Original Article

Studying the consistency between initial diagnosis of the surgeon with ultrasonography and pathologic results in the patients undergoing cholecystectomy during 2001-2011 in Shahid Motahari Hospital

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ABSTRACT

Introduction: in spite of the recent progress in imaging methods, diagnosis of gallbladder diseases is still difficult; and some of the gallbladder malignancies, though rare, can be fatal. Thus, conducting a study on what pathologic and radiological correlations exist between various gallbladder diseases and their consistency with clinical symptoms seems necessary, so that the number of the unwanted surgeries diminishes and the relative prevalence of gallbladder malignancies in Marvdasht is specified. Methods: the present cross-sectional study was conducted on patients admitted to Shahid Motahari Hospital, Marvdasht during 2001-2011 undergoing ultrasonography of the gallbladder and bile ducts. In doing so, the records of all 500 patients admitted to this hospital during this period - undergoing gallbladder and bile ducts ultrasonography - were examined using census method. The ultrasonography results of the patients were analyzed for the place of gallbladder stones as well. Finally, the data was analyzed in SPSS. Central tendency indices of frequency percentage and Pearson were used. Results: According to Pearson correlation, there was a correlation between the initial diagnosis of the surgeon and ultrasonography results ($P<0.05$). There was also a correlation between the initial diagnosis of the surgeon and pathological results consistency with the surgeon's diagnosis ($P<0.05$). Conclusion: Ultrasonography is usually done in the diagnosis for identification of the patients in need of cholecystectomy. As a model for confirming the surgeon's diagnosis, pathologist's diagnosis is considered a good method for the proper performance of the surgeon.

Keywords: Cholecystectomy, ultrasonography, pathology

Introduction

Gallbladder is an organ located at the lower part of the liver. This organ consists of three major parts: fundus or the lower edge of the sac, the body and infundibulum. The role of this sac is storing the yellow liquid bile. This fluid is secreted from the liver upon the entry of food to the stomach and is then transported to the gallbladder through a duct. Bile is poured into to the small intestine through the bile duct. The task of this fluid is creating a stable emulsion on the food fats done in the duodenum. Sometimes humans develop a gallbladder stones (cholelithiasis) and undergo surgery if the disease becomes critical. In the surgery, the doctor usually removes the gallbladder from the body. In this case, after some time, the bile duct dilates and does the gallbladder task. Bile contains water, cholesterol, lipids, bile salts, proteins and bilirubin. Bile salts are combined with fat, and bilirubin gives bile and feces a yellow color. If the bile fluid contains high levels of cholesterol, bile salts or bilirubin, it can turn into a hard stone in certain conditions (1).

Philip Mure (1987) developed Laparoscopic cholecystectomy (LC) and since then has been considered as the preferred method for treating symptomatic diseases of gallbladder. LC is the superior method in the treatment of symptomatic

