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Research Article

## SOME INTERESTING MORPHOLOGICAL FEATURES OF LIVER LOBES IN MUMBAI POPULATION

\*Khedekar Deepak N<sup>1</sup> & Hattangdi Shanta S<sup>2</sup>

<sup>1</sup>Assistant professor, <sup>2</sup>Head & Professor, Department of Anatomy, Lokmanya Tilak Municipal Medical College & GH, Sion, Mumbai, Maharashtra, India

\*Corresponding Author email: drdeepak2025@yahoo.co.in

### ABSTRACT

**Introduction:** Liver is the largest gland in the body mainly situated in the right upper quadrant of the abdomen. Abnormalities of liver are rare. Common abnormalities are irregularities in form, occurrence of one or more accessory lobes, fissures or abnormal ligaments. Rare abnormalities include atrophy, or complete absence of one of the lobes. Although the segmental anatomy of the liver has been extensively researched, very few studies have dealt with the surface variations of the liver. Accessory lobe may be confused with tumour. Accessory fissure may mimic internal trauma at the time of the post-mortem study. **Aim:** Present study was carried to find out the morphological variations of liver lobes occurring in Mumbai population. **Methods & Materials:** The materials used for present study comprised of formalin fixed 50 adult livers. **Results & conclusion:** In the present study we found accessory liver lobes in 3 cadavers i.e. 6 %, atrophy of left lobe in 15 cadavers i.e. 30 %, accessory fissures in 21 cases i.e.42%. There is also abnormal connection between left lobe and quadrate lobe in 14% cases. The findings of study may be helpful to radiologist and surgeons respectively, to avoid possible errors in interpretations and subsequent misdiagnosis, and for planning appropriate surgical approaches.

**Keywords:** liver lobes, accessory lobes, accessory fissures, atrophy of left lobe, morphology, variations.

### INTRODUCTION

Liver is the largest gland in the body mainly situated in the right upper quadrant of the abdomen. Here it is protected by the thoracic cage and diaphragm. It occupies most of the right hypochondrium and upper epigastrium and extends into the left hypochondrium. The liver has diaphragmatic surface (anterior, superior and some posterior) and relatively flat or even concave visceral surface which are separated by the sharp inferior boarder which follows right costal margin inferior to diaphragm. Diaphragmatic surface is smooth, dome shaped and covered with visceral peritoneum, except posteriorly in the bare area of the liver. Anteriorly left lobe and right lobe are separated by falciform ligament which extends from liver to anterior abdominal wall lies essentially in midline

plane. Right lobe is 4-5 times larger than left lobe. On the slanted visceral surface, the right and left sagittal fissures course on each side of transverse porta hepatis separating two accessory lobes (part of anatomic right lobe). The quadrate lobe anteriorly and inferiorly and the caudate lobe posteriorly and superiorly. Right sagittal fissure is continuous groove formed anteriorly by the fossa of the gall bladder and posteriorly by the groove for vena cava. Left sagittal fissure continuous groove formed anteriorly by ligamentum teres hepatis and posteriorly by the ligamentum venosum. Two sagittally oriented fissures linked centrally by tranverse porta hepatis forming H shaped groove on visceral surface. Porta hepatis contain portal triad i.e. portal vein, hepatic artery, bile

duct. Normally there is no communication between quadrate lobe and left lobe.<sup>1</sup>

Abnormalities of liver are rare inspite of its complex development in the ventral mesogastrium; common abnormalities are irregularities in form, occurrence of one or more accessory lobe, fissure or abnormal ligament. According to Champetier J.et al hepatic anomalies can be divided into two categories, i.e. anomalies due to defective development and anomalies due to excessive development of the liver. The liver tissue in the communicating with the main mass of liver is termed as accessory lobe while the liver tissue lying in the vicinity of the liver termed as ectopic liver.<sup>1-3</sup>

This study was undertaken to find out the morphological variations of liver lobes occurring in Mumbai population. The congenital abnormalities of liver can cause diagnostic confusion for physicians, surgeons, radiologist and anatomist.

## MATERIALS AND METHODS

This study was conducted in the department of Anatomy, Lokmanya Tilak Municipal Medical College & General Hospital, Mumbai, India. The materials used for present study comprised of 50 formalin fixed adult livers which were dissected during routine dissection classes for medical undergraduate students over a period of 6 years. The embalmed livers were carefully studied for the abnormality in various lobes of liver, presence of accessory lobes, accessory fissures. Specimens were photographed the findings were appropriately documented. The procedures followed were in accordance with the ethical standards of experimentation (institutional) and with the Helsinki Declaration of 1975, as revised in 2000.

**Inclusion criteria:** age between 20-72 years, weight between 1.2kg -1.8kg, intact specimens with normal anatomical features.

