

## ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (E.R.C.P.)

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### INTRODUCTION

Endoscopic Retrograde Cholangiopancreatography (E.R.C.P.) is the cannulation of the papilla of Vater under vision using an endoscope and instilling of radio-opaque dye into the duct system and taking X-rays to outline the biliary and pancreatic tree to help in the diagnosis of patients suspected to be suffering from biliary tract or pancreatic diseases.

E.R.C.P. is a combined endoscopic and radiological procedure and good results are obtained by close co-operations between the endoscopist and an interested radiologist using image intensifier with good fluoroscopy and facilities for instantaneous X-rays in the X-ray department with the assistance of a radiographer and a trained endoscopy nurse.

### Historical Data

Before the advent of fiberoptic endoscopes Rabinov and Simon<sup>1</sup> succeeded in the cannulation of ampulla of Vater under fluoroscopic control with a specially devised balloon instrument which was intubated through the mouth and performed both pancreatography and choledochography making a diagnosis of choledocholithiasis. However, the amount of effort required seems more than what was achieved and a doubt whether the same thing will be obtained on all occasions!

Duodenoscopy was first achieved using American fiberoptic instruments. McCune et al (1968)<sup>2</sup> introduced the fiber duodenoscope which allowed direct view of the papilla of Vater and performed cannulation to obtain pancreatography. Rapid progress in technique of fiberduodenoscopy gave impetus to this method of investigations.

First report of the cannulation techniques appeared in 1970 (Oi et al<sup>3</sup>, Takagi et al<sup>4</sup>, Ogoshi et al<sup>5</sup>). In the same year communications to the world Congress of Gastroenterology and Endoscopy at Copenhagen evoked world wide interest. The feasibility and relative safety of the technique were soon confirmed by various workers in the world.

The introduction of this technique to the Indian subcontinent is credited to Peter Cotton and Kunio Takagi by their vivid demonstration of the technique

at the first conference of the Society of Gastrointestinal Endoscopy in India in 1977. E.R.C.P. is a well accepted technique in various countries abroad and even reviews and progress articles have been written on its clinical use (Cotton, 1977)<sup>6</sup>. E.R.C.P. is now a routine extension of diagnostic panendoscopy and is performed at couple of centres in India<sup>7,8</sup>.

### Indications for E.R.C.P. (Table 1)

The commonest, and most rewarding indication (as in our series) of E.R.C.P. has been in the diagnosis and management of patients with suspected obstructive jaundice, to rule out particularly operable obstruction and also in the study of post-cholecystectomy problems. It is also indicated in patients in whom the oral cholecystography or intavenous cholangiogram has failed or has been inadequate.

Table 1: INDICATIONS FOR E.R.C.P.

1. Suspected obstructive jaundice
  - a) Extrahepatic biliary obstruction
  - b) To exclude intrahepatic Cholestasis
  - c) To find site and type of obstruction
2. Suspected or Known pancreatic disease.
3. Non-ulcer dyspepsia with suspicion of biliary or pancreatic problem.

Unlike cholangiography in patients of obstructive jaundice, E.R.C.P. can be successful even if the serum bilirubin is raised.

In patients suspected to be having pancreatitis, calculi or pancreatic carcinoma, E.R.C.P. may be done for diagnostic purpose and pre-operatively to delineate the duct. Despite development of technique such as high resolution computers tomography, E.R.C.P. continues to play an important and more specific role in pancreatic radiology<sup>10</sup>

In patients with vague upper abdominal pain, normal E.R.C.P. can rule out major pancreatic or biliary tract disorders.

### Contraindications for E.R.C.P. (Table 2)

Usual major contraindications of routine upper G.I. endoscopy apply to E.R.C.P. Oesophageal stricture, aneurysm of the thoracic aorta and recent myocardial infarction are the primary contraindications to the use of fiber-optics in the upper alimentary tract. Other contraindications can include patients who have pyloric stenosis, those with a history of sensitivity to drugs and in those in whom

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the anticholinergic drugs are unadvisable e.g. in patients with acute glaucoma or prostatism. In patients with acute abdomen and when the patient is unco-operative, upper G.I. Endoscopy is relatively contraindicated.

