 (80.0)	1 (20.0)	-	-	5 (4.9)
Palindromic rheumatism	2 (100)	-	-	-	2 (1.9)
Acute rheumatic fever	1 (33.3)	1 (33.3)	-	1 (33.3)	3 (2.9)
Haemarthrosis	2 (100)	-	-	-	2 (1.9)
Hypertrophic pulmonary osteoarthropathy	1 (100)	-	-	-	1 (0.9)
Leukaemia	-	-	-	1 (100)	1 (0.9)
Psoriatic arthropathy	1 (100)	-	-	-	1 (0.9)
Systemic lupus erythematosus	-	-	-	1 (100)	1 (0.9)
TB arthritis	-	1 (100)	-	-	1 (0.9)
Unspecified diagnosis	6 (85.7)	1 (14.3)	-	-	7 (6.9)
TOTAL	64 (62.7)	28 (27.4)	3 (2.9)	7 (6.9)	102 (85)

I was able to follow up 102 (85.0%) patients. Of these, 64 (62.7%) were able to do normal activities, 28 (27.4%) were unable to perform normal activities and 3 (2.9%) were severely incapacitated. There were 7 (6.9%) deaths.

Follow up after 5.8 months revealed that 19 (67.8%) patients with HIV arthropathy were able to do normal activities while 6 (21.4%) were unable to work and 1 (3.6%) was unable to take care of herself. There were two deaths in this group of patients. The exact causes of death could not be established.

In patients with rheumatoid arthritis 7 (43.7%) were able to do normal work while 6 (37.5%) were unable to work and 1 (6.3%) was incapacitated severely. There were two deaths in this group. One death was probably due to amyloidosis in a woman who had had symptoms for 25 years and the cause could not be found in the other.

Six (40.0%) patients with septic arthritis were unable to work at follow up and none was found to be incapacitated. In Reiter's disease 4 (28.6%) patients were unable to work and none was unable to care for self. Out of 5 patients with osteoarthritis who could be followed up one was severely handicapped and was unable to take care of himself. Two were unable to do normal duties.

One patient with acute rheumatic fever died and the cause was heart failure due to myocarditis.

One patient with systemic lupus erythematosus died and the cause of death was unestablished.

Out of the seven patients with unestablished diagnosis who were followed up only one was unable to work.

Table 20: Some aspects of functional disabilities (using the Arthritis Impact Measurement scale) on discharge and follow up

	On discharge (n=108)			On follow up (n=82)		
	Degree of disability			Degree of disability		
	Able	Need help	Not able at all	Able	Need help	Not able at all
Use of public transport	95	19	4	72	-	10
Household activities	108	8	2	72	5	5
Taking care of self	110	6	2	79	-	3

On discharge 95 (79.2%) patients were able to use public transport while 19 (16.1%) needed help and 4 (3.4%) were not able to use public transport at all. One hundred and eight (91.5%) patients were able to do household activities, while 8 (6.7%) needed help and 2 (1.7%) were not able to do household activities at all. One hundred and one (93.2%) patients were able to take care of themselves, 6 (5.1%) needed help and 2 (1.7%) were not able to take care of themselves at all.

On follow up, 72 (87.8%) patients were able to use public transport and 10 (12.2%) were not able to use public transport at all. Seventy two (87.8%) patients were able to do all household activities without help, 5 (6.1%) needed help and 4 (4.9%) were not able to do household activities at all. Seventy nine (96.3%) patients were able to take care of themselves while 3 (3.7%) were not able to take care of themselves at all.

DISCUSSION

This was a hospital based study and therefore the results cannot directly be extrapolated to the community. The incidence and prevalence of rheumatic diseases can be obtained by doing population studies and no such studies have been done in sub-Saharan Africa, apart from South Africa . Most of the patients who attend hospitals are those who have the most severe illness. On the other hand, some patients who are severely sick cannot reach a doctor especially if you consider the transport problems facing this country. During follow up I encountered four patients who could not come back to the hospital because of severe disease. Thus it is very possible that I did not see all possible cases of rheumatic disease at this referral centre. It was also possible that some patients with rheumatic diseases could have been admitted to surgical, or gynaecological/obstetrical wards. I did not find any such case after going through the admission register but this might have been due to poor recording. There is no rheumatic clinic at Muhimbili Medical Centre and no information had been circulated that this study was being done. Thus, the chances of selection bias are unlikely. Therefore, we can assume that from this study we can get a general idea of the pattern of rheumatic disease in the community.

