

**CORRELATION OF MRCP AND SURGICAL FINDINGS IN
PATIENTS WITH OBSTRUCTIVE JAUNDICE AT MNH.**

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By

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**A Dissertation/ Thesis Submitted in (partial) Fulfillment of the Requirement for the
Degree of Master of Science (Radiology and Imaging) of the**

**Muhimbili University of Health and Allied Sciences
October, 2017**

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled “*Correlation of MRCP and Surgical findings in patients with obstructive jaundice at MNH*” in (partial) fulfillment of the requirement for the degree of Master of Medicine (Radiology) of Muhimbili University of Health and Allied Sciences.

Dr. Mechris Mango

(Supervisor)

Date

DECLARATION

AND

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I, Latifa Rajab, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for similar or any other degree award.

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Date.....

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DEDICATION

I dedicate this work to;

My lovely children MariamI Mkwazu and Naim I Mkwazu for their love and support through thick and thin. Raheem mummy misses you.

My lovely parents Mr.Rajab Abdallah Sido and Ms.Zaynab S. Mgonja

ABSTRACT

Background

MRCP has shown an excellent capability in outlining the biliary tree hence demonstration of the level of biliary blockage (obstruction).

Objective

To determine the correlation of MRCP and intra operative (surgical) findings in patients with obstructive jaundice at MNH from June-December 2016.

Materials and methods

This is a cross-sectional hospital based study in which patients with obstructive jaundice were recruited. A sample size of 60 patients were studied using standardised questionnaires. Data analysis was done using statistical software (SPSS version 20) and statistical level of significance was $p < 0.05$.

Results

In this study females 37 (61.7%) are more affected than males 23 (38.3%). Of these 41-60 years old age group were commonly seen with range of 32-79 years of age. Obstructive jaundice was commonly caused by Cholelithiasis followed by pancreatic head tumor. Obstructive jaundice is significantly caused by cholelithiasis ($p < 0.001$) and pancreatic head tumor ($p\text{-value} < 0.0001$). With MRCP, sensitivity and specificity was almost 100%.

The results show that there were very strong and positive correlation between MRCP and intra operative findings.

Conclusion

MRCP is highly sensitive and specific with almost 100% in provision of accurate diagnosis. It is important because it shows levels, causes and extent of obstructions making it easier for surgeons to intervene.

Recommendations

1. MRCP should be an indication for the patients with obstructive jaundice.
2. Large study should be conducted involving other referral hospitals in the country so that it can represent the general population.
3. MRCP should be used before surgery or for surgical planning.

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LIST OF ABBREVIATIONS

MRCP	Magnetic Resonance Cholangiopancreatography.
ERCP	Endoscopic Retrograde Cholangiopancreatography.
USS	Ultrasonography
O.J	Obstructive jaundice
MNH	Muhimbili National Hospital
Tsh	Tanzanian shillings
Fig	Figure
MIP	Maximun Intensity Projection.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Literature Review

Jaundice is a yellowish discolouration of mucous membrane due to abnormally high amount of circulating bilirubin. Obstructive jaundice is a jaundice due to bile ducts blockage or abnormal retention of bile in the liver. Obstructive jaundice is a particular type of jaundice and occurs when the essential flow of bile to the intestine is blocked and remains in the bloodstream.

This might be due to blocked bile ducts caused by gallstones, or tumors of the bile duct which can block the area where the bile duct meets the duodenum. Pancreatic cancer can also be a cause of blockages as it often occurs near to the ampulla of Vater which joins the pancreas gland to the duodenum.

Other conditions that can cause obstructive jaundice include those that cause pressure on the bile duct such as lymphadenopathy, scar tissue (from previous infections or surgery), or a cyst, possibly of the pancreas(1,4).

Obstructive jaundice means; the total bilirubin is greater than $34.2\mu\text{mol} / \text{L}$, the yellowish discoloration of skin, sclera, and mucous membrane can be observed by naked eyes, known as the dominant jaundice(2). Laboratory investigations like increased serum bilirubin ($>3\text{mg/dl}$) and altered liver function tests help in diagnosis of the type of pathology but they cannot delineate the site of block and the exact cause of the blockage(3).

Many studies have revealed that there was significant association of having obstructive jaundice with age and sex. This showed that elderly females are highly affected. As shown in literature that *the ageing and gender were considered as risk factors of obstructive jaundice*(4).

An Indian study done in Nepal conducted by Karki S, Joshi KS1, et al in 2013 aimed at assessing the role of US among patients with obstructive jaundice showed that, the most common benign causes of obstructive jaundice were choledocholithiasis (63%), CBD stricture (12.3%), cholangitis (8%) and pancreatitis (6.85%) whereas cholangiocarcinoma (6.85%) and carcinoma head of pancreas (4%) comprised the malignant causes. (1)

