Original Research Article

Gross and macroscopic features of gallbladder in cholecystectomy specimen

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Abstract

Background: The gallbladder is described as having a fundus, body and neck. The neck lies at the medial end close to the portahepatis, and almost always has a short peritoneal-covered attachment to the liver (mesentery); this mesentery usually contains the cystic artery. The mucosa at the medial end of the neck is obliquely ridged, forming a spiral groove continuous with the spiral valve of the cystic duct. **Methodology:** This is a prospective study undertaken in the Department of Pathology over a period of 2 years. The study mainly included all cholecystectomy specimens received at the Department of Pathology. **Results:** Among 220 specimens, mucosa appeared velvety in 201 (91.3%). Six specimens (2.7%) showed yellow flecks, five (2.2%) showed necrosis, four (1.8%) showed polyp. One specimen each showed infiltrating growth (0.5%), Phrygian cap (0.5%), multiseptate gallbladder (0.5%) and mucocele (0.5%). **Conclusion:** Gallbladder was enlarged i.e, >10 cm in length in seven (3.2%) specimens, distorted in 14 (6.4%), contracted in four (1.8%) and normal in size in 195 (88.6%) specimens.
Key Words: Gallbladder, Cholecystectomy, Macroscopy.

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INTRODUCTION

The gallbladder is a flask-shaped, blind-ending diverticulum attached to the common bile duct by the cystic duct. In life, it is grey-blue in colour and usually lies attached to the inferior surface of the right lobe of the liver by connective tissue.[1] It measures up to 10 cm long and 3 to 4 cm wide in normal adults and its wall is approximately 1 to 2 mm thick, varying due to the degree of muscular contraction.[2] It usually lies in a shallow fossa in the liver parenchyma covered by peritoneum continued from the liver surface. The gallbladder is described as having a fundus, body and neck. The neck lies at the medial end close to the portahepatis, and almost always has a short peritoneal-covered attachment to the liver (mesentery); this mesentery usually contains the cystic artery. The mucosa at the medial end of the neck is obliquely ridged, forming a spiral groove continuous with the spiral valve of the cystic duct. At its lateral end the neck widens out to form the body of the gallbladder and this widening is often referred to in clinical practice as 'Hartmann's pouch'. The neck lies anterior to the second part of the duodenum. The body of the gallbladder normally lies in contact with the liver surface. It lies anterior to the second part of the duodenum and the right end of the transverse colon. The wall of the gallbladder comprises four layers: epithelium, lamina propria, smooth muscle, and serosa/adventitia. The lumen of the gallbladder is lined by a simple columnar epithelium, composed of two types of cells: the more common clear cells and the infrequent brush cells. The oval nuclei of these cells are basally positioned and the supranuclear cytoplasm displays occasional secretory granules containing mucinogen. In electron micrographs, their luminal surface displays short microvilli coated by a thin layer of glycocalyx. The basal region of the cytoplasm is

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particularly rich in mitochondria, providing abundant energy for the Na^+,K^+-ATPase pump present in the basolateral cell membrane. The lamina propria is composed of a vascularized loose connective tissue that is well endowed with elastic and collagen fibers. In the neck of the gallbladder, the lamina propria houses simple tubuloalveolar glands, which produce a small amount of mucus to lubricate the lumen of this constricted region. The thin, smooth muscle layer of the gallbladder is composed mostly of obliquely oriented fibers, whereas others are oriented longitudinally.[3] The perimuscular connective tissue (also called subserosa or adventitia) contains variable amounts of fibroelastic and adipose tissue as well as nerves, vessels, ganglia, and paraganglia. Mucosal invaginations (diverticula), referred to as Aschoff-Rokitansky sinuses, may be seen in normal gallbladders (in up to 40% of autopsies), but are much more pronounced in inflamed gallbladders. Bile ductules, known as Luschka ducts, which are thought to be remnants of the embryonic primordium of the liver, may be seen in the perimuscular connective tissue, especially adjacent to the liver. They have been reported in 10% of cholecystectomy specimens, and may occasionally measure up to 1 to 2 mm. They are lined by a cuboidal type of biliary epithelium, similar to the intrahepatic bile ductules, and are surrounded by a collar of fibrous tissue.

