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Case Report

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Beaver Tail Liver: A Rare Anatomic Finding – A Cadaveric Case Report

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ABSTRACT

Background: Accessory liver lobes are morphological variants of the liver representing additional lobes or smaller structures connected to the main liver mass. Beaver tail liver is a rare anatomical variation in which the left lobe of the liver surrounds the spleen to enclose it. These rare variations are often discovered incidentally and may create challenges in differentiating liver tissue from splenic pathology during imaging.

Methods: During routine dissection of the abdominal region, variation in the size, position, and anatomical connections of the liver was observed in a male cadaver aged approximately 45–50 years. The left lobe of the liver was elongated towards the left lateral side with angulated narrowing after crossing the midline, extending into the left upper abdominal quadrant between the stomach and visceral surface of the spleen above the splenic hilum.

Results: The narrow end of the elongated left lobe was located between the stomach and spleen and represented a hiding beaver tail liver variant.

Conclusion: Lack of awareness regarding such anatomical variants may lead to misdiagnosis as splenic trauma or subcapsular hematoma and may create confusion during radiological interpretation or invasive abdominal procedures, potentially resulting in serious clinical consequences.

Key-words: Accessory liver lobe, Anatomical variation, Beaver tail liver, Cadaver, Spleen

INTRODUCTION

The liver is a wedge-shaped gland that develops from an endodermal hepatic bud, sprouting from the distal part of the foregut loop. It mostly fills the abdominal cavity during the 3rd month of intrauterine life. During the embryonic period, it acts as the site of hemopoiesis but is later replaced by the spleen and bone marrow [1]. Beaver tail liver, also known as a sliver of liver, sabre-shaped liver, or flax-like liver, is a rare anatomical variation of liver morphology.

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In this, the left situation lobe of the liver may elongate and extend laterally across the midline, which encircles the anterior portion of the spleen. [2]

This variant is rare and tends to occur more frequently in females. The extended left hepatic lobe has normal hepatic parenchyma. Beaver tail liver is typically discovered accidentally during abdominal imaging and doesn't result in any functional abnormality of the liver. [3]

Differentiating between the liver and spleen can be troublesome when their CT densities or ultrasound echogenicity's are similar. Even though there are differences in characteristics, it may still be misinterpreted as a splenic mass or a hematoma in the peri-splenic or subcapsular region. [4]

Recent studies and cadaveric reports have highlighted the importance of recognizing beaver tail liver and its associated anatomical variants. Beaver tail liver has been

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described as a rare variation in which the elongated left hepatic lobe extends laterally and may be closely related to adjacent abdominal structures. Reports on cadaveric findings and hiding beaver tail liver variants further emphasize the clinical relevance of these uncommon anatomical presentations and their significance during radiological interpretation and surgical procedures. [5-7]

CASE PRESENTATION

During routine cadaveric dissection sessions of the abdominal region for undergraduate medical teaching, variations were noted in the size, location, and anatomical relationships of the liver in a male cadaver estimated to be 45–50 years old.

This elongation extended mainly toward the left lateral side, crossing the midline and occupying part of the left upper abdominal quadrant. A distinct angulated constriction was observed in the left portion of this lobe, which projected between the stomach and the visceral surface of the spleen, superior to the splenic hilum. After removal of the stomach and liver during dissection, the lesser sac became visible, and the splenic recess was clearly identifiable.

The spleen is of normal size and shape, with its anterior end supported by the phrenicocolic ligament. Mild adhesions were observed between the left lobe of the liver and the visceral surface of the spleen. The splenic vessels were located in their usual position and accompanied by the tail of the pancreas. Additionally, the fundus and body of the gallbladder were found to be enlarged (Fig. 1 and 2).

Fig. 1: Superior View

Fig. 2: View from below of the visceral Surface View

DISCUSSION

Accessory liver lobes refer to additional lobes of the liver that include normal hepatic tissue and remain connected to the main organ. These may occur either congenitally or as acquired anomalies. Several theories have been proposed to explain congenital development, including displacement of early liver tissue during embryogenesis, persistence of mesodermal septa during hepatic growth, or excessive branching of the foregut diverticulum. [8,9]

The left lobe of the liver exhibits variation in its morphology. One such variant, known as the “beaver tail” liver, is more commonly observed in females. [10] This configuration resembles a beaver’s tail due to the lateral elongation of the left lobe toward the spleen, and in some cases, it may partially or surround it.

Based on Couinaud’s segmentation, this variation can be considered an elongation of segment II. Venous drainage occurs via branches joining the left hepatic vein, while portal supply is derived from the left portal vein. [11,12]

Clinically, the beaver tail variant is important because it may be misdiagnosed in imaging studies, particularly computed tomography, where it can resemble a peri-splenic hematoma. [4] It should also be distinguished from the appendix fibrosa hepatis, a fibrous remnant that extends from the liver to the diaphragm and may contain degenerated bile ducts. [9]

This anatomical variation is more susceptible to injury in cases of trauma, mainly to the left upper abdomen or lower chest. Apart from this risk, the presence of a beaver tail variant may be beneficial in liver transplantation because it can contribute to a larger residual liver volume in donors. [13] This is particularly relevant given the reported incidence of post-transplant

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liver failure in right lobe donors, which is approximately 10%. [14]

Similar findings have been reported in previous studies describing variations in the morphology of the left hepatic lobe. Baruah and Choudhury reported tongue-like elongation of the left lobe, while Sultana described elongation of the left hepatic lobe as a rare anatomical variation with potential clinical implications. Morphological studies conducted by Chaudhari et al. and Patil et al. further emphasized that variations in hepatic shape and lobar extensions are important considerations for anatomists, radiologists, and hepatobiliary surgeons because they may influence radiological interpretation and surgical planning. The findings of the present case are consistent with previous literature and highlight the importance of awareness regarding such uncommon anatomical variants [15-18].

CONCLUSIONS

Beaver tail liver is a rare but clinically important anatomical variation characterized by elongation of the left hepatic lobe extending toward the spleen. Although usually asymptomatic and discovered incidentally during cadaveric studies or imaging procedures, a lack of awareness of this variation may lead to diagnostic confusion and inappropriate clinical interpretation. It can mimic splenic lesions, peri-splenic hematoma, or other pathological conditions during radiological examinations, particularly in trauma settings. Recognition of such anatomical variants is therefore important for anatomists, radiologists, and surgeons to avoid diagnostic errors and reduce procedural complications during abdominal interventions and hepatobiliary surgeries. Cadaveric studies continue to provide valuable insights into uncommon anatomical variations and play a significant role in improving anatomical knowledge, enhancing clinical understanding, and contributing to safer diagnostic and surgical practice.

CONTRIBUTION OF AUTHORS

Research concept- Mahesh Kadle, Shankar Dhapate
Research design- Mahesh Kadle, Shankar Dhapate
Supervision- Shankar Dhapate
Materials- Mahesh Kadle, Shankar Dhapate
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