A study done in Pakistan showed; Of the 60 patients; 40 (66.66%) were males and 20 (33.33%) were females, their mean age being 49.50 years. Malignant obstructive jaundice was seen in 34 (56.66%) patients while 26 (43.33%) had benign etiology. Amongst the commonest symptom; clay coloured stools (75%) was more frequent in patients with malignant disease whereas abdominal pain (51.66%) was most common in benign conditions. Commonest malignancy was Carcinoma (Ca) of the head of pancreas 18/60 (30%) followed by Ca of gall bladder 8/60 (13.33%), cholangiocarcinoma 7/60 (11.66%), and periampullary carcinoma 1/60 (1.66%). Choledocholithiasis 21/60 (35%) was the commonest benign cause followed by stricture of common bile duct 3/60 (5%) and acute pancreatitis 2/60 (3.33%). From this study it was concluded that: Obstructive jaundice is common amongst females and the cause is mostly malignant. Ca head of pancreas is the commonest malignancy while Choledocholithiasis is the commonest benign cause.(8)

Prevalence of obstructive jaundice depends on the cause, study done in Peshawar in Pakistan showed that out of 50 cases 25 were males and the rest were females. Their ages range from 46 to 93. The causes of obstructed jaundice included in the study are gall stones 20(40%) of the patients, mass of the head of the pancreas 16(32%), biliary strictures 4(8%) while other causes like hepatic abscesses, pseudopancreatic cyst, cholangiocarcinoma, choledochal cyst and periampullary carcinoma accounted for two cases each(9).

A study that was done in China revealed the following results: All patients were 16 to 90 years old, with an average age of 54.43 ± 16.09 years. Youth group with hepatocellular jaundice accounts for 59.72%, viral hepatitis 31.94%; middle-aged group with cholestatic jaundice accounts for 52.31%, liver cancer, 31.94%; the elderly group has cholestatic jaundice 67.33%, with 48.67% as malignant. The gender ratio of jaundice patients is male: female = 1.88:1, 47.83% Male patients has hepatocellular jaundice, and liver cancer is the

most common, 31.97% of female patients has hepatocellular jaundice, and bile duct cancer is the most prevalent. From this study it was concluded that: 1. Hepatocellular jaundice is more common in young patients, mainly from viral hepatitis. Hepatocellular and cholestatic jaundice are more common in the middle-aged group of patients, mainly the liver cancer, hepatitis, and liver cirrhosis. Cholestatic jaundice is common in elderly patients, with malignant, hepatitis and liver cirrhosis as the major causes. 2. In male patients, hepatocellular jaundice is common and liver cancer is the major cause. Hemolytic jaundice is more prevalent in female patients, mainly from cholangiocarcinoma (2).

Another study that was done in Khartoum Sudan pointed out that; in the period between January and July 2014. A total of 150 patients with obstructive jaundice were examined using ultrasound machine, 3.5 - 7 MHz probe. The study revealed that 65.33% of the study population with obstructive jaundice were female and 34.67% were males. The most common affected groups were 46 - 65 years old and 25 - 45 years old. The common causes of obstructive jaundice were biliary stones (61.33%) which were common in females and abdominal masses (32.67%) which were common in females too. Nausea, yellowish discoloration and abdominal pain were the most common symptoms (98%, 97.33% and 96.67% respectively). The causes of obstructive jaundice showed significant difference between males and females (P-value = 0.002). It was concluded from this study that: The ageing and gender were considered as risk factors of obstructive jaundice. (4)

Another study which was done in Ethiopia showed that, out of 215 patients recruited during the study complaining of obstructive jaundice; 104 (48.3%) were males and 111 (51.6%) were females, the age ranged from 23 to 80 years. In younger age group up to 30 years females (20 cases) were more common than males (9 cases), While in age between 71-80 years total number were 21 patients [10 males & 11 females], 132 cases (61.3%) from Thiagar while 83 patients (38.6%) from other governorates.

Of 201 patients (93.4%) had benign obstructions and 14 (6.5%) had malignant ones. The commonest causes were CBD stone 163 (75.8%), [91 (42.3%) in females while 72 cases (33.5%) were males.] In this study the second cause was hydatid cysts which were [28 (13%) 15 (6.9%) were females while 13 (6%) were males, either causing pressure on biliary tract or intra biliary rupture of the cyst. Malignant causes of obstructive

jaundice were 14 cases (6.5%) mostly occurring above 50 years old, 10 cases (4.6%) in females while 4 cases (1.9 %) in males .In females 7 cases were carcinoma of head of pancreas, 2 cases were cholangiocarcinoma of CBD ,one case of gall bladder cancer ,where as in males all cases were carcinoma of head of pancreas.

In the above study mentioned that post operative CBD strictures or ligations were 10 cases (4.6%). As CBD stone or stones were the most common cause [163 patients (75.8%)] , 131 patients of them (80.3%) respond to ERCP treatment and patients become well and discharge with good general condition while 32(19.7) patients showed no response to these treatment either due to difficult cannulation of ampulla of vater, uncorporate patient or difficult to deliver the stones. In 9 patients a stents were needed; In 5 patients stenting was succesful and in 4 patients stenting failed because of difficulty tight obstruction and or change in normal anatomy of ampulla of vater .The change in ampula of vater is due to adhesion secondary to malignancy(10).