**Exclusion criteria:** age below 20 years, specimens with cirrhotic liver, damaged liver, liver with gross changes in size and shape.

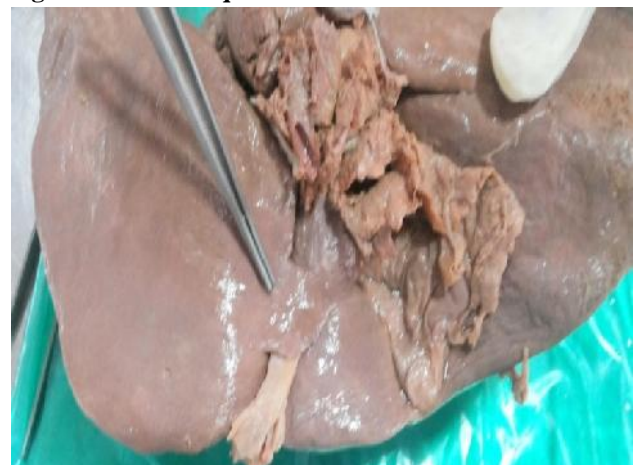
## RESULTS

In our study we found morphological variations of liver lobes out of 50 livers occurring in Mumbai population. We found Accessory liver lobes in 3 cases i.e. 6 % (fig: 4). Atrophy of left lobe of liver in 15

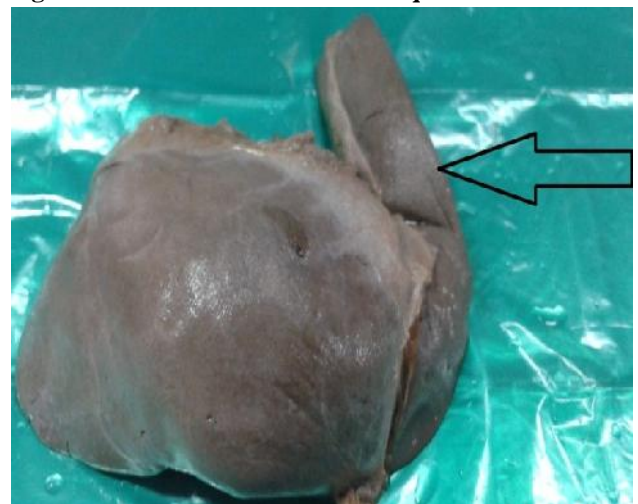
cases i.e. 30% (fig: 3,6), Accessory fissures ( ranging from 1-5) in 21 cases 42% (fig: 4, 5). Elongated right lobe in 6 cases i.e. 12 % (fig: 6), interconnected left lobe and Quadrate lobe with absence of fissure for ligamentum teres in 7 cases i.e. 14 % (figure: 2). One case with absent quadrate lobe (fig 1.).



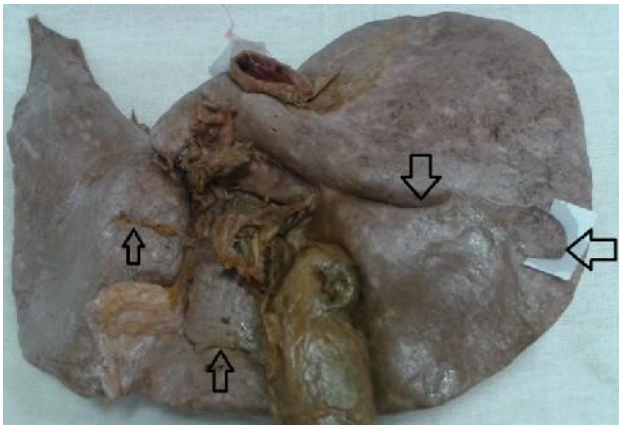
**Fig 1: Absence of quadrate lobe**



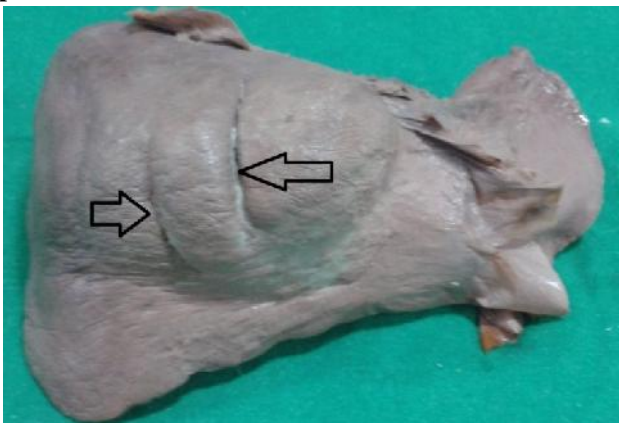
**Fig 2: Interconnected left lobe and quadrate lobe**



