

Morphological Variations in Gall Bladders of Cadavers

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ABSTRACT

Gall bladder is a pear-shaped pouch located in right hypochondrium, in a shallow fossa on the quadrate lobe of the liver. There are very common variations associated with gall bladder and it is surgeon's duty to be familiar with them so as to avoid surgical errors.

Aim: To describe external morphology, incidence of different shapes of gall bladder and to study variations in gross appearance of gall bladder

Material and method: A total number of 50 cadavers were dissected, analyzed using SPSS and tested at 5% level of significance.

Results: Out of 50 specimens studied, 92% gall bladders were found to be pear shape, 4% cylindrical, 2% flask shape and 2% irregular.

Conclusion: The knowledge of different shapes, variations and anomalies of gall bladder could be useful for radiologists and surgeons to prevent intra-operative hazards.

Key Words: Gall Bladder; Flask shape; Cylindrical

INTRODUCTION

The study and research in the field of human anatomy has a fundamental relationship and a lot of contribution in the practice of medicine and in particular to surgery. It is believed that human beings are similar in their general anatomical construction but when one investigates any particular region with more details, there found the variations in many aspects. The gall bladder is a pear-shaped pouch measuring 7×5×1 centimeter. It is situated in the right hypochondrium, in a shallow fossa on the quadrate lobe of liver. The fundus touches the anterior abdominal wall and continues with the body and the neck that narrows into cystic duct [1].

According to some eminent workers, a common pattern of variations may be found associated with gall bladder. These variations are due to arrest or deviation in normal embryological development. This knowledge of different variations and anomalies is necessary for surgeons during laparoscopic surgeries to prevent iatrogenic injuries those can leads to increase morbidity and mortality.

The present study describes variations seen in external morphology of gall bladder along with incidence and differences in dimensions and shapes.

AIM & OBJECTIVES

- 1.To study the incidence of different shapes of gall bladder.
- 2.To describe variations and anomalies associated with external morphology of gall bladder.
- 3.To analyze dimensions (length and breadth) of gall bladder.

METHOD AND MATERIALS

The present study was carried out in the Department of Anatomy in collaboration with the department of Forensic Medicine and Surgery department, PGIMS, Rohtak, Haryana, India. A total number of 50 adult human cadavers of both gender and age ranging from 18 years to 60 years were taken during medico-legal autopsies done in the department of Forensic Medicine after taking informed consent. The ethical clearance was taken from Biomedical Research Ethics Committee, Pt. B. D. Sharma Post Graduate Institute of Medical Sciences, UHS, Rohtak.

Specimens were collected as block dissection of the liver along with its associated structures and were fixed in 10% formalin for 24 hours. Gall bladder was dissected carefully and its shape, size and any associated variations were noted. Data was analyzed using SPSS 20.0 version and the result was tested at 5% level of significance. The present study was a part of larger study where extrahepatic biliary apparatus was taken into account.

RESULTS

In the present study, out of total 50 cases studied, pear shaped gall bladder (Figure 1) was observed in 92% of the samples whereas cylindrical shaped (Figure 1), flask shaped (Figure 1) and irregular shaped gall bladders constituted 4%, 2% and 2% of the samples respectively. Most commonly observed shape was pear shape (as shown in Table 1).

Mean length of the gall bladder was 6.47 ± 1.59 cm whereas mean breadth was 3.19 ± 0.66 cm. The length was observed to be ranging between 4 and 9cm whereas breadth of gall bladder was varying between 2 and 5.5 cm. A significant positive correlation was noted between length and breadth of gall bladder with Pearson's correlation coefficient as 0.520 and p value as <0.01 (as shown in Table 2).

Out of total 50 cases, 3 Phrygian cap (Figure 2) and 3 Floating (Figure 2) gall bladder was observed with incidence of 6% each (Tables 3 & 4).

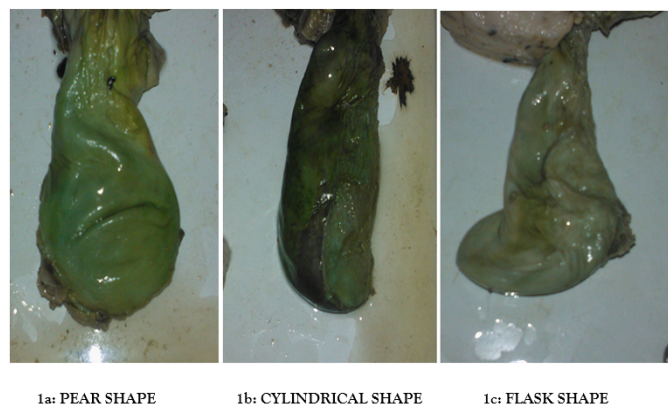


Figure 1) Presenting the Different Shapes of Gall Bladder.

