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Research Article

Morphological Study of the Quadrate Lobe of the Liver

Seye C[1]*, Mar NB[2] and Ndiaye AB[3]

[1]*Alioune Diop University, Diourbel, Senegal*

[2]*Iba Der Thiam University, Thiès, Senegal*

[3]*Cheikh Anta Diop University, Dakar, Senegal*

***Corresponding Author:** Seye C, Alioune Diop University, Diourbel, Senegal.

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Abstract

Objective: The objective of this study is to determine the morphological variations of the quadrate lobe, to propose the criteria that make it possible to define the presence or not of the quadrate lobe, the aspects defining the notion of fusion of the quadrate lobe with the right lobe or the left lobe. This study also looks for the different shapes of the quadrate lobe as well as the existence and frequency of fissures within this lobe. This study will improve anatomical knowledge and diagnosis of liver tumors located in this liver segment.

Material and Methods: This study was carried out in the necropsy room of the Bichat pavilion of the Aristide Le Dantec University Hospital in Dakar. It involved 39 livers of indigenous adult Senegalese cadaveric subjects whose cause of death was neither liver disease nor liver trauma. On each liver collected, rinsed with water, we observed and then photographed the external characteristics of the quadrate lobe including its presence, its limits, its seat, its shape, the presence of furrows.

Results: Of the 39 livers studied, we noted no cases of absence of the quadrate lobe. However, there were 16 cases of complete presence without fusion or 41.03% of cases and 23 cases of presence with fusion or 58.97%. We noticed the absence of total fusion of the lobe with the right lobe and 6 cases of fused quadrate lobe with both the left and right lobe.

We noticed the predominance of the rectangular shape with 68% of cases, followed by the ovoid shape with 25% of cases. The square shape was observed in only two cases.

Six cases (15%) of fissure of the quadrate lobe are noted of which 4 were transverse and 2 were oblique. No antero-posterior cracks were observed.

Conclusion: The quadrate lobe was always present. It is most often partially fused with the right lobe, or the left lobe or both. Complete fusions are done with the left lobe. The quadrate lobe does not reflect its name in its shape which is rectangular in the majority of cases. The presence of fissures in its surface is not uncommon. These data contribute to the improvement of anatomical knowledge of the quadrate lobe in the management of liver pathologies.

Keywords: Quadrate Lobe; Liver; Morphology

Introduction

The quadrate lobe, one of the four main lobes of the liver in the classical anatomical division, is located in front of the transverse groove (liver gate), between the gallbladder fright on the right and the groove of the round ligament on the left [1]. It constitutes the infero-medial sector of the liver, called segment IV in hepatic segmentation [2]. The square lobe shows many morphological variations and only a few studies have discussed these variations. Moreover, there is no objective criterion to define the notion of presence of the quadrate lobe, the notion of partial or total fusion of the quadrate lobe with the right or the left lobe.

The objective of this study is to determine the morphological variations of the quadrate lobe, to propose the criteria that make it possible to define the presence or not of the quadrate lobe, the aspects defining the notion of fusion of the quadrate lobe with the

right lobe or the left lobe. This study also looks for the different shapes of the quadrate lobe as well as the existence and frequency of fissures within this lobe. This study will improve anatomical knowledge and diagnosis of liver tumors located in this liver segment.

Material and Methods

This study was carried out in the necropsy room of the Bichat pavilion of the Aristide Le Dantec University Hospital in Dakar. It involved 39 livers of indigenous adult Senegalese cadaveric subjects whose cause of death was neither liver disease nor liver trauma. On each liver collected, rinsed with water, we observed and then photographed the external characteristics of the square lobe including its presence, its limits, its seat, its shape, the presence of furrows. The grooves can be antero-posterior, transverse or oblique. The square lobe is considered to be present completely without fusion when its boundaries formed forward by transverse groove, to the right by the gallbladder fright and to the left by the groove of the round ligament, are clear. It is considered absent when all its limits are absent. In the end it is considered present and merged when there is a total or partial absence of one or two of these three limits. Thus, we can note a partial or total fusion with the right lobe or the left lobe. Its shape will be described only in cases of complete presence of the quadrate lobe without any form of fusion. Its shape will be classified into three types : ovoid, rectangular, square.

Results

Of the 39 livers studied, we noted no cases of absence of the quadrate lobe. However, there were 16 cases of complete presence without fusion or 41.03% of cases (Figure 1) and 23 cases of presence with fusion or 58.97%. Cases of fusion of the quadrate lobe with the right lobe (Figure 2) and the left lobe (Figure 3) are listed in table 1. We noticed the absence of total fusion of the quadrate lobe with the right lobe and 6 cases of fused quadrate lobe with both the left and right lobe (Figure 4).

