

Research Article**Comparative Study between ERCP and MRCP in Diagnosing Obstructive Jaundice****Ahmed. Abd Elrahim⁴, Ala.M. Abd Elgyoum^{1,2}, H. Osman^{1,3}, A. Elzaki⁴, E. Abd Elrahim^{1,4}, Ali Hassan¹, Hamad Alneel El rayah⁴, Maram Khalid⁴, Mohammed⁴, Mubarak Abdullah⁴, Saddam Hassan⁴**¹Taif University, college of applied medical science, P O Box 2425 post code 21944, Taif KSA.²National Ribat University, Nile Street Burri, Postal Code 11111, Khartoum Sudan³College of Medical Radiologic Science, Sudan University of Science and Technology P.O.Box 1908, Khartoum. Sudan⁴ Faculty of Radiology Science and Medical Imaging, Alzaiem Alazhari University, PO Box 1432 Khartoum North, Sudan***Corresponding author**

Ahmed Abdelrahim Mohammed Ibrahim

Email: ahmed_ass2007@yahoo.com

Abstract: Jaundice (icterus) describes the yellow discoloration of the skin and mucous membranes, and other tissues by excess bilirubin, which is the degradation product of hemoglobin. The main objective is to hold comparison between MRCP and ERCP in patients with obstructive jaundice. Prospective and descriptive study deal with comparative study between Endoscopic Retrograde Cholangio pancreato graphy and Magnetic resonance cholangio pancreatography in diagnoses of obstructive jaundice among Sudanese population. In results The data was collected, classified, analyzed by using Statistical package for social science the analysis of the result found that the female patients were (56.7%) VS (43.3%) males, most of the patients affected age group in the over 5th decade (50%), most of the patients were employee (40%), most of the patients were married (93.3%), most of the patients were from center of Sudan (73.3%), and the patients with clinical diagnosis of obstructive jaundice were (76.7%). ERCP of the samples showed that (56.7%) of the patients had CBD stone but MRCP showed (60%). ERCP of sample showed that (16.7%) of patients had stricture and (16.7%) carcinoma head of pancreas but MRCP showed (20%) of the patients with stricture and (20%) carcinoma head of pancreas. Data analysis performed by using Statistical package for social science (SPSS). The conclusion was MRCP procedure is easy, comfortable, non-invasive procedure and there is no radiation hazard. While ERCP procedure is invasive, performed in the painful risky considerable conditions and there is radiation hazard. The recommendation was MRCP Examination should do before ERCP examinations to have an accurate diagnosis and to avoid missed diagnose, patient's preparations must take place as first step for MRCP and ERCP examination.**Keywords:** Jaundice, ERCP, MRCP.

INTRODUCTION

Jaundice (icterus) describes the yellow discoloration of the skin and mucous membranes, and other tissues by excess bilirubin, which is the degradation product of hemoglobin. Jaundice is not a disease but only a sign of many other different diseases, bilirubin undergoes glucuronidation conjugation in the liver, conjugated bilirubin direct is easily excreted because it is soluble in water. Unconjugated bilirubin indirect is not arise in either direct or indirect bilirubin raises the blood levels of total bilirubin , jaundice is clinically apparent when the serum total bilirubin is above 3 mg/dL [1, 2].

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 gall

stones, or tumors of the bile duct which can block the area where the bile duct meets the duodenum. These may be cancerous, pancreatic cancer can also be a cause of blockages as it often occurs near to the ampulla of Vater, the tube 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 swelling of lymph glands, scar tissue from previous infections, surgery and cyst of the pancreas [3].

Jaundice occurs when retention of bilirubin leads to serum levels above 2.0 mg/dL. Hepatitis and intra- or extra- hepatic obstruction of bile flow is the most common causes of jaundice involving the accumulation of conjugated bilirubin. Hemolytic anemia is the most common causes of jaundice

involving the accumulation of unconjugated bilirubin [1, 2].

Endoscopic retrograde cholangio pancreatography (ERCP) a technique that combines the use of fiber optic endoscopy and fluoroscopy to diagnose and treat certain problems of the Biliary and pancreatic duct systems [3] Endoscopic Retrograde Cholangio pancreato graphy radiography follow injection of radiopaque material in to the papilla of Vater, which is done through fiber optic endoscope guided by use of fluoroscopy, the procedure is helpful in determine the cause of jaundice. It's an invasive procedure. ERCP was discovered In the 1970, gastroenterologists have a wide spectrum of diagnostic and therapeutic options in the bilio pancreatic ductal system [3].