During this period of study 120 patients with rheumatic disorders were admitted comprising about 1% of the total medical and orthopaedic admissions to Muhimbili Medical Centre. This is almost similar to what has been observed in two Zimbabwe hospitals where rheumatic diseases comprised 1-2% of the total admissions (excluding maternity and psychiatric admissions)[36,38]. This may appear to convey the impression that these diseases are unimportant in our hospitals. However, the cost of follow up, rehabilitation and education is large compared to many other more acute diseases we often encounter in our hospitals.

Almost 70% of those who had rheumatic diseases were in the 11 - 40 year age group. This is the school and reproductive age group. It shows how important rheumatic diseases are in economic terms.

HIV ARTHROPATHY

Prevalence/sex Distribution

Human immunodeficiency virus (HIV) infection related arthritis was the commonest joint disorder encountered. Till now no criteria have been established to diagnose HIV related arthritic problems. In my study I encountered problems in which individuals had HIV disease but the joint disease pattern closely resembled rheumatoid arthritis. Also there were patients who had bloody diarrhoea preceding the onset of joint disease with close similarities to Reiter's disease. There were also patients who had HIV infection and fulfilled the criteria for septic arthritis. All these patients were not included in this category of HIV-related arthritis. This means that this group could have been larger if definite criteria had been developed to diagnose this disorder.

More males presented with HIV related arthritis than females. The reason for this male preponderance is not clear. The accessibility to hospital services for both males and females is the same. Thus male preponderance of HIV related arthritic disorders remains largely unexplained .

In two different studies carried out in Zimbabwe HIV related arthritis was the third and fifth commonest cause of rheumatic disease at two rheumatic disease clinics[35,36]. In one of these studies the prevalence of this disorder in males was almost equal to that in females. However, in the other study only 8% of the individuals affected were females. During a spell of teaching at Muhimbili Medical Centre McGill encountered two patients with HIV infection in two weeks who had acute polyarthritis[90]. HIV disease is a recently introduced disease. Any arthritic disorder associated with HIV is also new to us. We do not know the pattern of joint diseases in this hospital before the era of HIV infection. It is very surprising how such a recently introduced disease has acquired immense importance in rheumatology in our society. It will be very

interesting to monitor the trend of this pattern because this might reveal clues to the causes of various rheumatic diseases.

Clinical presentation:

The majority of patients with HIV arthropathy had symptoms for three or more weeks before being seen. This could mean that the symptoms are not so severe to make a patient seek medical advice or it could be a problem of referral. Many patients I saw had attended private hospitals or other medical services before being referred. Screening and testing for human immunodeficiency virus is not done in other centres as frequently as it is at Muhimbili Medical Centre. Thus in most patients the diagnosis had been missed in peripheral centres.

The presentation in a majority of patients was oligoarticular asymmetrical involvement of joints. This picture closely resembles that of Reiter's disease or reactive arthritis.

The presence or absence of urethritis was excluded just by history so I did not know how many patients with HIV infection had asymptomatic urethritis and it is very possible that this was missed. This could also mean that these cases were cases of reactive arthritis. Only one patient who had HIV infection was included in the category of Reiter's disease implying that there was no mis-allocation of patients in these two rather similar diseases.

The knee and ankle were the most commonly involved joints. The upper extremity joints were rarely involved compared to those in the lower limbs. The unusual thing was the common involvement of joints in the toes. It was also surprising to find a high prevalence of hyperuricaemia in these patients. Gout is unlikely but I am anxiously waiting for polarising light microscopy results on some of the joint aspirates I did on these patients.

Only six (18.8%) patients with HIV arthropathy had a body mass index (BMI) below normal. This means that HIV arthritis is a relatively early manifestation of infection by HIV.

Treatment and outcome

Non steroidal anti-inflammatory drugs were effective in abolishing the joint symptoms in these patients with HIV infection. Only one patient out of six was still unable to take care of herself on discharge. It has been pointed out that the arthropathy in those with AIDS is intractable to therapy with anti-inflammatories (McGill, Personal Communication).

It is possible that the patients I saw responded well to anti-inflammatory drugs because most of them were in the early stages of HIV infection. If the arthropathy in HIV infection is the same during the early and terminal stages of the infection there is no reason to explain this difference in the effects of these drugs.

On follow up only one patient was unable to care for herself and two had died of unestablished causes. Only 6 (21.4%) patients were unable to work. It is possible that other opportunistic infections overwhelm rheumatic disorders in these patients but long term follow up is needed. This will be relevant because most of the patients presented early in the course of HIV infection.

