BILIARY RECONSTRUCTION

AN ESSAY

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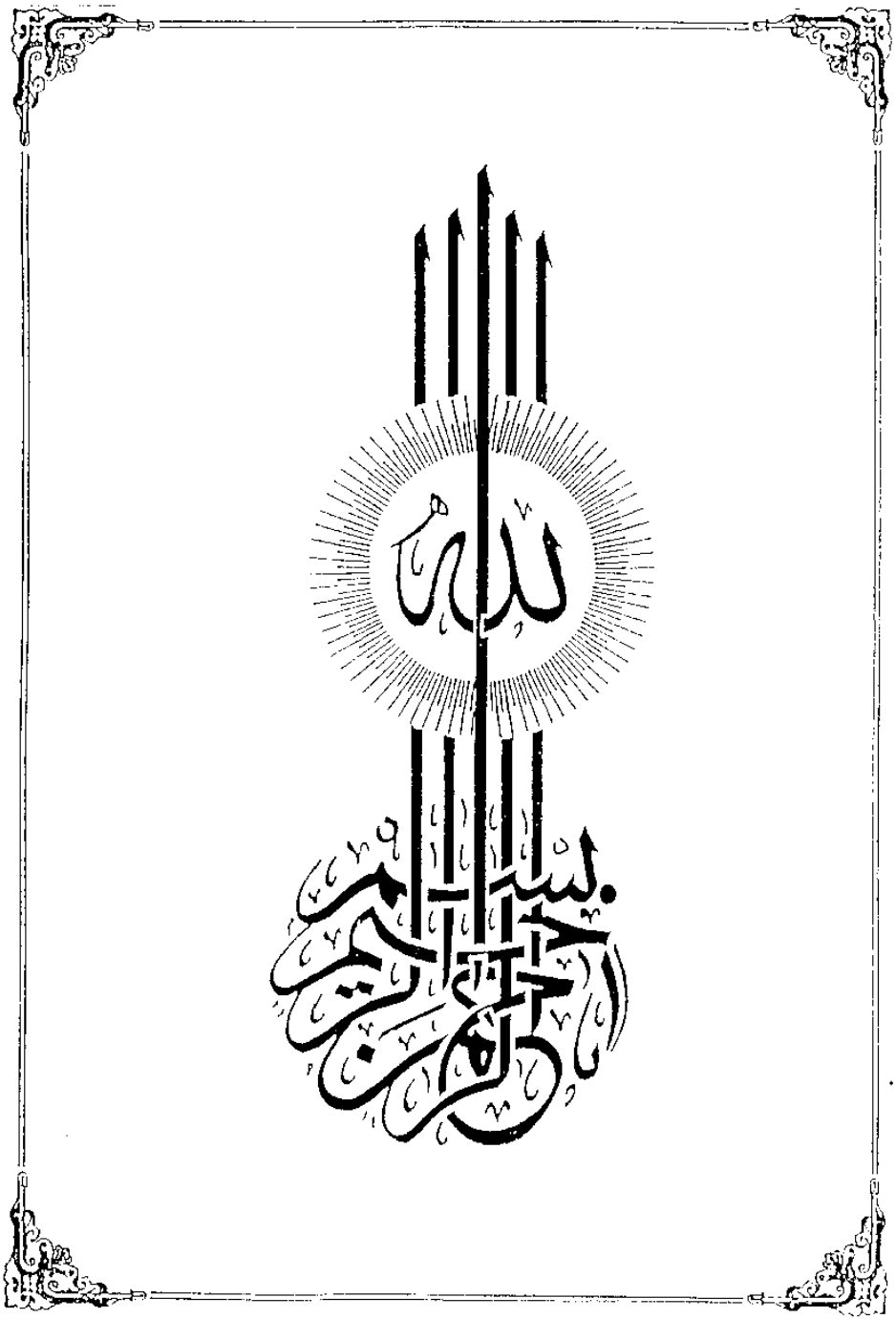

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PATHOPHYSIOLOGY OF BILIARY OBSTRUCTION

CHAPTER 1

PATHOPHYSIOLOGY OF BILIARY OBSTRUCTION

Definition

The term biliary tract obstruction requires precise definition.It is clearly inadequate to equate biliary obstruction with jaundice. Similarly obstruction and dilatation of the biliary tree are not synonymous,and the classical biochemical changes associated with complete obstruction may be absent or unreliable in many cases.

It is essential for the clinician to recognize at least four categories of biliary tract obstruction:

i. Complete obstruction producing jaundice.

ii. Intermittent obstruction which produces symptoms and typical biochemical changes but may or may not be associated with attacks of clinical jaundice.

iii. Chronic incomplete obstruction with or without classical symptoms or the observation of biochemical changes but producing pathological changes in the bile ducts or liver.

iv. Segmental obstruction : In which one or more isolated segments of the intra-hepatic biliary tree are obstructed. This obstruction takes the form of complete, intermittent or chronic incomplete obstruction as defined above classification by *(Benjamin, 1983).*

These variable forms of biliary obstruction are important to recognize since they may produce subtle clinical syndromes whose true nature may pass unrecognized.