Another study which was done at Bugando Tanzania; between July 2006 and April 2012, involved a total of 138 patients with a diagnosis of obstructive jaundice. Of these, fifty-four (39.1%) were males and the remaining 84(60.9%) were females. The male to female ratio was 1: 1.6. The age ranged from 14 to 84 years with a median age of 58 years. The median age of patients with benign causes was 40 years (range 16-52 years), while that of malignant causes was 62 years (range 47-84 years). The difference in age distribution of the benign and malignant disease was statistically significant ($P < 0.001$). The male to female ratio for benign obstructive jaundice was 1:2.4, while it was 1:1.6 for the malignant obstructive jaundice. This difference was statistically significant ($P < 0.001$).

Of the 138 patients, 52 (37.7%) had a benign and 86 (62.3%) a malignant cause of obstructive jaundice. Choledocholithiasis was the commonest cause among the benign group in 27 (51.9%) patients, whereas the commonest tumor among the malignant group was carcinoma of the head of pancreas in 56 (65.1%) patients(11) .Common MRCP findings according different studies. Cholangiocarcinoma accounts for less than 2% of all human malignancies [8]; however, it is the second most common primary hepatic malignancy after hepatocellular carcinoma, accounting for 10% to 15% of primary hepatic malignancies. Its prevalence is geographically heterogeneous, with the highest rates in

Asia, especially Southeast Asia [9]. In Western Europe and the United States, the incidence and mortality has increased over the last 4 decades.(12)

Imaging modalities suitable for obstructive jaundice include Ultrasonography, ERCP and MRCP. MRCP is a non-invasive technique that uses heavily T2 weighted imaging to visualize extra and intrahepatic bile ducts as well as pancreatic duct. It shows the biliary system by visualization of fluid in the ducts and the images can be presented in multiplanar formats as well as 3D (5). Due to its high sensitivity for detecting hepatobiliary pathology and the challenges in other imaging modalities, MRCP is becoming increasingly useful diagnostic tool in the hepatobiliary diseases. Advantages of MRCP include: It does not require administration of exogenous contrast materials; and the potential avoidance of a purely diagnostic ERCP with its potential complications of cholangitis and post-ERCP pancreatitis. The major disadvantages of MRCP are; The lack of therapeutic capability, MRCP images are not satisfactorily comparable to those provided by ERCP, inability to provide information with regard to resectability of pancreatic cancer; and its equipment is not readily available at every institution(5).

Other imaging modalities for example ultrasonography is operator dependent and is often the first and the most widely accepted method of choice to evaluate the biliary tree, even in the current era of magnetic resonance cholangiopancreatography (MRCP), endoscopic retrograde cholangiopancreatography (ERCP), and endoscopic ultrasound (EUS) (1). It is highly sensitive and specific for the detection of gallstones and gallbladder polyps and very helpful in the diagnosis of the spectra of appearances in acute and chronic cholecystitis. It is much more accurate than computed tomography (CT) or plain film radiographs, faster and more generally more readily available when compared with MRI or cholescintigraphy.

Bile duct dilatation can be easily diagnosed by measuring the size of intra- and extra-hepatic duct on ultrasound. However, it is difficult to clarify the aetiology, careful evaluation of the level and extent of obstruction on ultrasound together with the clinical presentation is required to determine the cause of obstruction. It should be noted that not all biliary dilatations indicate obstruction, a variety of factors (e.g., prior cholecystectomy

and most prominently age) have been reported to have an effect on the size of the bile duct (2)(6).

Endoscopic Retrograde Cholangiopancreatography (ERCP) is a technique which is used to study the bile ducts together with gallbladder and pancreatic ducts. This technique is invasive and is associated with complications which are Post ERCP Pancreatitis and cholangitis(5) and many more. It can provide diagnostic range equivalent to MRCP and MRCP is advised to be used so as to reduce the co-morbidities associated with ERCP.

A study published in Pakistan Journal of surgery shows surgical outcome as follows; In this study 13 (54.17%) patients had jaundice due to malignancy; out of these nine (37.5%) patients curative surgery was not possible. Seven (29.17%) patients, however, underwent palliative bypass surgery; three with Carcinoma. Head of Pancreas had cholecystojejunostomy, while three with cholangiocarcinoma and one with Carcinoma of Gall bladder, this patient had hepaticojejunostomy also. Two with nodes in the porta hepatis refused surgery and were advised endo-prosthesis. Fortner⁹ in his study on 52 patients with obstructive jaundice reported palliative procedures in 38 (73.1%) cases including endoprosthesis placement in 22 (42.31%) and bypass surgery in 16 (30.8%) cases (9). Other authors have also quoted similar figures(10-14).

1.2 Problem Statement

Obstructive jaundice is a known serious problem and researches of obstructive jaundice are required to deal with this problem.(1) .There is little documentations on obstructive jaundice in our settings and many complications occur because of late diagnosis.It is important to ascertain the accuracy of MRCP in comparison with surgical findings in patients with obstructive jaundice.

1.3 Rationale

O.J is a common biliary system health condition which affects adults and it has multisystem complications.Little is documented in our county regarding MRCP and intraoperative findings.There is a need to find out commonest causes of O.J or what are the most common findings intraoperatively following an MRCP.

1.4 Research Question

- 1.What are the radiological findings on MRCP in patients with obstructive jaundice attending MNH?
- 2.What are the intraoperative findings on patients with obstructive jaundice attending MNH?