RHEUMATOID ARTHRITIS

Rheumatoid arthritis was the second commonest rheumatic disorder seen. It was more common in females than in males though the difference was not statistically significant. This is surprising when you consider the observation in western countries. Studies carried out elsewhere have suggested that married women have an increased risk of developing rheumatoid arthritis and that the likelihood of developing rheumatoid arthritis, particularly sero-positive disease, may be related to pregnancy experience[91]. This data conflicts with other results that suggest lower fertility in women destined to develop rheumatoid arthritis[92]. Therefore the reasons for the higher female preponderance still remain unknown.

The disease was more common in primary school leavers compared to other groups but this may be due to the greater number of this group in this study.

Probably smoking is not related to the prevalence of rheumatoid arthritis because there were many patients who were non-smokers. About half of the patients with rheumatoid arthritis had a normal BMI and a few were below normal. This could mean that the patients had not been severely affected by the disease. It is easy for such an articular disease to cause disability and lead to disease-induced poverty.

Rheumatoid arthritis was found to be more frequent in manual workers and housewives. It would be interesting to look for the common factor in these two groups which might explain the reason for the higher prevalence of this disease. Some investigators have reported an increased incidence of rheumatoid arthritis in workers in the fishing, dairy and butchering industries and in those working outdoors[93]. It is suspected that rheumatoid arthritis could be triggered by trauma but this has not been fully investigated and there has been no supporting[94] evidence so far. There is frequent trauma in both manual workers and housewives and possibly the above observation agrees with this theory of trauma as being an aetiological factor.

Clinical presentation

In the majority of patients the articular symptoms had been present for more than three weeks before admission. Some patients have the tendency to neglect symptoms and this could cause delay. It is also possible that the symptoms were mild and therefore ignored by the patient in the initial stage of the illness.

The commonest joints to be involved were the proximal interphalangeal joint (PIP) followed by the wrist and the presentation was symmetrical. The joints in the lower limbs were less commonly affected than those in upper limbs. The knee was the commonly involved joint in the lower limbs. Involvement of the hand joints easily interferes with proper and full utilization of the hand and this increases the disability.

The average duration of stay of these patient was more than a week. This is a longer period compared to that of patients with malaria or gastroenteritis.

It is surprising that HIV infection was present in 35% of patients with rheumatoid arthritis. All these patients had typical presentation of rheumatoid arthritis and therefore misdiagnosis was unlikely; they had symmetrical joint involvement with evidence of radiographic osteopenia and joint erosions. It has already been pointed out that HIV infection improves the symptoms in rheumatoid arthritis. No peripheral blood CD_4 T lymphocytes were counted in these patients. It would be of interest to know the levels of these cells because they are thought to be responsible in initiating the autoimmune process in rheumatoid arthritis.

There is no obvious reason to explain the rather high prevalence of hyperuricaemia in patients with rheumatoid arthritis. No obvious cause of hyperuricaemia could be found in these patients. It has been pointed that low dose aspirin leads to hyperuricaemia by some unknown mechanisms. Could this be the cause of hyperuricaemia in such patients who are very likely to use aspirin because of pain? Rheumatoid arthritis is one of the causes of amyloidosis and it is not documented that hyperuricaemia occurs in renal amyloidosis. Anyway, these patients had no features of nephrotic syndrome, the hallmark of renal amyloidosis. Also, there could be laboratory errors in the estimation of serum uric acid level. There is a need of doing quality control. The mean serum uric acid level in patients with gout was 0.77 mmol/l while in non-gouty patients it was less than 0.57 mmol/l.

Associated extra-articular manifestations and complications

Only patients with rheumatoid arthritis manifested with joint deformities of the hand. The commonest deformities were ulnar deviation of the fingers at the metacarpophalangeal joints and muscle wasting. One patient had skin nodules. She was a female aged 70 years. The other

complications and extra-articular manifestations were very rare. The mean age for patients with rheumatoid arthritis was 34 years (range 9-70 years). Probably the rarity of extra-articular manifestations could be explained by the relatively young age of patients seen.

Treatment and outcome

More than half of patients with rheumatoid arthritis were able to work normally after being admitted with severe incapacitation. In most patients non steroidal anti-inflammatory drugs (NSAIDs) and especially indomethacin were used. In four patients low doses of prednisolone (7.5 mg) were used to control the symptoms after failure of NSAIDs. No disease modifying drugs were used because they were not available. It appears that in most of the patients the disease had worsened because on follow-up as many as 43% were unable to continue with their work. This could be the result of non-compliance or the progressive worsening of the disease in its natural course. It is suggested that long term follow-up should be done to effectively monitor progression and outcome of this disease. Four patients with rheumatoid arthritis were lost to follow-up.