Figure 1: Complete quadrate lobe.

Figure 2: Partial fusion of the quadrate lobe with the right lobe.

Figure 3: Fused quadrate lobe with the left lobe.

	Total fusion	Partial fusion	Total
Fusion of the quadrate lobe with the left lobe	4	12	16
Fusion of the quadrate lobe with the right lobe	0	13	13
Total	4	25	29

Table 1: Different types of quadrate lobe fusion.

Figure 4: Fusion with the right and left lobe.

The variations in shape of the 16 complete square lobes are summarized in table 2. We noticed the predominance of the rectangular shape with 68% of cases (Figure 5), followed by the ovoid form with 25% of cases (Figure 6). The quadrate shape was observed in only two cases (Figure 7).

Six cases (15%) of fissure of the quadrate lobe are noted of which 4 were transverse (Figure 8) and 2 were oblique (Figure 9). No antero-posterior fissure were observed.

Shape	Number	Percentage
Ovoid	4	25%
Rectangular	10	62,5%
Square	2	12,5%
Total	16	100%

Table 2: Variations in the shape of complete quadrate lobes.

Figure 5: Rectangular quadrate lobe.

Figure 6: Ovoid quadrate lobe.

Figure 7: Quadrate lobe in its square shape.

Figure 8: Quadrate lobe with transverse fissure.

Figure 9: Obliquely cracked square lobe.

Discussion

In our study, the presence of the quadrate lobe was noted in all livers studied according to our classification. The absence of the quadrate lobe remains rare in the various studies of the literature. Indeed, Sharmila [3] noticed the absence of the quadrate lobe in 3 cases (5%) while Joshi MM [4] observed it in 2 cases (2%). However, by observing the illustrations of these cases of absence of the square lobe in these different studies, it seems more reasonable to

us to speak of total fusion of the quadrate lobe with the left lobe. Fusions of the quadrate lobe with the right lobe require a total absence of the vesicular fright; which is exceptional. Thus, in our study we noticed four cases or 10% total fusion of the quadrate lobe with the left lobe while Joshi SD [5] finds two cases (2.2%). Fused quadrate lobes (58.97%) are the majority in our study, compared to the case of a quadrate lobe without fusion (41.03%). These often partial fusions of the quadrate lobe with the right or left lobe are due to hepatic parenchyma bridges that either interrupt the continuity of the groove of the round ligament on the left, or extend the quadrate lobe by shortening the gallbladder fright on the right. Thus, Patil [6] noted 5 cases (10%) of partial fusion or liver bridge between the quadrate lobe and the left lobe while Joshi MM [4] finds 13 cases (13%). These cases of fusion of the quadrate lobe with the left lobe are weak, compared to Joshi's study which finds 30%, not far from the 16 cases (41%) of fusion in our study. Fusions of the quadrate lobe with the right lobe are very common in our study, compared to data from the literature [3,5]. The quadrate lobe reflects its name by shape only in 12.5% of cases in our study. Effect it comes in a rectangular form in the majority of cases in our study with 62.5%. This predominance of the rectangular shape is found in the studies of Joshi MM [4] and Joshi SD [5] with respectively 74% and 66% of cases. Namrata [6] describes the predominance of the quadrangular shape in 85% of the livers examined, followed by the rectangular shape which represents only 10%.

The fissure of the quadrate lobe in the majority of the data in the literature, vary between 2 and 5% [3,4,8-10]. Which is low compared to our study where we noted 15% fissure. However Joshi SD [5] in his study finds 20% fissure on the 90 quadrate lobes studied.

The limitations of this study are the absence of the dimensions of the quadrate lobe that we could not measure in this study but also the number of quadrate lobes studied which is not very high.

Conclusion

Of the 39 livers studied, the quadrate lobe was always present. It is most often partially fused with the right lobe, or the left lobe or both. Complete fusions are done with the left lobe. The quadrate lobe does not reflect its name in its shape which is rectangular in the majority of cases. The presence of fissures in its surface is not uncommon. This study makes it possible to define objective criteria on the notion of presence of the quadrate lobe, the notion of partial or total fusion of the quadrate lobe with the right lobe and or the left lobe. Thus These data contribute to the improvement of anatomical knowledge of the quadrate lobe in the management of liver pathologies.

Conflict of Interest

None.

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