MATERIALA AND METHODS

This is a prospective study undertaken in the Department of Pathology over a period of 2 years. The study mainly included all cholecystectomy specimens received at the Department of Pathology. The patient's name, age, sex, parity, diet and clinical features were noted. Some of the cases had been diagnosed clinically and all cases had been subjected to ultrasound examination preoperatively. Resected gallbladder specimens were sent either cut opened or intact in 10% formalin. Intact specimens were opened by longitudinal incision. All specimens were examined grossly for the presence of stones, growths, polyps, ulceration, and other gross abnormalities. The size of the gallbladder, shape, external surface, wall thickness, and the nature of mucosa were noted. Chemical analysis of the gallstones was not done. Chi Square test and Fisher's exact test was done to know the association between different histopathological parameters and a p value of <0.05 was taken as statistically significant.

RESULTS

During the period of 2 years, a total of 220 cholecystectomy specimens were received. This constituted 0.89% of total number of surgical specimens (24857) received during this period. Out of 220 cholecystectomy specimens, 159 were those of females (72.3%) and 61 were males (27.7%). Hence there was female preponderance with male: female ratio being 1:2.61.

Table 1: Age distibution in gallbladder disease

Age Distribution	Male	Female	Total(220) & Percentage(100)
1-10 years	1	2	3 (1.4%)
11-20 years	2	4	6 (2.7%)
21-30 years	4	26	30 (13.6%)
31-40 years	14	42	56 (25.5%)
41-50 years	10	38	48 (21.8%)
51-60 years	17	30	47 (21.4%)
61-70 years	9	15	24 (10.9%)
71-80 years	3	2	5 (2.2%)
81-90 years	1	0	1 (0.5%)

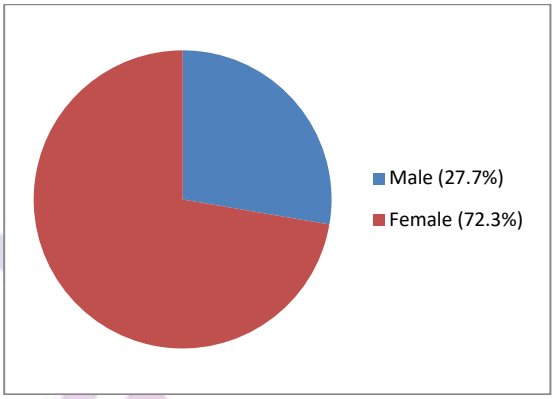

Figure 1: Sex distribution in gallbladder disease

The age of the patients ranged from one to 85 years. Most of the cases i.e. 56 patients (25.5%) were in the age group of 31-40 years. Median age of presentation was 43.6 years. Of the 159 female patients who underwent cholecystectomy, 42 (26.4%) were in the age group of 31-40 years. Out of 61 male patients, 17 (27.9%) were in the age group of 51-60 years. Of the 220 patients, 138 (62.7%) had pain abdomen, 68 (30.9%) had pain abdomen and vomiting, nine (4.1%) had pain abdomen and fever, three (1.4%) had pain abdomen and obstructive jaundice and two (0.9%) patients were asymptomatic. On examination three patients had icterus whose age ranged from one to nine years and had been operated for choledochal cyst excision. In the present study of 220 patients, 58 (26.4%) patients consumed vegetarian diet of which 20 were males and 38 were females. Mixed diet was consumed by 162 (73.6%) patients of which 41 were males and 121 were females. Of the 159 female patients, 149 (93.7%) patients were parous and 10 (6.3%) were nulliparous. Of the 149 parous women, 81 (54.4%) were multiparous and had three or more than three children 68 (45.6%) had one to two children. Gallbladder was enlarged i.e, >10 cm in length in seven (3.2%) specimens, distorted in 14 (6.4%), contracted in four (1.8%) and normal in size in 195 (88.6%) specimens.