Table 2 : CONTRA-INDICATION FOR E.R.C.P.

1. Unco-operative patient.
2. Severe cardiac problem.
3. Severe pulmonary disease.
4. HbsAg positivity.
5. Acute pancreatitis.
6. Acute Cholangitis.
7. Allergy to iodine — containing contrast.

The only absolute contraindication to E.R.C.P. is a positive serological test for hepatitis associated antigen, since it is not possible at present to sterilize the instruments. Relative contraindications include patients in the recovery phase of acute pancreatitis and those known to have pseudocysts of the pancreas. E.R.C.P. may also promote or aggravate cholangitis in patients with biliary stasis<sup>6</sup>. "Allergy to iodinated dye is not a contraindication"<sup>11</sup>.

**Complications of E.R.C.P.**<sup>6,12,13</sup> (Table 3)

As experience grows, success rates are higher and complications fewer<sup>12</sup>. Rate of complications is reported to be less than 3% and mortality 0.2% with experienced observers. In inexperienced hands, complications rate is about 7%.

Pancreatitis and sepsis are the two major hazards. Transient hyperamylasaemia occurs after almost every pancreatography but severe pancreatitis can occur in 1-7% cases.

This can be avoided by careful filling of pancreatic duct preferably under manometric monitoring. Sepsis is the killer after E.R.C.P. and occurs especially in poorly draining systems. Cholangitis is not uncommon and causes maximum deaths. Similarly, obstructed pancreatic ducts and pancreatic pseudocysts are important causes of pancreatic sepsis, which carries 20% mortality. Pancreatic pseudocysts are best cannulated preoperatively. The practice of mixing antibiotic with the contrast agent has not been shown to be useful in preventing sepsis<sup>14</sup>.

Table 3 : COMPLICATIONS OF E.R.C.P.

1. Cholangitis
2. Pancreatitis
3. Pancreatic Sepsis
4. Hyperamylasaemia
5. Instrumental injury
6. Side-effects of drugs
7. Pharyngitis

Possibility of transmission of viral hepatitis used to be frequently discussed but rarely documented. Instrumental injury and side effects of drugs used are other possible complications as for any other upper gastrointestinal endoscopy. Aspiration pneumonia, parotitis, conjunctivitis and haematemesis have also been reported.

**E.R.C.P. for Biliary diseases**

**1) Obstructive Jaundice**

E.R.C.P. gives good visualisation of both biliary and pancreatic tree (fig. 1).

History, natural evolution, clinical examination and routine investigation point to the diagnosis of obstructive jaundice. By and large it is possible to differentiate between medical and surgical jaundice. However, in few cases, clinical examination, and other investigations cannot exclude surgical cause of jaundice beyond doubt. At this stage added investigation is essential. In the absence of investigation, the tendency is to either continue with medical treatment or to make the patient for laparotomy. If at surgery, it turns out to be a medical jaundice, the added insult of anaesthesia; and surgery leads to untoward result. And hence, now in this era, where basic investigations are available (even at smaller centres) such approach would be deplorable.