1.5 Objectives

1.5.1 Broad objective

To determine the correlation of MRCP and intra operative (surgical) findings in patients suspected with obstructive jaundice at MNH from June-December2016.

1.5.2 Specific objectives

1. To determine social demographic distribution of the patients (suspected) with obstruction jaundice at MNH from June to December, 2016.
2. To determine MRCP findings in patients with obstructive jaundice at MNH from June to December 2016.
3. To determine intraoperative findings of the study population at MNH from June to December 2016.
4. To determine correlation between MRCP and intra operative findings in patients with obstructive jaundice at MNH from June to December 2016

CHAPTER TWO

2.0 METHODOLOGY

This is a descriptive hospital based cross sectional study which was conducted at radiology and Surgical department, Muhimbili National Hospital from June to December 2016.

Patients were consecutively included in the study.

Structured questionnaires were used for recording patients' demographics, clinical information and imaging findings. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. Statistical Association was done by using cross tabulations and Chi-square test was used to compare proportions. P value of < 0.05 was considered statistically significant.

2.1 Type of study

The study is descriptive cross sectional hospital based study.

2.2 Study duration

The study was conducted from June to December, 2016

2.3 Study area

The study was conducted at Radiology Department of Muhimbili National Hospital. MNH is the biggest government hospital in Tanzania and it receives referrals from all over the country. And Radiology department is well equipped with different imaging modalities including MRI scanner.

2.4 Study population

The study included adults referred to Radiology Department for MRCP and then have undergone surgery at Surgical Department .

2.4.1 Inclusion criteria

Patients from 18 to 85 years who have done MRCP as well as undergone surgery.

2.4.2 Exclusion criteria

Children and normal MRCP results.

2.5 Patients involved

All adults who fulfilled the inclusion criteria and sign consent form.

2.6 Sampling method

Convenience sampling was used.

2.7 Sample size

The sample size calculated from Fisher's formula;

$$n = Z^2 P (1-P) / E^2$$

Where: n= sample size,

$$Z = (1.96)$$

P = prevalence = 2.3%. This is the prevalence of obstructive jaundice study done in the Bugando Tanzania, (Mabula, n.d.)

95% confidence interval was used.

E = margin error 5%

The sample size in this study is 60 patients. According to the study design there is no chance of non-response.

2.8 Collection of data

Data collection was done by using special designed forms for recording clients. Informations and image findings were printed from the MR machine. Demographic information and clinical features were obtained from patient request form.

2.9 Imaging and Evaluation

With MRCP Imaging, no contrast is given. Patient has to fast for about 4 hours prior to examination to reduce gastroduenal secretions, also to reduce motility whereby it helps to eliminate motion artifact, it also helps to promote gallbladder distension.

For optimization of the ducts visualization, images acquired were reformatted in different planes using Multiplanar Reconstruction (MPR) and Maximum Intensity Projection (MIP). Images obtained from patients who underwent MRCP study using heavily T2 weighted in Philips, Achieva, 1.5 Tesla, Eindhoven, Best, Netherlands MR machine, and a phased array body coil were used. Radiologist and Primary Investigator read the MRCP images. Surgery in addition was done and patient evaluated, using 1.5T machine and then findings were correlated.



Figure 1: MIP Showing normal MRCP.



Figure 2: MRCP showing dilated pancreatic duct due to blockade at pancreatic head.

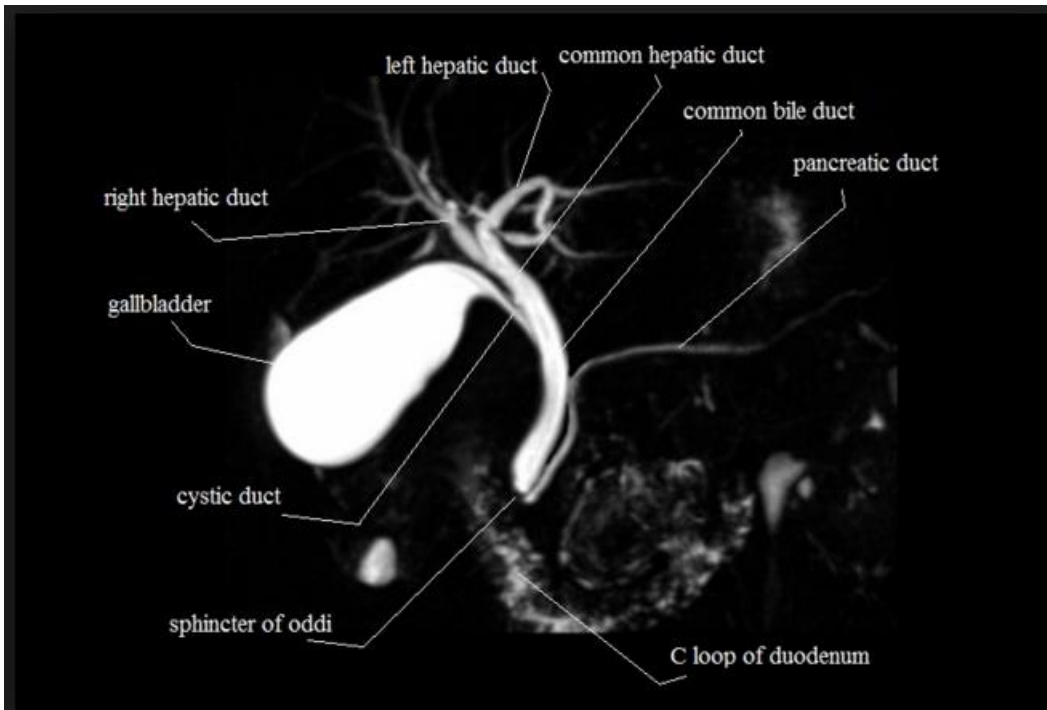


Figure 3: Normal MRCP showing well distended Gallbladder.

