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A Cadaveric Study on the Prevalence of Hartmann Pouch of Gallbladder with Relation to Gallstones in Basrah City

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Abstract

Hartmann pouch is a dilatation of the wall of the gallbladder at the region between neck and the cystic duct, It is inconstant feature found as an anatomical variant and considered a frequent site for gall stone impaction and mucocele formation as a complication . Knowledge about anatomy of the pouch is important while performing surgery for cholecystectomy to avoid serious complications.

Objective: To identify the incidence and nature of Hartmann's pouch in human gallbladder and the relation with gallstones for the growing importance and use of various invasive surgical techniques for gallbladder and extrahepatic biliary diseases.

Material and Method: The study was carried out in the department of Forensic Medicine at Basrah city ,from Jan 2018 to Jan 2019 .Two hundred fourteen gallbladders were obtained from cadavers that were under examination in the morgue , The gallbladders were examined morphologically to show Hartman pouch and gall stone existence and biopsies from the pouch were taken for histopathological examination.

Results: In the present study Hartman pouch was found in 4.7%, usually at older age group (> 40 yrs.). It was slightly higher in male than female and no significant association between Hartman pouch and gall stone presence. Histological picture showed normal histology of the three layers as seen in normal gallbladder

Conclusion: Hartman pouch is inconstant feature, more in male with no significant relation to gall stone, exist as an anatomical entity in our area of study.

Key words: *Hartmann pouch, gallstones and percentage*

Introduction

The gallbladder is a hollow pear shaped end diverticulum which stores and concentrates bile. It lies on the visceral surface of the right lobe of the liver and anatomically formed of neck, body and fundus [1,2] .Variations in the shape and size of the gallbladder is not uncommon [3,4] and should have attention through ultrasonic investigations and during laparoscopic cholecystectomy because the related Injuries may elevate the risk of morbidity and mortality[5-9].

One of these variations is Hartmann's pouch, which was named after Henri Albert Hartmann who first described it in 1891 [10]. He recognized it as a dilatation on the ventral aspect in the junction of neck and cystic duct, has inconstant feature, variable in size and described it as a normal variant [11-14]. The Hartmann's pouch may cabin the gallstones as common site [15]. A big Hartmann's pouch may hide the cystic duct and the Calot's triangle, which poses a major trouble during cholecystectomy [16-18]. It may also be complicated in associated pathological conditions responsible for adhesion between the neck and cystic duct. In addition, it

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may cause chronic infections, which promote malignant changes later on [19].

Recently, Hartmann's pouch is recognized more as an outcome of pathology in the form of dilatation or presence of stoness, when the gallstones lodged within the Hartmann's pouch result in mucocele formation[20]. Different data about the incidence of the pouch and gallstone relation were obtained from many articles, which makes the knowledge of relevant anatomy important for safer cholecystectomy.

Aim

To clarify the disagreements with regard to the incidence, nature and gallstones relation to the Hartman pouch and to obtain our own reference data because of inadequate information of this type of variant in our population of Basrah city which gives value to the present study.

Material and Method

The study was conducted from Jan 2018- Jan 2019. Two hundred fourteen human gallbladders were collected during routine postmortem examination in the morgue of the department of Forensic Medicine at Basrah city. Both gender were taken and age ranged from 10 to 79 years. The Ethical Review Committee at Health institute in Basrah city approved the study.

A Morphological examination was carried out on all gallbladders among the studied samples of unidentified bodies. Abdominal surgery for Crush injury to the abdominal organs specifically liver, biliary system dysfunction and suspected cases of poisoning were excluded. Specimens were divided in two groups, those with Hartmann's pouch and those without. Gallbladders were opened for the presence of gallstones. (Fig 1 a and b). The samples were divided according to age groups as in Table 1.

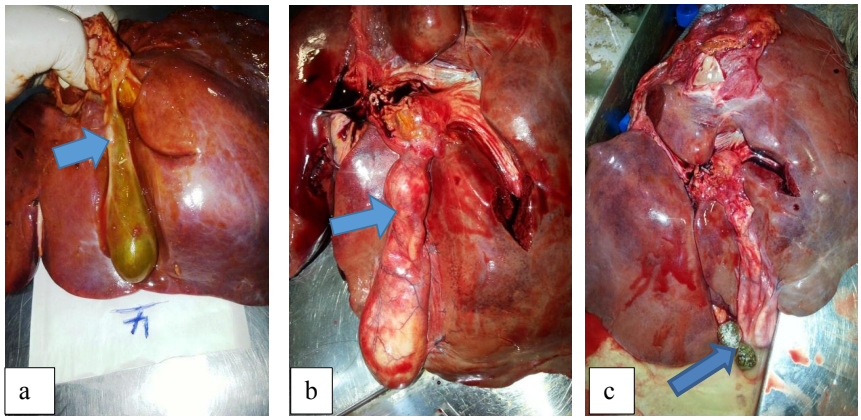

Figure 1A: Gallbladder with Hartman pouch (a) .Gallstones impacted in Hartmann pouch (b &c).