SEPTIC ARTHRITIS

This was the third commonest cause of rheumatic disease seen in this series. I have included patients in whom the synovial fluid aspirate did not grow any bacteria. But in these patients the synovial fluid was purulent and the other clinical features suggesting septic arthritis were present in these cases. The causative organisms were not sought from extra-articular sites like blood, urine, skin or throat. In some patients there were pustules which yielded no growth on culture and sensitivity.

Associated conditions which could predispose to septic arthritis were alcohol intake in five patients, use of antibiotics, sickle cell anaemia, diabetes mellitus and HIV infection (no other

signs of AIDS). In two patients aged above 55 years no obvious associated conditions could be seen. In other studies conditions which were found to predispose to the development of septic arthritis were extra-articular infections, serious chronic illness (cancer, cirrhosis, diabetes), prior antibiotics, prior immunosuppressive and prior arthritis in the infected joints[95]. One of the articular problems known to predispose to septic arthritis is rheumatoid arthritis[96,97]. In such cases it is easy to miss the diagnosis of septic arthritis and thus delay treatment and this increases the morbidity of the disease.

Two patients were positive for HIV infection but had no signs of AIDS and thus were included in this category. It was surprising to find two patients with hepatomegaly for which no obvious cause could be found. Again no obvious explanation can be given for the hyperuricaemia seen in five patients. In all these patients there was a peripheral blood leucocytosis of greater than 10,000 cells/microlitre and all responded well to antibiotic therapy. It is very unlikely that these were cases of acute gout because the typical presentation of gout was absent in all of them. Most of these patients had been on aspirin which might have interfered with kidney handling of uric acid. It would be interesting to know the metabolism of uric acid in septic arthritis.

Significantly more males had septic arthritis than females; males were three times more affected. Studies on septic arthritis carried out elsewhere have not shown such a high male preponderance. A ten year review of cases of septic arthritis in an English health district showed that of the 74 cases studied, 43 were male and 31 were female[98]. This male excess has got no simple explanation, but one might think that trauma which males are prone to sustain could be one of the predisposing factors to develop septic arthritis.

Clinical features

The majority of patients with septic arthritis had been seen at the hospital at least three weeks after the onset of the symptoms. This is a very big delay. It has been noted that a delay in

starting appropriate antibiotic therapy is one of the factors which worsens the outcome of septic arthritis[98]. This delay could be due to poor referral system because in all the patients the pain experienced had been so severe that it could not be ignored. All patients with septic arthritis came with fever.

In all patients with septic arthritis the knee joint was involved. In only one patient each were the toe, wrist and elbow joints involved. In two patients the proximal interphalangeal joints were involved. Other studies have revealed almost the same pattern of joint involvement in septic arthritis[95,98,99]. It is surprising that no hip involvement was encountered in this series.

The peripheral white blood cell count was above 10,000 cells per microlitre in 14 (82%) patients. In other studies it had been noted that only 60% of the patients with septic arthritis had leucocytosis of greater than 10,000 cells per microlitre[95], while in another study only 23% of patients had leucocytosis of greater than 14 x 10^9/L[98]. This has greater diagnostic implications especially in our hospital where much reliance is placed on full blood picture results. Septic arthritis due to ***Neisseria gonorrhoea*** has been noted not to be accompanied by a rise in peripheral white blood cell count[99].

In only four patients was it possible to isolate microorganisms from the synovial fluid. There were two cases of beta-haemolytic streptococci, one of Klebsiella species and one of ***Streptococcus pyogenes.*** The possible reasons for the failure to isolate the organisms could be the delay and poor handling of the specimens, inability to take specimens from extra-articular sites and poor technique in culturing organisms.

In other centres the commonly implicated organisms have been ***Neisseria gonorrhoea, Staphylococcus aureus and Beta-haemolytic streptococcus***[95,98,99]. The treatment of septic arthritis requires proper use of an appropriate antibiotic and it becomes extremely difficult to manage such

patients without adequate microbial knowledge.

Treatment and outcome

In most of these patients parenteral antibiotics were used and where appropriate joint effusions were aspirated daily using a needle. There was no death observed in patients with septic arthritis.

All the patients who had been unable to take care of themselves on admission had improved. On follow up after 5.8 months 40% of the patients were unable to work and had persistent joint pain and stiffness. In one study in the USA it was observed that complete recovery occurred in 88% of the joints infected with streptococci, 50% of the joints infected with staphylococci, and in 33% of joints infected with gram negative bacilli.

