Short communication

Duplicate caudate lobe of liver with oblique fissure and hypoplastic left lobe of liver

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Abstract

Introduction: There are many kinds of congenital abnormalities of the liver as agenesis of lobes, absence of its segments, deformed lobes, lobar hypotrophy or atrophy, transposition of the gall bladder. A liver was observed with duplicated caudate lobe and hypoplastic left lobe of the liver. The aim is to analyse the new anatomical variant morphologically, clinically and radiologically. **Materials and Methods**: During routine dissection in Department of Anatomy, CSM Medical University, Lucknow, UP, India, a liver of 55 year aged male cadaver was examined for new variants. Measurements were taken to provide position, shape and size of anomalies. **Results**: The caudate lobe was uncommonly duplicated by a fissure of length, 2.5 cm and an oblique fissure of length 2.0 cm on the caudate lobe placed inferiorly was also observed in this specimen. There was vertical furrow of length and depth of 6.0 cm and 0.2 cm respectively on the right lateral surface of liver besides above malformations. The left lobe of liver was hypoplastic. These are all new variants different from the normal morphology of liver which may confuse during development and complicate surgical procedures besides misinterpretation of imagery. **Conclusion**: This case may be of immense use to clinicians involved in the diagnosis and management of hepatic diseases, to anatomists, morphologists for new variants along with new morphology, for new developmental defect to embryologists and for misinterpretation of imagery of liver radiologists.

Keywords: liver, caudate lobe, morphology, fissure, embryologists.

1 Introduction

Normally the liver consists of two lobes, right and left demarcated by peritoneal ligaments. On posteroinferior surface, the right lobe consists of caudate and quadrate lobes.

There are many kinds of congenital abnormalities of the liver as agenesis of lobes, absence of its segments, deformed lobes, lobar hypotrophy or atrophy, transposition of the gall bladder. The incidences of congenital anomalies of human liver are rare (AKTAN, SAVAS, PINAR et al., 2001) and occurrences of these are rarer than almost in any other organ of the body (WAKEFIELD, 1898). The incidences of the anomalies are high in society but these remain unnoticed as most of these are asymptomatic (AKTAN, SAVAS, PINAR et al., 2001). These may be detected at any age as an accidental finding (DAVER, BAKHSHI, PATIL et al., 2005) during diagnosing for other diseases. It is important to keep in mind about the anomalies of liver during the preoperative diagnosis as it will be helpful for surgeons in planning biliary surgery or a portosystemic anastomosis (AKTAN, SAVAS, PINAR et al., 2001).

Under the present study a case of rare morphology of the liver in which there is furrow in right lateral surface of liver (Figure 1), duplication of caudate lobe and an oblique fissure in the inferiorly placed caudate lobe (Figure 2). These anomalies were detected during examination of livers in the cadaver of a 55 year aged male in Department of anatomy, CSM Medical University Lucknow UP India. The major fissures are important landmarks for interpreting the lobar anatomy and locating the liver lesions. But the anomalies noticed in this case may confuse the clinicians and radiologists.

Procedures like laparoscopic hepatectomy and laparoscopic thermal ablation for patients with hepatic tumour, are commonly used (KANEKO, TAKAGI and SHIBA, 2002). In any operative procedure involving the liver, a surgeon's knowledge of hepatic anatomy is vital in determining the patient's diseases' outcome. Hepatic imaging is usually performed to diagnose primary or metastatic liver diseases (SAHANI and KALVA, 2004). In the era of imaging and minimally-invasive approaches, it is imperative on the part of both the radiologists and operating surgeons to have a thorough knowledge of the anatomy and the commonly-occurring variations of this organ. Hence to alert clinicians, surgeons and radiologists and to add information of variants to the data base of anatomists including morphologists the study has been carried out.

2 Case Report

During routine dissection, it was a 55 year aged male cadaver in which it was found that the liver with morphology of multiple variations such as the caudate lobe was divided into two lobes by a fissure having length of 2.5 cm along with a notch on superior surface of caudate lobe (Figure 2), another fissure of length, 2.0 cm was located in inferiorly placed caudate lobe, a vertical fissure of length, 6.0 cm and depth, 0.2 cm was found on right lateral surface (Figure 1) and the left lobe was hypoplastic (Figure 3). The anterior

surface was normal with falciform ligament at normal site. The gallbladder was normally placed in fossa for gallbladder. There was no other abnormality in this liver.

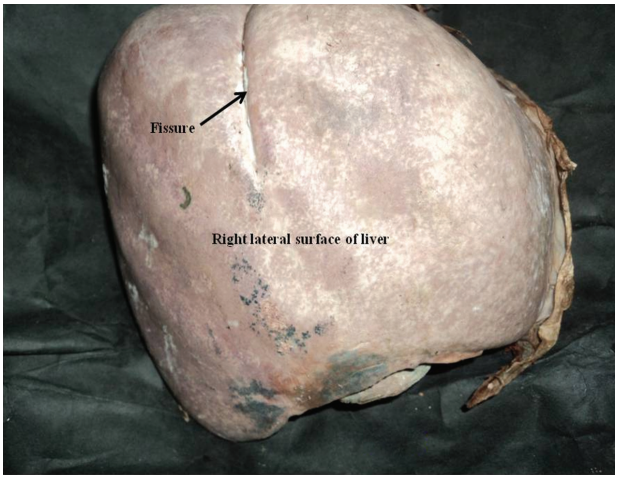

Figure 1. Right lateral surface of liver presenting fissure.

