



ANATOMICAL VARIATIONS IN CAUDATE LOBE OF LIVER: A CADAVERIC STUDY

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Abstract

56 livers were dissected and removed from cadavers of unknown age and sex, and their caudate lobes were studied in terms of their shapes, any fissures present and their extension of it. Photographs were taken and data were stored. It was found that different shapes of caudate lobes, like rectangular, square, triangular, oval and pyriform, were observed in 17, 5, 9, 5 and 10 livers, respectively. Irregular shapes of caudate lobes were noticed in 10 livers. Out of 56 livers, in 10 livers an extended papillary process was observed, and in 6 livers an extended caudate process was observed. In 5 caudate lobes, fissures were observed.

Introduction

Liver is a mixed gland which is situated in right hypochondriac region and in epigastric region of abdominal cavity. Large amount of abdominal cavity is occupied by liver which is the largest organ. The size of liver varies according to age and sex. It is divided into right and left lobe by falciform ligament anteriorly and ligamentum venosum and ligamentum teres posteriorly. Caudate and quadrate lobe is present in right hepatic lobe. The liver has four lobes or eight segments, depending on whether it is defined by its gross anatomical appearance or by its internal architecture.

Understanding of normal structure of liver and awareness of variation in liver is significant while performing surgery and minimally invasive surgical procedures. Variations may be in the form of different shapes, sizes, number of lobes and its process of hepatic lobes are of prime importance. Caudate lobe is a part of right lobe of liver which is located on the posterior surface of the liver, between the groove for inferior vena cava (IVC) to the right, fissure for ligamentum venosum to the left and porta hepatis anteriorly. Caudate lobe has small rounded projection on the inferior surface of caudate lobe which is called as papillary process ¹. Caudate lobe is of surgical importance because of its own vascularization. It receives blood supply from hepatic arteries and venous drainage is directly into inferior vena cava via hepatic veins. It is considered as individual segment. The explanation given is that the venous drainage of caudate lobe is by the emissary veins that pass directly from caudate lobe to inferior vena cava ². So deep anatomical location makes caudate lobe important for its lobectomy in case of tumor. During abdominal imaging it is challenging to interpret on its

crosssectional anatomy². Exact knowledge about the structure of caudate lobe, its process, shape and extension are important while doing resection of it to get fruitful results. The study was conducted to study different shapes and extension of caudate lobe in cadavers.

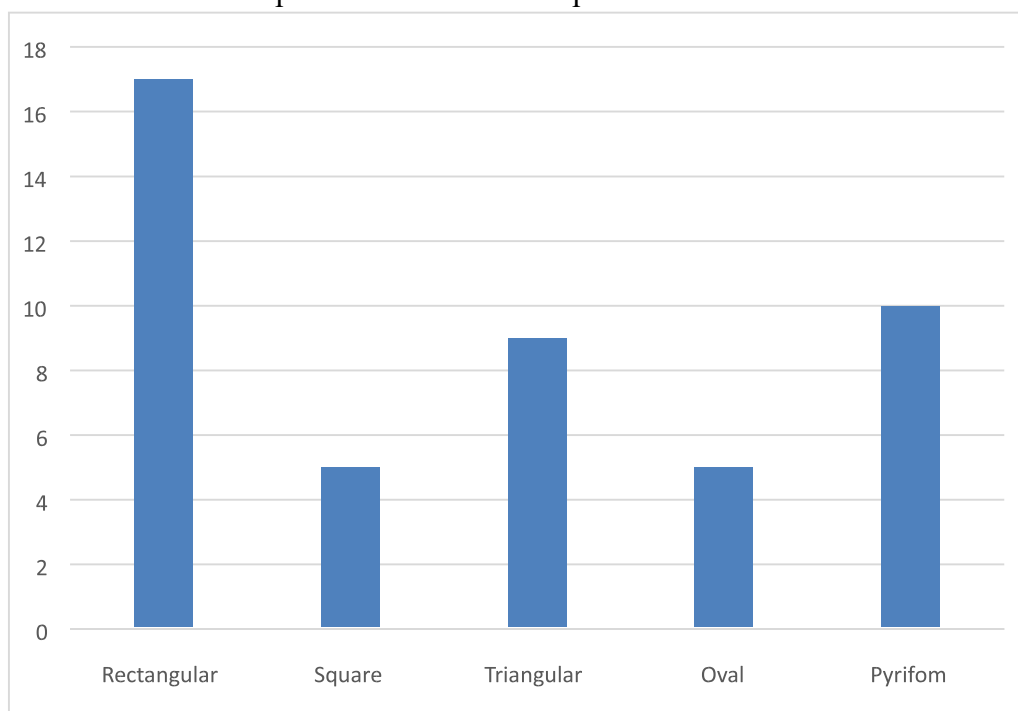
Materials and methods

56 livers were dissected and removed from cadavers of unknown age and sex and their caudate lobes were studied in terms of their shapes, any fissures present and extension of it. Photographs were taken and data was stored.

