

## Morphological Study Of Variations In The Lobar Pattern Of Liver

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**Abstract :** Background and Objective: A sound knowledge of the normal and variant liver anatomy is a prerequisite to having a favourable surgical outcome. A possibility of the presence of the abnormal liver has to be kept in mind when an unexplained abdominal mass is encountered. Although the lobar anatomy of the liver has been extensively researched, very few studies have dealt with lobar anomalies of liver. The present study is aimed to know various lobar anomalies of liver. Methods: The present study was done using 40 formalin-fixed livers in the department of Anatomy, NMC, Raichur. Results: It was observed that elongation of left lobe of liver was seen in 2 cases, Reidel's lobe was observed in 1 case, quadrate lobe was absent in 2 cases and was ill-defined in 1 case. Conclusion: This study has been done to serve as a guide for proper interpretations of liver images using various imaging modalities. It will also be useful to the operating surgeons to be aware of the frequently occurring morphological variations of liver. [Deepa G et al NJIRM 2013; 4(4) : 42-45]

**Key Words:** atrophy, bile duct , congenital, gallbladder, liver, spleen.

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**Introduction:** The variations in the lobar pattern of liver are quite rare. A possibility of the presence of the abnormal liver has to be kept in mind when an unexplained abdominal mass is encountered. A sound knowledge of the normal and variant liver anatomy is a prerequisite to having a favourable surgical outcome. The lobar anomalies may be congenital which include agenesis of its left lobe, absence of its segments, deformed lobes, Reidel's lobe, decrease in the size of the lobes, lobar atrophy, hypoplastic lobes and transposition of the gall bladder<sup>1</sup>.

The embryological development of liver appears in the middle of the 3<sup>rd</sup> week as an outgrowth of the endodermal epithelium at the distal end of the foregut. This outgrowth, the hepatic diverticulum, or liver bud, consists of rapidly proliferating cells that penetrate the septum transversum<sup>2</sup>. The complete knowledge about the segmentation of the liver is very important for surgeons during resection of primary or metastatic tumour. The present study has been done to know the variations in lobar pattern of liver.

**Material & Methods:** Approval of the Institute Research Council was obtained prior to commencement of the study. The present study was conducted using 40 formalin-fixed livers, all of which were normal and without any pathological entity. The variation in the lobar pattern of liver was observed.

**Result:** Table 1: shows the observations of the study.

**Table 1:** Incidence Of Variations Of The Lobar Patterns Of Liver In Present Study.

No	Variation	Incidence (N=40)	Percentage
01	Elongation of left lobe of liver	2	5%
02	Absence of quadrate lobe	2	5%
03	Ill-defined quadrate lobe	1	2.5%
04	Reidel's lobe	1	2.5%

Elongation of the left lobe was observed in 2 cases where the left lobe was seen to be extending into the left hypochondrium and reached up to the spleen (Figs 1 and 2). Quadrate lobe was absent in 2 cases (Figs 3 and 4). In one case, the quadrate lobe was ill-defined not reaching the inferior border (Fig 5). One case showed the presence of Reidel's lobe, where the right lobe was extended downward to the right of the cystic notch (Fig 6).

**Discussion:** Lobar anomalies of the liver are rare. Using Couinaud nomenclature, the liver is divided into eight segments. The caudate lobe alone represents segment I. segment II is the superior portion of the lateral segment of the left hepatic lobe. Segment III is the inferior portion of the

Fig 1: Specimen Showing Elongated Left Lobe Of Liver (Encircled Part).

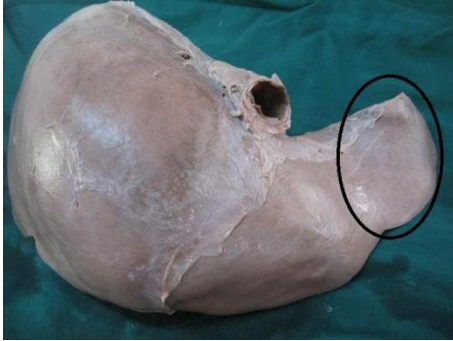


Fig 2: Specimen Showing Elongated Left Lobe Of Liver (Encircled Part).

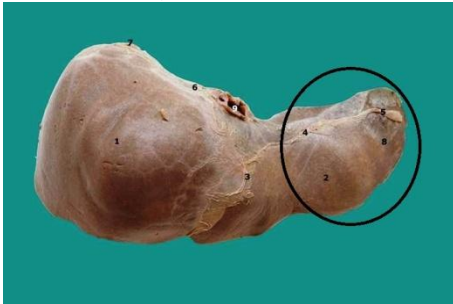


Fig 3: Specimen Showing Absence Of Quadrate Lobe (Arrow).



Fig 4: Specimen Showing Absence Of Quadrate Lobe (Arrow).

