RECENT APPLICATIONS FOR ERCP IN THE MANAGEMENT OF BILIARY FISTULA

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List of Abbreviations

Abb.	Full term
ABC	ATP-Binding cassette
CBD	Common Bile Duct
CCK	Cholecystokinin
CHD	Common Hepatic Duct
CT	Computerized Tomography
ECPGa	Endoscopic Cholangiopancreatographyain
ERC-ERCP	Endoscopic retrograde cholangio-pancreatography
ES	Endoscopic Sphincterotomy
EUS	Endoscopic Ultrasound
GI	Gastro-Intestinal
HIDA	Hepatobiliary Iminodiacetic Acid
IOC	Intra-operative Cholangiogram
IV	Intra-venous
IVC	Inferior Vena Cava

LCs	Laparoscopic Cholecystectomies
LFTs	Liver Function Tests
LHD	Left Hepatic Duct
MRC-MRCP	Magnetic Resonance Cholangiopancreatography
MRI	Magnetic Resonance Imaging
PRBCs	Packed Red Blood Cells
PTC	Percutaneous Transhepatic Cholangiogram
RHD	Right Hepatic Duct
SOD	Sphincter of Oddi Dysfunction
TIPSS	Trans-jugular Intra-hepatic Porto-systemic Shunt
US	Ultrasound
WBCs	White Blood Cells

Introduction

ERCP:

ERCP is a direct contrast study of the pancreatico-biliary system. It is useful in the diagnosis and treatment of diseases involving the pancreas and bile ducts,such as stones, benign and malignant strictures, and developmental anomalies.

It is superior to indirect cholangiography (oral or IV), especially in cases with obstructive jaundice, which leads to raised intrabiliary pressure and impaired biliary excretion of contrast.

Moreover, intrahepatic bile duct pathologies can be demonstrated by ERCP using occlusion cholangiography. Pathology in the gallbladder and cystic duct abnormalities can also be visualized, although ERCP is not the best imaging study for gallbladder disease.**(Leung JWC et al, 2008)**

Endoscopic cannulation of the papilla of Vater was first reported in 1968 . However, it was really put on the map shortly afterwards by several Japanese groups, working with instrument manufacturers to develop appropriate Long side-viewing instruments . The technique (initially called ECPGa endoscopic Cholangiopancreatographyain Japan) spread throughout Europe in the early 1970s . Early efforts were much helped by a

multinational workshop at the European Congress in Paris in 1972, organized by the Olympus company. ERCP rapidly became established worldwide as a valuable diagnostic technique, although doubts were expressed in the USA about its feasibility and role , and the potential for serious complications soon became clear . ERCP was given a tremendous boost by the development of its therapeutic applications, notably biliary sphincterotomy in the mid-1970s and biliary stenting 5 years later .**(Laurence BH et al, 2010)**

ERCP is the most challenging endoscopic procedure performed regularly by gastroenterologists. It is often difficult technically, and may fail. Optimal practice requires considerable manual dexterity, a broad knowledge of pancreatic and biliary diseases, and familiarity with the many alternative diagnostic and therapeutic approaches. Furthermore, it carries substantial risks, even in the hands of experts **(Cotton, 2011).**

This diagnostic and therapeutic modality has impacted significantly in the management of patients with many different benign and malignant pancreatico-biliary problems. A successful ERCP requires the coordination and cooperation of a dedicated and committed team of endoscopists,nurses, and assistants, as well as an organized and functioning unit. It takes many years to learn, and repeated practice, in order to master the skill of ERCP and to do it safely. It is important to understand the indications,

Contraindications, limitations, and complications of individual procedures when offering ERCP to patients. Although successful ERCP has replaced surgery as a treatment option for some difficult pancreatico-biliary diseases, we have also seen problems and complications arising as a result of endoscopic treatment **(Cotton, 2011).**

ERCP is indicated for the diagnosis and treatment of three main disease categories: (a)biliary tract disorders; (b) pancreatic disorders; and (c) ampullary disorders. in biliary tract disease, ERCP is helpful in diagnosing and treating choledocholithiasis, benign and malignant biliary strictures, operative and traumatic ductal injuries, and sphincter of Oddi dysfunction. in pancreatic disease, ERCP is used to treat complications of both acute and chronic pancreatitis (pancreatic duct strictures, pseudocysts, pancreatic duct leaks) .in ampullary disease, ERCP can be utilized to treat sphincter of Oddi dysfunction and to remove ampullary adenomas . ERCP also allows the endoscopist to obtain tissue and cytology specimens of the biliary tract, the pancreas, and the ampulla **(Shimizu et al., 2009)**.

Biliary Fistulae:

Biliary fistulas are broadly classified into: external and internal fistulas. Internal biliary fistulas are further classified into, bilio-enteric, bilio-biliary, bilio-vascular, and bilio-bronchial.