2.10 Data analysis

Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. Statistical Correlation between MRCP and intraoperative findings as well as socio demographic distribution were presented in cross tabulations and Chi-square test was used to compare proportions. P value of < 0.05 was considered statistically significant.

2.11 Ethical consideration

The Researcher introduced herself to the patient and give the explanation of the study then requested the patient to participate in the study and consent obtained from the patient. The interpretation of the Images was done by Principal Investigator and Radiologists. The patients information's and images findings were confidential. Data were handled confidentially and stored in a secured place.

2.12 Ethical clearance

This proposal was presented to the department of Radiology, Muhimbili University of Health and Allied Sciences. Ethical clearance was then obtained from the Research and Publication Committee of the Muhimbili University of Health and Allied Sciences.

2.13 Dissemination of results

Results obtained from the study ,written text including all illustrations by graphs and figures will be compiled and submitted to MUHAS library. The study result will also be presented at University research seminars and Muhimbili National hospital MRI and Surgical units.In addition results wil be presented to local and international relevant meeting.

CHAPTER THREE

3.0 RESULTS

Obstructive jaundice is a common biliary system health condition which affects adults and it has multisystem complications.

3.1 Descriptive results

In this study the number of participants was 60 where males were 23(38.3%) and females 37(61.7%). The mean and mode age of patients participated in the study were 49.7 and 35 years old respectively with standard deviation (SD) of 12.9 and range (32-79) years old as shown in the table 1 below.

Table 1: Socio demographic distribution of patients with obstructive jaundice at Radiology and Surgical Departments, Muhimbili National Hospital. N=60

		Patients(N)	Percentage (%)
Gender	Female	37	61.7
	Male	23	38.3
	Total	60	100
Age group	21-40	22	36.7
	41-60	25	41.7
	61-80	13	21.7
	Total	60	100

Distribution table showing females are more affected than male which are 37(61.7%) and 23(38.3%).

Of these 41-60 years old age group is more affected which accounts for 25 (41.7%).

3.2 MRCP findings at MNH from June to December 2016

By using the MRCP test the leading cause of obstructive jaundice was gallstone 34(56.7%), followed by head of pancreas tumour 15(25%), then choledocholithiasis 5(8.3%) and lastly was cholangiocarcinoma and GB tumour each 2(3.3%). Other causes were klatskin tumour and cystic duct obstruction each has 1(1.7%) as shown in the figure 1 below.

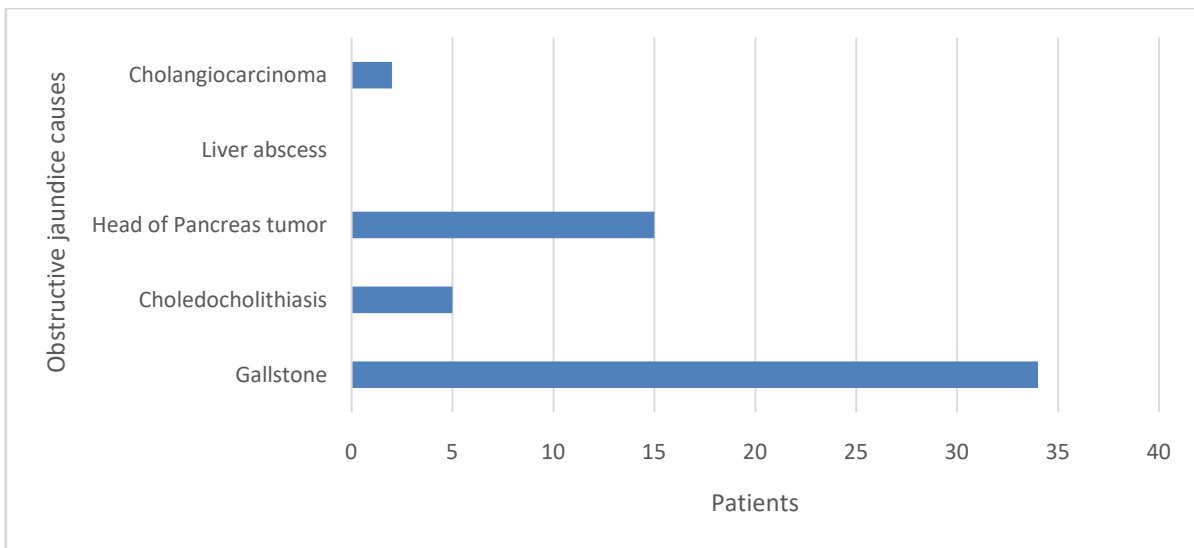


Figure 4: The distribution of obstructive jaundice causes with patients at Radiology Department, Muhimbili National Hospital. N=60

The results shown that most affected age group were 21-40 which are 19(31.7%) for gallstone, 5(5%)Choledocholithiasis, the head of pancreas tumor affects age group of 61-80 8(13.3%) more than others as shown in the table 2 below.

