Original Research Article

Morphometric study of cadaveric adult human gall bladder

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Abstract

Background: Gall bladder is highly variant organ, as it presents with variations in dimensions, shape, external morphology in form of folds and abnormal positions. These anatomic variations of gall bladder and biliary tract are important as failure to recognize them can lead to complications following laparoscopic cholecystectomy and radiological interventions. Present study was aimed to conduct morphometric study of cadaveric adult human gall bladder. **Material and Methods:** Present study was descriptive, observational study, conducted in 64 gall bladders extracted from adult (age > 40 years) human liver specimens from embalmed cadavers. **Results:** Among 64 gall bladders studied, mean length was 6.62 ± 0.92 cm while mean width was 3.92 ± 0.71 cm. Majority gall bladder had length 6-7.5 cm (76.56 %). Majority gall bladder had length 3.2-4.2 cm (65.63 %). Common shape of gall bladder noted was pear (78.13 %), Hartman's pouch (9.38 %), while other shapes noted were cylindrical (4.69 %), flask shaped (3.13 %), bilobed (1.56 %), hour glass (1.56 %) and irregular (1.56 %). **Conclusion:** Study of various morphological and morphometric variants of the gall bladder is important for teaching and acknowledgement of undergraduate and postgraduate students in departments of anatomy, general surgery, radiology.
Keywords: gall bladder, shape, hepatobiliary system, morphological study

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INTRODUCTION

The gall bladder is a blind diverticulum-like structure for the storage and release of bile into the duodenum for fat digestion.[1] Gall bladder varies highly in dimensions, shape and morphology. It may be double, bifid or altogether absent. It may bear a phrygian cap which is usually demarcated on the fundus of gall bladder. The phrygian cap is reported as a septum within an otherwise normal gall bladder on ultrasound examination of abdomen.[2] The most common surgical procedures performed on biliary tract is cholecystectomy, commonly for gall stones. Cholelithiasis was more common in females, 5th decade, presented most commonly with pain abdomen. Ultrasonography was the most common investigation. Laparoscopic cholecystectomy reduces the number of hospital days, pain disability. Gall bladder is highly variant organ, as it presents with variations in dimensions, shape, external morphology in form of folds and abnormal positions. These anatomic variations of gall bladder and biliary tract are important as failure to recognize them can lead to complications like inadvertent ductal ligation, biliary leak and strictures following laparoscopic cholecystectomy and radiological interventions.[3,4] Present study was aimed to conduct morphometric study of cadaveric adult human gall bladder.

MATERIAL AND METHODS

Present study was descriptive, observational study, conducted in department of anatomy, at Kanachur Institute of Medical Sciences, Mangalore, India. Study duration was of 2 years (December 2014 to December 2016). Study was approved by institutional ethical committee. In present study, 64 gall bladders extracted from adult (age > 40 years) human liver specimens from embalmed cadavers were studied. The position, shape, and any external variation (pear shaped, flask shaped, cylindrical, hourglass shaped, retort shaped, bilobed, irregular) of the gall bladders were noted. Gall bladders were measured for their

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dimensions using a metal scale. The length was measured as the distance from fundus to neck. The width (maximum transverse measurement) was also measured. Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

RESULTS

Among 64 gall bladders studied, mean length was 6.62 ± 0.92 cm while mean width was 3.92 ± 0.71 cm.

Table 1: Measurements of gall bladder in the present study

Findings	Range (cm)	Mean and standard deviation(cm)
Length	5.6 - 8.6	6.62 ± 0.92
Width	2.2 - 5.4	3.92 ± 0.71

Majority gall bladder had length 6-7.5 cm (76.56 %).

Table 2: Variations in the length of the gallbladder.

Length in cm	No. of specimens	Percentage
4 - 6	7	10.94%
6- 7.5	49	76.56%
7.5-9	8	12.50%

Majority gall bladder had length 3.2-4.2 cm (65.63 %).

Table 3: Variations in the width of gallbladder.