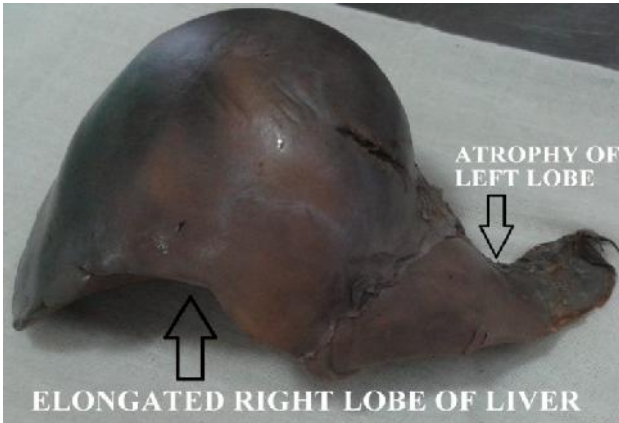
**Fig 3: Atrophy of left lobe**



**Fig 4: Accessory fissure (arrow) and accessory lobe on posterior and inferior surface of liver**



**Fig 5: Accessory fissures on anterior surface of liver**



**Fig 6: Atrophy of left lobe and elongation of right lobe.**

## DISCUSSION

In this world of the modern imaging techniques it becomes utmost important to radiologist and diagnosing clinician to have thorough knowledge of anatomy and commonly occurring variations in organ like liver which is largest gland of the body and the main metabolic centre of the body. Externally liver has been divided into two anatomical lobes and two accessory lobes by the reflections of peritoneum from its surface. Internally on the basis of the blood supply

and biliary drainage, there are four main hepatic division. These hepatic divisions can be subdivided into eight surgically resectable hepatic segments, each served independently by secondary or tertiary branch of portal triad, respectively.<sup>1</sup>

Accessory lobe of the liver is very rare variation which may remain silent in many subjects. In our study we found accessory lobes in 3 cadavers. There was no evidence of ectopic liver tissue. Sato el found incidence of ectopic liver lobe and accessory liver lobe 0.7%.<sup>4</sup> Accessory lobes are most commonly found on the undersurface of the liver, but also have been seen on the gall bladder surface<sup>5</sup>, hepatogastric ligament, near the umbilicus, adrenal gland<sup>6</sup>, pancreas and the thoracic cavity accessory intrathoracic liver lobe was first reported by Hansborough and Lipin in 1975.<sup>7</sup> Riedel in 1888 described the occasional tongue-like projection of the right lobe of the liver, extending to or below the umbilicus.<sup>8</sup> Madhur gupta et al related liver size to body surface area.<sup>9</sup>

Multiple accessory fissures may mimic pathologic liver nodules on CT and may be associated with diaphragmatic scalloping or eventration on the chest film. When only parts of these fissures are seen sonographically, they may be mistaken for echogenic liver lesions.<sup>10</sup> We got quite higher incidence of accessory fissures i.e.42%.Shailaja et al in her study revealed accessory lobes (6%) and accessory fissures (24%) associated with gallbladder mesentery (4%) amongst the liver specimens studied.<sup>11</sup> A liver was observed with duplicated caudate lobe and hypoplastic left lobe of the liver.<sup>12</sup> Hussein Muktyaz et al found accessory liver lobes in 6 cadavers 14.6%, atrophy of left lobe in 2 cadavers 4.8%, accessory fissures in 5 cases 12.1%.<sup>13</sup>

Lobar atrophy of the liver due to causes other than liver tumor or liver cirrhosis is a relatively rare pathological condition, and there are only a few reports in the literature.<sup>14</sup> We got 15 cases of left lobar atrophy during our study. Hepatic lobar atrophy usually occurs in the setting of combined biliary and portal vein obstruction. A significant correlation exists between hepatic lobar atrophy and ipsilateral portal vein obstruction.<sup>15</sup>

Joshi SD et al utilised 90 livers for their studies. In that study, the quadrate lobe was absent in 2 cases and in two other cases, the quadrate lobe was not seen on the inferior surface, but after retracting the two lips of



the fissure for ligamentum teres, it was seen lying deeply.<sup>16</sup> In our study incidence of absent quadrate lobe is 2%. There was no incidence of deeply seated quadrate lobe.

## CONCLUSION

In this study we have described morphological variations of the liver lobes. This could be a cause of medical interventions because of unexpected presence of the variant accessory lobe of liver resembling. Atrophy, agenesis, presence of accessory fissure or lobe, absence of normal fissure or lobe of liver can cause diagnostic confusion for surgeons during surgery and for physicians, radiologist and anatomist. Therefore it becomes necessary for clinicians to have up to date knowledge of the morphological variations of liver.

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**Conflict of interest : Nil**

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