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## Prospective Comparative Study of Mrcp and Ercp in Biliary and Pancreatic Duct Abnormalities

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### Abstract :

Magnetic resonance cholangiopancreatography (MRCP) is a non-invasive diagnostic modality capable to produce high-quality images of the biliary and pancreatic disorders.

**Aims:** To assess the diagnostic accuracy of MRCP and endoscopic retrograde cholangiopancreatography (ERCP) for the evaluation of biliary and pancreatic diseases.

**Methods:** Forty-two patients with suspected diseases of the biliary and pancreatic diseases were enrolled in this study. The results of MRCP were evaluated blindly by two radiologists. The study was conducted in King Fahad University Hospital in the period between January and December 2004.

**Results:** MRCP detected more gallbladder stones, combined gallbladder and total stones than ERCP and lower cases of common bile duct (CBD) stones. Both procedures were sensitive. Data were analyzed using SPSS Version 15.

**Conclusion:** 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.

### Key Words:

Biliopancreatic diseases; Magnetic resonance cholangiopancreatography; Endoscopic retrograde cholangiopancreatography.

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**Introduction :**

Magnetic resonance imaging (MRI) has been described as the most important development in medical diagnosis since the discovery of X-rays by W. Roentgen 100 years ago. With the development of fast imaging sequences special surface coils and improvements in the quality of abdominal images, magnetic resonance cholangiopancreatography (MRCP) has become an exciting new imaging technique.<sup>1</sup> Endoscopic retrograde cholangiopancreatography (ERCP) still offers the highest sensitivity and specificity for the evaluation of biliary and pancreatic ducts. MRCP may offer greater safety, less discomfort and greater patient acceptance. Its diagnostic accuracy has been demonstrated in various studies.<sup>2-5</sup>

It is currently believed that the primary use of MRCP is to evaluate common bile duct and pancreatic duct abnormalities of unknown origin. In this clinical application, MRCP has proved to be as sensitive and specific as diagnostic ERCP.<sup>6-7</sup>

MRCP should also be used whenever ERCP is impossible because of anatomical or technical reasons.<sup>8-10</sup>

Currently, the diagnostic accuracy of MRCP is considered to be equivalent to that of ERCP for a broad spectrum of benign and malignant pancreatic and biliary duct diseases.

**Objective :**

The objective of this study was to compare prospectively the diagnostic value of magnetic resonance cholangiopancreatography (MRCP) versus endoscopic retrograde cholangiopancreatography (ERCP) in the detection of cholangiopancreatic diseases.

**Methods :**

The MRCP was acquired using commercially available software in a clinical MR-scanner (Magelom Expert 1-T-scanner, Siemens Medical System, Erlangen, Germany) with a body coil. All sequences were performed during breath holding. Between January and December 2004, MRCP was performed in 51 patients. ERCP was carried out in only 48 of them 24 hours later. The patients consisted of 26 females with a median age of 50 years and 25 males with a median age of 53 years. Four patients

had MRCP of non-diagnostic value, one patient had claustrophobia. ERCP had failed in four patients, so these nine patients were excluded from the study to have a trial group of 42 patients. The inclusion criteria for our study were obstructive jaundice, biliary colic, ascending cholangitis and gall stone pancreatitis. Both procedures were conducted in King Fahad Hospital of the University. The study was approved and carried out according to the guidelines of the Medical Ethical Committee of King Faisal University and to the Helsinki-Declaration the MRCP and ERCP images were interpreted blindly by two radiologists with experience in biliary pancreatic diseases images without prior informations. Later the images have been analyzed and compared. The sensitivity and specificity of MRCP were determined using the findings on direct cholangiopancreatography as the gold standard.

**Statistical analysis :**

Data were entered and analyzed using SPSS Version 15. Chi square test and or testing between two proportions were used as appropriate level of significance was set to be  $<0.05$ .

**Results :**

Comparing the findings of MRCP and ERCP showed that the MRCP detected significantly more gallbladder stones, combined gallbladder and total stones than ERCP ( $p=0.012$ ), (0.0003) and (0.0005) respectively and lower cases in respect of common bile duct (CBD). No statistical difference was observed between the two methods with respect to CBD strictures ( $p=0.6$ ). Regarding the etiology of the CBD-strictures, one patient was suffering from autoimmune pancreatitis which was confirmed via endoscopic sonography and fine need aspiration. Two patients had cholangiocarcinoma diagnosed by brushing and bile aspiration, the remaining two had inflammatory causes of the strictures. One had CBD-bile leakage post laparoscopic cholecystectomy, confirmed by ERCP. This patient was managed by papillotomy and placing of a stent. MRCP detected significantly more gallbladder and pancreatic duct visualization than ERCP ( $p=0.0005$ , 0.001) respectively. MRCP detected four pancreatic cancers out of 42 patients, while ERCP detected only two out of 42. All these six patients were referred to the surgical department and the diagnosis was confirmed histologically. There was no significant

statistical difference ( $p=0.86$ ). Both procedures showed similar sensitivity. Table 1 is showing the relevant findings.