Both external and internal biliary fistulas can occur due to some disease (spontaneous or pathological) or trauma (either iatrogenic or external trauma). While external fistulas are more frequently post-traumatic, internal fistulas are more commonly spontaneous

Spontaneous fistulas may be associated with the following diseases: gallstones, peptic ulcer, bile duct cancer, hepatic abscess, hydatid cyst, amebic abscess, and rare diseases (T.B., mucomycosis, polyarteritis nodosa)

Iatrogenic fistulas commonly follow the following procedures: cholecystostomy, cholecystectomy, choledochotomy, biliaryintestinal anastomoses, drainage of intra-abdominal collections, interventional radiology, liver surgery, and endoscopic sphincterotomy **(Czerniak. 2010).**

Any part of the biliary tree can be involved in fistulas including: the gallbladder, common bile duct, common hepatic duct, cystic duct remnant, right or left hepatic ducts and intra-hepatic biliary radicles.

An "uncontrolled fistula" denotes fistula formation with intraperitoneal leakage and collection of bile. Meanwhile, a "controlled fistula" denotes a fistula with drainage to the exterior through the abdominal wall without any significant intraabdominal collection **(Czerniak. 2010).**

An internal biliary fistula may produce cholangitis, hepatitis, intestinal obstruction, hemorrhage due to erosion of a nearby vessel, and localized peritonitis. In cases of cholecystocholedochal fistula, a stricture or complete obliteration of the common bile duct may occur, resulting in jaundice and other signs of obstruction. Despite the variety of the above-mentioned complications, many patients are symptom-free for years, and occasionally the fistula will close spontaneously **(Hirata et al., 2011).**

Consequences of external biliary fistula are mainly due to depletion of electrolytes and fluid, to the absence of bile from the gut and to the possibility of ascending exogenously acquired biliary infection. Total biliary loss for short periods of up to 3 weeks may not result in a serious depletion of electrolytes and fluid since the body is able to compensate for this loss. Long-term total external biliary fistula results in fluid and electrolyte disturbances if replacement therapy is not instituted. Sodium loss is usually in excess of chloride loss, leading to metabolic acidosis. The serum potassium level is initially lowered, but the

accompanying fluid loss may lead to a decrease in plasma volume, low-output renal failure and hyperkalemia. Absence of bile from the gastrointestinal tract causes interference in the absorption of fat soluble vitamins A, D and K. Vitamin A and D deficiency is associated with long-term total biliary fistula and is rarely seen today, while vitamin K deficiency is evident: earlier. Clinically, patients with an external biliary fistula even in the short term, feel unwell, weak and lethargic. In advanced and neglected cases, caloric and protein malnutrition results in gradual weight loss while the electrolyte changes may result in stupor and vasomotor collapse **(Sing et al., 2012).**

When the interal fistula produces complications that cause clinical symptoms and signs, ordinarily the treatment is surgical. Cholecystectomy and closure of the abnormal duodenal or colic opening is the preferred procedure for the cholecystoduodenal And cholecystocolic fistulas. Subtotal gastrectomy with vagotomy and gastrojejunostomy is the preferred procedure for the choledochoduodenal type of duodenal ulcer, because the biliary tract will be protected from the reflux of gastrointestinal contents. The exclusion-type subtotal gastrectomy and vagotomy promote the healing of the offending duodenal ulcer. When stones are present in the common bile duct, operative cholangiography, removal of stones, and T-tube drainage, are indicated **(Hirata et al, 2011)** .

The management of external biliary fistulas follows the following steps: (1) resuscitation and initial management, (2)drainage (converting an uncontrolled fistula into a controlled one), (3) definitive diagnosis of the anatomy of the fistula,(4) definitive treatment **(Khalid et al., 2011).**

A controlled fistula is first evaluated for biliary-enteric continuity. Lack of this continuity, i.e. a total fistula, is a straight forward indication for surgery after a reasonable period of conservative treatment. When biliaryenteric continuity is present, the next factor to consider is distal obstruction. In absence of obstruction, conservative treatment results in spontaneous closure in most cases. If there is distal obstruction, some intervention is required to relieve it. An attempt is made to achieve this non-surgically. Non-surgical methods include endoscopic methods (sphincterotomy, alone or sphincterotomy and stenting) and percutaneously by balloon dilatation. Should these methods fail, surgery is indicated, It is important to select the appropriate therapeutic approaches according to the setting. Resorting to surgery as a primary approach for therapy should not be the standard practice. On the other hand, strict adherence to a conservative approach, which employs non-surgical methods and excludes surgery, is associated with an obligatory 9% conversion to surgery at an advanced stage of the disease, together with a mortality rate of 3.5% **(Chen et al, 2012).**

Aim of the Work

This essay aims at assessment of benefit of ERCP as a recent minimally invasive method of management of biliary fistulae (internal & external), including the benefit of ERCP in definitive diagnosis of the anatomy of the fistula, decision making & definitive treatment of the fistula with biliary-enteric continuity through sphincterotomy alone or combined with common bile duct stenting. The application of ERCP in management of biliary fistulae will reduce the risk associated with surgical management.