Management Of Biliary Tract Injuries

An Essay
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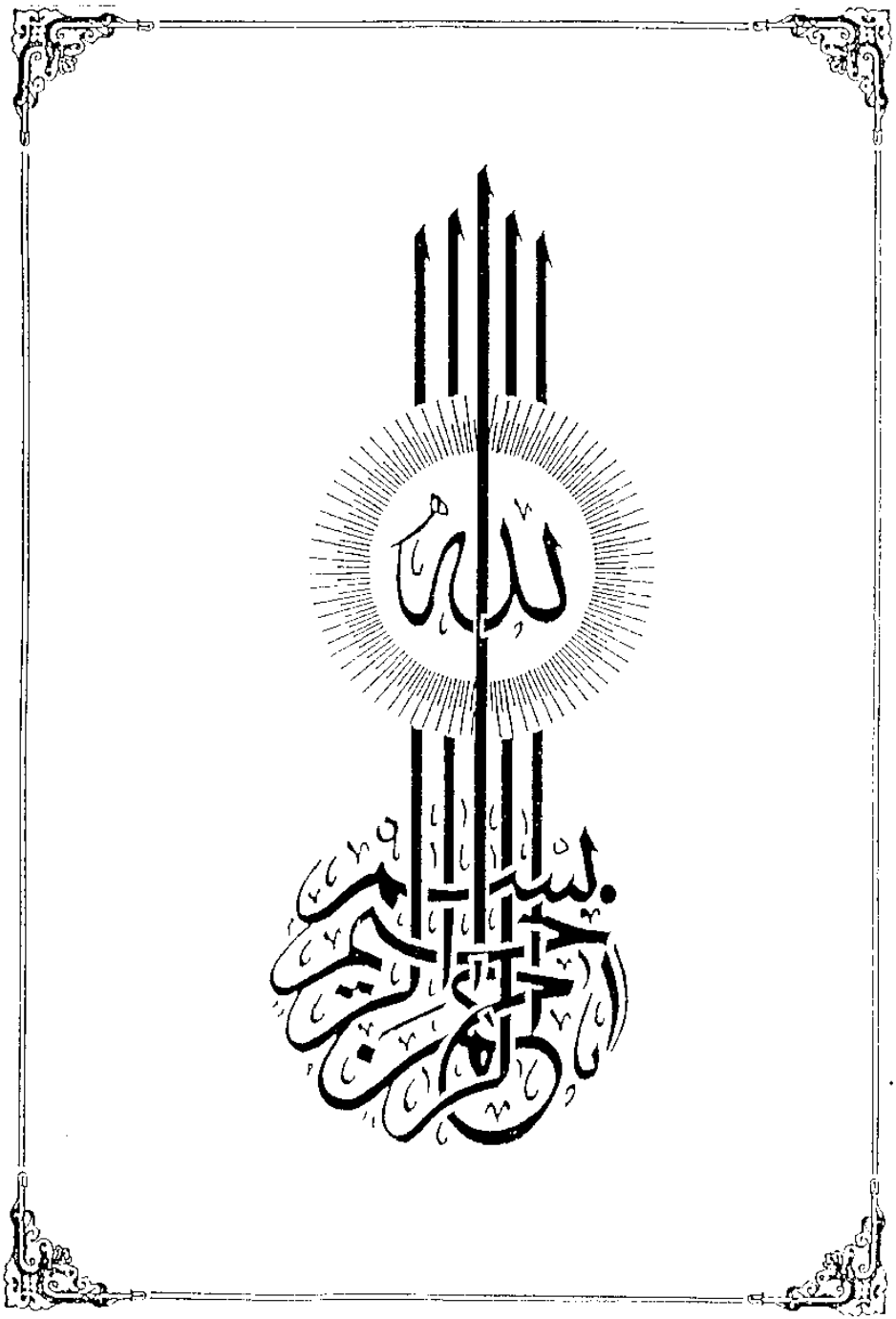

TO MY PARENTS

AND MY GREAT BROTHER;

MAHMOUD

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INTRODUCTION

بسم الله الرحمن الرحيم

BILE DUCT INJURY

INTRODUCTION:

Trauma to the extra hepatic biliary tree can result from medical and surgical procedures, but it's the "accidental" injury arising at cholecystectomy which most frequently result in tragic consequences for patients, who may be deprived of their most productive years of life . this type of injury may necessitate repeated surgical interventions. Damage to bile duct at operation is preventable because it results from a failure of surgical technique.

There is debate about the exact incidence of bile duct injury at cholecystectomy; the few surveys undertaken have put figure at one injury per 300-500 open cholecystectomy procedure *(bismuth H 1982 & kune G.A. 1979)*.

Biliary surgery has, of course, undergone a resurgence of interest in past few years with the advent of laparoscopic removal of gall bladder. Although some authors have speculated that there has been a tenfold increase in the incidence of trauma to biliary tract with this new technique *(Cameron JL . Gadacz TR 1991)*. The early published series show only a slight increase to one injury per 150-200 laparoscopic cholecystectomy *(Peters JH et al., 1991)*.

