

Incidence of Various Types of Gallstones in Association with Age

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ABSTRACT

Aim: Gallstones are responsible for many hospitalizations and surgical interventions in our local population. Our main goal was to evaluate the relationship between age and gallstones as a risk factor in our local population.

Methods: Cross-sectional study of all cholecystectomy patients with prior informed consent was conducted in the department of Surgery at Sheikh Khalifa Bin Zaid Hospital (PGMI), Quetta and Bacha Khan Medical Complex, Swabi for the duration of 06 months from 15th March 2021 to 15th August 2021.

The stones are divided into 3 groups according to their colour: light yellow and whitish like a cholesterol stone, black and black-brown like a pigment stone, and laminated brownish or greenish yellow as mixed stones. The collected data was statistically processed using SPSS version 21. The types of stones were correlated with the age groups of the patients using the student's test and / or the Chi-square test as appropriate. The confidence level was defined as 95% CI and p values below 0.05 were considered statistically significant.

Results: The study included 100 patients 14(14%) men and 86 (86% women) with a female to male ratio of 13.2: 1, chi-square = 1190.70, p < 0.0001 and their mean age was 46.2 years (SD ± 9.4) (Range, 30 to 75 years). The most common pigment stones were found in 44 (44%). The highest incidence of gallstones was found in the age groups 41-50 and 31-40, 44% and 26%, respectively (p <0.05).

Conclusion: From the study it can be concluded that age has an influence on the occurrence of gallstone disease.

Keywords: Gallstone (GS); Pigment stones (PS); Mixed stones (MS); Cholesterol stones (CS);

INTRODUCTION

Gallstone disease is a common disease whose incidence ranges from 10% to 20% of the world's population¹⁻². Its incidence is four times higher in women than in men, and its frequency is high in the younger age group³⁻⁴. However, since most patients remain asymptomatic, it is difficult to establish the actual incidence of the disease⁵. Traditional risk factors for gallstone disease (GSD) are the four "Fs": "female, obesity, forty years of age, and fertility," but age is an additional risk factor in Western countries⁶⁻⁷. Gallstone disease before the age of 20 is a rare condition⁸⁻⁹. The incidence of gallstones, which increases with age, is observed in all ethnic groups¹⁰⁻¹¹. Gallstones (GS) occur in all age groups, but their incidence increases with each decade of life and is more frequent in the fourth and fifth decades of life¹². Twenty to thirty percent of 65-year-old Westerners and about 10% of the non-Western population of the same age are affected by gallstones¹³. Our main goal in this study is to evaluate the association between age and gallstones as a risk factor in our local population.

MATERIAL AND METHODS

A cross-sectional study was conducted in the department of Surgery at Sheikh Khalifa Bin Zaid Hospital (PGMI), Quetta and Bacha Khan Medical Complex, Swabi for the duration of 06 months from 15th March 2021 to 15th August 2021. It covers all patients treated with cholecystectomy with prior informed consent. Data was collected and distributed on the pre-designed and tested questionnaire. It contained personal data, the results of ultrasound examinations and the number, size and color of the stone. The stones are divided into 3 groups according to their color: light yellow and whitish like a cholesterol stone, black and black-brown like a pigment stone, and laminated brownish or greenish yellow as mixed stones. The collected data was entered into a computer and statistically processed with SPSS version 21. Figures are expressed as mean ± SD. The types of stones were correlated with the age groups of patients using the student's test. The confidence level was defined as 95% CI and p values below 0.05 were considered statistically significant.

RESULTS

100 patients 14 (14%) men and 86 (86%) women were enrolled in the study, 13.2: 1 female to male ratio; Chi-square = 1190.70, p

<0.0001 and their mean age was 46.2 years (SD ± 9.4) (Range, 30 to 75 years).

Most of the patients were in the age group from 31 to 50 years (65 (65%), rarely <30 years and in the elderly > 70 years). The stones were solitary in 35 (35%) of them. Pigment stones were detected most often 44 (44%) (Fig. 1). The highest incidence of gallstones was found in the age groups 41-50 and 31-40, 44% and 26%, respectively (p <0.05).