Observations and results

1. Different shapes of caudate lobes like rectangular, square, triangular, oval and pyriform were observed in 17, 5, 9, 5 and 10 livers respectively.
2. Irregular shapes of caudate lobes were noticed in 10 livers
3. Out of 56 livers, in 10 livers extended papillary process was observed and in 6 livers extended caudate process was observed
4. In 5 caudate lobes fissures were observed.

Graph 1 shows various shapes of caudate lobe



Graph 2 shows details of caudate lobe

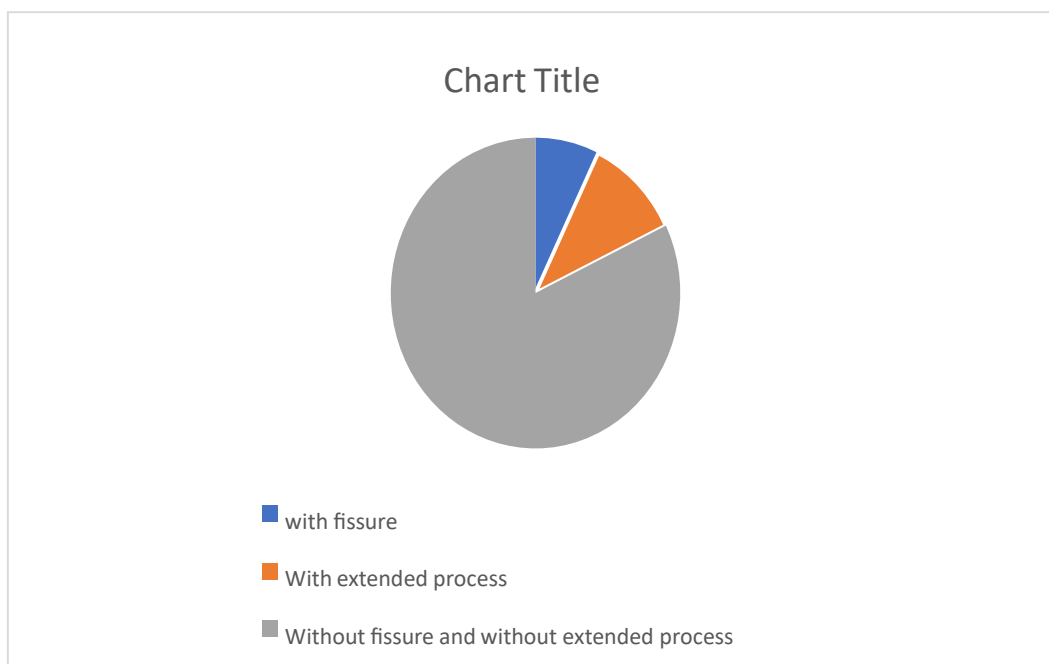


Image 1 Shows different shapes of caudate lobes



A- Triangular, B- Oval, C- Rectangular, D- Square, E- Pyriform F- Irregular

Image 2 shows fissures in caudate lobe

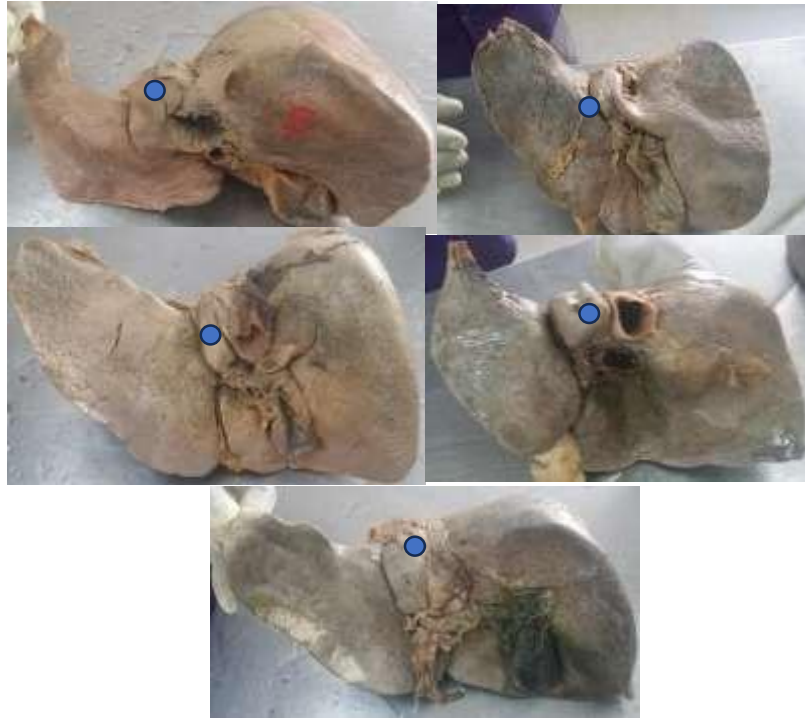


Image 3 shows extended papillary process

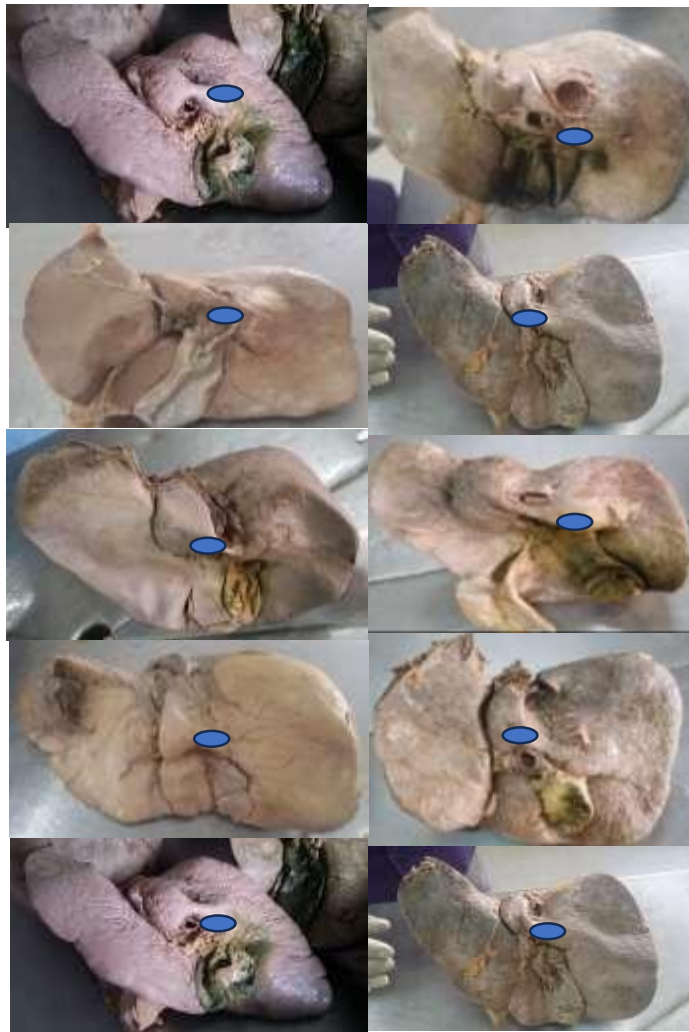


Image 4 shows extended caudate process



Discussion-

Caudate lobe of liver is a complex structure of liver which is independent in terms of vascularity. It is one of the four lobes of liver. Systemic arterial supply to the caudate lobe is usually derived from multiple caudate arteries, which arise from the right, left and middle (if present) hepatic arteries. These arteries are frequently connected to each other and have overlapping vascular territories³. Most of the liver drains into the inferior vena cava by three major hepatic veins, left, right and middle. The caudate lobe, however, drains via several minor hepatic veins (between 1 and 5), which open into the inferior vena cava independently of the major hepatic veins⁴. The caudate lobe is therefore anatomically and functionally independent of the right and left lobes of the liver⁵. The caudate lobe may also be spared from the hepatic parenchymal atrophy of cirrhosis and undergo compensatory hypertrophy⁶. Caudate lobe has three parts as, papillary process, caudate process and