The Role of Endoscopic Retrograde Cholangiopancreatography (ERCP)

Myriam Delhaye

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Abstract/Summary

Since its introduction, 40 years ago, the diagnostic workload of ERCP has been dramatically reduced in benefit of non- or less invasive imaging procedures such as magnetic resonance imaging or endoscopic ultrasonography.

A few additional pieces of diagnostic information can be obtained through ERCP such as cytology and biopsy tissue sampling, visual inspection of the ducts through pancreatoscopy and thanks to new development of intraductal imaging.

However, ERCP is an operator-dependent procedure requiring training, experience and associated with low failure and complications rates.

The major field of ERCP consists in the therapeutic options provided by this procedure, including relief of pancreatic ductal obstruction related to stone(s) and/or stricture(s) in the setting of painful chronic pancreatitis.

ERCP should therefore be applied to patients with chronic pancreatitis who may benefit from endoscopic treatment or for whom tissue sampling would be required.

12.1 Introduction

Chronic pancreatitis (CP) is a progressive, destructive inflammatory process, characterized by recurrent attacks of abdominal pain, leading to irreversible pancreatic ductal and parenchymal changes, and results in a decrease in exocrine and endocrine functions late in the disease (Steer et al. 1995; Etemad and Whitcomb 2001).

The reported incidence (5–7/100,000 inhabitants per year) and prevalence (10–15/100,000 inhabit-
ants) of CP in Western countries underestimate the true spectrum of this disorder because its diagnosis is often problematic, particularly in the early stage of the disease (Steer et al. 1995; Levy et al. 2006).

The origin of CP is mixed, with about 70% of the cases being attributed to alcohol abuse. The remaining cases are classified as idiopathic CP (20%), tropical pancreatitis or unusual causes including hereditary pancreatitis and CP-associated metabolic and congenital factors. Recent studies reveal that subjects with CP usually have multiple risk factors including a number of underlying genetic susceptibility gene mutations (Etemad and Whitcomb 2001).

Once CP is initiated, it appears to progress relentlessly toward inflammatory destruction of the total organ.

The diagnosis of CP can be based on the presence of the three following criteria: ductal abnormalities, presence of pancreatic calcifications, or fibrosis in histological specimen (Alazmi et al. 2006). The first two signs are late indicators and generally appear several years after the onset of symptoms. Moreover, an histological specimen obtained after surgical resection or pancreatic biopsy is rarely available, especially in the early stages of the disease (Varadarajulu et al. 2007). The formal diagnosis of CP is therefore often delayed, the average length of time to diagnosis of CP being approximately 5 years (Levy et al. 2006).

Traditionally, ERCP has been considered as the gold standard study for diagnosing the subtle and overt ductal abnormalities in cases of CP (Catalano et al. 1998). However, since its introduction in 1968 (MCCUNE et al. 1968), 40 years ago, ERCP has evolved from a purely diagnostic procedure to a therapeutic modality when the first sphincterotomy was carried out in 1974 (Kawai et al. 1974).

As a diagnostic test of CP, the role of ERCP has been dramatically decreased as access to competing non- or less-invasive imaging techniques such as magnetic resonance imaging (MRI) and endoscopic ultrasonography (EUS) is becoming widely available (Adler et al. 2005). Actually, the vast majority of patients undergoing ERCP have evidence of structural disease on pre-ERCP imaging and 9 out of 10 patients are scheduled with therapeutic intent.

In patients who have CP, the aims of the endoscopic therapy are to alleviate outflow obstruction of the pancreatic duct to decrease ductal hypertension and relieve pain. Available endoscopic modalities include ERCP which is used to treat pancreatic ductal strictures, pancreatic ductal stones, bile duct strictures and some pseudocysts (Delhaye et al. 2003).

12.2 Technical Principles of ERCP

ERCP is a technically challenging procedure in CP patients and requires intravenous sedation and analgesia or most often general anesthesia of the patient (Ong et al. 2007).

Cannulation of the pancreatic duct with injection of contrast medium at the major and/or the minor papilla allows for complete evaluation of the pancreatic ducts in a single radiograph.

Indeed, ERCP is a dynamic, operator-dependent procedure that requires immediate interpretation of cholangiograms and pancreatograms to make diagnostic and therapeutic decisions. Radiologists are not provided formal training in post-ERCP film interpretation. So, currently, the endoscopist would selectively consult with other advanced ERCP endoscopists about the findings noted on a cholangiogram or a pancreatogram instead of relying on radiologists for interpretation of post-procedure ERCP films (Kucera et al. 2007).

However, a sufficient experience and competency can be acknowledged to expert radiologists in the field of magnetic resonance cholangiopancreatography (MRCP) (Matos et al. 1997).

Appropriate selection of patients for ERCP is of utmost importance. ERCP should be almost exclusively therapeutic with avoidance of diagnostic ERCP by using a combination of clinical assessment and prior imaging so that limiting ERCP to patients with a near-certain probability of requiring therapy (Williams et al. 2007). ERCP is therefore not indicated for patients with abdominal pain without objective evidence of pancreatico-biliary disease by laboratory or noninvasive imaging studies (Baron et al. 2006).

Standard ERCP cannulas typically are 5F-catheters (Fig. 12.1a,b) that can accept a 0.035-inch guidewire (Fig. 12.1b). Guidewires are often used in conjunction with cannulas or sphincterotomes (Fig. 12.1c) to obtain and to secure deep cannulation, and to perform wire-guided sphincterotomy, stent placement, stone extraction, and other therapeutic techniques (delhaye et al. 2003).

The overall outcome of a procedure like ERCP is a balance between technical success, complications, and clinical efficacy (Freeman and Guda 2005) (Table 12.1).