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gallbladder diseases. This surgical procedure, which used to be done by four trocars, has undergone many changes today. Studies have shown that although the reduction in the number of trocars and their size has not changed the complications and duration of surgery, it has helped reduce postoperative pain and thus the need for analgesic (2). Bonmati et al. concluded that the increase in the thickness of the gallbladder wall and its wall ultrasonography views are proper signs for the differentiation of cirrhotic ascites from malignant (3). In a prospective study, Dr. Huang et al. examined the ultrasonographic views of the gallbladder wall in 94 patients with ascites, and concluded that using non-thickened bile duct results as a predictor of malignant ascites has sensitivity of 80.6% and specificity of 93.9%, and using the number of wall layers in the prediction of malignant ascites has a sensitivity of 87.1% and specificity of 78.8%. Finally, they concluded that sonographic examination of the gallbladder wall was useful in differentiating these two groups (4). Among the causes of ascites, one can refer to cyrotic and malignant types. The conventional method for detecting these two types of ascites is paracentesis, which is a time-consuming and aggressive method. Compared to this, ultrasonography is a simple and convenient method that results in valuable results within a short time (5). The role of radiology and ultrasonography in hepatitis is not for its detection, but for rejection of other probable causes. In acute viral hepatitis, the increase in gallbladder thickness, decreased liver parenchymal echo and hepatomegaly have been reported. A study has been conducted to determine the sonographic changes of the liver and bile ducts and their related factors. Liver and bile duct ultrasonography and some tests were performed on 42 patients with acute viral hepatitis. In 45.12% of the patients, gallbladder thickening, in 33.3% hepatomegaly, and in 19.3% decrease in liver parenchymal echo were observed. There was no significant relationship between age, gender, type of hepatitis, symptoms similar to cholecystitis and serum levels of aspartate aminotransferase and alanine aminotransferase and alkaline and bilirubin. There were only correlations between the increase in prothrombin time and thickening of the gallbladder and a decrease in the echocardiogram of the liver parenchymal echo $p<0.01$ and in the upper quadrant pain (RUQ pain) $p<0.05$. Moreover, thickening of the gallbladder and liver parenchymal echo reduction in acute viral hepatitis was not correlated with the severity of liver tissue destruction but with liver dysfunction (6).

Since the introduction of LC by Philip Mure (1987), it has widely been successful across the world, and metastasis to the site of laparoscopic ports after laparoscopy has become more evident in unexpected cases of bile cancer. Gallbladder carcinoma has been reported in 1% of all bile duct surgeries, most of which have been diagnosed only after histological examination of gallbladder carcinoma (7). Wound metastasis in open cholecystectomy in unexpected gallbladder carcinoma is very rare but it is observed in laparoscopic surgery. Moreover, the development of malignancy after laparoscopy seems aggressive and wide-ranging according to what was obtained in radical surgery after initial laparoscopic surgery [8].

Gallbladder stones are the commonest cause of bile duct disorder causing many economic and health problems in most countries worldwide. Many patients with gallbladder stones do not show significant symptoms. Moreover, about 25-50% of the patients experience complications and problems making removal of gallbladder necessary in these patients. Acute cholecystitis is the commonest complication of gallbladder stones due to dilatation and inflammation of the gallbladder following cystic duct obstruction. The secondary bacterial infection occurs in 50% of cases, in which case, multiple symptoms are not expected. Pain, nausea, vomiting and fever are common. Murphy's sign (stoppage of the secondary respiration due to pain in the deep touch of the right below the ribs) is a physical result relatively specific to acute cholecystitis. The gallbladder is dilated and palpable in about 30% of patients. Non-specific laboratory results, such as leukocytosis, impairment in liver tests, and bilirubin and amylase increase are observed (9). Nowadays, cholecystectomy is usually done using laparoscopy (10, 11). Furthermore, the mortality rate due to cholecystectomy has been estimated to vary from 0.1% to 0.7% in different studies (12), and about 3,000 deaths (0.12% of the total deaths) are recorded due to gallbladder stones and diseases in America (13). Over the past two decades, much attention has been paid to risk factors and epidemiologic factors of gallbladder stones and ultrasonography plays a significant role in this, but the prevalence and epidemiology of this disease are changing due to changes in the lifestyle and industrialization of societies. In a comprehensive study on 33,000 individuals aged 30-69 in Italy, the frequency of gallbladder stones was 18.8% in women and 9.5% in men (14). In other studies, the prevalence of gallbladder stones in women has been reported to be higher compared to men (16-14). Similar to the study conducted at educational hospitals in Ethiopia in 2006, in more recent studies, the prevalence of gallbladder stone among women was reported to be 5 times higher than that of men (17). Considering the connection of age with the prevalence of gallbladder stones, the results of Sirmione (1993) showed an increase in the prevalence of gallbladder stones with age (18). In Berger et al. (2000), the commonest complaints in men was RUQ pain during the night and in women with severe pain associated while eating greasy foods (50). Concerning the location of bile stones, Tazuma (2006) in Japan reported the place of most gallbladder stones in the gallbladder (19).

