ORIGINAL ARTICLE

To Study the Role of Infectious Agents in Gallstones Formation in Different Age Groups

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ABSTRACT

Background: Gallstone disease remains one of the most common medical problems leading to surgical intervention. Infection plays a role in the development of these stones.
Aims and Objectives: Study was designed to find out role of infectious agents in gall stone formation in women with different age groups.
Methodology: Case control study of six months was conducted in Surgical Ward of Sir Ganga Ram Hospital Lahore. 100 women with confirmed upper abdominal ultasonography for gall stone diagnosis were included in the study. Patients were divided into 3 groups based on their age range 25-39 years (group 1), 40-50 years (group 2) and > 50 years (group 3). Patients were considered to be in the perimenopausal period, based on irregular menstruation or its cessation, vasomotor symptoms and decreasing estrogen levels. The subjects were not taking any medication, including hormone replacement therapy. Detailed information was filled in proforma.
Results: It was observed that the mean age of women belong to group 1 was 31.88 years, of group 2 was 42.29 years and of group 3 was 61.25 years. Their BMI was 26, 26.5 and 28.0 kg/m^2 respectively. Mixed type of gall stone (cholesterol and bilirubin) was observed in group 1. On the other hand in group 2 and 3 mixed type of gall stone consist of cholesterol, bilirubin and calcium. Infectious agent like staph aureus and pseudomonas aureginosa were identified in all groups.
Conclusion: Both gram positive and gram negative bacteria may play a role in developing gall stone in 35% menstruating women, 49% perimenopausal and 16% postmenopausal women. It is concluded that gall stone formation may be more prevalent in menstrual and perimenopausal age as compared to postmenopausal age.

Key words: menstrual status, gall stone formation and infectious agents

INTRODUCTION

Gallstone disease remains one of the most common medical problems leading to surgical intervention. Gallbladder (GB) stone disease is a common disorder affecting approximately 10-25% of the adult population in Western countries[1]. GB stone formation is multifactorial, and known risk factors are advancing age, female gender, genetics/ethnicity, obesity, rapid weight loss, diet, drugs, and physical activity[2,3].

Female predominance is obvious, particularly at a young age. However, the gender difference narrows with increasing age, particularly after menopause. Moreover, female predominance is less evident in Asia where the occurrence of pigmented stones is more common[3]. Gallstones occur in nearly 25% of women in the U.S. by age 60 and as many as 50% by age 75. In general, women are probably at increased risk because estrogen stimulates the liver to remove more cholesterol from blood and divert it into the bile[4].

The abnormalities of gallbladder epithelial function involved in cholesterol gallstone pathogenesis are impaired biliary lipid absorption and an increased secretion of mucin gel[5]. There are many events that may promote cholelithiasis. The liver secretes too much cholesterol into the bile. The gallbladder may not be able to empty normally, so bile becomes stagnant. The cells lining the gallbladder may not be able to efficiently absorb cholesterol and fat from bile. High levels of bilirubin have been observed in patients with gallstones[6].

Blockage of the cystic duct with gallstones causes accumulation of bile in the gallbladder and increased pressure within the gallbladder. Concentrated bile, pressure, and sometimes bacterial infection irritate and damage

the gallbladder wall, causing inflammation and swelling of the gallbladder. Inflammation and swelling of the gallbladder can reduce normal blood flow to areas of the gallbladder, which can lead to cell death due to insufficient oxygen[7].

Infection develops in about 20% of cases and plays a role in the development of these stones. It is suggested that bacteria or other microorganisms may trigger oxidation which, in this case, can cause changes that lead to pigment stone formation. The microorganisms identified were Escherichia coli and Enterococcus faecalis, followed by Staphylococcus aureus, Pseudomonas aeruginosa, Enterococcus faecium, Enterobacter aerogenes and Enterobacter cloacae[8].

Brown pigment stones are more common in Asian populations. They contain more cholesterol and calcium than black pigment stones and are more likely to occur in the bile ducts[9].

The incidence of gall stone, increases with time in our country. It is thought that besides disturb metabolism of fat, infectious agents also play a role in gall stone formation. Therefore study was designed to find out the role of micro-organism in gall stone formation.

