ANATOMICAL VARIATIONS IN THE EXTRA HEPATIC BILIARY DUCTAL SYSTEM

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ABSTRACT

The aim of the study was to study the various anatomical variations occurring in the extra hepatic biliary ductal tract. The study material consisted of 40 adult specimens of liver, gallbladder with duodenum collected enmass from the forensic department. Out of the 40 specimens dissected we came across accessory hepatic ducts all arising from the right lobe of liver .These accessory right hepatic ducts drained into the common hepatic duct at different levels. Knowledge of these accessory ducts confirmed by various intra operative cholangiographic procedures is necessary for avoiding any serious complications during surgery. Hence we conclude that this study will be a useful guideline for the operating Surgeons and Radiologist working in that area.

Key words: cystic duct, accessory right hepatic duct, common hepatic duct, extrahepatic biliary tract.

INTRODUCTION

The normal anatomy of the biliary tract is seen in less than 50% of cases.(Kaushik and Attri 2005)[1] Variations in the extra hepatic duct system add to the operative difficulties for the surgeons (Suchocki and Meyers 1999)[2]. These include aberrant or accessory biliary ducts, aberrant cystic duct, alterations of biliary tract associated with situs inversus and anomalous junction of bile duct to pancreatic duct along with vascular anomalies.

Materials and Methods

40 adult specimens of liver, gallbladder with duodenum were collected enmass from the forensic department Madras Medical College Chennai. The dissection was carried out carefully and the cystic duct, right and left hepatic ducts, common hepatic duct and common bile duct were dissected from end to end. The formation of extra hepatic biliary ductal system was noted in all the specimens. The variations if present any were photographed and documented.

OBSERVATION

We encounter accessory right hepatic ducts, apart from the normal right hepatic duct in 6 specimens. Cystic duct, common hepatic and common bile duct were normal in their anatomy and no variations were noted. The 6 accessory right hepatic ducts are described below:

In specimen 1 a small accessory right hepatic duct arose from the right lobe of liver wind round between the two divisions of cystic artery. It terminated in the middle of common hepatic duct the right and left hepatic duct was found to be of intra hepatic union. (Fig 1)

In specimen 2 the accessory right hepatic duct emerged below the 2 divisions of cystic artery. It ran parallel to common hepatic duct and joined with the common hepatic duct in the lower half..In this case also the right and left hepatic ducts united intrahepatically. (Fig 2)

In specimen 3 the right and left hepatic ducts joined within the substance of liver. And a small accessory right hepatic duct was present near the gall bladder fossa. It ran below and close to the lower half of common hepatic duct .It joined with the common hepatic duct just above the union of cystic duct with common hepatic duct (Fig 3)

In specimen 4 also, the small accessory right hepatic duct was seen close to the gall bladder fossa and it ran above and parallel to the cystic artery. It drained into the upper half of common hepatic duct. The right and left hepatic duct united extra hepatically to form the common hepatic duct (Fig 4)

In specimen 5 the accessory hepatic duct from the right lobe of liver descended parallel to the deep branch of cystic artery, it terminated by joining the common hepatic duct in its middle. The common hepatic duct was formed by the union of right and left hepatic duct extra hepatically (Fig5)

In specimen 6 the small accessory right hepatic duct close to the inferior surface of gall bladder fossa was

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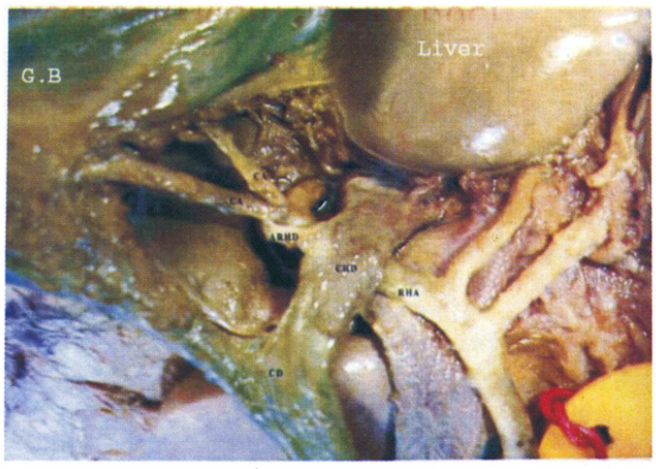