Gallbladder cancer is a non-common, but fatal cancer. Gallbladder stone is the most important risk factor for gallbladder cancer. Hence, a retrospective study on 1136 patients who had undergone cholecystectomy during 1993-2003 examined in what percent of these people the stones were the cause of cholecystectomy and what percent of the patients with stones had cancer diagnosis based on the pathology response. Of total 1131 cases of cholecystectomy, 1055 (92.8%) had cholecystectomy due to gallbladder stones, of whom 1.4% had ultimately a pathologic diagnosis of gallbladder

cancer. Additionally, the total cases of gallbladder cancer in these 10 years were 20 cases, of which 70.5% were hospitalized and undergone surgery by initial diagnosis of the stone. Only in 5% of the patients had early diagnosis of cancer. Although a small percentage of the patients with gallbladder stones have ultimately been diagnosed with cancer. In many patients with gallbladder cancer, the disease emerges with a manifestation of the stone, so there is a close connection between the presence of stones and gallbladder cancer. Thus, prophylactic cholecystectomy is likely to be useful in patients with chronic gallbladder stones and those in risk of it (20).

Considering the points mentioned and as surgeons face many patients suspected of acute inflammation of the gallbladder on a daily basis, the primary diagnosis of acute and progressive gallbladder inflammation helps surgeons prioritize patients according to the need for surgery. In spite of the recent advances in imaging methods, diagnosis of gallbladder disease is still difficult and while some gallbladder malignancies, although rare, can be fatal and the prognosis of 5 years of survival after surgery does not reach 50%. Thus, conducting a study on what pathologic and radiological correlations exist between various gallbladder diseases and their consistency with clinical symptoms seems necessary, so that the number of the unwanted surgeries diminishes and the relative prevalence of gallbladder malignancies in Marvdasht is specified.

Materials and Methods

The present cross-sectional study was conducted on patients admitted to Shahid Motahari Hospital, Marvdasht during 2001-2011 undergoing ultrasonography of the gallbladder and bile ducts. The sampling method was convenient based on purpose. In doing so, the records of all 500 patients, under 20 and older than 60 years of age, admitted during this period undergoing gallbladder and bile ducts ultrasonography were examined. It is worth noting that during this period, most of the gallbladder and bile ducts ultrasonography was done in Shahid Motahari Hospital by one radiologist. According to ultrasonography results, 500 of these patients had gallbladder stones. In these subjects, demographic variables such as age, gender, and clinical symptoms including epigastric pain, RUQ pain, nausea and vomiting, jaundice, itching, anorexia, fever and chills were evaluated. Additionally, laboratory results such as leukocytosis, increase in amylase and alkaline phosphatase, increased liver enzymes, hyperbilirubinemia and hyperlipidemia were recorded. The ultrasonography results of the patients were analyzed for gallbladder stone. Finally, the data was analyzed in SPSS. In descriptive analyses, the central indices such as frequency percent, mean, dispersion index and standard deviation were used. Moreover, Chi-Square test was used in analytical analysis of the data. In comparisons and analyses of the data, the significance level was 0.95. Moreover, the information of the subjects was confidential by researchers and at all stages of the study; they adhered to the principles of the Helsinki Treaty.