In particular the entity of segmental biliary obstruction has been poorly recognized and described in the past but now may be diagnosed confidently as a result of advanced radiological imaging techniques, particularly percutaneous transhepatic cholangiography.The biochemical evidence of segmental obstruction is necessarily incomplete.

Table 1-1 provides a general frame work and illustrates the way in which a variety of pathological entities may fall into each of the above four categories.

Bile Duct Carcinoma

Primary cancer of the extrahepatic biliary system is conveniently classified as occurring in three anatomical areas: The upper third comprising the common hepatic duct and the confluence of the hepatic ducts, the middle third comprising the common bile duct between the cystic duct and the upper part of the duodenum and the lower third between the upper part of the duodenum and the papilla of Vater. There is a variation in the pathological features, diagnosis and treatment of tumors in these areas *(Longmire 1977).*

Adenocarcinoma of the bile ducts (cholangiocarcinoma) has a number of morphological variants: papillary, nodular, sclerosing, or diffuse. The papillary lesions grow within the lumen of the duct. It was found that multiple tumors may be found in up to 7% of patients with papillary bile duct tumors. The papillary tumors usually present in the low bile duct and

Table 1-1

Lesions commonly associated with biliary tract obstruction

1. *Complete obstruction:*
   - Tumours, especially of the pancreatic head
   - Ligation of the common bile duct
   - Cholangiocarcinoma
   - Parenchymal liver tumours, primary or secondary

2. *Intermittent obstruction:*
   - Choledocholithiasis
   - Periampullary tumours
   - Duodenal diverticula
   - Papilloma of the bile duct
   - Choledochus cyst
   - Polycystic liver disease
   - Intra biliary parasites
   - Haemobilia

3. *Chronic incomplete obstruction:*
   - Strictures of the common bile duct:
     congenital
     traumatic (iatrogenic)
     sclerosing cholangitis
     post-radiotherapy
   - Stenosed biliary enteric anastomosis
   - Stenosis of the sphincter of Oddi
   - Chronic pancreatitis
   - Cystic fibrosis
   - ? Dyskinesia

4. *Segmental obstruction:*
   - Traumatic (including iatrogenic)
   - Hepatodocholithiasis
   - Sclerosing cholangitis
   - Cholangiocarcinoma

in the region of the sphincter of Oddi and some times the differentiation from tumors of the duodenal mucosa may be difficult.

The sclerosing type is more common at the hilus and the nodular variety in the mid duct.The diffuse type is difficult to differentiate from sclerosing cholangitis. In rare instances malignant primary tumors other than cholangiocarcinoma may affect the bile ducts, for example carcinoid tumors have been recorded, squamous cell carcinoma and mesenchymal tumors are highly unusual.

Incidence

Bile duct tumors constitute about 2% of all cancers found at autopsy *(Blumgart 1987a)*. Most tumors occur in the 50-70 year age group, but the tumor has been reported in very young patients. Males are more frequently affected than females. The extra hepatic bile ducts have a rich lymphatic network in their thick outer walls. Extension through the duct wall spreads submucosally, and extension to lymph nodes in the porta hepatis and coeliac axis occurs early. The pancreatico-duodenal nodes are involved more frequently than with primary gallbladder cancers.

A review of 11 surgical and autopsy series found that 41% of 376 patients had positive lymph nodes *(Kopelson 1977)*.

Intra abdominal spread involving peritoneal surfaces is more common than realized in late stages.

Natural history

The majority of patients with bile duct cancer die within six months to a year of diagnosis,from local tumor spread and the effects of biliary obstruction and cholangitis leading to liver failure *(Ottow 1985)*. THe prognosis has been considered worst for lesions affecting the confluence of the bile ducts and best for lesions close to the papilla. This is due to the fact that the proximal lesions may present at a later stage and that treatment has been less well developed and carries a higher risk for lesions in this location.

Etiology

Etiology is unknown and there is no convincing link with the presence of gall stones,although in one recent series 37% of 94 cases had coincident cholelithiasis *(Blumgart 1984a)*.

similarly, 50% of 109 patients with bile duct cancer seen at Lahey Clinic had a history of previous cholecystectomy and 25% had other previous biliary tract operations *(Alexander 1984)*.

There may be a relationship between ulcerative colitis and cholangiocarcinoma. The incidence of biliary tract cancer in patients with ulcerative colitis is estimated to be 0.4 *(Cady 1985)*.

