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Anatomical Study of Gall Bladder and External Morphology

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Abstract: *- Introduction - The gallbladder is the pear shaped musculomembranous structure lodged in a fossa on the inferior surface of the right lobe of the liver and shows various anomalies and anatomic variations. For upper abdominal surgeries and radiological approach it is very important to know and understand the anatomy and different types of variations of the gall bladder. objective - Aim of this study was to study External morphology of gallbladder . Material and method:-Study was conducted on 60 gallbladder obtained from formalin fixed cadavers. Location, Shape, length and transverse diameter of gall bladder were studied. Result : - Commonest shape observed in this study was pear shaped . Average length of gallbladder was found to be 10.5cm. Mean diameter of gall bladder was 3.4 cm, folded Gall bladder and hartmann pouch were observed. Commonest location of Gallbladder is supramarginal .Conclusion : - Knowledge of this variations of Gallbladder is important for surgeon and radiologist for avoid iatrogenic injuries during procedures.*
Key words*: - Gall bladder, External morphology and variations.*

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I. Introduction

Gall bladder flask shaped blind diverticula which is situated in contact with under surface of right lobe of liver. In the adult the gallbladder length is between 7 and 10 cm with a capacity of up to 50 ml (1). The gallbladder has fundus, body and neck. The fundus lies at the lateral end of the body and usually projects below the inferior border of the liver to a variable length (1). Variations in shape, size of gallbladder not uncommon. Malformation of gallbladder and the Extrabiliary system may result of deviation and arrest normal embryological developmental process. These variations frequently observed during imaging of gallbladder and during surgical procedure like laparoscopy and cholecystectomy. Normally gall bladder found in right upper quadrant but may found rarely in retro duodenal, retro pancreatic or within falciform ligament, intra hepatic or retro placed (2).

II. Material and Methods

The Study was conducted on 60 gallbladders obtained from formalin fixed cadavers used for undergraduate students study during period of 5 years. The specimens of gall bladder were procured from embalmed human adult cadavers.The abdominal cavity was opened and the peritoneal cavity exposed. All the specimens of gall bladder were numbered and different parameters were measured. Each specimen was studied for location, shape, length ,breadth and variations in external morphology of Gallbladder. Measurements like maximum transverse diameter of gallbladder at the level of body of gallbladder and maximum length from tip of fundus to the neck of gall bladder were taken. All specimens were inspected by naked eye. According to their shape gallbladder were classified into pear shaped, cylindrical shaped, irregular shaped. Location of Gallbladder is also studied whether it is supra marginal, marginal or infra marginal.

III. Results

Length of gall bladders was found to be ranging between 4cms to 17cms. In forty-eight (80%) gall bladders the length ranged between 7-10cms. The smallest gall bladder was 4 cm in length and the largest was 17cms. The breadth of the gall bladders was observed to be between 2.5cms -5cms. Forty one gallbladders (66.69%) the breadth ranged between 3-3.4cms. Shapes of the gall bladder were either pear shaped, cylindrical, irregular or flask shape shaped. Folded Gall bladder and Hartmann pouch were observed in five (8.33%) specimens out of sixty. We found Gall bladder at supra marginal to inferior border of liver in 56.66 %, marginal in 35.01% and infra marginal in 6.66%.

Fig 1: pear shaped Gall bladder

Fig 2: hartmann pouch

Fig 3: cylindrical shape

Fig 4: supra marginal Gall bladder

Fig 5: Agenesis of gallbladder

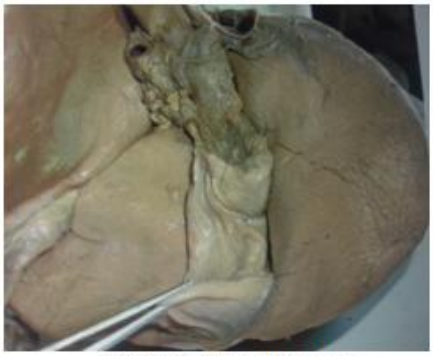

Fig 6: folded gallbladder

IV. Discussion

These various entities and their incidences are depictedGall bladder varies greatly in its size and shape. It may be duplicated, bifid or sometimes absent. The liver, gall bladder and the biliary ductal system develop from the hepatic diverticulum of the foregut, in the beginning of the fourth week of development . The gall bladder varies greatly in size and shape and it may be impossible sometimes to distinguish between various parts described. The dimensions of the gall bladder as found in this study were nearer with those of Chiari and Shah [3] . we found absent of Gallbladder without any abnormalities of biliary tract in one specimen, which is also observed by Chopra PJ et al [4]. Joliat J.R et al [5] . G. Desolneux et al [6]observed duplication of the gall bladder. Agarwal A et al[7] reported double gall bladder. The Pear shape of the gall bladder as found in most of the specimens (85%) in this study were in consonance with the findings of many workers Moore and Dalley[8] and Chari and Shah [3] . Cylindrical shaped Gallbladder found in three specimens in our study.This shape has been observed by Hollingshead[9] .Hourglass gallbladder has been reported by Shaher[10] . Retort shaped gall bladder has been described by Meilstrup et al [11] in a sonographic study. The gall bladder is relatively constant in its development and the two most significant variations are the folded fundus and variation at the neck of the gall bladder . In the present study folding of the neck over the body of the gall bladder was found in

2 (3.33%) specimens. Meilstrup et al [(11)] observed that gross bending of the gallbladder could occur posteriorly or anteriorly and lead to bizarre or unusual shapes when visualized by sonography and other imaging techniques. Futura et al [(12)] observed that there was a significantly higher prevalence of kinking of the gallbladder and Hartmann's pouch in the females than in male subjects which could be related to the higher rate of gallstone formation and biliary tract diseases in females. We have observed two specimens (3.3%) from one male and one female cadavers with Hartmann pouch . Gore et al[(13)] found it in 1%-6%of population, and observed a fold or septum between the body and the fundus. In the present study, folded fundus was found in one (1.65%) specimens . This variant is asymptomatic and can be diagnosed on x-ray or ultrasound. This anomaly is of two types. In the retroserosal or concealed type, the peritoneum completely invests the gall bladder, but in serosal or visible type, the peritoneum gets reflected on itself after it follows the bend in the fundus. This variant may sometimes simulate a mass in the liver. It is of no clinical significance unless mistaken for a layer of stones or hyperplastic cholecystosis[(14)]

The liver primordium appears as an outgrowth of the endodermal epithelium at the distal end of the foregut in the middle of the third week. This liver bud or hepatic diverticula consist of rapidly proliferative cells that penetrate mesodermal plate called septum transversum. Hepatic cell continue to penetrate septum so the connection between the hepatic diverticulum and foregut narrows forming bile duct. Small ventral outgrowth formed by hepatic bud gives rise to the gallbladder and the cystic duct [(15)] . Malformation of gallbladder and the billiary system may result of deviation and arrest normal embryological developmental process[(16)] . This results in malformation of Liver, Gallbladder and Extra biliary apparatus. Failure to recognize them may lead to inadvertent ductal ligation, billiary leaks and strictures after laparoscopic cholecystectomy[(17,18)] .

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