The true frequency of injury may be greater but unrecognized, because of under reporting and lack of adequate long term follow up of patients in whom

such trauma may declare itself as stricture only some years after the original surgery. However this is true for open and laparoscopic cholecystectomy, and the risk of injury from the later procedure might not be as greater as some have feared *(O.J. Garden, 1991)*.

Bile duct injury results from imprecise dissection and inadequate demonstration of anatomical structures. The wide variation in biliary anatomy is often cited as a contributing factor to the development of such injuries, particularly where dissection is difficult in patients whose gallbladder is fibrosed from previous attacks of acute cholecystitis. The extra hepatic biliary tree is most at risk in those patients in whom there is a low entry of a right hepatic sectoral duct into the common bile duct . Injury to common hepatic duct may result from injudicious attempts by the surgeon to control hemorrhage, although anomalies of the vasculature are not always responsible *(O.J. Garden., 1991)*.

It is apparent from the results of open cholecystectomy that the experienced surgeon is not immune from traumatizing the exrtarahepatic biliary tree, although it is more likely that complication will arise between the surgeon's 25th and 100th open cholecystectomy. Learning curve for laparoscopic cholecystectomy has yet to be determined and it remains to be seen whether the bile duct is at most risk during the "easy", straightforward operation, which some believe to be the case for open cholecystectomy *(Andren Sandenberg A. 1985)*.

The bile duct is more liable to damage because of the use of diathermy in laparoscopic dissection, and so it may not be justified for the surgeon to undertake extensive dissection of the cystic duct. Furthermore, such dissection may jeopardize the delicate micocirculation of the biliary tree and so produce ischaemic necrosis with subsequent stricture formation *(Northover JMA. et al., 1979)*.

At open cholecystectomy, injury to the bile duct may go unrecognized and declare itself as biliary fistula or as jaundice only in the post operative period . Routine abdominal drainage may allow early detection of bile leakage and avoid extensive morbidity and mortality associated with biliary peritonitis. Although a policy of routine drainage after cholecystectomy has found little support, such an approach may be valuable after laparoscopic cholecystectomy to avoid the early discharge of a patient with an occult bile leak which would clearly benefit from careful observation and further evaluation *(O.J. Garden., 1991)*.

If injury is recognized at surgery and there is no loss of duct, it may be managed by insertion of a T-tube or by primary anastmosis without tension of tissues It's more likely, however, that Roux loop of jejunum will require to be anastomosed to the common hepatic duct, but the inexperienced surgeon should refrain from undertaken unfamiliar maneuver which aggravate the situation. The outcome of secondary repair in the patient with an established biliary fistula is less favorable because of the small caliber of the hepatic ducts.

Optimum results are obtained in jaundiced patients with a dilated duct system. Considerable patience will therefore be required of both patient and surgeon to enable controlled closure of an external biliary fistula before repair is undertaken. The best chance of effecting a successful repair is at the initial attempt by a skilled surgeon. Experience suggests that the most successful method of reconstruction is by direct mucosa-mucosa suture of the hepatic duct to a Roux loop of jejunum *(Bismuth et al., 1979).*

Injuries to the extra hepatic bile duct from blunt abdominal trauma are rarer, the small size of the hepatic ducts and their location high in the liver hilus challenge surgical management. Although complications of these injuries are frequent, mortality is always the result from associated injuries. *(Busuttil et al., 1980) & (Sheldon et al., 1985).*

BILE DUCT INJURY

AETIOLOGY:

Injury to the bile duct may follow damage inflected during upper abdominal operations or may be due to blunt or penetrating abdominal injury. Injuries occurring during abdominal operations are important, first, because they increase mortality and morbidity rates for in excess of those recognized for the initial surgical procedure. The results may be particularly tragic because many of the patients so afflicted are young and in the most productive years of life *(Bear & Blumgart, 1990)*.

Causes of Bile Duct Injuries:- Table (1)

A- POSTOPERATIVE BILE DUCT INJURIES FOLLOWING:-

1- Injuries at cholecystectomy and exploration of the common bile duct (open & laparoscopic)

2- Injuries after other operative procedures:

a- biliary -enteric anastmosis to previously normal bile ducts.

b- Following operations upon the liver or portal vein.

c- Pancreatic operations.

d- Gastrectomy.

e- Following a variety of other operations "*rarely*".