REITER'S DISEASE

This was the fourth commonest rheumatic disease seen. It was six times more common in males than females. Other observers had found that sexually acquired reactive arthritis (SARA) was ten times more common in males than females but the sex distribution was equal in post-dysenteric disease[28]. It appears that Reiter's disease affects mainly young adults; the maximum age was 35 years and mean of the ages was 26, the lowest in the series. This might reflect the high sexual activities of patients in this group.

No explanation can be given for the excess of the disease in primary school leavers. It appears as if smoking is not associated with Reiter's disease. One of the clinical features of Reiter's disease is weight loss and this is shown by the prevalence of underweight in these patients which was 35.7%. Almost a half of the patients were manual workers and definitely the disease had interfered with their income.

In only one patient was there evidence of familial aggregation of the disease. Lawrence had found that 14% of first degree relatives of probands with Reiter's syndrome had radiological sacroiliitis as opposed to 5.7% in a control population[100].

Clinical presentation

The majority of patients with Reiter's disease were seen after at least three weeks had passed since the onset of symptoms. Sometimes it thus became difficult to obtain a history of previous attacks of diarrhoea or urethritis from these patients because of problems of recall.

The commonly involved joints were the knee and ankle. Very rarely the upper limbs were involved. No case of conjunctivitis or typical skin lesions (keratoderma blenorrhagica or circinate balanitis) were seen. Heel pain was also not seen. It is thus very easy to miss such patients. In Smith et al's series comprising 29 women, the classic Reiter's triad was recognised in only one patient at presentation, though the complete triad developed in four other patients up to 2.7 years after presentation[101].

It is thought that the presence of enthesitis (Achilles tendinitis and plantar fasciitis) is a marker for the B27 gene (McGill Personal Communication). The absence of this clinical presentation possibly supports the contention that the frequency of this gene is less than 1% in the African population. Long term follow up is needed to detect the other components of Reiter's syndrome as it is obvious that the presentation is incomplete at the onset of the disease.

Hyperuricaemia was found in 28% of the patients with Reiter's disease. The cause of this hyperuricaemia is not known. Only one patient who was a prisoner with Reiter's disease had HIV infection. The arthritic symptoms had been preceded by a bout of bloody diarrhoea and therefore it was probably Reiter's disease.

Treatment outcome

Most of patients received non-steroidal anti-inflammatory drugs and all those who had been severely affected by the disease were able to take care of themselves. During the 3 to 9 months follow up only 28.6 per cent of patients were unable to do their normal work. It has been noted

that HLA-B27 carriage and sexually acquired reactive arthritis are associated with recurrence of arthritis and persistent pain, deformity and disability[102,103,104]. In Finland after 20 years of follow up, 42% out of 100 cases were unable to do their normal work, 39% were doing light work only, 2% were unable to work, and 1% was confined to home[105]. In another series of 185 patients, 19 out of 50 seen and examined were disabled with recurrent backache, arthropathy and visual loss[106].

Amor followed up 155 patients with Reiter's syndrome for more than 15 years and found that uveitis occurred after five to ten years from the onset of the disease[107]. He found that skin manifestation became more frequent later in the disease and some patients developed psoriasis after ten years. With regards to joint symptoms he noted a tendency to remission during the first four years. However, after four years the number of attacks increased and there were symptoms and signs of peripheral arthritis.

This means that Reiter's disease is a long lasting problem with sequelae which are difficult to note when a patient is seen in the early stage. There might be other complications which may have escaped observation. There is a need to do careful follow up for a considerable number of years to know the whole range of complications in this interesting disease.

GOUT

Gout together with osteoarthritis were the fifth commonest joint disorders seen in this series. Though not significant, males were more affected than females. Epidemiological studies carried in USA which revealed an estimated prevalence of gout of 28 per thousand for males and four cases per thousand for females support this observed male excess[108].

In five patients hyperuricaemia was induced by thiazide diuretics (all five were hypertensive). There was no association of gout with social class. This is in agreement with findings by Lutalo

in Zimbabwe where he found that social class was not associated with gout[41]. Studies carried in western countries have revealed that the social class of patients with gout is significantly higher than that of matched controls[109]. These contradictory findings seem to point to other factors, genetic or environmental which may be responsible for the development of gout.

There was evidence of gout in other family members in only one of the patients seen. A study by Hauge and Harvald revealed 16 (6.1%) cases of gout amongst 261 relatives of 32 gouty patients[110]. It has generally been concluded that there are many environmental factors which influence the degree of hyperuricaemia and gout.

Obesity was found in four out of seven patients with gout and this stresses the role of weight gain in predisposing to the development of gout.