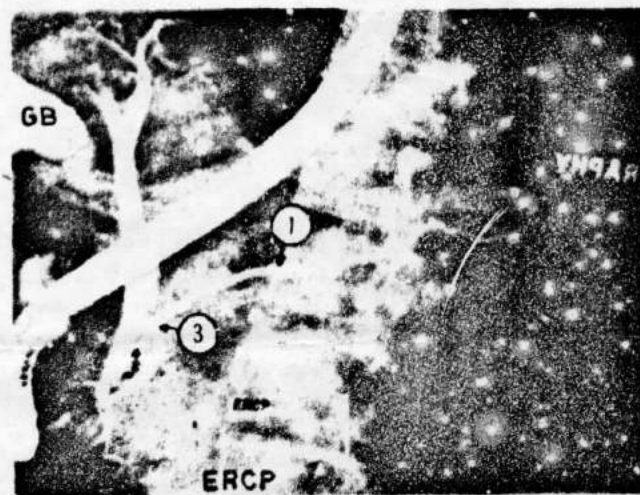


Fig. 1 : Normal E.R.C.P. Biliary and pancreatic tree. Normal Pancreatic (Wirsung's) duct (1). Junction of duct of head with the body is called knee (3). Small duct arising at Knee (2) is the duct of Santorini. Few small duct draining head of the gland are also seen.

Where surgical jaundice is to be excluded, sonography, trickle cholangiography, radioisotope scan, P.T.C., E.R.C.P., or CT scan would be useful. However, P.T.C. or E.R.C.P. because of excellent resolution of picture, give site and type of block in all cases or it excludes surgical jaundice beyond doubt. In our series of first 100 cases of obstructive jaundice, in 15

cases, surgical jaundice was excluded by E.R.C.P. and unnecessary operation avoided. These observations are similar to those by other workers<sup>9</sup>.

The commonest cause of obstructive jaundice in our country is biliary stone disease (fig. 2).

The diagnosis of etiology of attacks of jaundice also can be difficult. It is important to remember that two attacks of jaundice can occur in patients with carcinoma of the ampulla of Vater with resultant delay in correct diagnosis. E.R.C.P. with enroute endoscopy can greatly help in the early diagnosis of carcinoma of ampulla. When the proximal segment is not visualised on E.R.C.P. percutaneous transhepatic cholangiography is indicated as a supplementary examination to enable the surgeon to assess the extent of the stricture or stenosis.

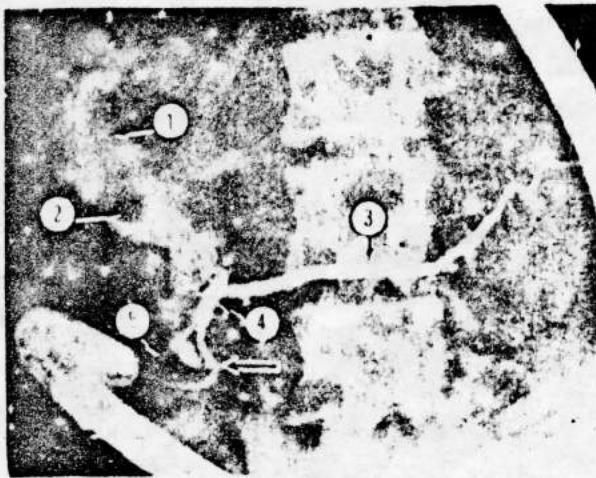


Fig. 2 : X-Ray shows cannula entering papilla (arrow) E.R.C.P. delineates common bile duct (1) with stone (2) Pancreatic tree (3), Knee (4), duct of Santorini (5), which usually opens higher up in duodenum through an accessory papilla.

## 2) Postcholecystectomy problems

Many patients continue to have symptoms following cholecystectomy and some are even incapacitated by recurrent pain. Even in the absence of jaundice, intravenous cholangiography may fail to provide diagnostic radiograph and in these patients retrograde cholangiography has proved to be a major advantage. E.R.C.P. has the added advantage of enroute endoscopy, contributing to the investigation of gastric, duodenal and pancreatic disease. The adequacy and function of any previous sphincter surgery, can also be assessed. In 3 of our patients sphincteroplasty was so well seen that doubt of poor biliary drainage was totally cleared.

## E.R.C.P. for pancreatic diseases -

Pancreatograms are simpler to obtain but more difficult to interpret. The entire duct system should

be visualised without overfilling. Emptying of pancreatic tree occurs in about 7 minutes<sup>10</sup>. Chronic pancreatitis causes enlargement and calibre variation of main pancreatic duct and its branches<sup>6</sup>. The change in early pancreatitis are nonspecific.