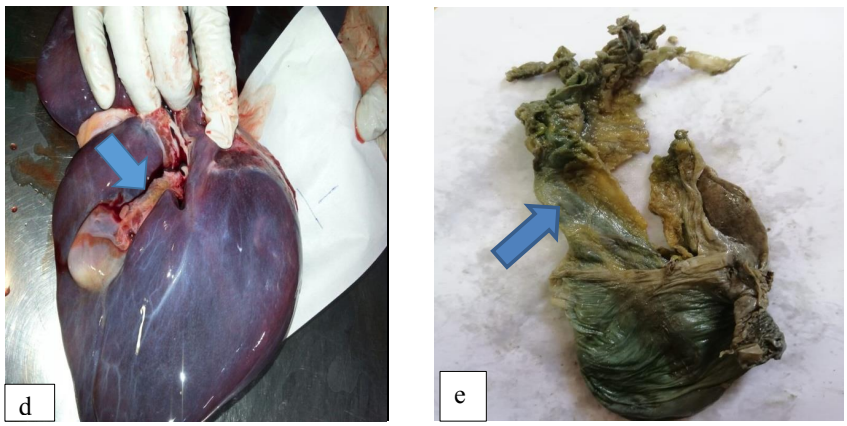

Figure 1B: Gallbladder without Hartmann pouch (d and e)

Table 1: Age distribution and Numbers

Age groups (years)	No of samples
< 20	30
20 -40	111
40-60	58
> 60	15
Total	214

Three millimeter thickness tissue samples from Hartmann pouch were preserved in 10% NBF for routine histopathological processing to obtain sections of 4 micrometer thickness then stained with hematoxylin-eosin and examined under the light microscope by using Elica camera for photomicrography .Data analysis were done using SPSS v.20 , and P value < 0.05 is considered significant with 95% confidence interval. .

Results

1. Morphological study:

A total of 214 gallbladders underwent morphological examination, age range from 3 -79 years with mean age 36.22 ± 14.94, Male / Female ratio = 2.3 / 1.

Hartmann Pouch was observed in10 out of 214 specimens (4.7% incidence), while gallstones were found in 14 out of all gallbladders (6.5% incidence) as shown in Fig 2.

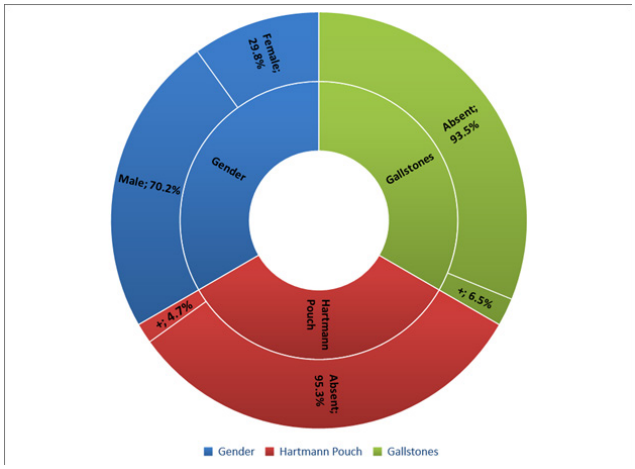

Figure 2: A sunburst diagram showing the gender distribution and the incidences of Hartmann pouch and gallstones in the studied cases. (+ Sign indicates the presence of pouch or gallstone).

Regarding the relation of Hartman pouch to age groups. The pouch was detected mostly in the 40-60 years old age group (n=6) followed by the (> 60 years) group (n=3) with significant statistical difference (P=0.03) in comparison to the other age groups as shown in Figure 3.

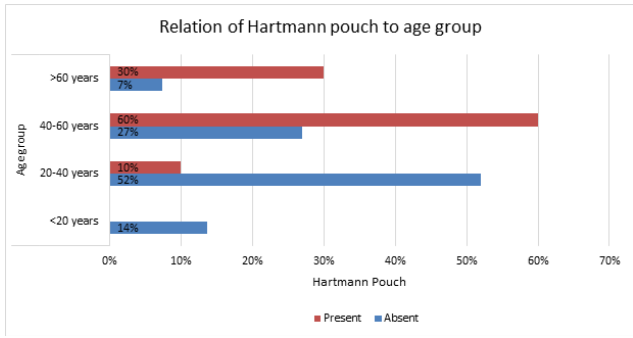

Figure 3: Relation of Hartmann pouch to age groups.