Methodology:

Case control study of six months was conducted in Surgical Ward of Sir Ganga Ram Hospital Lahore. 100 women with confirmed upper abdominal ultasonography for gall stone diagnosis were included in the study. Patients were divided into 3 groups based on their age range 25-39 years (group 1), 40-50 years (group 2) and > 50 years (group 3). Patients were considered to be in the perimenopausal period, based on irregular menstruation or its cessation, vasomotor symptoms and decreasing estrogen levels. The subjects were not taking any medication, including hormone replacement therapy. Detailed information was obtained and entered in proforma.

Informed consent was obtained from all women participating in the present investigation, in accordance with the Ethics Committee of Fatima Jinnah Medical College/Sir Ganga Ram Hospital and following the principles of the Helsinki Declaration. We did not perform any statistical tests because we did not have a group for comparison. In this investigation, we did not use any control group because we had the data of normal gallbladder emptying

Table: Variables related to gall stone in different age groups of women.
No of cases in parenthesis.

Groups of patients	Mean Age (years)	Age range (Year)	BMI Kg/m^2	Type of gall stone with frequency and percentages	Infectious agents
Group 1 (35)	31.88±18.61	25-39	26.0±5.6	Mixed (chol+Bilirubin) 35 (35%)	Staph aureus 35 (35%)
Group 2 (49)	42.29±7.99	40-50	26.5±6.5	Mixed (chol+Bilirubin + calcium) 49 (40%)	Staph aureus Pseudomonas aurignosa 49 (40%)
Group 3 (16)	61.25±6.75	> 50	28.0±7.1	Mixed (chol+Bilirubin + calcium) 16 (16%)	Staph aureus Pseudomonas Aurignosa 16 (16%)

RESULTS

Variables related to gall stone in different age groups of women are tabulated (Table). It was observed that the mean age of women belong to group 1 was 31.88 years, of group 2 was 42.29 years and of group 3 was 61.25 years. Their BMI was 26, 26.5 and 28.0 kg/m^2 respectively. It was observed that most women of group 1 and 2 belong to middle class or B class and remaining with belong to C class. On the other hand most of the women of group 3 belong to class C (data not shown). Duration of gall bladder stone was in a range of 8-12 months (data not shown). Mixed type of gall stone (cholesterol and bilirubin) was observed in group 1. On the other hand in group 2 and 3 mixed type of gall stone consist of

cholesterol, bilirubin and calcium. Infectious agent like staph aureus and pseudomonas aureginosa were also identified in all groups.

DISCUSSION

Present study observed that mean age of women with gall stone was in a range of 25-70 years. However a study reported that mean age of women with gall stone was 39-75 with mean age 57.00 years[11]. Our study is in line with a study who reported that an estimated 20% of adults over 40 years of age and 30% of those over age 70 have biliary calculi[2]. A study confirmed that gallbladder emptying time is longer during the perimenopausal period and may be responsible for bile stone formation[11].

Additionally a study found that age, gender and female sex hormones are thought to influence contractility of the gallbladder[12].

Our study also observed that only 16 women with age > 50 years or postmenopausal women (group 3) was suffered with gall stone disease as compared to of women belong to group 1 and 2. Our study is in contrast with a study who observed that women at highest risk of gall stone disease with age over 50 years[13]. A study stated that the sensitivity of the gallbladder to neurohormonal stimulation varies with age and gender[12].

Our study is in line with a study who reported that epigastric and right upper quadrant pain occurring 30-60 minutes after meals is frequently associated with gallstone disease[2].

Mixed type of gall stone (cholesterol and bilirubin) was observed in group 1. On the other hand in group 2 and 3 mixed type of gall stone consist of cholesterol, bilirubin and calcium. An imbalance between these bile salts and cholesterol may results the bile fluid turns to sludge. This thickened fluid consists of a mucus gel containing cholesterol and calcium bilirubinate[14].

Our study also identifies the infectious agent like staph aureus and pseudomonas aureginosa in gall bladder specimen of all groups. Our study is in accord with a study who observed positive bacterial culture and reported that infection in the common bile duct from obstruction is common and serious[15]. A study reported that gallstone disease bacteria are not only present in bile but also in the gallbladder wall and within the gallstones[16,13]. Study concluded that bacteria may have a role in the development of carcinoma of the Gallbladder[13]. Our results are in contrast with the findings of a study who found that predominant organisms were Escherichia coli, Klebsiella, and Enterococcus[17].

CONCLUSION

Both gram positive and gram negative bacteria may play a role in developing gall stone in 35% menstruating women, 49% perimenopausal and 16% postmenopausal women. It is concluded that gall stone formation may be more prevalent in menstrual and perimenopausal age as compared to postmenopausal age.

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