

## Cadaveric Study to Assess the Morphology of Liver to Document the Presence of Accessory Lobe and its Clinical Significance

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### Abstract

**Background:** The liver can present a number of congenital anomalies. More common among them are the irregularities of the shape and the number of lobules. The less common variations include the presence of accessory lobes or accessory livers. The accessory lobes may be attached to the liver through a mesentery, or a bridge of the hepatic tissue and they are usually asymptomatic. An accessory liver lobe is a very rare occurrence and when it exists, it becomes clinically important because of its rarity.

**Aim:** To assess the morphology of liver to document the presence of accessory lobe and its clinical significance

**Materials and Methods:** A study was conducted in the Department of Anatomy, Netaji Subhash Medical College and Hospital, Bihta, Patna, Bihar, India, in which 70 liver from donated embalmed cadavers were examined for the presence of accessory lobe. Only cadavers, whose clinical history excluded liver diseases, were used for the study.

**Results:** 10% specimens showed accessory lobe. All are present on the under surface of liver.

**Conclusions:** Knowledge of the presence of a small accessory lobe of the liver near the porta hepatis is useful for surgeons and radiologists in diagnosing, surgical planning and avoiding iatrogenic injuries of the accessory lobe.

**Keywords:** Cadaveric study, accessory lobe, congenital anomalies

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### Introduction

Liver is the most massive of the viscera, occupying a substantial portion of abdominal cavity, that is, right hypochondrium and epigastrium, and extending into left hypochondrium as far as left lateral line [1]. It is a wedge-shaped organ with its narrow end pointing towards left. It is convex in the front, to the right,

above, and behind, and is somewhat concave inferiorly, where it is moulded to the shapes of the adjacent viscera [2].

In disease conditions, there is variation in liver size and morphology. Variations in the orientation are also seen in an individual as a result of body build. This makes it difficult to accurately assess the

liver size by manual palpation as is done in clinics [3]. The liver is exposed to a number of congenital anomalies. The major anomalies of the liver have been classified as accessory liver lobe and ectopic liver tissue [4].

Deformed lobe, agenesis of a liver lobe, and absence of its segments are also other reported liver anomalies [5, 6]. The most common liver anomalies are irregularities in the shape of the liver and irregularities in the number of liver lobules. However, rarely, it may have accessory lobes; this anomaly has an estimated prevalence of less than 1%. An accessory lobe of the liver is congenital ectopic hepatic tissue mostly due to embryonic heteroplasia, although in rare instances it may occur after trauma or surgery [7]. One of the abnormalities reported several times is Riedel's lobe [8], defined as a downward tongue-like projection of the anterior edge of the right liver lobe to the right of the gallbladder.

The size of liver, either in clinical examination or in imaging techniques, depends on several factors such as age, sex, body size, and shape, and the particular examination technique utilized.

In some cases, the liver can be palpable due to anatomic reasons or underlying abnormal conditions.[9]

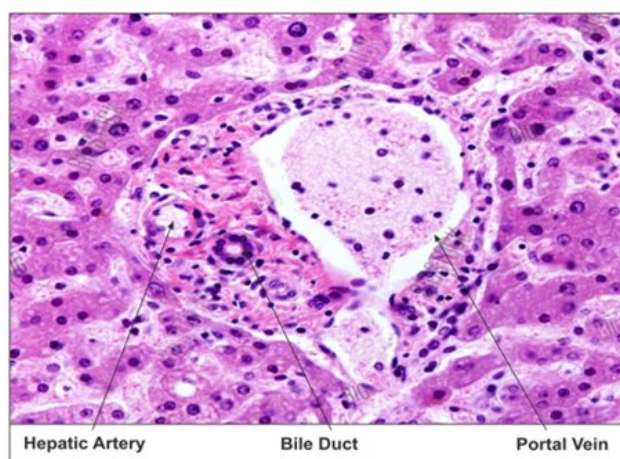
#### Material & Methods:

70 adult human livers were obtained from donated embalmed cadavers (58 male & 12 female) in the Department of Anatomy at Netaji Subhash Medical College and Hospital, Bihta, Patna, Bihar, India, all ranging between age groups of 65 to 75 years.