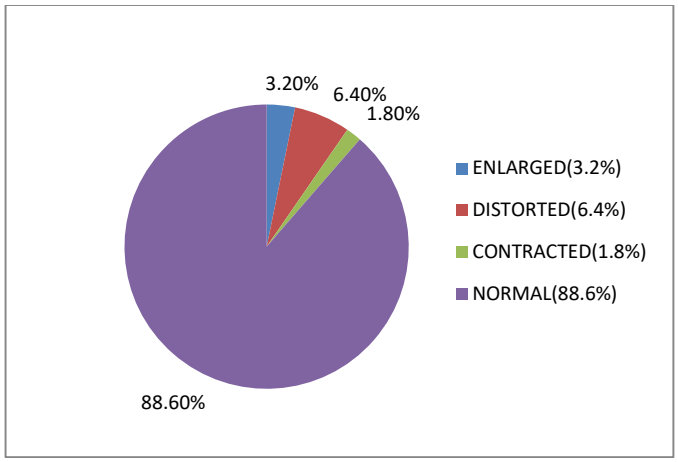

Figure 2: Size of the gallbladder

Wall of the gallbladder was thickened i.e, more than or equal to 3mm in 172 (78.2%) and normal in 48 (21.8%) specimens.

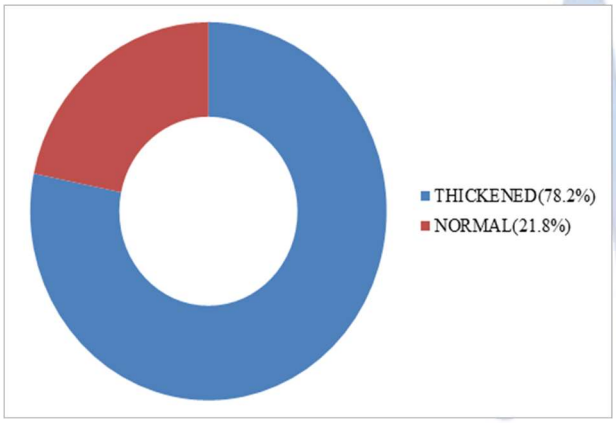

Figure 3: Wall thickness of the gallbladder

Among 220 specimens, mucosa appeared velvety in 201 (91.3%). Six specimens (2.7%) showed yellow flecks, five (2.2%) showed necrosis, four (1.8%) showed polyp. One specimen each showed infiltrating growth (0.5%), Phrygian cap (0.5%), multiseptate gallbladder (0.5%) and mucocele (0.5%).

