



A variant origin of cystic artery from superior mesenteric artery

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Abstract

The cystic artery usually arises from the right hepatic artery. It usually passes posterior to the common hepatic duct and anterior to the cystic duct to reach the superior aspect of the neck of the gallbladder and divides into superficial and deep branches. The superficial branch ramifies on the inferior aspect of the body of the gallbladder, the deep branch on the superior aspect. In our case we observed a variant origin of cystic artery from the superior mesenteric artery. Knowledge of the variant vascular anatomy of the sub-hepatic region is important for hepatobiliary surgeons in limiting operative complications due to unexpected bleeding.

© *Int J Anat Var (IJAV)*. 2014; 7: 30–31.**Key words** [cystic artery] [gallbladder] [common hepatic duct] [common bile duct]

Introduction

The cystic artery (CA) arises from the right hepatic artery in the Calot's triangle in the cysto-hepatic angle immediately to the right of common hepatic duct. After it has passed behind the common hepatic duct and anterior to the cystic duct, it reaches the superior aspect of the neck of gallbladder to divide in to superficial and deep branches. The superficial branch ramifies on the gallbladder to divide in to superficial and deep branches. The superficial branch ramifies on the inferior aspect of gallbladder and the deep branch on the superior aspect; these branches anastomose over the surface of body and fundus [1]. Sometimes there can be more than one cystic artery supplying the gallbladder or the artery may arise from other arteries like the left hepatic artery, the common hepatic artery, the gastroduodenal artery, the superior pancreaticoduodenal artery and the superior mesenteric artery [2].

Case Report

In the routine dissection of 43-year-old male cadaver, we found a very rare origin of the CA, which was taking origin from superior mesenteric artery (Figure 1). It passed posterior to the common hepatic duct to reach the superior aspect of the neck of the gallbladder and divided into superficial and deep branches that supplied the gallbladder and continued to the

right lobe of liver. This kind of variant origin of CA, according to our knowledge is rarely reported in anatomical literature.

Discussion

The CA is known to exhibit variations in its origin and branching pattern. This is attributed to the developmental changes occurring in the primitive ventral splanchnic arteries [3]. In most of the cases, the CA arises from the right hepatic artery. The other origins include superior mesenteric artery through its inferior pancreatico-duodenal branch [2]. During development, the extrahepatic biliary system arises from an intestinal diverticulum, which carries a rich supply of vessels from the aorta, coeliac trunk and superior mesenteric artery. Later most of these vessels are absorbed, leaving in place the mature vascular system. As the pattern of absorption is highly variable, it is not unusual for the cystic artery and its branches to derive from any other artery in the vicinity [2].

In a case reported by Veena et al., two cystic arteries were reported to arise from the right hepatic artery to supply the two surfaces of gallbladder separately [1]. Considering the fact that the diseases of the extra hepatic biliary apparatus often need surgical intervention, it is very important to know anatomy of the same, which is frequently unusual [1]. The CA originating from the middle hepatic artery at a distance of about 1 cm from its origin was also reported [3]. In the 160

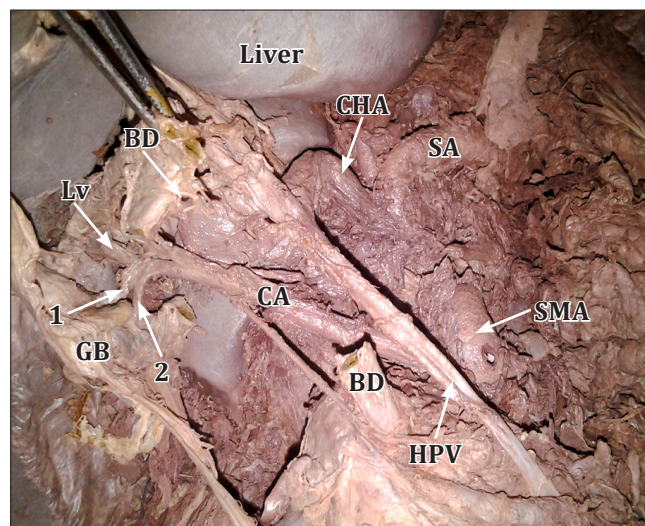


Figure 1. Photograph of the male cadaver showing variant origin of cystic artery (CA). (SMA: superior mesenteric artery; SA: splenic artery; CHA: common hepatic artery; GB: gallbladder; BD: bile duct -cut; HPV: hepatic portal vein; 1, 2: superficial and deep branches of cystic artery; Lv: a branch of cystic artery to the liver)

Sudanese cases investigated, the origin of the cystic artery was from the right hepatic artery in 78%, from the common hepatic artery in 17%, from the left hepatic artery in 2% and from the gastroduodenal artery in 3%. No cases arising from other arteries were noted [4].

Knowledge of the different anatomical variations of the arterial supply of the gallbladder, liver and stomach is of great importance in hepatobiliary and gastric surgical procedures [5]. The arterial variations should not be ignored and with an accurate knowledge on the anatomical variations, many operative and postoperative complications can be avoided. The knowledge on the CT variations would enable the radiologists

in protecting the important vessels prior to transcatheter therapies, and also in preventing inadvertent injuries. The anatomy of the hepatic artery is of great importance in hepatic surgeries, especially in liver transplantation and in many radiological procedures, to ensure complete arterializations of the grafts, which can prevent necrosis of the liver parenchyma postoperatively [6].

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