para-caval portion. Papillary process is also called as Spiegel lobe which extends towards stomach while caudate process is continuous with right lobe of liver^{7,8}. Papillary and caudate process can be enlarged, absent or smaller in size. Small papillary process can be mistaken as enlarged lymph node at porta hepatis and enlarged Spiegel's lobe can be mistaken as pancreatic body mass⁷. Various shapes like triangular, quadrangular, oval, square and pyriform are observed in caudate lobe. In the present study rectangular shaped caudate lobes were found in 17 livers out of 56, triangular in 9, oval in 5, pyriform in 10, square in 5 and irregular in 10 livers. The overall shape of the caudate lobe was classified into rectangular, piriform or irregular⁹. Morphological variations in caudate lobe are seen in the form of different shapes, presence of fissures and its extended processes. In the present study 5 caudate lobes showed fissures in them and 6 caudate lobes showed extended processes. It was noticed the notch in approximately half of the patients undergoing hepatectomy¹⁰. It was observed that the frequency of occurrence of the notch decreased with the advancing age⁹ and noted that the external notch may be a vestige of the portal segmentation of the caudate lobe¹⁰. It was reported that in 34 of 96 cases, hepatic vein lies in the plane of the vertical fissure¹. It was found prominent papillary process in 33% of the livers in their study¹. Change in the extension and prominence of papillary process may lead to misinterpretation of images while reading CT scans.

Conclusion

Variations in the shape, size and extension of papillary and caudate process are of prime importance while reading CT images and while doing surgery. Errors can be minimized with proper understanding of anatomy of liver and its variations.

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