Magnetic resonance cholangio pancreatography (MRCP) is a special type of magnetic resonance imaging that produces detailed images of the hepatobiliary and pancreatic systems, including the liver, gallbladder, bile ducts, pancreas and pancreatic duct. Magnetic resonance imaging is a noninvasive medical test that helps physicians diagnoses medical conditions. MRI uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures. The images can then be examined on a computer monitor, transmitted electronically, printed or copied to a CD, MRI does not use ionizing radiation x-rays [4].

MRCP is new technique that using heavily T2-weighted sequences, the signal of static or slow moving fluid filled structures such as the bile and pancreatic ducts is greatly increased, resulting in increased duct to background contrast. MRCP has some advantages over ERCP Specifically MRCP is noninvasive, is cheaper, uses no ionizing radiation, requires no anesthesia, less operator dependent, better demonstrating ducts proximal to an obstruction or tight stenosis and when combined with conventional T1- and T2-weighted sequences, allows anatomic imaging of extra ductal diseases [4].

MRCP with no therapeutic value, although both techniques can image the ductal system in detail, MRCP allows imaging of the surrounding parenchyma. Magnetic resonance cholangio pancreatography is an alternative to diagnostic endoscopic retrograde cholangio pancreatography for investigating biliary obstruction. The use of MRCP may prevent the use of unnecessary invasive procedures [4].

OBJECTIVES

To hold comparison between MRCP and ERCP in patients with obstructive jaundice. To show the presence, causes and level or site of obstruction by both modalities.

MATERIALS & METHODS

Prospective, descriptive, study deal with comparison between Endoscopic Retrograde Cholangio pancreatography and Magnetic resonance cholangio pancreatography to diagnose obstructive jaundice among Sudanese population, in Soba University, Ibn cina, Asia, National Ribat and clinical doctor hospital; Khartoum-Sudan, from March 2014 - May 2014, in thirty consecutive patients presented with MRCP report showed obstructive jaundice for ERCP examination. Sample frame was comprised of thirty random cases confirmed signs and symptom of obstructive jaundice were examined by ERCP and MRCP, selection of participation was though simple random on Tuesday and Wednesday.

Patient preparation for ERCP examination the stomach must be empty 8Huorse, generally no eating or drinking 8 hours generally performed in the prone or semi-prone position, the left lateral and prone positions are believed to carry a lower risk of aspiration, anesthesia and sedation, sedative and throat spray. During ERCP, patients lie on their back or side on an x ray table the left lateral position [3].

Scanning guideline and protocol for ERCP examination, the doctor inserts an endoscope down the esophagus, through the stomach, and into the duodenum. Video was transmitted from a small camera attached to the endoscope to a computer screen within the doctor s view [5].

Patient preparation for MRCP examination, no patient preparation is required for MRCP but fasting 2-4 hours prior to the examination can be beneficial because it reduces the fluid in the gastric antrum and the duodenum, which may overlies the ducts [4].

Position of patient for MRCP examination in Supine Scanning guideline and protocol for MRCP examination, common protocols of the MRCP examination include heavily T2 weighted Sequences acquired either with thin slice sections or thick slabs or both.

RESULTS

Table 1: Distribution of the gender

	Gender	Frequency	Percentage
	Male	13	43.3%
	Female	17	56.7%
	Total	30	100.0%

Table 2: Distribution of the social status

Social status	Frequency	Percentage
Single	2	6.7%
Married	28	93.3%
Total	30	100.0%

Table 3: Distribution of the clinical diagnosis

Clinical diagnosis	Frequency	Percentage
Jaundice	7	23.3%
Obstructive jaundice	23	76.7%
Total	30	100.0%

Table 4: MRCP finding: obstruction level

Obstruction level	Frequency	Percentage
Intra hepatic	4	13.3%
Extra hepatic	20	66.7%
Both	6	20.0%
Success	30	100%
Failed	0	00%
Total	30	100.0%

Table 5: MRCP finding: causes of obstruction

Cause of obstruction	Frequency	Percentage
Stone	18	60.0%
Stricture	6	20.0%
CA head of pancreas	6	20.0%
Total	30	100.0%

Table 6: ERCP finding: obstruction level

Obstruction level	Frequency	Percentage
Intra hepatic	1	3.3%
Extra hepatic	25	83.3%
Both	1	3.3%
Success	27	90.0%
Failed	3	10.0%
Total	30	100.0%