Clinical presentation

All patients had chronic articular pain on first presentation at the hospital. The commonly involved joints were the knee, ankle and great toe. No case of tophi was seen. The unusual thing in this series was the presence of hyperuricaemia in cases which clinically presented as other types of rheumatic disease. The high serum levels of uric acid observed in patients with septic arthritis, rheumatoid arthritis, HIV arthropathy and Reiter's disease should be taken with caution. The results could be due to laboratory errors and it is recommended to do quality control. It has been noted that gout has a tendency to occur during systemic illness such as pneumonia, or following myocardial infarction and also following emotional stress[111]. It will be very important to confirm this finding. Otherwise gout in such cases could resemble septic arthritis and this could lead to inappropriate therapy.

Treatment and outcome

All patients improved promptly on using indomethacin and none was found to be unable to take

care of self on discharge. It was surprising that one patient out of five was unable to work. No radiological examination of the joint was done to exclude the presence of joint erosion. The period of follow up was too short to recognize any renal complications in these patients. Only three patients were able to afford allopurinol for long term use.

OSTEOARTHRITIS

These was a slight excess of females with osteoarthritis and this is the observation seen elsewhere[28]. The mean age of patients with osteoarthritis was the highest among all rheumatic diseases seen agreeing with the concept that this is more of a degenerative disease of the joints. That there were cases of osteoarthritis in this study might appear to contradict an earlier epidemiological study carried in South Africa in which no case of osteoarthritis was seen in 543 African blacks[112]. However, this is a hospital based study and it is inappropriate to compare it with the South African study. Furthermore it has been noted that there are no black/white differences in the prevalence of osteoarthritis in the USA[113].

The level of education and smoking were not found to be associated with the occurrence of osteoarthritis. The number of patients seen was too small for comparison.

Four of the patients seen were found to be obese. Controversy still persists whether overweight is associated with osteoarthritis. Osteoarthritis is a disease in which cartilage breakdown and erosion are accompanied by bony changes such as osteophytosis, subchondral sclerosis, and bony cysts. It has been suggested that increased force per unit area in the knee of obese patients is probably the cause of the disease[114]. Other cross-sectional studies have also found an association between obesity and knee osteoarthritis, the association being greater in women than men[115,116,117,118]. However, these cross-sectional studies failed to establish whether osteoarthrosis precedes obesity or vice versa. Also, this theory of mechanical stress on the knee joint does not explain the occurrence of osteoarthritis in the distal interphalangeal joints. Furthermore, other

studies have linked osteoarthritis with hyperuricaemia[115] and diabetes mellitus[119]. This indicates that much has yet to be learned about the cause of osteoarthritis.

Little can be done to alter the course of osteoarthritis once it has developed. Prevention, therefore, remains the best solution. It is thus important to do further studies to find the predisposing factors of osteoarthritis so that primary prevention can be done.

Housewives were more affected by the disease than any other occupational group. Probably this is due to the fact that there is a female excess of the disease. Osteoarthritis, particularly of the young onset has been postulated to result from joint trauma but the findings are conflicting[28].

Clinical Presentation

Most patients had a chronic presentation when first seen. In most cases of osteoarthritis patients had attempted various remedies before coming to the hospital and in many of them the diagnosis had been missed.

Heberden's nodes were not seen in this series. Brighton et al also commented that Heberden's nodes were rare in Negro populations[112]. It is thought that Heberden's nodes are inherited as an autosomal dominant trait[120]. The probable lack of the responsible gene in African populations might explain this rarity. It thus becomes difficult to explain the role of this gene in the development of generalised osteoarthritis.

Familial clustering of osteoarthritis was seen in only one patient. The role of genetic factors in osteoarthritis is difficult to explain. Kirwan and Silman concluded that there was evidence of a single autosomal dominant gene for Heberden's nodes, but that there were other genes of varying penetrance determining the susceptibility to generalised osteoarthritis[28].

The knee joint was involved in all patients with osteoarthritis. The wrist and distal interphalangeal joints were each involved in one patient. It is surprising that I did not see a

patient with hip joint involvement. This could be due to the small number of patients I saw. Hyperuricaemia was found in two patients. The typical clinical features of gout were absent in these patients and it is unlikely that they were misdiagnosed. Could hyperuricaemia be one of the biochemical disturbances which in association with overweight lead to osteoarthritis?

Treatment and outcome

In all these patients non-steroidal anti-inflammatory drugs were used to control pain. All had been instructed to attend physiotherapy. On discharge all those who had been unable to care for self had improved but five had been unable to work. Follow up after 5.8 months showed that two were unable to work and one was completely incapacitated. In other studies it has been found that osteoarthritis may become static[121] or even improve[122]. However, the overall outcome in osteoarthritis is uncertain and Taylor estimated that about one third of patients with osteoarthritis who had hip replacement were under 60 years of age[123]. This means that in this group the disease had progressed to warrant the use of surgery.

