



MORPHOLOGICAL STUDY OF ANOMALIES OF LOBES AND SEGMENTS OF HUMAN LIVER

^{1*}SHARMILA ARISTOTLE

^{1*}Professor, Department of Anatomy, SRM Medical College Hospital and Research centre

ABSTRACT

Objective: To identify various morphological variations in surface of human liver. Materials and Methods: The study was conducted in 60 adult human liver specimens by dissection method. Results: out of 60 specimens studied 25cases (41%) showed variations. Presence of additional lobe in 3 cases (5%); accessory fissures in 8 cases (13%); short gall bladder in 3 cases (5%); elongated left lobe in 2 cases (3.3%);very small left lobe in 1 case (1.6%);absence of quadrate lobe in 2 cases (3.3%);very small quadrate lobe in 1 case (1.6%);absence of fissure for ligamentum teres 1 case (1.6%); incomplete fissure for ligamentum teres in 3 cases (5%); prominent caudate process in 1 case (1.6%).Conclusion: Thorough knowledge of these variations is a must for surgeons for planning any surgeries and to radiologist for correct interpretation of diagnosis and treatment occurring in that region.

KEY WORDS: Morphology, additional lobe, ligamentum teres, quadrate lobe, variations.



SHARMILA ARISTOTLE

Professor, Department of Anatomy, SRM Medical College Hospital and Research centre

INTRODUCTION

Congenital anomalies of human liver are rare and these anomalies are considered to be rarer than any other organ of the body¹. Anatomical knowledge of segmentation of liver is more important for liver surgeries. The major fissures present in liver divide the liver into various anatomical and physiological segments of liver. Though variations in segmental anatomy of liver have been extensively studied; very few studies have been done in the variations in surface anatomy of liver². Most of the right hypochondrial masses are usually asymptomatic. So knowledge of these variations should be kept in mind while diagnosing an abnormal right hypochondrial mass. Resection of the various lobes or segments is considered as treatment of many diseases including carcinoma. With this background we undertook this study for identifying various morphological anomalies of liver lobes.

MATERIALS AND METHODS

The study was conducted in 60 adult human liver specimens collected from the department of anatomy SRM Medical College Chennai. All the livers were dissected during routine dissection classes for 1st year undergraduate medical students. Variations in the lobar pattern of liver was observed and photographed.

RESULTS

Out of 60 livers studied anomalies were observed in 41%. i.e., 25 specimens. The variations present were additional lobes in 3 cases (5%); accessory fissures in 8 cases (13.3%); absence of fissure in 1 case (1.6%) and incomplete fissure in 3 cases (5%); short gall bladder in 3 cases (5%); elongated left lobe in 2 cases (3.3%); very small left lobe in 1 case (1.6%); prominent caudate process in 1 case (1.6%); absence quadrate lobe in 3 cases (5%). Additional lobes were observed in 3 cases. In one specimen additional lobe was observed just above the gall bladder near porta hepatis between caudate and quadrate lobe. Two accessory fissures were also seen one in quadrate lobe and a horizontal fissure in the inferior surface of right lobe of liver. (Fig. 1). Presence of accessory lobe in fissure for ligamentum teres (Fig. 2). In another case additional lobe was noted in quadrate lobe. (Fig. 3). Presence of accessory fissures in 8 cases. Vertical fissure in anterior surface of right lobe (Fig. 4). Transverse fissure in inferior surface of right lobe (Fig. 5). Horizontal fissure in quadrate lobe in 2 cases (Fig. 6). Vertical fissure in anterior surface of right lobe representing as if three lobes are present (Fig. 7). Transverse fissure present in quadrate lobe and in right lobe (Fig. 1) along with the additional lobe. Short gall bladder was noted in 3 cases. (Fig. 9). Prominent caudate process and absence of quadrate lobe was observed in one case (Fig. 8). Elongated left lobe of liver in 2 specimens (Fig. 10). Very small left lobe in 1 case (Fig. 11). Absence of fissure for ligamentum teres in one case (Fig. 12). Incomplete fissure for ligamentum teres in three cases. (Fig. 13)



Figure 1
Liver shows accessory fissure in quadrate lobe and inferior surface of right lobe additional lobe near porta hepatis above the gall bladder.