Table 2: The causes of obstructive jaundice from MRCP with patients age groups at Radiology Department, Muhimbili National Hospital. N=60

Obstructive jaundice causes		Age Group (years)				P-value(Pearson's X ²) at 95% CI
		21-40	41-60	61-80	Total	
Gallstone	No	3(5%)	13(21.7%)	10(16.7%)	26(43.3%)	0.001
	Yes	19(31.7%)	12(20%)	3(5%)	34(56.7%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	
Choledocholithiasis	No	19(31.7%)	23(38.3%)	13(21.7%)	55(91.7%)	0.396
	Yes	3(5%)	2(3.3%)	0(0%)	5(8.3%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	
Head of pancreas tumour	No	22(36.7%)	18(30%)	5(8.3%)	45(75%)	0.0001
	Yes	0(0%)	7(11.7%)	8(13.3%)	15(25%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	
Liver abscess	No	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	Na
	Yes	0(0%)	0(0%)	0(0%)	0(0%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	
Cholangiocarcinoma	No	22(36.7%)	23(38.3%)	13(21.7%)	58(96.7%)	0.235
	Yes	0(0%)	2(3.3%)	0(0%)	2(3.3%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	

The table revealed that although the results were not significant but number of females were higher than number of males in most causes of obstructive jaundice as shown in the table 3 below.

Table 3: Obstructive jaundice causes with gender in patients with obstructive jaundice at Radiology and Surgical Departments, Muhimbili National Hospital. N=60

		Gender			P-value(Pearson's X ²) at 95%CI
		Female	Male	Total	
Gallstone	Yes	22(37.3%)	12(18.6%)	34(55.9%)	0.654
	No	14(23.7%)	12(20.3%)	26(44.1%)	
	Total	36(61%)	24(39%)	60(100%)	
Choledocholithiasis	No	33(55.9%)	22(35.6%)	55(91.5%)	0.342
	Yes	3(5.1%)	2(3.4%)	5(8.5%)	
	Total	36(61%)	24(39%)	60(100%)	
Head of Pancreas tumor	Yes	8(13.6%)	8(11.9%)	16(25.4%)	0.48
	No	28(47.5%)	16(27.1%)	44(74.6%)	
	Total	36(61%)	24(39%)	60(100%)	
Liverabscess	Yes	0(0%)	0(0%)	0(0%)	nil
	No	36(61%)	24(39%)	60(100%)	
	Total	36(61%)	24(39%)	60(100%)	
Cholangiocarcinoma	Yes	1(1.7%)	1(1.7%)	2(3.4%)	0.745
	No	35(59.3%)	23(37.3%)	58(96.6%)	
	Total	36(61%)	24(39%)	60(100%)	

3.3 Intraoperative findings of the study population at MNH from June to December 2016

The results show that there are minor difference between Intraoperative and MRCP where head of pancreatic tumour is slightly detected higher through intraoperative than MRCP while is vice versa to the Cholangiocarcinoma. But other causes were the same in both intraoperative and MRCP as shown in the figure 2 below.

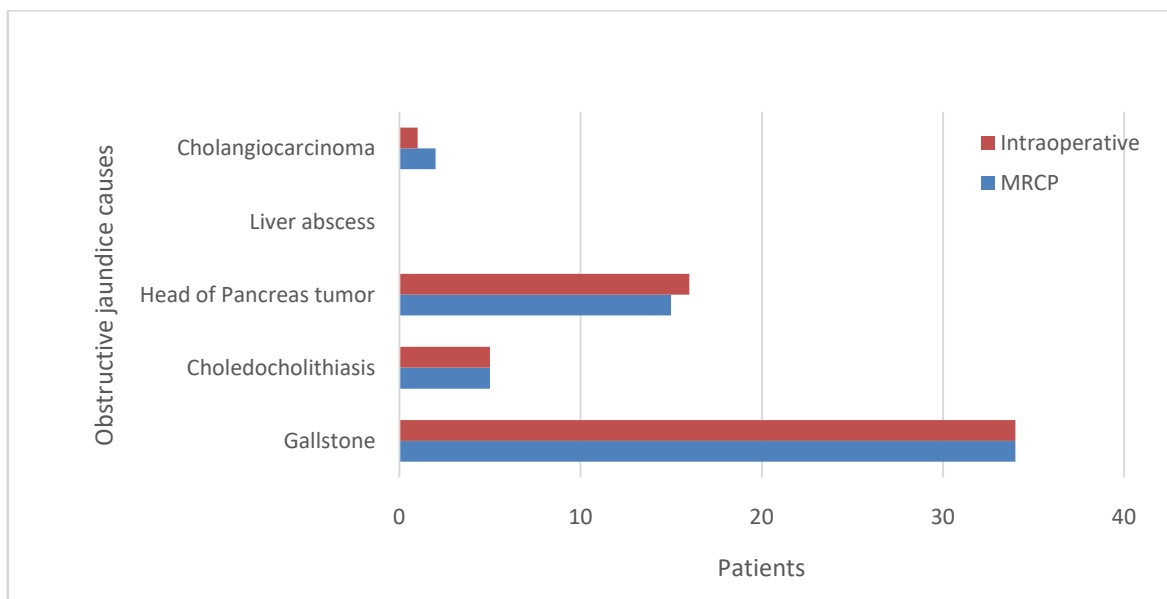


Figure 5: Comparison of obstructive jaundice causes between intraoperative and MRCP at Radiology and Surgical Departments, Muhimbili National Hospital. N=60