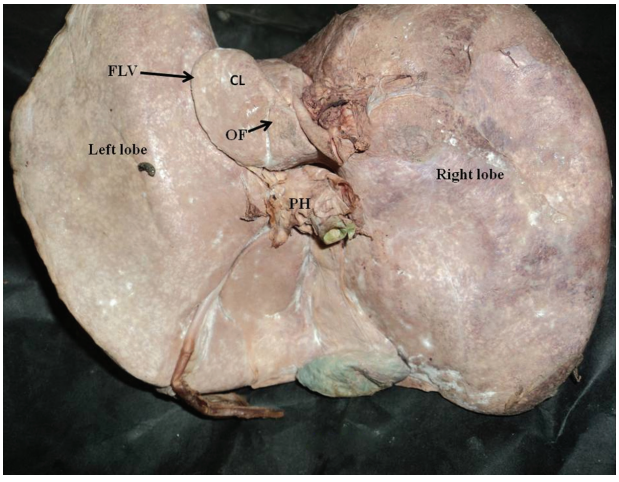

Figure 2. Posteroinferior surface of liver. FLV-fissure for ligamentum venosum, CL-caudate lobe, OF- oblique fissure, PH- porta hepatis.

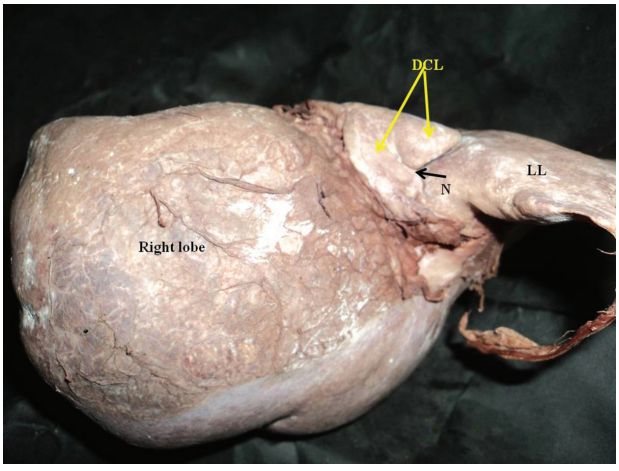

Figure 3. Superior surface of liver. DCL- duplicated caudate lobe, N- notch on the superior border of caudate lobe of liver, LL- left lobe of liver.

3 Discussion

The caudate lobe was noticed made up of two portions, connected by a narrow parenchymal bridge, which is known as the caudate isthmus. The first part was situated to the left of the inferior vena cava, corresponding to the Spiegel's lobe or Couinaud's segment. The second part extended in front of and to the right of the inferior vena cava. This second part was also extending caudally as a caudate process. This is termed as the paracaval portion (MAZZOITTI and CAVALLARI, 1997).

In continuation a notch on the superior border of caudate lobe was also detected (Figure 2). The fissure extended from this notch obliquely dividing the caudate lobe into two parts. No literature is available on this notch. Kogure, Kuwano, Fujimaki et al. (2000) also noticed another notch along the inferior border in approximately half of the patients undergoing hepatectomy. Same notch was also described by (JOSHI, JOSHI and ATHAVALE, 2009) in their study. Kogure, Kuwano, Fujimaki et al. (2000) were of the view that this external notch may be a vestige of the portal segmentation of the caudate lobe, as demonstrated in animal livers. Similarly the notch observed by the author may also be caused by portal segmentation of caudate lobe.

A fissure in the caudally placed lobe (Figure 2) observed in present case has also not been reported therefore comparative analysis is not possible. However, it may lead to misinterpretation of imagery.

Prominent vertical grooves on the anterosuperior surface were found in 6% of the livers by (JOSHI, JOSHI and ATHAVALE, 2009). Higher incidences of such grooves were observed by (MACCHI, FELTRIN, PARENTI et al., 2003; AUH, RUBENSTEIN, ZINNSKY et al., 1984). But in this case, vertical groove on right lateral surface was observed (Figure 1). This is not reported so far. According to (SCHAFER and SYMINGTON, 1896) and (DE BURLET, 1910) (as quoted by Macchi et al. (2003), such diaphragmatic sulci result from uneven growth of the hepatic parenchyma caused by variable resistance offered by different bundles of the diaphragm muscle (MACCHI, FELTRIN, PARENTI et al., 2003). But more recently, radiological and corrosion cast studies have attributed the formation of this type of sulci to the existence of weak zones of hepatic parenchyma, represented by the portal fissures between the adjacent sagittal portal territories. These weak zones offer a lower resistance to external pressure of the diaphragm (MACCHI, FELTRIN, PARENTI et al., 2003; MACCHI, PORZIONATO, PARENTI et al., 2005). Macchi et al. (2003) suggested that the diaphragmatic sulci could represent a useful landmark for surface projection of the portal fissures and of the hepatic veins and their tributaries running through them.

According to (AUH, LIM, KIM et al., 1994) the accessory hepatic fissures are potential sources of diagnostic errors during imaging. Any collection of fluid in these fissures may be mistaken for a liver cyst, intrahepatic haematoma or liver abscess. Implantation of peritoneally-disseminated tumour cells into these spaces may mimic intrahepatic focal lesions (AUH, LIM, KIM et al., 1994).

Thus knowledge of variations in the liver may be of paramount importance to clinicians to diagnose hepatic diseases, surgeons for carrying out liver related surgery, imaging personals for avoiding misinterpretation of images and anatomists and morphologists for new variants.

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