Fig 1: ARHD-accessory right hepatic duct;CA-cystic artery;CHD-common hepatic duct;CD-cystic duct;RHA-right hepatic artery;GB-gallbladder

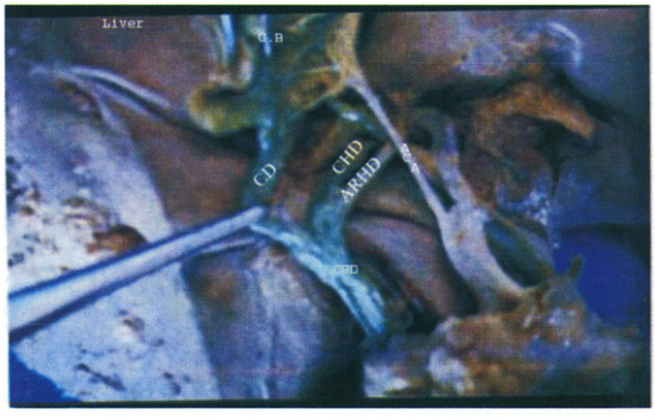

Fig 2: CBD-common bile duct; CHD-common hepatic duct;CD-cystic duct;GB-gallbladder; ARHD-accessory right hepatic duct;ACA-accessory cystic artery

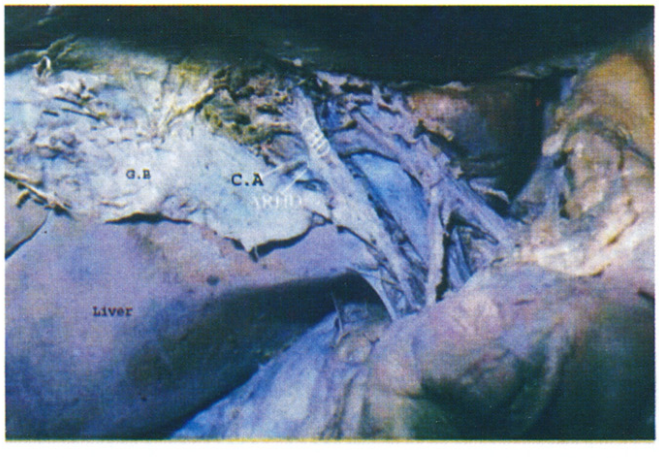

Fig 3: CHD- common hepatic duct; GB-gallbladder; ARHD-accessory right hepatic duct; cystic artery

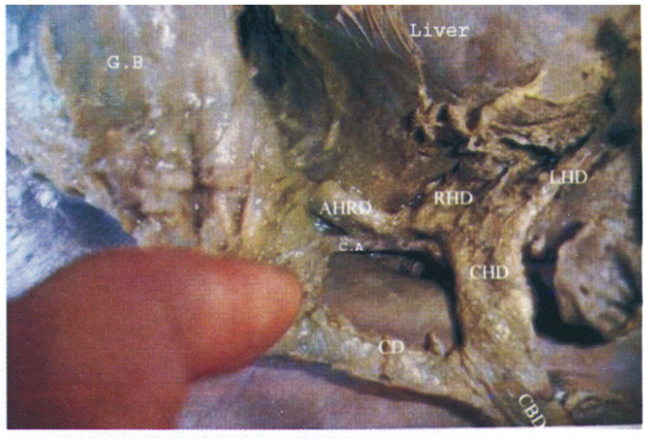

Fig 4: RHD-right hepatic duct;LHD-left hepatic duct;ARHD-accessory right hepatic duct;CD-cystic duct;CBD-common bile duct;CHD-common hepatic duct; GB-gallbladder ;CA-cystic artery

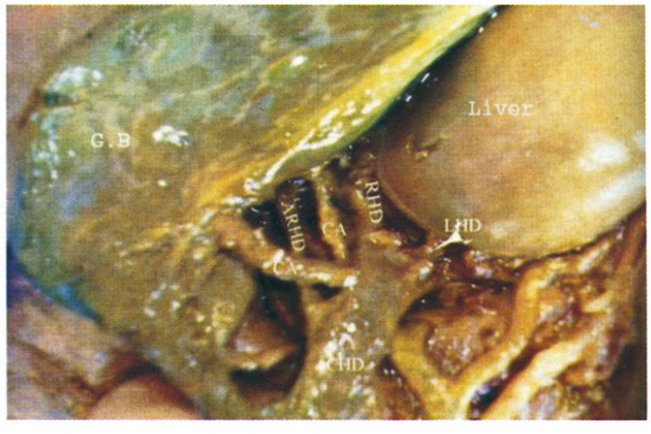

Fig 5 : RHD-right hepatic duct;LHD-left hepatic duct;ARHD-accessory right hepatic duct;CD-cystic duct;CHD-common hepatic duct; GB-gallbladder ;CA-cystic artery