In the intraoperative findings the results show similar trends like in the MRCP where the age group of 41-60 of patients was more affected by obstructive jaundice than other age group for the all obstructive jaundice causes as shown in the table 4 below.

Table 4: The causes of obstructive jaundice from intraoperative findings with patients age groups at Surgical Department, Muhimbili National Hospital. N=60

		Age Group				P-value(Pearson's X ²) at 95% CI
		21-40	41-60	61-80	Total	
Gallstone	Yes	19(31.7)	12(20%)	3(5%)	34(56.7)	0.001
	No	3(5%)	13(21.7)	10(16.7%)	26(43.3)	
	Totl	22(36.7)	25(41.7)	13(21.7%)	60(100%)	
Choledocholithiasis	Yes	3(5%)	2(3.3%)	0(0%)	5(8.3%)	0.369
	No	19(31.7)	23(38.3)	13(21.7%)	55(91.7)	
	Totl	22(36.7)	25(41.7)	13(21.7%)	60(100%)	
Head of Pancreas tumor	Yes	0(0%)	8(13.3%)	8(13.3%)	16(26.7)	0.0001
	No	22(36.7)	17(28.3)	5(8.3%)	44(73.3)	
	Totl	22(36.7)	25(41.7)	13(21.7%)	60(100%)	
Liverabscess	Yes	0(0%)	0(0%)	0(0%)	0(0%)	nil
	No	22(36.7)	25(41.7)	13(21.7%)	60(100%)	
	Total	22(36.7)	25(41.7)	13(21.7%)	60(100%)	
Cholangiocarcinoma	Yes	0(0%)	1(1.7%)	0(0%)	1(1.7%)	0.491
	No	22(36.7%)	24(40%)	13(21.7%)	59(98.3%)	
	Total	22(36.7%)	25(41.7%)	13(21.7%)	60(100%)	

The results depicts that MRCP findings are almost similar to the intraoperative results. Although all relations of causes and gender were not significance but gallstone 22(37.3%), choledocholithiasis 3(5.1%) and head of pancreas tumor 9(15.3%) were all from female patients while only Cholangiocarcinoma 1(1.7%) was from males as shown in the table 5 below.

Table 5: Intra operative findings with patients' gender in patients with obstructive jaundice at Radiology Department, Muhimbili National Hospital. N=60

		Gender			P-value(Pearson's X ²) at 95%CI
		Female	Male	Total	
Gallstone	No	14(23.7%)	13(20.3%)	27(44.1%)	0.231
	Yes	22(37.3%)	11(18.6%)	33(55.9%)	
	Total	36(61%)	24(39%)	60(100%)	
Choledocholithiasis	No	33(55.9%)	22(35.6%)	56(91.5%)	0.316
	Yes	3(5.1%)	2(3.4%)	5(8.5%)	
	Total	36(61%)	24(39%)	60(100%)	
Head of Pancreas tumor	No	27(45.8%)	17(27.1%)	44(72.9%)	0.961
	Yes	9(15.3%)	7(11.9%)	16(27.1%)	
	Total	36(61%)	24(39%)	60(100%)	
Liver abscess	No	36(61%)	24(39%)	60(100%)	0.647
	Yes	0(0%)	0(0%)	0(0%)	
	Total	36(61%)	24(39%)	60(100%)	
Cholangiocarcinoma	No	36(61%)	23(37.3%)	59(98.3%)	0.39
	Yes	0(0%)	1(1.7%)	1(1.7%)	
	Total	36(61%)	24(39%)	60(100%)	

Intraoperative findings with gender was not statistically significant.

3.4 Correlation between MRCP and intra operative findings at MNH from June to December 2016

This results shown that significantly there were very strong and positive correlation between MRCP and intra operative findings [Cramer's correlation coefficient (V) ranges from 1-0.71 with P value at 95%CI for all causes correlated was 0.0001] as shown in the table 6 below.

