Role of Magnetic Resonance Imagingto Evaluate the Biliary System Diseases

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ABSTRACT:- Magnetic Resonance Cholangiopancreatography (MRCP) is a technique that has evolved over the past two decades, and consider as a noninvasive diagnostic modality capable to produce high-quality images of the biliary and pancreatic disorders. And the study done in King Khalid hospital in Najran. in period from Feb to Oct 2017 with two MR machines 1.5 and 3 Tesla.

The results show that the most abnormalities for all patients in the female than the male for all diseases, and for patients age group's most patients with history ranged from 31- 60 years with 60 patients, and the most frequently disease lesion, obstructive jaundice and abdominal pain (13,15 and 13). compare between the history and MRI finding we notice that the most history diseases for female lesion, obstructive jaundice and abdominal pain but in MRI finding the most diseases was stone, cyst and lesion. for male the most history diseases cancer, Cholelithiasis and abdominal pain but in MRI results was stone, cyst and hemangioma. the correlate between the history and age group show that the most disease history was obstructive jaundice, lesion and abdominal pain repeated 15,13 and 13 respectively but in the relation between the MRI finding with age group showed that the most daises finding stone, cyst and lesion repeated 40, 15 and 10 times respectively.

Keywords: MRI, MRCP, Biliary System

I. INTRODUCTION

It's two decades since first describe of magnetic resonance cholangiopancreatography (MRCP) [1]. And the techniqueshave evolved considerably and by improvements in speed of acquisition and spatial resolution.MRCP is performed using heavily T2-weighted sequences, supplemented by fat-saturated T1- and T2-weighted MRI, and with steady-state gradient-echo acquisitions (true fast imaging with steady-state precession), which are less susceptible to flow artifacts [2]. And preferred the images that presented intwo separate planes be acquired for definitiveidentification of gallstones in the extrahepatic bile ducts on MRCP [3]. MRCP consider very useful in patients with complete biliary obstruction after biliary-enteric anastomosis [3].

With heavily T2-weighted images were originally achieved using a gradient-echo (GRE) balanced steady-state free precession technique [4,5]. A fast spin-echo (FSE) with a long echo time (TE) can introduced shortly after [6], with the advantages of a higher signal-tonoise ratio and contrast-to-noise ratio, and a lower sensitivity to motion and susceptibility artefacts. the FSE sequences have been modified and described including rapid acquisition withrapid enhancement (RARE) [7], half-Fourier acquisition single-shot turbo spin-echo (HASTE) [8], and fast-recovery fast spin-echo (FRFSE) [9] sequences. The breath-hold (using a single shot approach) [10] and non-breath-hold techniques (with respiratory triggering) [11] have been used, with images obtained either as a two-dimensional (2D) or three-dimensional (3D) acquisition. Using different to improve the, which is traded off for thinner contiguous slices. Acquiring images with near isotropic voxels allows improved post-processing manipulation of the images with multi-planar reconstruction, maximum intensity projection (MIP) and volume rendering.

Gallstones (cholelithiasis) are the most common cause of biliary tract disease in adults, afflicting 20-30 million persons in North America. Approximately one-fifth of men and one-third of women will eventually develop cholelithiasis.

Obstructive jaundice or biliary tract disorders are often common complaint of patients, and the majority of these patients turned out to have cholelithiasis. Biliary disorders are more common in females than males. Correct methods to detect common bile duct and pancreatic disease in patients with obstructive jaundice are important for treating surgeon to carryout appropriate treatment. For this purpose, surgeons prefer the diagnostic modality which is noninvasive, safe and highly sensitive in diagnosing biliary disorder as the treatment approach varies highly depending on the cause of biliary obstruction.

II. MATERIAL AND METHODS

Study using data from King Khalid hospital in Najran, with an aim to assess the biliary system pathologies in Najran patients. Biliary system diseases will be performed on Magnetic Resonance Imaging with 1.5 and 3.0 Tesla.

III. TECHNIQUE

The MRCP technique is based on heavily T2-weighted images which result in a dramatic increase in contrast between stationary fluids (bile) and the background (hepatic and pancreatic parenchyma, abdominal fat). As a result, the bile presents a very high signal intensity compared with low signal intensity background. In addition, no signal comes from flowing blood. The examination does not require an intravenous contrast agent. It is recommended that patients fast for 3–4 hours before undergoing an MRCP in order to reduce fluid content within the stomach, decrease duodenal peristalsis and promote gall bladder filling. MRCP is performed using breath-hold and non-breath-hold sequences. The breath-hold sequence acquires a single slab of data, between 40 and 80 mm thick, in 1 or 2 seconds. This gives similar projection images to those acquired by ERCP. Thin slabs (4 mm thick) can also be acquired using breath-hold T2-weighted half Fourier acquisition single-shot turbo spin echo (HASTE) sequences. These are obtained in coronal or oblique coronal views. In addition, the MRCP involves acquiring multiple thin collimation slices, a non-breath-hold, respiratory-triggered 3D turbo spin-echo (TSE) T2-weighted sequence, (1.5 mm) that can be post-processed on an imaging workstation. The commonly used post-processing method is a maximum intensity projection (MIP) algorithm. The source images from a thin collimation multi-slice acquisition are reviewed in addition to the MIP reconstructions in order to demonstrate small stones or other intraductal pathology that may be obscured by partial volume averaging effect [12].