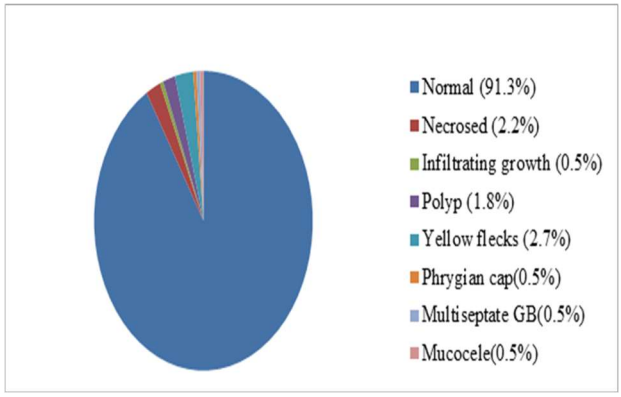

Figure 4: Macroscopic appearance of mucosa

DISCUSSION

In the present study maximum number of cases was noted in the age group of 31-40 years. Similar observation was made by Mohan H et al [5] followed by Tyagi SP et al [6] and Gangoli AS (1999)[7] but these have taken age group range from 31- 50 years. In the study conducted by Mohan N (2007)[8] maximum number of cases was noted in the age group of 41-50 years. In the present study, female patients (42) showed higher incidence in the age group of 31-40 years, which covered their reproductive phase of life and male patients (17) in the age group of 51-60 years. In the present study there was female preponderance with male to female ratio of 1:2.61. There were 159 female patients and 61 male patients who underwent cholecystectomy. Similar female preponderance in gallbladder disease was observed by the following workers The female ratio observed by Tyagi SP et al (1992) was considerably higher when compared with our study and others. Of 220 patients, 138 (62.7%) patients had pain abdomen, 68 (30.9%) had pain abdomen and vomiting, nine (4.1%) had pain abdomen and fever, three (1.4%) had pain abdomen and obstructive jaundice and two (0.9%) patients were asymptomatic. The observation made in our study was consistent with that made by Gangoli AS (1999)[7] who observed pain abdomen in 57.75% of the patient and Mohan N (2007)[8] in 58.0% but was less compared to Magee RB et al (83.0%).[9] In the present study of the 220 patients, 58 (26.4%) patients consumed vegetarian diet and 162 (73.6%) mixed diet. This observation was consistent with the study done by Gangoli AS (1999) [7] who observed 73.3% of the patient with mixed dietary habit and 26.7% with vegetarian diet. Of the 159 female patients, 149 (93.7%) patients were parous and ten (6.3%) were nulliparous. Of the 149 parous women, 81(54.4%) multiparous and had 3 or more children and 68 (45.6%) had 1 to 2 children. Similar observation was made by Tyagi SP et al (1992)[6] who observed 52.7% of the women with 3 or more children. In the present study, the size of gallbladder was enlarged in 7 (3.2%) specimens, distorted in 14 (6.4%) specimens, contracted in 4 (1.8%) specimens and normal in 195 (88.6%) specimens. Gangoli AS (1999)[7] observed enlarged gallbladder in 15 specimens (12.93%), contracted in 51 (43.97%) specimens and normal size in 50 specimens (43.10%). Tyagi SP et al (1992)[6] observed enlarged gallbladder in 29.8% of the cases, small gallbladder in 16.6% of the cases and normal in 53.6% of the cases. In the present study, wall of the gallbladder was thickened in 172(78.2%) and normal in 48(21.8%) specimens. This finding was consistent with that of Mohan N (2007)[8] who observed thickened gallbladder wall in 84(56.0%) and Tyagi SP et al (1992) [6] who observed in 56.4% of the specimens. In the present

study of 220 specimens, mucosa appeared velvety in 201(91.3%). Six specimens (2.7%) showed yellow flecks, five (2.2%) showed necrosis, four (1.8%) showed polyp. One specimen each showed infiltrating growth (0.5%), Phrygian cap (0.5%), multiseptate gallbladder (0.5%) and mucocele (0.5%). Such normal appearing mucosa was also the commonest feature observed by Mohan N (2007) in 126 (84%) and Gangoli AS (1999) in 81.03% of the specimens. Tyagi SP et al observed normal mucosa in 42.7% of the gallbladder specimen which was less compared to our study. This may be due to early intervention of our patients. Multiseptate gallbladder is a very extremely rare congenital anomaly of the gallbladder. A review of the cases described a female predominance. To make a diagnosis of multiseptate gallbladder exactly, it is important to detect clearly the septa in the gallbladder. To clarify more characters of the multiseptate gallbladder, examination of a larger patient population will be needed and further studies will be required.[10] In the present study one case (0.5%) of multiseptate gallbladder was noted in 37 year old female who presented with pain abdomen. A Phrygian cap is a congenital anomaly of the gallbladder with an incidence of 4%. It has no pathological significance and normally causes no symptoms.[11]In the present study one case (0.5%) of Phrygian cap anomaly was diagnosed in 37 year old female. In the present study mucocele was noted in one case (0.5%). Hayes BD et al (2014) in their study of 2522 cases noted mucocele in 7 cases which constituted 0.28% of the cases.[12]

CONCLUSION

The macroscopic and microscopic assessments of cholecystectomies which were performed for cholelithiasis in routine clinical studies are usually predictable. However, incidental fundal type adenomatosis may also be seen. Recognition of this rare entity is important because the similar characteristics with the adenoma and carcinoma of the gallbladder may confound the surgeons. These lesions should be kept in mind due to their rare potential of developing into benign or malignant tumor. Gallbladder disease, particularly gallstone disease is seen to be prevalent in the ethnic groups and there is marked geographical variation in the gallbladder disease.

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