**Table ( 1 )**  
Comparison between MRCP and ERCP relevant findings

Findings	MRCP			ERCP		
	GB	CBD	Total	GB	CBD	Total
Stones	30	7	37	17	11	28
CBD-strictures	-	4	4	-	5	5
CBD-dilatation	-	21	21	-	18	18
GB-visualization	35	-	35	23	-	23
Pancreatic duct visualization	-	-	38	-	-	19
CBD visualization	-	42	-	-	-	42
Pancreatic cancer	-	-	4	-	-	2
CBD leak	-	-	-	-	-	1

GB=Gall bladder

CBD=Common bile duct

### Discussion :

Over the past three decades, ERCP has emerged as the principal method for diagnostic examination of the pancreatobiliary tree. Diagnostic ERCP is associated with a complication rate ranging between 3-9%.<sup>11-13</sup> Today, MRCP, as a non-invasive procedure, which is free of any morbidity, has gained an important role in the evaluation of the biliary tree and pancreatic duct disorders.

MRCP can visualize the normal or dilated common bile duct in 96-100% of patients.<sup>14-17</sup> 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.

Obstruction at the ampulla of Vater resulting in dilatation of the common bile duct can be due to various benign or malignant pathology. ERCP has definite advantages over MRCP because it allows direct visualization of the ampulla and biopsies of the lesion.

Recently ERCP and MRCP have been challenged by endoscopic sonography, which is quite sensitive in diagnosing CBD stones and other pathology of the biliary and pancreatic ducts.<sup>18-20</sup>

In our prospective controlled study, comparing MRCP and ERCP, the results showed that MRCP detected significantly more gallbladder, combined and total stones than ERCP ( $p=0.012$ ,  $0.0003$  and  $0.0005$ ) respectively and fewer cases in respect of common bile duct. This is in agreement with other studies.<sup>11,21,22</sup>

Regarding structures of the common bile and pancreatic ducts, no statistical difference was observed between the two methods ( $p=0.6$ ). This is in comparable with other reports.<sup>23,24,25</sup>

MRCP detected significantly more gall bladder and pancreatic duct visualization than ERCP ( $p=0.0005$ ,  $0.001$ ) respectively. These results might be explained by cannulation of the CBD separately and presence of stones in the cystic duct. Our findings are consistent with other studies.<sup>26-30</sup> 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.

However, optimal patient management requires sometimes, diagnostic and therapeutic procedures. MRCP is purely a diagnostic technique, nevertheless, it can provide important information in patients in whom ERCP has failed.

In conclusion, 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.

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## دراسة مستقبلية لمقارنة الفحص بالرنين المغناطيسي بالفحص التنظيري الارتجاعي لأمراض القنوات المرارية والبنكرياسية

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### الملخص :

يعتبر فحص القنوات المرارية والبنكرياسية عن طريق الرنين المغناطيسي من الفحوصات الحديثة والتي تمكن الطبيب لتشخيص دقيق لأمراض القنوات المرارية وقنوات البنكرياس

**الهدف :** تهدف هذه الدراسة المستقبلية إلى مقارنة دقة تشخيص الرنين المغناطيسي بالفحص التنظيري الارتجاعي لأمراض قنوات البنكرياس والقنوات المرارية .

**الطريقة :** تمت الدراسة في مستشفى الملك فهد الجامعي بالخبر في الفترة ما بين يناير وديسمبر ٢٠٠٤م أجرى الفحصان لأثنين وأربعين مريضاً يعانون من احتمال إصابتهم بأمراض في القنوات المرارية وقنوات البنكرياس وقد تم تقييم النتائج عن طريق إثنين من أخصائي الأشعة.

**النتائج :** أظهرت النتائج أن الرنين المغناطيسي كما أدق في تشخيص حصوات المرارة ورؤية كيس المرارة وقنوات البنكرياس ، بينما التشخيص التنظيري الارتجاعي كان أدق في تشخيص حصوات القنوات المرارية - كلا الفحصان يمتلكان حساسية جيدة أجريت التحليلات الإحصائية باستخدام SPSS نسخة ١٥ .

**الخلاصة :** أظهرت الدراسة أن الرنين المغناطيسي كان أدق في تشخيص ورؤية كيس المرارة وقنوات البنكرياس بينما التنظير الارتجاعي كان أدق في تشخيص حصوات القنوات المرارية كما أظهر الفحصان تشابهاً في دقة التشخيص لدى المرضى الذين أجريت عليهم هذه الدراسة.