Results

In this study on 500 patients from 20 to 60 years of age undergoing cholecystectomy, 399 (70.7%) were females and 101 (17.9%) were males. Moreover, 325 (57.6%) patients had RUQ pain, and 14 (2.5%) fever, 2 (0.4%) itching, 12 (2.1%) jaundice, and 209 (37.1%) has other clinical symptoms. Fifty-six (9.9%) patients had heart disease, 91 (16.1%) hypertension, 47% (8.3%) endocrine disorder and diabetes, 47 (8.3%) were overweight with hyperlipidemia, and 61 (10.8%) had other diseases. Additionally, 334 (59.2%) patients had chronic cholecystitis, 158 (28%) acute cholecystitis, 2 (0.4%) cholangitis and 16% (2.8%) had other diseases. Fifty-four (9.6%) patients were less than 20 years of age, 170 (30.1%) were 20-40 years of age, 223 (39.5%) were 40-60 years of age and 53 (9.4%) were older than 60. Chart 5.4 shows their frequency. The results of the consistency of the surgeon's results and the results of ultrasonography among patients undergoing cholecystectomy showed that 245 (43.4%) cases had consistency and 123 (21.8%) cases did not and in case of 132 (23.4%) cases, the results were not available. Additionally, the frequency of consistency of pathologic results with surgeon diagnosis among patients undergoing cholecystectomy showed that in 189 (33.5%) cases, this consistency existed 47 (8.3%) cases did not and 264 (46.8%) cases had no data available. They results of descriptive statistics are shown in Table 1.

Table 1: The results of descriptive statistics

	Frequency	Percent	Frequency percent	Cumulative percent
Male	101	17.9	20.2	20.2
Female	399	70.7	79.8	100.0
Total	500	88.7	100.0	
RUQ pain	325	57.6	57.8	57.8
Fever	14	2.5	2.5	60.3
Itching	2	0.4	0.4	60.7
Jaundice	12	2.1	2.1	62.8
Other cases	209	37.1	37.2	100.0
Heart disease	56	9.9	18.5	18.5
Hypertension	91	16.1	30.1	48.7
Endocrine diseases and diabetes	47	8.3	15.6	64.2
Overweight and hyperlipidemia	47	8.3	15.6	79.8
Other cases	61	10.8	20.2	100.0
Chronic cholecystitis	334	59.2	65.5	65.5
Acute cholecystitis	158	28.0	31.0	96.5
Cholangitis	2	0.4	0.4	96.9
Other cases	16	2.8	3.1	100.0
<20 years	54	9.6	10.8	10.8
20-40 years	170	30.1	34.0	44.8
40-60 years	223	39.5	44.6	89.4
> 60 years	53	9.4	10.6	100.0
Consistent (ultrasound)	245	43.4	49.0	49.0
Not consistent (ultrasound)	123	21.8	24.6	73.6
Not available (ultrasound)	132	23.4	26.4	100.0
Consistent (surgeon's diagnosis)	189	33.5	37.8	37.8

Not consistent (surgeon's diagnosis)	47	8.3	9.4	47.2
Not available (surgeon's diagnosis)	264	46.8	52.8	100.0

Table 2 shows the correlation between the initial diagnosis of the surgeon and the consistency of ultrasonography with the surgeon's diagnosis, showing Pearson correlation of 0.799 (with a p-value of close to zero, sig = 0) and a significance at 0.01 level. It shows the correlation between the initial diagnosis of the surgeon and the consistency of pathologic results with the surgeon's diagnosis, showing Pearson correlation of 0.584 (with p-value close to zero, sig = 0) i.e. significant at 0.01 level.

Table 2: Correlation between initial diagnosis of surgeon and consistency of ultrasonography results with surgeon diagnosis

Variables	The correlation coefficient	Sig.
Initial diagnosis of surgeon and consistency of ultrasonography results with surgeon diagnosis	0.799**	0.000
Initial diagnosis of surgeon and consistency of pathologic results with surgeon diagnosis	0.584**	0.000