TABLE 1

Frequency of different shapes of gall bladder.

Shapes	No. of specimens	% (percentage)
Pear	46	92%
Cylindrical	2	4%
Flask	1	2%
Irregular	1	2%

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TABLE 2

Dimensions of the gall bladder.

Dimensions	Mean ± SD	Range
Length(cm)	6.47 ± 1.59	4-9 cm
Breadth(cm)	3.19 ± 0.66	2-5.5 cm

(Pearson's correlation coefficient) $r = 0.520$ p value < 0.01

TABLE 3

Anomalies associated with the gall bladder.

Anomalies	No. of specimens	% (percentage)
Gall bladder Phrygian cap	3	6%
Floating gall bladder	3	6%



2a: PHRYGIAN CAP ANOMALY

2b: FLOATING GALL BLADDER

Figure 2) Showing Anomalies of Gall Bladder.

TABLE 4

Comparison of dimensions and shapes of gall bladder as reported by various authors.

Authors	Length of gall bladder	Breadth of gall bladder	Shapes of gall bladder
Gregor et al ⁶	7.5-10 cm	-	-
Turner & Fulcher ⁷	10cm	3-5cm	Elliptical (% not mentioned)
Moore & Dalley ⁵	7-10cm	-	Pear shaped (% not mentioned)
Chiari & Shah ²	7-10cm	2-5cm	Pear shaped (% not mentioned)
Vakili & Pomfret ⁸	7-10cm	4cm	Piriform (% not mentioned)
Standring ⁹	7-10cm	-	Flask shaped (% not mentioned)
Rajguru et al ³	5-12cm	2.5-5cm	Pear (85%), flask (5%), cylindrical (3.33%), hourglass & retort or irregular (1.67% each)
Anjankar et al ¹⁰	7-10cm	2-5cm	Pear (commonest) (82.22%)
Present study	4-9cm	2-5.5cm	Pear (92%), flask (2%), cylindrical (4%), irregular (2%) (Fig. 1a,b,c)

DISCUSSION

The gall bladder varies greatly in size and shape and it may be impossible sometimes to distinguish between various parts described. The smallest and largest gall bladder observed in the present study was of 4 cm and 9 cm in length respectively. The length of gall bladder in the present study was

slightly less than what had been reported by others. The breadth of the gall bladders in the present study ranged between 2-5.5 cm and it was similar to that reported by Chiari & Shah [2] and Rajguru et al. [3]. Gore et al. [4] stated that the size might increase after vagotomy, in diabetes because of autoimmune neuropathy, in pregnancy, in patients with sickle cell disease, after cystic duct obstruction and in extreme obese people whereas micro gallbladder was usually seen in association with cystic fibrosis. In the present study this point could not be discussed because this type of history was not taken during sample collection.

The pear shape of the gall bladder was found in most of the specimens (92%) in the present study and cylindrical, irregular and flask shaped gall bladders were also observed in 4%, 2% and another 2% of the cases respectively. These observations were in agreement with the findings of Rajguru et al [3]. But, no hourglass or retort shape of gall bladder was observed in the present study as reported by Rajguru et al. Moore & Dalley [5] and Chiari & Shah [2] also reported pear shaped gall bladder in most of the cases but percentage frequency of this type of gall bladder was not mentioned [6-10].

In the present study folded fundus (Phrygian cap) was found in three (6%) specimens. Similar findings were reported by Lichtenstein & Nicosia [11], Gore et al. [4] and Rajguru et al. [3] whereas Deutsch et al. reported this anomaly only in 0.33% cases [12].

Several authors such as Mayo and Kendrick [13], Goiney et al [14], Barnes et al [15], Bose & Sastry [16] in their studies had reported ectopic location of gall bladder, double and triple gall bladder and agenesis of gall bladder but no such findings were observed in the present study.

A wandering or floating gall bladder is suspended from a long mesentery and hanging freely from the liver bed. It is susceptible to torsion and consequent gangrene and may herniate through the foramen of Winslow into the lesser sac.

Floating gall bladder has been cited in literature in the form of numerous case reports. Kabarouers et al [17] reported a case of floating gall bladder with hypoplasia of right lobe of liver and Maeda [18] also reported a case of floating gall bladder associated with left hepatic lobe hypoplasia. In the present study, floating gall bladder was observed in 3 cases (6%).

CONCLUSION

The present study describes variations seen in external morphology of gall bladder along with incidence and differences in dimensions and shapes. The knowledge of different shapes, variations and anomalies of gall bladder could be useful for radiologists and surgeons to avoid surgical errors.

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