In relation to gender, Hartmann pouch was significantly more in males than in females (P=0.032), but gallstones presence did not differ significantly between the studied male & female cases (P=0.919). (Fig 4).

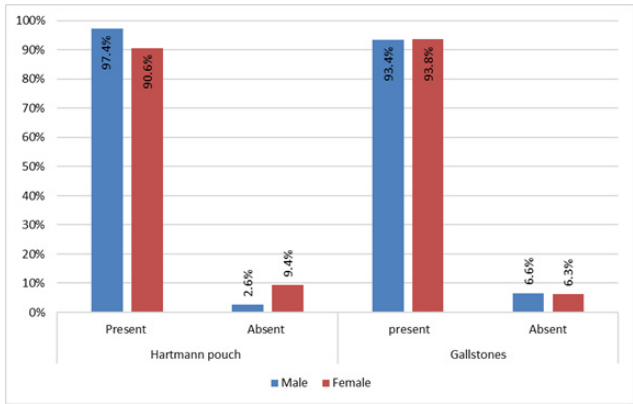

Figure 4: relation of gender to the incidence of Hartmann pouch & gallstones.

In relation to the pouch presence, the incidence of gallstones was slightly but not significantly greater (P=0.0707) as shown in table 2.

Table 2: Hartmann Pouch and gall Stones

Presence of Hartmann pouch				
Gall stones		**Pouch present**	**Pouch absent**	**P value**
	present	94.1%	80%	o.o77
	absent	5.9%	20%	

2. Histological study :

Histological examination to the neck area of the pouch reveals three layers: the mucosal layer in form of

villi lined with simple tall columnar cells ,faint stained cytoplasm and basely placed nuclei ;the lamina propria with loose connective tissue and diffuse lymphatic tissue .The fibromuscular layer and smooth muscle layer interspersed with layer of loose connective tissue rich in elastic fibers .The outer layer is a wide perimuscular loose connective tissue having numerous blood vessels, lymphatics, and nerves .The serosa is seen outside .This histological picture resemble the normal histology of gallbladder (Fig 5).