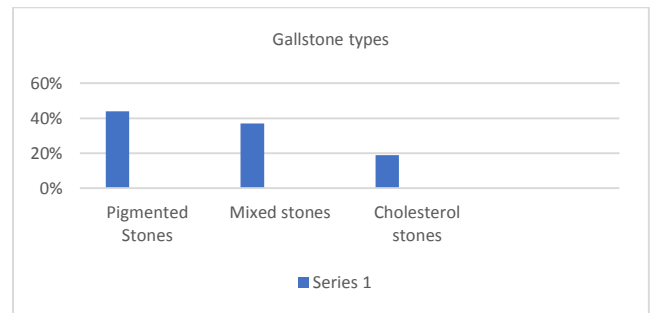


Figure 1:

Pigment and cholesterol stones were found mainly in the 41-50 age group, with 21 (21%) and 10 (10%) stones, respectively (p = 0.01 and p = 0.03). Mixed stones were found mainly in the 31-40 and 41-50 age groups. Cholesterol stones were found in one young adult (<30 years old) or older (> 70 years old) patients (Table 1).

Table 1: Incidence of different types of gallstones in relation to age in patients with symptomatic calculi cholecystitis in the studied groups

Age group	Cholesterol stones	Mixed stones	Pigment stones	Total (%)
< 30	0 (0.0%)	2 (2%)	6 (6%)	8
31-40	4 (4%)	12 (12%)	10 (10%)	26
41-50	10 (10%)	13 (13%)	21 (21%)*	44
51-60	1 (1%)	7 (7%)	4 (4%)	12
61-70	3 (3%)	2 (2%)	3 (3%)	8
71-80	1 (1%)	1 (1%)	0 (0.0%)	2
Total	19 (19%)	37 (37%)	44 (44%)	100

DISCUSSION

The incidence of gallstones was significantly higher in women than in men, and the increase was greater in the middle-aged groups¹¹⁻¹². These results were in line with previous studies. The reason for this increase is now well known and is due to elevated levels of estrogen, which increases the excretion of cholesterol into the bile, causing it to become oversaturated with cholesterol¹³⁻¹⁴. A Taiwanese study confirmed that aging is directly related to the development of gallstones due to prolonged exposure to other risk factors, regardless of where you live or your standard of living¹⁵⁻¹⁶. A Danish study showed a higher incidence of GSD in patients over 45 years of age compared to <35 years of age, while the gender difference in the incidence of GSD decreased with age¹⁷. Our study found that GS is rare at an extreme age. The incidence of OS was higher in the 41-50 age group in this study. This finding is in line with Indian research¹⁸. Contrary to the study by Pradhan SB et al, in Nepal, the age group most affected by gallstone disease (32.5%) was 30-39 years of age¹⁹. This study sought to determine whether the most common types of stones in the gallbladder are single or multiple.²⁰ According to our findings, most stones were present in patients with gallstone disease, which is consistent with previous studies. There are three types of gallstones in the industrialized western world; they most often consist of cholesterol, followed by pigment and mixed stones. As per our findings, the most common gallstones in the 41-50 age group are pigment stones, followed by MS, followed by SC²¹. These findings are in line with the Libyan study. Likewise, pigmented gallstones remain a major constituent of gallstones in Taiwan. This finding contradicts previous reports that found CS to be an important component of gallstones in Western populations. Moreover, where EM was the major component of gallstones, followed by PS and CS, the incidence differed from other Indian reports²². The differences observed between nations can be attributed to the different nutritional conditions and habitats, and the different socioeconomic status of people. Due to the lack of epidemiological studies in our country, this study was not conducted to investigate the pathogenesis of pigmented gallstones, which are the main component of gallstones²³. Although the dominance of pigment stones in our study can be explained by the high prevalence of tropical diseases, especially malaria, in our region, as it is one of the main factors causing pigment stones to accelerate bilirubin production²⁴. Another factor that increases increased bilirubin production is the arrest of bile flow, which predisposes to infection and the subsequent formation of pigmented stones²⁵. As we found, CS was more common in the 41-50 age group and was not detected in very young and old patients, as in the rest. A limitation of this study was the small sample size and was not representative of the entire population; it relied solely on the patients of the tertiary care hospital.

CONCLUSION

From the study it can be concluded that age has an influence on the occurrence of gallstone disease. Our work opens a forum for discussion and should be continued in further and modified stages. Further research will be recommended based on our findings.

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