In patients clinically suspected to be suffering from recurrent pancreatitis there is a need to eliminate etiological factors like gall stones and to assess the state of ductal system in particular to find stricture that could be amenable to surgery. There is an indication for pancreatography in patients with calcified pancreas except when symptoms are sufficient to warrant consideration for surgery. Pancreatography rarely provides a diagnosis of chronic pancreatic disease in the absence of suggestive symptoms and bio-chemical alterations.

The precise diagnostic contribution to pancreatic disease of endoscopic pancreatography has to be considered vis-a-vis with other sophisticated investigations like arteriography and scanning (using isotope), ultrasound, and C.T. Scan. The analysis of pure pancreatic secretion and function studies may also have diagnostic application. In some cases the distinction between chronic pancreatitis and cancer cannot be made on radiographs alone and reliance must be placed on cystology or indeed clinical history. Carcinoma and pancreatitis may occasionally co-exist. Very few curable cancer of the pancreas have been detected by pancreatography and endocrine adenomas are not seen with this technique. The diagnosis of smaller lesions require detailed interpretation of branch duct patterns of which the normal variations are not yet documented. A good quality normal endoscopic pancreatogram virtually excludes cancer but does not exclude pancreatitis as a cause of recurrent pain<sup>6</sup> (Corron 1977). Since in islet cell tumours the pancreatic duct is almost never involved, E.R.C.P. cannot be expected to give positive results.

In a patient with suspected pancreatic pseudocyst, E.R.C.P. even though relatively contraindicated, the same was done pre-operatively to decide communication of the cyst with the duct. In this situation, ultra-sonography is routinely advocated prior to E.R.C.P. and the later is followed by an operation within 24 hours in case a communication is found as the chances of the cyst getting infected are very high.

## Added Advantages (Table 4)

En-route visualisation of stomach and duodenum is possible while doing E.R.C.P. If a lesion is seen, particularly a growth, biopsy and cytology can be obtained.

Table 4 : ADDED ADVANTAGES OF E.R.C.P.

1. En-route visualisation
2. Biopsy/Cytology
3. Intra-ductal pressure measurements
4. Papillotomy
5. Drainage
6. Introduce prosthesis
7. Mother—baby scope.

Various technical advances such as use of balloon catheters<sup>16</sup> in cases of patulous sphincter of Oddi and use of special contrast medium to outline pancreatic parenchyma<sup>17</sup> would lead to better radiographic visualization in the coming years. E.R.C.P. can also be performed in infants and children<sup>18</sup>, but experience in paediatric E.R.C.P. is limited.

Endoscopic papillotomy and removal of gall stones are now established therapeutic procedures. Foreign bodies in common bile duct can be similarly removed<sup>19</sup>. A large bore bile duct endoprosthesis can be introduced for palliation in the treatment of obstructive jaundice<sup>20</sup>. To avoid repeated E.R.C.P. examinations, a thin catheter can be passed into common bile duct and brought out through nose and left in place. Repeated cholangiographies and bile duct lavage can be carried out through this catheter.

There have been many advances in diagnostic E.R.C.P.<sup>6</sup> Collection of pure pancreatic juice or bile is possible. Cytology, culture and biochemistry of fluid are useful in diagnosis of malignancies, infections and inflammations, as well as for study of physiology of these secretions. Brush cytology, and transendoscopic biopsy can be done. Sphincter manometry and papillary electromyography can be used for study of sphincter function. The "mother-baby scopes" are under trial. This minute (baby)fiberscope is passed through conventional endoscope, so that direct visualization of interior of biliary and pancreatic ducts is possible.

#### CONCLUSION

E.R.C.P. is a new technique in the medical horizon of India. Proper perspective must be achieved before it is allowed to be percolated to various centres. Technically E.R.C.P. is a little difficult procedure. It requires training and patience. Just because it is new, we should not be enamoured. How much benefit it has in the management of patient should be dispassionately decided.

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