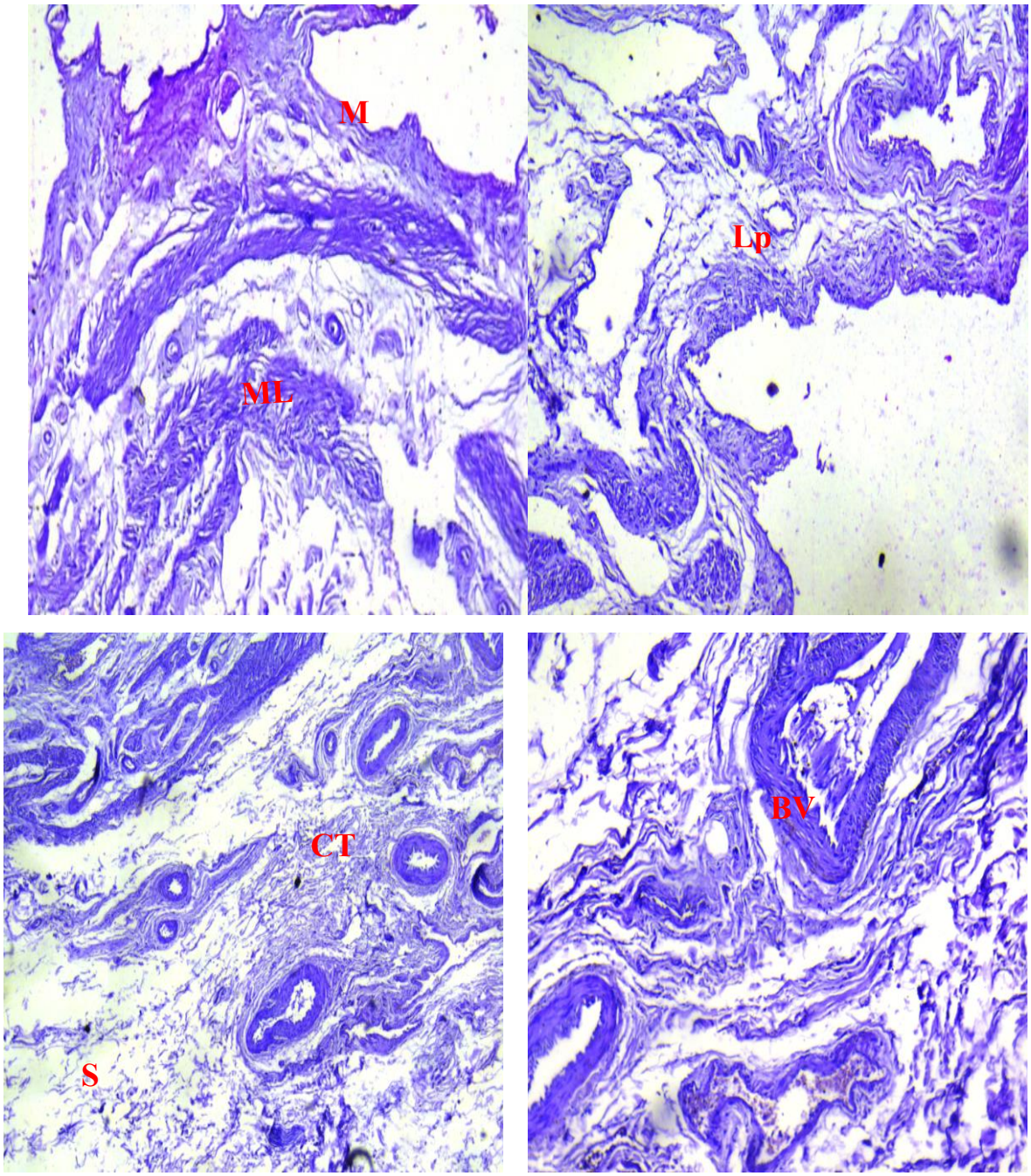

Fig 5: Different histological sections of Hartmann pouch showed layers of mucosa(m) , lamina propria (LP) ,connective tissue(CT) with blood vessels (BV), muscular layer (ML) and serosa (S) , (10X,40X),

Discussion

Brunicardi 2010 [21] found a developmental curvature at the neck region of the gallbladder, which may enlarge to form the Hartman pouch. Standring 2008, Moore and Dalley 2006 [22, 23] detected a dilatation located at the junction of the neck of the gallbladder and the cystic duct, which is identified as Hartmann's pouch. This anatomical variation of the biliary system and its associated choleithiasis may result in serious intra operative and postoperative complications [24, 25].

The present study found Hartmann pouch in 10 out of total 214 gallbladders (4.6%) which agrees with many other articles regarding the incidence like Leena et al 2015 who gave 4% of Hartmann pouch over total specimen examined in south Keralites, Another study by Nuran et al 2012 identified the pouch in 4 cases out of 70 (5.7%) in Dhaka, Bangladesh while Raj et al 2017 found an incidence of 8-9%. These studies consider Hartmann pouch from anatomical point of view as infrequent feature but it disagree with Van Eijck et al 2007 who detected 51 Hartmann pouch out of 98 (52%) gallbladders examined which was much higher than the present study. he also considered Hartmann's pouch as a morphological entity. Khan et al 2014[26] registered also higher prevalence (72.5%) of population of Dhaka (Bangladesh). In addition, Hartmann pouch was observed in a slightly higher proportion (81%) in a group of chronic calculous cholecystitis patients. The current study noticed also that the pouch tend to be more frequent with increasing age (40-60 & above 60 years) which may be due to data sample (more adults and older patients than young). Slight significant difference regarding gender and Hartman pouch distribution was detected in this study (male have slightly elevated ratio which could be due to data sample distribution).These findings disagree with Futura and Kinfu 2001 [27] who noticed a significantly higher prevalence of kinking of the gallbladder and Hartmann's pouch in the female subjects more than male subjects .

The gallstone formation is frequent worldwide and presented as a common clinical problem faced usually in daily clinical practice in Basrah city. Majority of biliary diseases are a complications of gallstones, in form of acute and chronic cholecystitis, obstructive jaundice, gallbladder empyema ,,acute cholangitis, acute pancreatitis, malignancy, etc.[28]. Lakshmi [29] found a significant association between Hartman pouch and presence of stone which differ from the current results (No significant relation) , it could be asymptomatic but it may present with clinical manifestation which increases as the pathology of adhesions between the cystic duct and the neck of the gallbladder exist.

The Hartmann pouch could be congenital or acquired, the true (congenital) diverticula may or may not be involved in the pathology within the gallbladder but it include all three histological layers of normal gallbladder While the acquired type may result from a disease process and has little or no smooth muscle in the wall of gallbladder [30, 31]. This study found normal histology of Hartman pouch as that present in normal gallbladder. These findings distinguish Hartmann pouch as an anatomical entity in our area of study.

Conclusion

This study provides facts of the Hartmann pouch prevalence and nature, which is of value in clinical-surgical events to manage invasive procedures, therapeutics and diagnostics in this region. It is inconstant feature with low proportion in our population, found more at older age, may lodge gallstones and tend to be anatomical more rather than pathological. A good anatomical knowledge of these structures is required, especially when performing emergency room procedures. Further recommendation is to study the Hartman pouch by imaging ultrasound in population with larger sample size.

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