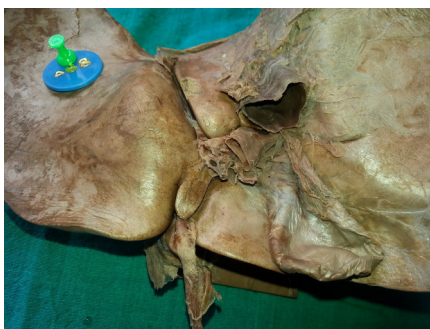


Figure 2
Presence of an accessory lobe in fissure for ligamentum teres



Figure 3
Liver shows additional lobe in quadrate lobe and presence of short gall bladder



Figure 4
Vertical fissure in anterior surface of right lobe



Figure 5
Transverse fissure in inferior surface of right lobe



Figure 6
Horizontal fissure in quadrate lobe



Figure 7
Vertical fissure in anterior surface of right lobe appearing as if 3 lobes



Figure 8
Liver shows absent quadrate lobe and prominent caudate process



Figure 9
Liver shows short gall bladder



Figure 10
Elongated left lobe with absent quadrate lobe



Figure 11
Very small left lobe



Figure 12
Liver shows absent quadrate lobe and absent fissure for ligamentum teres



Figure 13
Incomplete fissure for ligamentum teres

DISCUSSION

During 3rd week of intra uterine growth, liver develops as a hepatic diverticulum which is an endodermal out growth at the distal end of foregut. This hepatic diverticulum consists of rapidly proliferating hepatic cells that penetrate into the septum transversum. Most of the congenital anomalies are either due to defective or excess development³. Morphological developmental anomalies are classified as agenesis, aplasia and hypoplasia⁴. Drakshayini et al noted absence of caudate lobe of liver with tongue like protrusion of left lobe of liver⁵. No such anomaly was noted in our study, instead we observed absence of quadrate lobe in 5 % of cases. The anomalies related to excess development leads to the formation of accessory lobes. These accessory lobes can lead to complication of torsion and if torsion occurs in the vascular pedicle or if a metastasis occurring in them requires immediate surgical attention.

Among these presence of Riedel's lobe is most common which projects on the right lateral surface of the liver⁶. Hepatic malformations are more common in the perinatal age group since most of the anomalies undergoes reformation postnally⁷. Failure in the postnatal development of liver leads to the occurrence of anomalies in fissures. Variations in the fissure are commonly seen on the antero superior surface⁸. Fissures present in the antero superior surface of right lobe mimics as a separate third lobe. In our study also, we observed 3 cases of antero-superior fissures in right lobe resembled as three separate lobes. Caudate lobe anomaly along with anomaly in fissure was encountered in few studies. Singh et al noticed duplicate caudate lobe along with oblique fissure with a hypoplastic left lobe of liver⁹. These accessory fissures may misinterpret the diagnosis in imaging technique¹⁰. Saxena et al observed various congenital malformations like grooves on the hepatic surface (10%), tunnel for

ligamentum teres(15%),enlarged papillary process (10%), absence of quadrate lobe(5%), additional fissure(20%), lingular process (15%)¹¹. In our study also we encounter similar anomalies as mentioned by the author.Collection of fluid in these fissures can be diagnosed as liver abscess, cyst or intra hepatic hepatoma. We observed 7 cases of accessory fissure in various surfaces of liver in our study. Apart from accessory fissures liver shows additional lobes. Presence of these additional lobes may be misdiagnosed as lesser omental lymphadenopathy. They can herniate through diaphragm into the thorax. Joshi et al did an extensive study on the variations of liver. Pujari et al also have reported accessory lobes in their study¹². We observed 3 cases of accessory lobes seen on the posterior and inferior surface of liver. Short gall bladder has been reported in 2008 by pamidi et al¹³. These gall bladders are not seen in healthy livers. These gall bladders are due to the presence of abnormal peritoneal folds like cystohepatocolic folds. They hide in their fossa and may lead to confusion in imaging techniques and also in laproscopic