B- INJURIES DUE TO BLUNT OR PENETRATING TRAUMA

(Blumgart & Thompsons, 1987)

A- POST OPERATIVE BILE DUCT INJURIES

The risk of operative injury to biliary tract varies with the operation being performed and with exception of injury at cholecystectomy, there are no studies that reflect the frequency at such damage. Many injuries are not reported at all or are not detected, the patient ultimate illness being ascribed to some other causes. While the great majority of injuries to the common bile duct occur during cholecystectomy, with or without exploration of the common bile duct, a number also occur in association with other operations, on stomach, the pancreas, the liver, or portal hypertension. Stricture of biliary enteric anastmosis occur following re-constructive or bypass procedures in association with other operations, for example, pancreatico-duodenectomy *(Johnson, 1979).*

It's important that such stricture are not misinterpreted as recurrent carcinoma. In addition to injuries to a normal biliary tree, damage also follow operations performed on diseased biliary tract, as for example after excision of choledochus cyst, or following operations for sclerosing cholangitis. *(Blumgart & Thompsons, 1987)*

(1) Post Cholecystectomy Injuries:-

"Injuries to bile duct are unfortunately not rare and often turnout to be tragedies (Grey-Turner, 1944).

Cholecystectomy has a high degree of safety, but it is important to remember that it is a major operation and should never be undertaken lightly. While results are good, they are not uniformly so, and some reports suggest that 20%

to 25% of patients will have some continuing symptoms *(Boerma, 1983).* A minority of patients will suffer damage to the biliary tract figures are available from survey carried out in Sweden, Finland, Germany, and France and all suggest the incidence of biliary tract injury is roughly 2/1000 operations for gall stone *(Bismuth, 1982 & Kune, 1981).*

CAUSATIVE FACTORS AND PREVENTION.

*** Post-cholecystectomy biliary tract injury:**

A number of factors related to bile duct injury during cholecystectomy.

(i) Anatomical variations.

(ii) Haemorrage.

(iii) Bile duct ischaemia.

(iv) Pathological factors.

(v) Technical factors.

ANATOMICAL VARIATIONS:-

It is of great importance during biliary surgery to know the ductal anatomy and to recognize, in time, unusually located structures (fig. 1). Before the era of intraoperative cholangiography, the incidence of anomalies of surgical importance was recognized mainly by pathologists or anatomists. With modern operative fluorocholangiography indicated that in 10% of patients, anomalies of surgical importance can be discovered *(Berci 1992).*

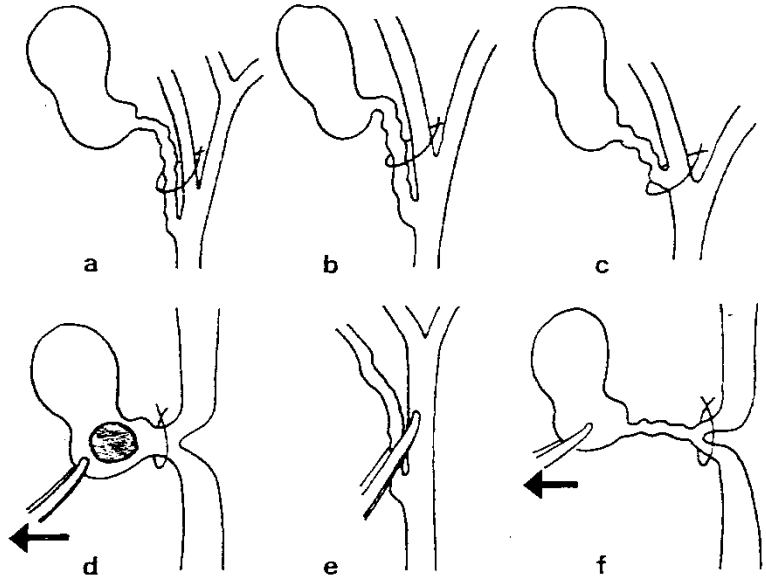

Fig (1)
Anatomical predisposition to bile duct injury. It is emphasized that these are uncommon causes of duct injury.

All Anatomical variation of the biliary system will be discussed here:

Variation of biliary system are important during surgery, as failure to recognize variant can produce iatrogenic injury. These anomalies include mainly the extra hepatic ducts, gall bladder, and anomalies of the vessels around biliary system.

Anomalies of extra hepatic duct: *(fig. 2 , 3 , 4 & 5)*

* Accessory hepatic duct may open into:-

(1) Cystic duct, or

(2) Neck of gall bladder, or

(3) Right hepatic duct, or(4) Right side of the common hepatic duct at a point at, or very close to, the site where the cystic duct and C.H.D. join,

OR

(5) It may enter the gall bladder itself.

Accessory hepatic duct present in 10% of human subject *(Stewart, 1990)*. It is usually the size of normal cystic duct, but in some cases it may be minute. An undetected injury to one of these ducts may result in no change in the patient's post-operative course or it may produce a biliary fistula. When an accessory duct passes through the cholecysto-hepatic triangle, it is subjected to transection and bile leakage.

Cholecysto-hepatic ducts drain bile from the liver directly into the gall bladder are rare *(Benson & Page, 1976)*.

Based on dissection of the extra-hepatic biliary tree of 65 cadavers, Defined