Only cadavers, whose clinical history excluded liver diseases, were used for the study.

#### Results:

We observed an accessory lobe in 70 livers. They were situated in the posterior part of the fissure for ligamentum teres, close to the porta hepatis. The lobes were triangular in shape and about one inch in width. They were attached to the left anatomical lobe of the liver through a vascular pedicle which contained the branches of hepatic artery, portal vein and hepatic duct. Microscopic structure of the accessory lobe showed normal liver architecture.



**Figure 1: Showing photographic presentation of microscopic structure of the accessory lobe seen under high power**

#### Discussion:

Knowledge of the embryological development of organs is important to

appropriately describe most of the congenital anomalies associated with the organs. As a type of congenital anatomical malformation, accessory lobes of the liver

occur very rarely because the malformation is associated with an autosomal recessive gene with a very low frequency [10].

Accordingly, in this cadaveric report, we observe that the liver contained one additional (accessory) lobe located between the quadrate and caudate lobes visible in its visceral surface; this observation does not match the above classifications. A study conducted in India reported a small accessory lobe of the liver in an adult male cadaver, which was situated in the posterior part of the fissure for ligamentum teres, close to the porta hepatis [11]. An adult cadaveric study on normal morphological variation of liver lobes using 50 specimens found accessory liver lobes in 8 cases (16%) [12]. Nayak [11] identified additional liver lobes in approximately 9% of cases among 55 livers of South Indian cadavers.

Bradley [12] has done much to elucidate the development of liver. The single liver in some lower animals like pig and dog has distinct lobules separated by strands of connective tissue and sometimes the human liver shows this variation by reversion [13]. The variations in the anatomy of human liver have been classified as congenital or acquired [14]. The congenital anomalies of liver can be divided into anomalies due to defective development and anomalies due to excessive development. Defective development of left lobe of liver can lead to gastric volvulus, whereas defective development of right lobe may remain latent or progress to portal hypertension [15]. The excessive development of liver results in the formation of accessory lobes of liver which may carry the risk of torsion [16]. Acquired changes in the liver morphology are represented by the following characteristic features: (1) linguiform lobes, (2) costal organ with very small left lobe, (3) deep renal impressions and "corset" type constriction and local inflammation of the organ or

gallbladder [17]. The accessory hepatic fissures are potential sources of diagnostic errors on both sonography and CT (Y. H. Auh et al. [18].

The accessory lobe which is being reported here is surgically and radiologically very important due to its small size and the presence of a vascular pedicle. Due to the small size, it might be mistaken for a lymph node. It might be accidentally removed during the surgeries in and around the porta hepatis. Damage to the lobe or its vascular pedicle might result in bleeding into the abdominal cavity. Accessory lobes need attention when there is torsion of the vascular pedicle or metastasis occurring in them. Torsion of the accessory lobes is a surgical emergency. [19-20]

An accessory lobe could be formed by the displacement of the primitive rudiment of the organ, or by persistence of the mesodermal septa during its proliferation. [21] Its presence occurs due to an error in the formation of the endodermal caudal foregut and segmentation of the hepatic bud in the third month of the intrauterine life. [22] Damage to the accessory lobe or its vascular pedicle might result in bleeding into the abdominal cavity. Accessory lobes need attention when there is torsion of the vascular pedicle or metastasis occurring in them. Torsion of the accessory lobes is a surgical emergency. [23]

### Conclusion:

Knowledge of the presence of a small accessory lobe of the liver near the porta hepatis is useful for surgeons and radiologists in diagnosing, surgical planning and avoiding iatrogenic injuries of the accessory lobe.

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