Table 7: ERCP finding: causes of obstruction

Causes of obstruction	Frequency	Percentage
Stone	17	56.7%
Stricture	5	16.7%
CA head of pancreas	5	16.7%
Success	27	90.0%
Failed	3	10.0%
Total	30	100.0%

Table 8: Both MRCP and ERCP findings

Findings	Frequency	Percentage
Same	19	63.3%
Different	11	36.7%
Total	30	100.0%

DISCUSSION

The study found that obstructive jaundice is most common in elderly ages specially over 51 years there were 15 out of 30 cases (50%) this is due to elevation of the bilirubin level in this stage of life than normal. Of the 30 cases 17 patients were females forming an incidence (56.7%) and 13 were males (43.3%) increase incidence of female patients in this

study due to excessive cholesterol in the body, multiple pregnancies, obesity and rapid weight loss. This result is the same as the study of Abdul-Aziz A. Al-Quorainetal, his study is Prospective Comparative Study of Mrcp and Ercp in Biliary and Pancreatic Duct Abnormalities, and he found that the patients consisted of 26 females with a median age of 50 years and 25 males with a median age of 53 years [6].

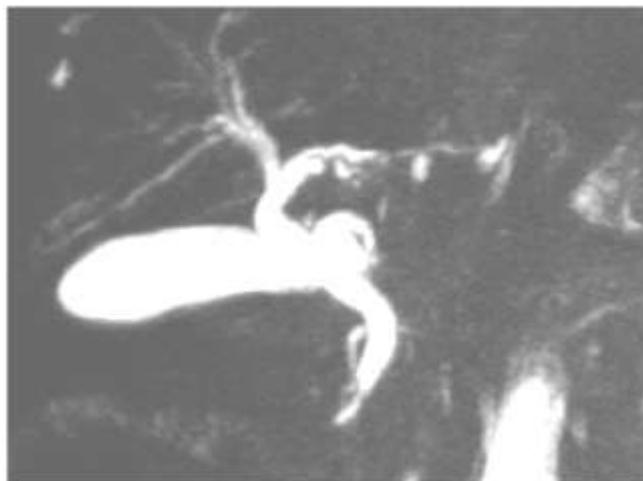


Fig 1: 61 years old male patient, MRCP image shows Mild extra hepatic biliary radicles dilatation with CBD small filling defect.



Fig 2: ERCP image for same patient shows dilated CBD with Stone.

MRCP sensitivity in detecting common bile duct and gallbladder stone was high that concerned with obstructive jaundice 18 from 30 patients (60%) compared with other causes such as stricture and carcinoma head of pancreas, but ERCP detected 17 patients (56.7%) with common bile duct stone. MRCP most sensitive to detect biliary stricture there were 6 from 30 patients (20%) diagnosed by MRCP and ERCP diagnosed 5 (16.7%). This record explains the sensitivity of MRCP over ERCP. Our study agrees with

[12] in their study MRCP compared to diagnostic ERCP for diagnosis biliary obstruction, they found that MRCP was more comfortable and sensitive diagnostic investigation compared with ERCP for diagnosing Biliary stricture. MRCP most sensitive to detect pancreatic tumor there were 6 from 30 patients (20%) diagnosed by MRCP and ERCP diagnosed 5 (16.7%). This record explains the sensitivity of MRCP over ERCP. Our study agrees with in their study Comparative assessment of imaging modalities in

biliary stricture. The sensitivity and specificity for diagnosis of malignancy in the 50 patients were as follows: 85% / 75% for ERCP/PTC, 85% / 77% for MRCP. Efficiency of MRCP to detect cause of obstructive jaundice was 30 cases out of 30 (100%) and ERCP was 27 (90%). This record explain that the MRCP more accurate than ERCP to detect cause of obstructive jaundice. This study agree with Stephen J Walters, he found that MRCP is more accurate comparable with ERCP for diagnosing biliary obstruction.

MRCP can visualize the normal or dilated common bile duct in 96-100% of patients.14-17 Strictures of the common bile ducts or pancreatic duct can be easily diagnosed by MRCP. However, the cause of such strictures cannot be accurately identified. Obstruction of the biliary tree with calculi can be easily diagnosed by MRCP or ERCP [7-8].

MRCP was more sensitive in diagnosing gallbladder stones and visualization of the gallbladder and the pancreatic ducts, while ERCP was more accurate in diagnosing CBD - stones; however, both procedures were generally sensitive and showed almost similar results. MRCP can replace diagnostic ERCP in patients not tolerating the invasive procedure and in those with failed ERCP.