SURGICAL- Gallstone	Cramer's V	1.000	-.345	-.660	-.212	1	-.345	-.690	-.149
	P value (95%CI)	0.0001	.007	.000	.103		.007	.000	.256
	N	60	60	60	60	60	60	60	60
SURGICAL- Cholelithiasis	Cramer's V	-.345	1.000	-.174	-.056	-.345	1	-.182	-.039
	P value (95%CI)	.007	0.0001	.183	.671	.007		.164	.766
	N	60	60	60	60	60	60	60	60
SURGICAL- Head of Pancreas tumor	Cramer's V	-.690	-.182	.957	-.112	-.690	-.182	1	-.079
	P value (95%CI)	.000	.164	.0001	.394	.000	.164		.551
	N	60	60	60	60	60	60	60	60
SURGICAL- Cholangiocarci noma	Cramer's V	-.149	-.039	-.075	.701	-.149	-.039	-.079	1
	P value (95%CI)	.256	.766	.568	.0001	.256	.766	.551	
	N	60	60	60	60	60	60	60	60

Table 7 : Performance Characteristics of Surgery vs MRCP

	Prevalence	Sensitivity	Specificity	PPV	NPV	OR	P value
Gallstone	43.30%	100%	100%	100%	100%	82.1	0.0001
Choledocholithiasis	9.10%	100%	100%	100%	100%	34.4	0.0001
Head of Pancreas							
tumour	25%	100%	97.8%	93.8%	100%	60	0.0001
Cholangiocarcinoma	3.30%	50%	100%	100%	98.30%	7.4	0.007

CHAPTER FOUR

4.0 DISCUSSION

The research included 60 adult cases who were referred to MNH for MRCP and the surgery done due to features of obstructive jaundice and positive MRCP results. All patients MRCP results were taken in Radiology department and followed up in Surgical department, surgery was done and the results were correlated (compared).

In this study females are more affected than males which accounts for 37 (61.7%) and 23 (38.3%) respectively with female to male ratio of 1.6:1. Of these 41-60 years old age group is more affected which accounts for 25 (41.7%). This is consistent to the study done by Nayyef et al also in line with the study done by Anon et al. Contrary to the study done by Yu et al which showed that males are more affected with obstructive jaundice compared to females.

The most common cause of Obstructive jaundice in the study is a benign cause which is Cholelithiasis and it accounts for 34 (56.7%). This is followed by a malignant cause pancreatic head tumor 15 (25%).

The results are similar to study done by Nayyef et al that benign causes are common but for them it is choledocholithiasis contrary to this study where cholelithiasis is the cause. Also study done by Anon et al shows that biliary stones are common causes of obstructive jaundice.

The study also shows that causes of obstructive jaundice which are cholelithiasis and pancreatic head tumor are statistically significant (p -value < 0.001) compared to other causes of obstructive jaundice for example choledocholithiasis, cholangiocarcinoma and liver abscess which shows high p -value which is not statistically significant the reason could be attributed to smaller number of cases seen through out the study.

This is similar to study done by Anon et al which also showed that the causes of obstructive jaundice was statistically significant with p value (P -value = 0.002).

The results show that there are minor differences between intraoperative and MRCP where head of pancreatic tumour is slightly detected higher through intraoperative than MRCP while is vice versa to the Cholangiocarcinoma. But other causes were similar in both intraoperative and MRCP.

The results depict that MRCP findings are almost similar to the intraoperative results. Although all relations of causes and gender were not significance but gallstone 22(37.3%), choledocholithiasis 3(5.1%) and head of pancreas tumor 9(15.3%) were all from female patients while only Cholangiocarcinoma 1(1.7%) was from males.

The results show that there were very strong and positive correlation between MRCP and intra operative findings [Cramer's correlation coefficient (V) ranges from 1-0.71 with P value at 95%CI for all causes correlated was 0.0001].So this is statistically significant.

This is similar to the study done by Anon et al which showed that MRCP is highly sensitive and specific approximately 100%.It also shows levels,cause and extent of obstruction.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

MRCP is highly sensitive and highly specific in provision of accurate diagnosis. It is important because it shows levels, causes and extent of obstructions making it easier for surgeons to intervene.

5.2 Recommendation

1. MRCP should be an indication for the patients with obstructive jaundice.
2. Large study should be conducted involving other referral hospitals in the country so that it can represent the general population.
3. MRCP should be used before surgery or for surgical planning.

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APPENDICES

Appendix I: Questionnaire – English Version

1.Sociodemographic data.

a)age

b)Sex

2.MRCP findings

a)Gallstone

b)Choledocholithiasis

c)Head of Pancreas tumor

d)Liver abscess

e)Cholangiocarcinoma

f)Other

3.Surgical findings

a)Gallstone

b)Choledocholithiasis

c)Head of Pancreas tumor

d)Liver abscess

e)Cholangiocarcinoma

f)Other

Appendix II: Dodoso

1. Utangulizi.

- a) Umri
- b) Jinsia.
- c) Kiwango cha elimu

2. Matokeo/Majibu ya MRCP

- a) Mawe kwenye kifuko cha nyongo
- b) Mawe kwenye mirija ya nyongo
- c) Uvimbe kwenye kichwa cha kongosho ()
- d) Jipu kwenye ini/Ugonjwa wa ini
- e) Saratani yamirijaya nyongo
- f) Nyingine

3. Matokeo/Majibu ya MRCP

- a) Mawe kwenye kifuko cha nyongo
- b) Mawe kwenye mirija ya nyongo
- c) Uvimbe kwenye kichwa cha kongosho ()
- d) Jipu kwenye ini/Ugonjwa wa ini
- e) Saratani yamirijaya nyongo
- f) Nyingine