Long term follow up studies in this disease are important. If it is found that the disease runs a relentless course, the burden of care for these patients will lie in the hands of orthopaedic surgeons. The development of prosthetic joint replacement has revolutionalized the treatment of osteoarthritis of the hip and knee joints. At the hip and knee this operation can provide complete relief of pain and excellent function. The costs of the surgical procedure, the uncertainties about the life of these devices and risks of infection and loosening prohibit the universal use of this mode of treatment. Thus it will be of great importance to anticipate these problems by following up these patients carefully.

ACUTE RHEUMATIC FEVER

The three patients seen with acute rheumatic fever indicate that the disease is not rare in

Tanzania. One patient in this group was 32 years old and this should keep us aware of the adult onset of this disease.

The occurrence of hyperuricaemia in two patients could be coincidental. Other investigators have noted renal abnormalities in acute rheumatic fever characterised by proteinuria, microhaematuria and cellular casts[124] . It will be of interest to pursue studies which could confirm or refute this observation which might have clinical significance.

Two patients with acute rheumatic fever had experienced joint pains for more than three weeks before being seen. Probably these two fell in the group of 'chronic rheumatic fever'. None of the patients had erythema marginatum, chorea or subcutaneous nodules.

On discharge only one patient was severely incapacitated while one was unable to work. On follow up after 5.8 months one patient was able to perform normal activities while one was unable to perform normal duties. There were no signs of rheumatic carditis in these two patients. In a large follow up series about 95% of patients with acute rheumatic fever develop carditis within the first three months while in less than 5% there is persistence of joint symptoms for more than 6 months[125].

One patient died in congestive cardiac failure due to myocarditis. The two patients surviving were given benzathine penicillin monthly for prophylaxis against streptococcal pharyngitis. It has been noted that the incidence of first attacks of rheumatic fever following epidemics of streptococcal infection in the general population is 1-3%[125]. However, the rate of reactivation of rheumatic fever by streptococcal pharyngitis in patients who have had rheumatic fever previously may exceed 50%. This underlies the importance of prophylaxis. In a large multicentric follow up study it was found that prophylaxis becomes more important in those who have evidence of carditis in the initial attack. In the United Kingdom - United States Cooperative

Study patients without organic murmurs during the acute attack showed virtually no evidence of the development of rheumatic heart disease on follow up studies for 5 to 10 years[126,127]. In those with mild carditis 83% had normal hearts when followed for 5 years and 70% followed for 10 years showed no features of rheumatic heart disease. The presence of heart failure was followed by complete healing in only 30% at 5 years and 40% at 10 years.

It is therefore important to follow up patients to know how they progress with regard to heart complications.

HYPERTROPHIC PULMONARY OSTEOARTHROPATHY

The two cases of hypertrophic (pulmonary) osteoarthropathy seen might have been of the primary type because no cardiac lesions, neoplasms or infections could be identified. It is said that primary hypertrophic osteoarthropathy is most often hereditary but I could not find any member of the patients' family with a similar presentation.

These patients had very mild articular complaints and the major problem was the unsightly joints. These was no physical impairment in these patients. This was true even during follow up. It has been observed that primary hypertrophic osteoarthropathy could be self limiting or lead to occasional joint effusions[128].

HAEMARTHROSIS

Both patients with haemarthrosis did not give any history of trauma, bleeding tendency or similar previous attacks. The possibility of haemophilia was very remote. The knee was the only joint affected in both cases. In only one patient was there evidence of a possible underlying chronic illness because of a raised erythrocyte sedimentation rate but this could not be identified. There was no classical clinical picture of gout and therefore the hyperuricaemia noted in one patient was purely coincidental. That all patients were above the age of 50 years could possibly point to an age related disorder. There was little improvement noted on discharge and knee joint pain persisted in both.

PALINDROMIC RHEUMATISM

This is a vague diagnosis because some rheumatologists think that it is one of the unusual patterns of onset of rheumatoid arthritis. It is regarded as a syndrome which can be either the initial manifestation of many different organic processes or a syndrome which never evolves into anything more. It has been likened to gout, with pain beginning in one joint. Symptoms worsen for several hours and are associated with swelling and erythema. There are remissions and exacerbations. It is thought that 25-30% of patients with palindromic rheumatism develop rheumatoid arthritis.

