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Multiple variations in the external features of a single cadaveric liver - A case report

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Abstract
Introduction: Gross abnormalities of the liver are rare inspite of its complex development. These anomalies often go unnoticed as they are asymptomatic but found incidentally at autopsy and laparotomy which might lead to confusion during surgery or clinical misdiagnosis.
AIM: The present case report describes a myriad of variations in the external morphology of a single cadaveric liver which could cause potential errors during diagnostic procedures.
Materials and Methods: This liver specimen was procured from a female cadaver during routine dissection of abdomen, in the Department of Anatomy SCB MCH, Cuttack.
Observations: i) Single accessory fissure of length – 6 cm, depth 3 cm ii) accessory caudate lobe of length 17 mm, breadth- 15 mm thickness- 7 mm iii) Absence of fissure for ligamentumteres iv) another accessory lobe at the junction of posterior and inferior surface on the right lobe length – 45mm from the root of attachment and breadth – 30 mm v) a very prominent papillary process vi) ligamentum teres was found embedded in the substance of the liver on its inferior surface.
Conclusion: This study would certainly throw light on the importance of such variant appearance for having a favourable surgical outcome for surgeons during segmental resection, planning biliary surgery or a portosystemic anastomosis, for clinicians to rule out diseases and radiologists when interpreting liver radiologic findings.

Keywords: liver, anomalies, variations, accessory fissure, accessory lobes

1. Introduction
Gross abnormalities of the liver are rare [1] inspite of its complex development. These anomalies often go unnoticed as they are asymptomatic but found incidentally at autopsy and laparotomy [2-4] which might lead to confusion during surgery or clinical misdiagnosis.

2. AIM: The present case report describes a myriad of variations in the external morphology of a single cadaveric liver which could cause potential errors during diagnostic procedures.

3. Materials and Methods: This liver specimen was procured from a female cadaver during routine dissection of abdomen, in the Department of Anatomy SCB MCH, Cuttack.

4. Observations: i) Single accessory fissure of length – 6 cm, depth 3 cm ii)accessory caudate lobe of length 17 mm, breadth- 15 mm thickness- 7 mm iii) Absence of fissure for ligamentumteres iv) another accessory lobe at the junction of posterior and inferior surface on the right lobe length – 45 mm from the root of attachment and breadth – 30 mm v) a very prominent papillary process vi) ligamentumteres was found embedded in the substance of the liver on its inferior surface.

5. Discussion: Accessory liver lobes are defined as supernumerary liver lobes, composed of normal liver parenchyma in continuity with the liver, in contrast to ectopic liver lobes that have no anatomical continuity with the normal liver [5]. They are most often located in the right lobe attached by a pedicle containing blood vessels and biliary vessels [6].
Accessory liver lobes are classified based on the drainage of bile and presence of common capsule. Type I – A separate accessory lobe whose duct drains into an intrahepatic bile duct of normal liver.

Type II – Duct drains into an extrahepatic bile duct.
Type III –Incorporated in a common capsule with the normal liver and the bile drains into an extrahepatic duct. Especially discrete masses located in gastrohepatic ligament, connected to the liver by a band of tissue that may contain blood vessels and bile ducts [7].

The accessory right lobe with such a myriad of anomalies in a single liver is altogether a new finding not reported so far in the literature. Since these anomalies were observed in a female cadaver of 20- 25 yrs clinical history was not available. The observation of diaphragm in the cadaver did not show any signs of hernia. Mostly accessory lobes are asymptomatic but some present with acute abdominal symptoms due to torsion of the lobe or intestinal obstruction caused by the lobe or its mesentery. While accessory lobes can simulate tumours, there have also been reports of hepatocellular tumours that developed in these lobes [7].

The embryological basis of the anomalies of liver morphology occurring in the course of organogenesis remains to be elucidated [6]. Dodds *et al*. gave a hypothesis to explain the formation of caudate liver. According to them during second trimester the ductusvenosus rotates rightwards as the liver enlarges, so that a small portion of the liver becomes inserted behind the mesentery for the ductusvenosus. This part of liver gives rise to caudate lobe of liver [8]. During the formation of caudate lobe, a small portion of caudate lobe may have become separated from it and included in the mesentery of ductusvenosus to form the accessory lobe. Genes related to its formation are ZIC3, Nodal, Acvr2b, Ebaf, Cfc1&Dnah 11.

Defective development of left lobe can lead to conditions like gastric volvulus due to hypermobility of the stomach. But absence of right lobe is often symptomatic due to presence of portal hypertension with biliary colic, hematemesis, hypersplenism and esophageal varices.

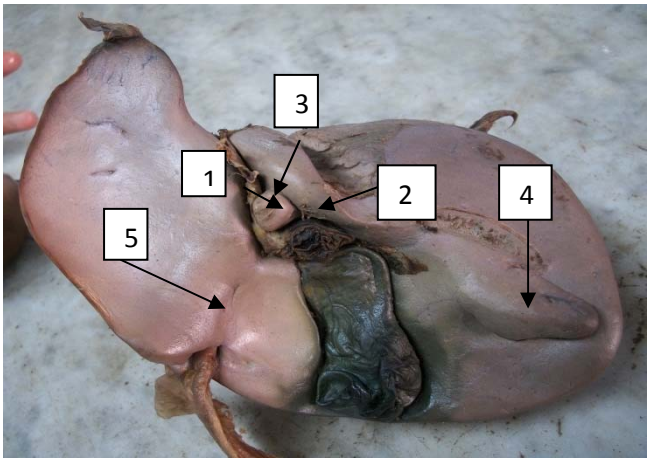

Fig 1: Showing Liver Anomalies Such As [1] Accessory Caudate Lobe(Acl), [2]Enlarged Papillary Process(Epp),[3]Accessory Fissure(Af)[,4] Accessory Liver Lobe(All) And [5] Embedded Ligamentum Teres(Elt).

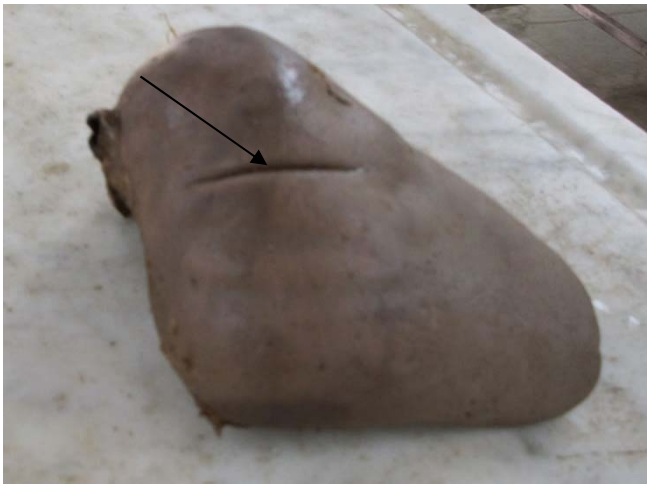

Fig 2: Showing Accessory Fissure in the Superior Surface of Liver

6. Conclusion: This study would certainly throw light on the importance of such variant appearance for having a favourable surgical outcome for surgeons during segmental resection, planning biliary surgery or a portosystemicanastomosis, for clinicians to rule out diseases and radiologists when interpreting liver radiologic findings.

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