surgeries.Presence of elongated left lobe may be misdiagnosed as distension of the hepatic flexure, gastro ptosis, hydatid cyst or sarcoma of the liver¹⁴.These elongated lobes may reach up to spleen and may be mistaken for splenomegaly .H.waring et al reported such elongated left lobes in their study which coincides with our findings of elongated left lobe in 3.3% of cases. In few studies tongue like projection of the left lobe of liver was observed¹⁵.

CONCLUSION

Most of the anomalies of liver are usually asymptomatic. So all these variations mentioned above should be kept in mind while planning for any surgical procedures in that region. This study also will be useful for radiologists for proper interpretation of correct diagnosis.

CONFLICT OF INTEREST

Conflict of interest declared none.

REFERENCES

1. Aktan, Z.A.Savas, R. Pinar, Y. Arslan O. Lobe and segment anomalies of the liver. J Anat.Soc.India 2001; 50(1):15-16.
2. Joshi SD, Joshi SS, Athavale SA. Some interesting observations on the surface features of the liver and their clinical implications. Singapore Med J 2009; 50(7):715- 19.
3. Daver, GB,Gakhshi, GD, Patil, a, Ellur, S, Jain, M.and Daver, NG. Bifid liver in a patient with diaphragmatic hernia. Indian Journal of Gastroenterology. 2005; vol. 24, n. 1, p. 27-28.
4. Gamal MA Hassan, hamdy A sliem, Abousree T Ellethy. Hepatic embryonic development and anomalies of the liver. Journal of gastroenterology and hepatolgy research .2013;vol 2,n 4.
5. Drakshayini B.kokati, Anitha lakshmi. An unusual morphology of the human liver. a case report. J.biosci Tech. 2015;vol 6(3):686-688.
6. Champetier J, Yver R, Létoublon C, Vigneau B. A general review of anomalies of hepatic morphology and their clinical implications. Anatomia Clinica. 1985;7(4):285-299.
7. Parke, WW, Settles, HE, Bungler, PC and Vandenmark, RE. Malformations of the liver: some prenatal and postnatal developmental aspects. Clinical Anatomy 1996; vol 9(5):309-316.
8. Macchi V. Feltrin G. Parenti A. De Caro R. Diaphragmatic sulci and portal fissures. J Anat. 2003; 202 (3):303-8.
9. Singh R, Singh K, Man .S. Duplicate caudate lobe of liver with oblique fissure and hypoplastic left lobe of liver. J. Morphol. sci .2013;vol 30(4):309-311.
10. Auh YH. Lim JH. Kim KW. et al. Loculated fluid collections in hepatic fissures and recesses: CT appearance and potential pitfalls. Radiographics 1994; 14:529-40.
11. Aloxsaxena, krishor Kumar agarwal, Charuljakhwal, Shivalisingh, Amal rani das. some variable facts of liver: Embryological and clinical perspective. International journal of Anatomy ,Radiology and surgery 2016 jan;vol 15(1) 64-67.
12. Pujari BD, Deodhare SG. Symptomatic accessory lobe of liver with a review of the literature. Postgrad Med J 1976; 52:234-36.
13. Pamidi, N; Nayak, S; Vollala V.R. Cytogastrocolic fold and associated atrophy of the gall bladder. Singapore Med. J 2008; 49(9):234-6.
14. Deepa G, Shivakumar GL. Morphological study of variations in the lobar pattern of Liver. NJIRM 2013; Vol. 4(4):42-45.
15. Shojichiba, Tokaosuzucki and Tatsuokasai. A Tongue like projection in the left lobe of human liver, accompanied with lienorenal venous shunt and Intrahepatic arterial anastomosis. Okajimas Folia Anatomica Japonica 1991-1992; vol 68(1):51-66.