In male patient's malignant causes of obstructive jaundice predominated (74.2%), whereas in females benign causes were predominant (52%). Carcinoma of head of pancreas was the most common cause of obstructive jaundice as a whole, as well as most common aetiology of malignant obstruction in male patients. In females Choledo cholithiais was the most common cause of biliary obstruction as well as the most common benign aetiology. Gallbladder carcinoma was the most common cause for malignant obstruction in females [9].

MRCP detected significantly more gall bladder and pancreatic duct visualization than ERCP ($p=0.0005$, 0.001) respectively. These results might be explained by calculation of the CBD separately and presence of stones in the cystic duct. Our findings are consistent with other studies [10, 11]. Our results from this prospective study present the potential of using MRCP and comparing it with the ERCP in our University Hospital. The results of the study confirm the sensitivity of both procedures in diagnosing biliary and pancreatic disorders [10, 11].

CONCLUSION

The study found that obstructive jaundice is most common in elderly ages, with increased incidence of patients in female more than male; majority of the patients were from central of Sudan. MRCP is more accurate and more sensitive than ERCP for detecting biliary stones, biliary stricture and pancreatic tumors.

That means MRCP is superior to ERCP in the evaluation of the biliary obstruction. On other the hand the ERCP procedure is used for diagnostic and therapeutic palliative procedures rather than primary diagnostic test in modern setup, removal and drainage duct stones is the advantage over the MRCP.

RECOMMENDATIONS

MRCP Examination should done before ERCP examinations, to have an accurate diagnosis and to avoid missed diagnose, patients preparations must take place as first step for MRCP and ERCP examination. ERCP procedure is needed for treatment, however good sterilization and safely consideration must be achieved to avoid the complications. Obese, fertile, over 40, female should do routine investigation for cholesterol and biliary disease regularly, because of their high risk.

REFERENCES

1. George R. Wettach, Tomas W. Palmrose Terry K. Morgan. Pathology. 8th ed. McGraw- Hill; U.S.A 2009.
2. Elzaki A, Osman H, Abdelrahim A, Abdelgyoum A, Alzahrani S; Ultrasonography Versus Endoscope Retrograde Cholangio-Pancreatography in Diagnosing Obstructive Jaundice
3. Available from: <http://www.en.wikipedia.org/wiki/Jaundice.com>
4. Available from: http://www.en.wikipedia.org/wiki/Endoscopic_retrograde_Cholangiopancreatography.com.
5. Prasad SR, Sahani D, Saini S; "Clinical applications of magnetic resonance cholangio pancreatography. Journal of Clinical Gastroenterology 33 (5): 362-6.5- http://www.ncchta.Org/project_Data/3_project_record_published.Asp?jtid=1355 website.
6. Kimmey; Complication of gastrointestinal endoscopy. 9thed. 2010. Philadelphia; chapter 40.
7. Al-Quorain AA, Ismail MH, Al-Mulhim AA, Yasawy MI, Elhassan AY, Al-Mulhim FA; Prospective Comparative Study of Mrcp and Ercp in Biliary and Pancreatic Duct Abnormalities. Scientific Journal of King Faisal University (Basic and Applied Sciences), 2010; 11(1): 1431.
8. Guibaud L, Bret PM, Reinhold C, Atri M, Barkun AN; Bile duct obstruction choledo cholithiasis: diagnosis with MR cholangiography. Radiology, 1995; 197: 109-15.
9. Barish MA, Yucel EK, Ferrucci JT; Magnetic resonance cholangio pancreatography. N Eng J of Medicine 1999; 341(4): 258-63.
10. Verma S, Sahai S, Gupta P, Munshi A, Verma S, Goyal P; Obstructive Jaundice- Aetiological Spectrum, Clinical, Biochemical And Radiological Evaluation At A Tertiary Care

- Teaching Hospital..The Internet Journal of Tropical Medicine.2010 Volume 7 Number 2.
11. Kaltenthaler EC, Walters SJ, Chilcott J, Blakeborough A, Morgel YB, Thomas S; MRCP compared to diagnostic ERCP for diagnosis when biliary obstruction is suspected: a systematic review. BMC Medical Imaging 2006; 6: 9
 12. Fa Chao ZHI, ZhiQiang YAN, Ziao Lin LI, JianXin ZHU, Cun Long CHEN, Xue Lin ZHANG *et al.*; Prospective study of diagnostic value of magnetic resonance cholangio pancreatography versus endoscopic retrograde cholangio pancreatography in cholangio pancreatic diseases. Chinese Journal of Digestive Diseases 2002; 3(3): 124-6.