** Correlation is significant at the 0.01 level (2-tailed).

Discussion and Conclusion

LC is known as the selective treatment for gallbladder stones. The purpose of the study was to examine the role of LC in patients with acute cholecystitis and comparing it with open cholecystectomy and elective LC regarding complications, rate of becoming open method, duration of hospitalization and duration of surgery. The study was done on patients with acute cholecystitis. The study found no significant differences between the open surgery and laparoscopic acute cholecystectomy regarding age, gender, temperature, and white blood cell count and ultrasonography results, showing the consistency of the results of ultrasonography with the surgeon's diagnosis (21). This was consistent with the present study. Nowadays, LC is considered as the golden standard for cholecystectomy. A study was conducted to specify the results of the first group of patients undergoing LC in Ayatollah Golpayegani Hospital in Qom. It was a descriptive retrospective study conducted on subjects undergoing LC within 2 years. In ultrasonography, both males and females had symptomatic gallbladder stones, followed by cholecystitis without gallstone, as a prevalent outcome in ultrasonography, which is consistent with the surgeon's diagnosis (22). It is consistent with the present study as well. In the study by Paziar, the commonest ultrasonography result in both genders was symptomatic gallbladder stones, followed by acute cholecystitis without gallstone. In the study of Pisiar, the most common ultrasonography findings in both genders was multiple gallbladder stones, and an increase in the thickness of the gallbladder as a prevalent result in ultrasonography examination [23]. In the last two decades, laparoscopic surgery has become so common, especially for bile duct surgery. The treatment of these patients has resulted in considerable improvements concerning the duration of treatment, duration of admission, treatment costs and the time to return to work. A descriptive study examined the therapeutic outcomes of patients undergoing removal of gallbladder using laparoscopy from April 2002 to September 2003. Age, gender, symptoms of ultrasonography results, and the results of the surgeon during surgery as well as duration of hospitalization, hemorrhage, duration of surgery and its complications were examined. This method is suggested given its convenience, speed, few complications and patient satisfaction. In this method, the results of the surgeon are highly consistent with that of ultrasonography (24), consistent with our study. Bladder and gallbladder cancers are rare with very poor prognosis. LC is considered as the standard golden treatment for gallbladder stones. A study was conducted to examine the prevalence of bladder and gallbladder cancers and the possibility of reduction in the usual diagnosis of histological results of gallbladder samples. Pathological laboratory data were from gallbladder samples retrospectively over 5 years (June 2000 to July 2005). The total number of pieces was 1452. In forty (0.27%) cases of primary bladder and gallbladder cancers, one case was primary B cell lymphoma, another one was secondary cancer, and one case was intraepithelial neoplasia (IEN). The results showed that a high percentage of malignancy inconsistencies in all cases. Out of four bladder and gallbladder cancers, 3 were at T_2 and one was at T_4 stages. Prior to carcinoma surgery, an ultrasonography scan was performed on the patients with only one case suspected to have thick gallbladder wall. In all suspected cases of gallbladder cancer before or during surgery, the pathological examination had not estimated the changes or the outcome (25). In a study, the relationship between pathological symptoms and cholecystectomy results was examined. In the study, the surgeon, based on the view that the confidence and reliance on the clinical symptoms and cholecystography help the surgeon, performed 233 cases of cholecystectomy. The clinical results showed that the pathology of gallbladder is very diverse. The results of pathologic changes do not justify the treatment 100%. Though they are helpful in identifying and treating the disease, the results of the pathology are not 100% consistent with the results of the surgeon (26).

Imaging is usually conducted in screening the patients for cholecystectomy and there is a consensus over improving the prognosis of patients with cholecystectomy. Ultrasonography with gradual pressure is used as the first line in the evaluation of these patients. The diagnosis of cholecystectomy at Shahid Motahari Educational Center, Marvdasht is often done directly and clinically based on a precise biographical report and examination. Nonetheless, imaging methods are used if the diagnosis is not clear. Given the results, it is better to consider standard indices of ultrasonography in case of the patients in need of cholecystectomy and use complementary techniques for diagnosis of cholecystectomy in ultrasonography. As a model for confirming the surgeon's diagnosis, pathologist's diagnosis is considered as a

good method for the proper performance of the surgeon.

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