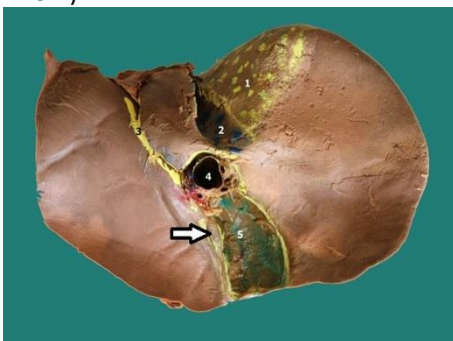
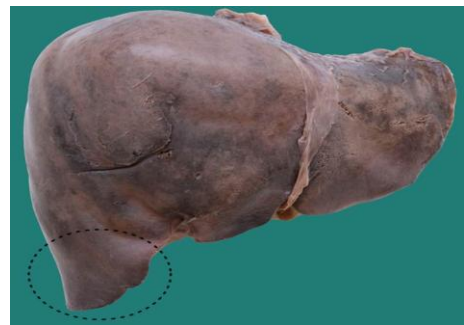


Fig 5: Specimen Showing Ill-Defined Quadrate Lobe (Arrow).



Fig 6: Specimen Showing Riedel's Lobe (Encircled Part).



lateral segment of the left hepatic lobe. Segment IV occupies the entire medial segment of left hepatic lobe. Segment V is the inferior portion of the anterior segment of the right hepatic lobe. Segment VI is the inferior portion of the posterior segment of the right hepatic lobe. Segment VII is the superior portion of the posterior segment of the right hepatic lobe. Segment VIII is the superior portion of the anterior segment<sup>3</sup>

The liver is divided by the principle plane into 2 halves of approximately equal size. The principle plane is defined by an imaginary parasagittal line from the gall bladder anteriorly to the inferior vena cava posteriorly. The usual functional division of the liver into right and left lobes lies along this plane<sup>4</sup>.

The knowledge of the commonly occurring lobar variations is of more significance in the diagnostic imaging and minimally invasive surgical approaches. The variations in the lobar pattern are found more often in the adult female and the

larger percentage of cases involve right lobe alone or when the left lobe is involved, the deformity is always associated with right enlargement<sup>5</sup>. The hepatic lobe anomaly is not always congenital. Therefore, the diagnosis of this anomaly requires other things such as no evidence of liver dysfunction<sup>6</sup>.

In our cases, elongation of left lobe was seen in 2 cases where it was observed that left lobe extended into the left hypochondrium and reach up to spleen. J.H.Waring says that among liver anomalies, the left lobe may be long and thin, having been met with extending downward and to the left onto the left hypochondrium, or even below this viscous. When this form of lobulation occurs, it may be mistaken for large spleen, but is usually definable. Connected with the liver, and its free movement during respiration would indicate the nature of the enlargement or swelling to be in the left hypochondrium. Elongated left lobe may also occur postoperatively where following splenectomy, liver may change its position and shape. Migration of left lobe of liver into the splenic bed in left upper quadrant is often seen by surgeons immediately after removal of spleen. This process may depend on many factors including liver pliability, obesity, age of the patient or the previous existence of splenomegaly and its duration. This condition may mimic residual spleen after splenectomy, accessory spleen, mass lesion in the region of portahepatis or recurrent foci of disease<sup>7</sup>. Elongated left lobe may be misdiagnosed as distension of the hepatic flexure of the colon, gastroptosis, hydatid cyst or sarcoma of liver. The condition may be asymptomatic or patient may present with symptoms like pain in epigastrium, palpitations of heart, constant gastric disturbances etc.<sup>5</sup>.

In one case, we observed the presence of Reidel's lobe. The inferior border of the right lobe, to the right of the gall bladder often demonstrates a bulge of tissue, which when pronounced, is referred to as Reidel's lobe. Although the right inferior border of the liver is not usually palpable, the presence of a Reidel's lobe may be clinically detectable and may give rise to confusion as an

apparent pathological right upper quadrant mass<sup>4</sup>. This anatomical variant has been reported in some detail by Reitmeier et al. and was first described by Reidel a French surgeon. It has been observed almost exclusively in females<sup>8</sup>. Reidel's lobe may extend into the iliac fossa or may extend to below the anterior superior iliac spine. The causes to this condition may be pushing down of right lobe of liver by an enlarging gall bladder, a dragging down of liver substance by adhesions to the anterior abdominal wall, the drag of adherent prolapsed intestine or other abdominal viscous, and presence of growths and cysts of various kinds. Reidel called the attention to the facts that extension of the right lobe occurs more frequently in females and that after evacuation of a distended gall bladder, the lobe diminishes in size rather rapidly. Finney stated categorically that in some cases, the condition was caused by the tight lacing of women's' apparel but that the principle cause is enlargement of the gall bladder with adhesions from preceding inflammatory conditions playing an important role<sup>9</sup>. Champetier et al have described Reidel's lobe as a sessile accessory lobe, most regard it simply as a tongue-like projection of the right lobe. Accessory lobes are composed of normal hepatic tissue, containing their own hepatic blood vessels and bile ducts which are connected to the rest of the liver<sup>10</sup>. Reidel's lobe is easily mistaken for other tumours in this area, especially, visceroptotic right kidney. It does not cause symptoms and treatment is not required. Rarely, it is a site for metastasis. Or primary hepatocellular carcinoma<sup>11</sup>. Absence of quadrate lobe in 2 cases and ill-defined in one case was also observed in the present study.

**Conclusion:** The present study highlights the occurrence of morphological variations in the lobar pattern of liver. This study has been done to serve as a guide for proper interpretations of liver images using various imaging modalities. It will also be useful to the operating surgeons to be aware of the frequently occurring morphological variations of liver.

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