All the three patients were negative for HIV infection, were not hyperuricaemic and no one showed evidence of joint effusion. The radiological findings of the joints involved did not reveal any abnormality. There was a recurrent pattern of joint involvement in all of them. Therefore it was appropriate to include them in this category. The definitive diagnosis of these patients, however, will depend on findings after prolonged follow up.

In all of them more than three but less than six joints were involved in a symmetrical pattern, but the hands were spared. Follow up was possible in only two patients and they were able to perform normal activities without any evidence of residual joint disease.

TUBERCULOUS ARTHRITIS, SYSTEMIC LUPUS ERYTHEMATOSUS (SLE), ACUTE LEUKAEMIA AND PSORIATIC ARTHROPATHY

All these were very rarely encountered in this series. The patient with SLE was a male of 30 years with an erythematosus rash over the cheeks and bilateral involvement of both knees which had no effusions. Involvement of other systems was not obvious and HIV test was negative. He was unable to perform normal duties and on discharge there was no improvement. He died two months after discharge, the cause being unestablished.

The patient with acute myeloid leukaemia was a female aged 40 years. She had the symptoms of bilateral knee and elbow joint swelling for one week. She was anaemic and the involved joints were found to be swollen, hot and tender. Radiological examination of both knees was normal. She had hyperuricaemia and very high ESR (146 mm/hr). Peripheral white blood cell count was 31,400 cells/mm. and bone marrow biopsy confirmed the diagnosis. Joint symptoms had improved on non-steroidal anti-inflammatory drugs but she succumbed to anaemia and died two months after discharge.

The patient with psoriatic arthropathy was a male aged 50 years. He had the symptoms for 4 years. He was also diabetic on chlorpropamide. He was using dithranol for psoriasis. He also had HIV disease.

There was bilateral involvement of the knees, metacarpophalangeal joints, wrists, elbows and shoulders with minimal evidence of inflammation in the involved joints. He was hyperuricaemic with a high ESR. Radiologically there was no evidence of osteoporosis, joint space narrowing

or bony erosion of the involved joints. He used indomethacin. He was completely incapacitated by the joint disease, improved on discharge and he was able to perform normal duties after follow up. The skin lesions had all disappeared.

The patient with tuberculous arthritis of the knee joint was an elderly man of 70 years. He had the symptoms for 3 weeks. The involved knee was swollen, non tender and not warm. Aspiration revealed pussy fluid which grew nothing but the synovial fluid differential count was 65% lymphocytes and 35% polymorph. He was anaemic with an ESR of 155 mm/hr. He was also hyperuricaemic and the peripheral white blood cell count was normal. He was severely handicapped by the disease and he absconded and lost to follow up.

UNESTABLISHED DIAGNOSES

It was very difficult to group these patients in to any of the known arthritic diseases. In all of them it was either the knee or ankle joints which were involved. In most cases the presentation was chronic with absent evidence of joint inflammation or any systemic illness. In all except one the ESR was above 33 mm/hr. There was no hyperuricaemia in these patients and all had no HIV infection. No extra- articular manifestations were observed. Radiological examination of the joints was normal. In these people the disease was mild with good response to anti-inflammatory agents.

Thus it was difficult to categorize these patients. Perhaps such patients needed synovial membrane biopsy or arthroscopy. Possibly these investigations coupled with follow up might elucidate the cause of arthritis in this group of patients.

Many rheumatic diseases (eg gout, rheumatoid arthritis and systemic lupus erythematosus) are characterised by remissions and exacerbations. Assessing disease disability at one point in time does not give an accurate information. But from this study, a good number of patients were

unable to use public transport (because of pain and disability), unable to do household activities and also unable to take care of themselves. Thus, unlike other acute infectious diseases, rheumatic disorders lead to interference with the socioeconomic activities of the patients in a more direct way. In Tanzania, there are no special facilities for disabled individuals. It is very difficult for these patients, for example, to attend follow up clinics or do any shopping by using public transport. The provision of special facilities for such disabled patients will only become relevant if the extent of the problem is understood by policy makers.

Summary

The study has revealed that rheumatic diseases are not rare in developing countries like Tanzania. The spectrum of the diseases is as that seen in developed countries. The striking features are the high prevalence of HIV arthropathy and the younger age of patients who are afflicted by the diseases. The diseases run a chronic course and no special facilities are offered to these patients.

Recommendations

1. To carry out population studies in order to determine the prevalence of rheumatic diseases and estimate the magnitude of the problem.
2. Doctors and all health care workers should be aware of the problems faced by patients suffering from rheumatic diseases and acceptable treatment regimes for these patients should be available.
3. There is a need to have a special clinic for patients having musculoskeletal diseases at Muhimbili University College of Health Sciences.

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