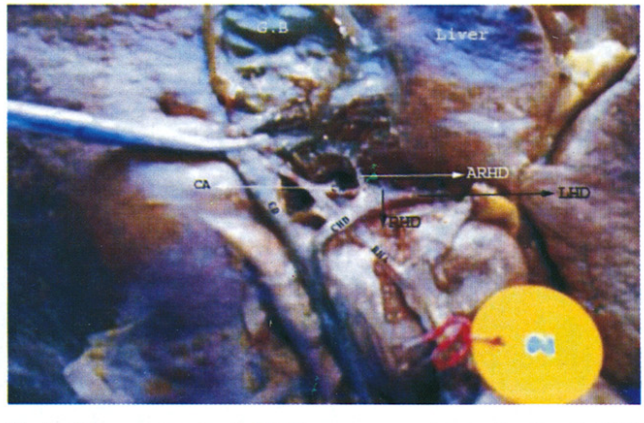

Fig 6.CD-cysticduct;CHD-common hepatic duct; GB-gallbladder ;CA-cystic artery; ARHD-accessory right hepatic duct;RHA-right hepatic artery;RHD-right hepatic duct;LHD-left hepatic duct

observed. It descended downwards and parallel to the left hepatic duct and it terminated in the common hepatic duct. The right and left hepatic ducts united immediately as soon as it emerged from corresponding surface of liver to form the common hepatic duct (Fig 6)

Discussion

The extra hepatic biliary system develops from the hepatic diverticulum of foregut along with the liver during the 4th week of foetal life. This diverticulum rapidly proliferates into the septum transversum and divides into 2 parts namely pars cystica and pars hepatica. From the pars hepatica, liver and hepatic ducts develop and from the pars cystica, gallbladder and cystic duct develop. Most of the authors (Losanoff et al. 1996; Adkins et al. 2000)[3,4] stated that during the development of pars cystica, at the junction of cystic and hepatic duct, the cells proliferate to form the common bile duct. Failure of this normal pattern of development leads to various anomalies. Several studies have mentioned that accessory bile ducts as persistent foetal connection between the liver and gallbladder or the extra hepatic ductal system, having an incidence of 9-28%(Klotz et al. 1992)[5].These accessory ducts are thought to arise as a result of disordered biliary tract embryology (Suriya et al. 2008)[6]. The other possible explanation (Walia et al. 1986)[7] is the delayed division of the hepatic antrum into cystic and hepatic diverticulum.

Flint (1992)[8] in his study of 200 specimens founded accessory right hepatic ducts emerging from the right lobe of liver in around 29 cases. He further classified the accessory bile ducts on the basis of termination as follows:

Type 1 - Termination in the upper half of common hepatic duct (or) in the right hepatic duct.

Type 2 - Termination in the lower half of common hepatic duct.

Type 3- Termination at the union of cystic and common hepatic duct.

In our study type 1and type 2 accessory right hepatic ducts were observed and instead of type 3 we noted termination of accessory right hepatic duct just above the union of cystic duct with common hepatic duct. Gray (1999)[9] stated that, accessory hepatic ducts are more common from the right lobe of liver. Daseler et al (1947)[10] worked on 500 cases and noted accessory right hepatic duct in 8 of his cases. He described the 3 modes of termination of the accessory ducts as accessory right hepatic duct entered common bile duct, cystic duct and gallbladder.

In our study, we had not encounter any ducts entering the cystic duct as described by him.

His study also reveals accessory ducts emerging from the quadrate lobe of liver in 2 cases.

Lurje (1937)[11] described that 2.8% of accessory ducts arising from the right lobe of liver entered into the cystic duct. Practically, all the accidents to the ducts occur more during cholecystectomy. Hence it is necessary for the gastroenterologist, radiologist to make familiar with both normal and variations of the biliary anatomy for the correct diagnosis and treatment.

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