It has been suggested that infection and bile stasis may be important in the genesis of bile duct cancer, and a relationship has been demonstrated between congenital hepatic fibrosis or polycystic disease and the presence of these tumors *(Blumgart 1987a)*.

Long standing poorly drained choledochal cysts may also undergo neoplastic change.There is a reported incidence (2.5-28%) of bile duct

carcinoma in patients with underlying bile duct cysts. These figures contrast with incidence of 5.4-7.5 per 100.000 men of tumors of the bile ducts. *(Rossi 1987).*

In south east Asia infestation with *clonorchis sinensis or opisthorchis viverrini* is found more frequently in patients with intra-hepatic cholangiocarcinoma than in control subjects. These parasitic infections may be related to the development of bile duct cancer *(Lin 1979).*

A recent study by Welton et al reports that chronic typhoid carriers in New York died of hepatobiliary cancer six times more often between 1922 and 1975 than did matched controls, and they propose that bacterial degradation of bile salts might be the etiologic factor.

Tumors of the Hilar and Intra Hepatic Bile Ducts

Of all cancers arising in the biliary tree, the most difficult to manage are the proximal lesions arising at the hepatic duct confluence, or within the intra hepatic ducts and spreading downward toward the hilum.

Ever since the first description of adenocarcinoma at the bifurcation of the common of the bile ducts by *Altemeier et al and Klatskin* there has been pessimism about these tumors which although more frequent in occurrance than other bile duct tumors, have been considered to have the worst prognosis.

There is difficulty in differentiating such lesions from carcinoma of the gall bladder involving the common hepatic duct, rarely from liver tumors close to the hilus, and occasionally from sclerosing cholangitis.The possibility that a benign localized stricture, probably a localized form of

Table 1-2

Classification of the pancreatic neoplasms

Benign	Malignant
Duct cell origin	
Duct cell adenoma	Ductal adenocarcinoma
	Squamous cell carcinoma
	Giant cell carcinoma
	Carcinosarcoma
Cystadenoma	Cystadenocarcinoma
Acinic cell origin	
Acinic cell adenoma	Acinic cell carcinoma
Connective tissue origin	
Lipoma	Liposarcoma
Liomyoma	Liomyosarcoma
Neurilemmoma	Neurofibrosarcoma
Hemangiopericytoma	Malignant Hemangiopericytoma
Hemangioma	
Lymphangioma	
Lymphatic origin	
	Malignant fibrous histiocytoma
	Malignant lymphoma
Uncertain origin	
Papillary cystic neoplasm	Malignant papillary cystic neoplasm
	Pancreaticoblastoma
Islet cell origin	
Insulinoma	Malignant insulinoma
Glucagonoma	Malignant glucagonoma
Gastrinoma	Malignant gastrinoma

Adapted from Legg M A: Pathology of the pancreas. In Brooks JR (ed): Surgery of the pancreas, p 41-77. Philadelphia, WB Saunders.

sclerosing cholangitis, may exist at the hilus must also be taken into account *(Hadjis 1985).*

Tumors of the Pancreatic Head:

Neoplasms can occur in the pancreas involving both the parenchyma of the exocrine pancreas and the islets or the endocrine pancreas.

Islet cell tumors (5% of pancreatic neoplasm) are mostly small and circumscribed.

Neoplasia of the exocrine portion of the pancreas accounts for 95% of pancreatic tumors.Benign neoplasia of the exocrine pancreas are rare (2% of pancreatic tumors) *(Sindelar 1985).*

Table 1-2 illustrates the classification of pancreatic neoplasms.

Benign Biliary Strictures:

Benign stenosis and strictures of the bile ducts occur in a number of conditions and may affect the intrahepatic or extrahepatic biliary tree. They may be single or multiple. Table 1-3 details those causes of benign biliary strictures.

I. Bile duct injuries

Injury to the bile duct may follow damage inflicted during upper abdominal operations, usually cholecystectomy or may be due to blunt or penetrating abdominal injury.

1. Postoperative bile duct stricture

In a series of 19 patients with operative injuries to their biliary tracts,58% of patients incurred their injuries during cholecystectomies for acute cholecystitis, 37% of patients received their injuries during elective

Table 1-3

The causes of benign biliary stricture

I. Bile duct injuries
   1. Post operative bile duct stricturing following:
      a. Injuries at cholecystectomy and exploration of the common bile duct.
      b. Injuries after other operative procedures:
         biliary enteric anastomosis to previously normal bile ducts
         following operations upon the liver or portal vein
         pancreatic operations
         gastrectomy
         following a variety of other operations
   2. Stricture after blunt or penetrating injury

II. Post inflammatory strictures
   - Associated with gallstones
   - Associated with chronic duodenal ulcer
   - Granulomatous lymphadenitis
   - Associated with abscess or inflammation in the subhepatic region or in the liver
   - Associated with chronic pancreatitis