Table 1. Show correlation between the gender and age group:								
	Gender Age Group					Total		
		18-30	31-45	46-60	61-80	81-100		
	Female	8	23	14	10	2	57	
	Male	5	17	8	4	2	36	
	Total	13	40	22	14	4	93	

IV. **RESULTS** Table 1. Show correlation between the gender and age group:

History		Gen	Total	
		Female	Male	
	GB Stone	0	1	1
	Cancer	2	5	7
	Cyst	3	0	3
	None	2	2	4
	Lesion	11	2	13
	Cholelithiasis	2	4	6
	Jaundice	1	2	3
	Cholecystitis	5	1	6
	Obstructive jaundice	12	3	15
	Pancreatitis	4	2	6
	Stone	5	4	9
	Abdominal pain	7	6	13
	Obstruction	3	4	7
Total		57	36	93

 Table 2. Show correlation between history and gender:

Table 5. Show correlation between the history and age group:							
History			Total				
		18-30	31-45	46-60	61-80	81-100	
	GB Stone	0	1	0	0	0	1
	Cancer	0	3	3	1	0	7
	Cyst	0	0	1	2	0	3
	None	1	1	1	1	0	4
	Lesion	1	4	5	3	0	13
	Cholelithiasis	1	2	2	0	1	6
	Jaundice	1	1	0	0	1	3
	Cholecystitis	1	4	0	1	0	6
	Obstructive jaundice	3	9	1	2	0	15
	Pancreatitis	1	2	1	1	1	6
	Stone	1	4	3	1	0	9
	Abdominal pain	2	5	4	2	0	13
	Obstruction	1	4	1	0	1	7
Total		13	40	22	14	4	93

Table 3. Show correlation between the history and age group:

Table 4. Show correlation between MRI finding with gender:

MRI Finding		Gen	Total	
		Female	Male	
	Hemangioma	5	4	9
	Mets	3	0	3
	Tumor	3	0	3
	Stone	20	20	40
	Normal	2	2	4
	None	0	1	1
	Obstruction	0	1	1
	Cyst	10	5	15
	Lesion	7	3	10
	Pancreatitis	1	0	1
	Multiple Stone	5	0	5
	Obstruction Jaundice	1	0	1
	Total	57	36	93

Table 5. Show correlation between MRI finding with age group:

MRI Finding			Total				
		18-30	31-45	46-60	61-80	81-100	
	Hemangioma	0	3	6	0	0	9
	Mets	0	2	1	0	0	3
	Tumor	0	0	1	2	0	3
	Stone	7	19	9	2	3	40
	Normal	2	0	1	1	0	4
	None	0	1	0	0	0	1
	Obstruction	0	1	0	0	0	1
	Cyst	1	6	3	5	0	15
	Lesion	1	5	1	2	1	10
	Pancreatitis	0	0	0	1	0	1
	Multiple Stone	1	3	0	1	0	5
	Obstruction Jaundice	1	0	0	0	0	1
Total		13	40	22	14	4	93

V. DISCUSSION

Correlate between the gender and age group that divided to five groups; the most age period frequently for both gender was 31-45 years repeated 23 and 17 time for female and male respectively. then 46-60 years repeated 14 and 8 times for female and male respectively. **Table 1.**

Table 2.Show correlation between the history and patients gender, were the number of patients 57 and 36 for female and male respectively. And the most disease for female was lesion, obstructive jaundice and abdominal pain repeated 11, 12 and 7 times respectively. And for male cancer and abdominal pain repeated 5 and 6 times.

Crosstabulation for the history with age group, the most frequently disease was obstructive jaundice in the age period 31-45 years repeated 9 times. Over all the most age period for all patients with disease was 31-45 years, then 46-60 years, and less age period 81-100 years. **Table 3**.

MRI finding with gender over all the stone was superior for all findings. According to gender the most diseases finding for both female and male was stone, cyst and lesion with frequently for female 20, 10 and 7 and for male 20, 5 and 3 times respectively. **Table 4.**

Table 5.Show correlation for the MRI finding over all results was stone, cyst and lesion, And the most age period repeated was 31-45 and 46-60. The most disease was stone, cyst and lesion repeated 19,6 and 5 respectively in age period from 31 to 45 years. And with same frequently for all ages period mostly.

VI. CONCLUSION

Magnetic resonance cholangiopancreatography (MRCP) is a technique that has evolved over the past two decades, and consider as a noninvasive diagnostic modality capable to produce high-quality images of thebiliary and pancreatic disorders. And the study done in King Khalid hospital in Najran. in period from Feb to Oct 2017 with two MR machines 1.5 and 3 Tesla.

The results show that the most abnormalities for all patients in the female than the male for all diseases, and for patients age group's most patients with history ranged from 31- 60 years with 60 patients, and the most frequently disease lesion, obstructive jaundice and abdominal pain. Comparing between the history and MRI finding we notice that the most history diseases for female lesion, obstructive jaundice and abdominal pain but in MRI finding the most diseases was stone, cyst and lesion. for male the most history diseases cancer, Cholelithiasis and abdominal pain but in MRI results was stone, cyst and hemangioma.the correlate between the history and age group show that the most disease history was obstructive jaundice, lesion and abdominal pain repeated 15,13 and 13 respectively, but; in the relation between the MRI finding with age group showed that the most daises finding stone, cyst and lesion repeated 40, 15 and 10 times respectively.

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