Width in cm	No. of specimens	Percentage
2.5-3.2	9	14.06%
3.2-4.2	42	65.63%
4.2-5.1	13	20.31%

In present study, common shape of gall bladder noted was pear (78.13 %), Hartman's pouch (9.38 %), while other shapes noted were cylindrical (4.69 %), flask shaped (3.13 %), bilobed (1.56 %), hour glass (1.56 %) and irregular (1.56 %).

Table 3: Variations in the shapes of gallbladder.

Shapes of the gallbladder	No. of specimens	Percentage
Pear	50	78.13%
Hartman's pouch	6	9.38%
Cylindrical	3	4.69%
Flask shaped	2	3.13%
Bilobed	1	1.56%
Hour glass	1	1.56%
Irregular	1	1.56%

DISCUSSION

The gall bladder development in fetal life is complex and starts as early as the 4th week of gestation; the abnormal development of the gall bladder is associated with various congenital abnormalities.[5] Cholecystectomy is the most common operative procedures performed on biliary tract. In the surgery of gallbladder, both the normal anatomy and the high incidence of variations occurring in the relations between the vascular and the ductal systems are important to prevent complications. Size of gall bladder may vary in some physiological condition as well as in some diseased conditions. Size of gall bladder may increase after vagotomy, in diabetes because of autoimmune neuropathy, in sickle cell disease, after cystic and common duct obstruction, in pregnancy and in obese. Microgall bladder may found associated with cystic fibrosis.[6] Gallbladder size and its volume are the key determinants of gallbladder contraction and function. These parameters g*et al.*tered with age and can be explained of the age-related reduction in gallbladder contractility and its association with gallstone formation. The gallbladder volume shows a statistically significant increase with age and there is a marked increase in these parameters after the 5th decade. This explains the exponential increase in prevalence of cholelithiasis and cholecystitis by 4 to 10 times after the 5th decade of life.[7] Rajendra R *et al.*,[8] found incidence of normal gall bladder was 53.2%, oval shaped 11.4%, cylindrical 11.4%, hourglass shaped 6.3%, partially intrahepatic 5.1%and intrahepatic 3.8%, Phrygian cap 3.8%, left gallbladder 2.5%, double gall bladder 1.5%. The precise knowledge of the various morphological and morphometric variants of the gall bladder is important for the operating Surgeons and Radiologists. The preoperative diagnosis of these variations helps to reduce the complications like bleeding and biliary leaks.

CONCLUSION

Study of various morphological and morphometric variants of the gall bladder is important for teaching and acknowledgement of undergraduate and postgraduate

students in departments of anatomy, general surgery, radiology.

REFERENCES

1. Marciani L, Cox EF, Hoad CL, Totman JJ, Costigan C, Singh G, et al. Effects of various food ingredients on gall bladder emptying. Eur J Clin Nutr 2013;67:1182-7.
2. Standring S. Gray's anatomy: Theanatomical basis of clinical practice, 40th edition. Elsevier Churchill Livingstone, Philadelphia, London 2008;1177-1181.
3. Rajguru J, Khare S, Jain S, Ghai R, Singla M, Goel P. Variations in The External Morphology of Gall Bladder. J Anat Soc India. 2012;61(1):9–12.
4. Blazer S, Zimmer EZ, Bronshtein M. Nonvisualization of the fetal gallbladder in early pregnancy: Comparison with clinical outcome. Radiology 2002;224:379-82.
5. J. Desai, N Bhojak, Study of variations in external Morphology of gallbladder in cadavers, BJ Kines NJBAS, 2015; 7(1).
6. Kariuki BN, Saidi H, Ndung'u B, Kaisha W, Ogeng'o J. Influence of age on gallbladder morphometry. Anat J Afr. 2017;6(2):987–94.
7. Rajendra R, Makandar UK, Tejaswi H L, Patil. B. G. Morphometric Study of Gall Bladder In South Indian Populations (cadaveric study) Indian Journal of Forensic and community Medicine, January – March, 2015; 2(1): 35-42.

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