

Is Severity of Cholecystitis related to Body Mass Index?

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Abstract: Obesity is an established risk factor for gall stone disease. Male sex has also been recently cited as a risk factor for severe symptomatic cholelithiasis. As a possible cause of several difference in regards to the severity of cholecystitis, many physiological differences between the two sexes can be examined. It is postulated that the total body fat, the main value of which is significantly higher for females than males, may contribute to this sex difference. To study the association between body mass index and severity of cholecystitis. This is a prospective study carried out on 70 patients for cholecystitis whose weight and height measurements had been recorded on admission. Patients were placed in either group - Obese (BMI $\geq 25\text{kg/m}^2$) or Non-Obese (BMI $< 25\text{kg/m}^2$). The association between BMI and severity of cholecystitis was investigated. Of the 70 patients included in the study, 47 patients (67.14%) were chronic cases of cholecystitis, 16 cases (22.85%) were diagnosed as acute cholecystitis and complicated acute cholecystitis was seen in 7 patients (10%). Among the complicated cases, empyema was noted in 4 patients and peri-cholecystic abscess in 2 patients. 42 patients (60%) of the 70 patients who were studied were obese and 28 patients (40%) were non-obese. In case of males, the proportion of complicated acute cholecystitis was higher in non-obese patients (20%) compared with obese patients (9%). The results were statistically significant ($p < 0.05$). In case of females, there is no significant difference in proportion of complicated acute cholecystitis in obese and non-obese patients. BMI was found to be negatively correlated with the severity of cholecystitis in males, resulting in higher incidence of severe cholecystitis in the non-obese male patients.

INTRODUCTION

Obesity is an established risk factor for gall stone disease¹. An acute reduction of body weight also predisposes a person to cholelithiasis^{2,3}. Despite many reports on association of body weight to gallstone disease, the effect of body weight on severity of cholecystitis has been rarely reported. Male sex has also been recently cited as a risk factor for severe symptomatic cholelithiasis^(4,5). As a possible cause of several difference in regards to the severity of cholecystitis, many physiological differences between the two sexes can be examined. It is postulated that the total body fat, the main value of which is significantly higher for females than males, may contribute to this sex difference⁶. The objective of the study was to determine the association between body mass index and severity of cholecystitis.

MATERIALS AND METHODS

This is a prospective study carried out on 70 patients for cholecystitis whose weight and height measurements had been recorded on admission. The patients with chronic cholecystitis were electively operated on, and those patients with acute cholecystitis were operated on during their initial admission when they were stabilized or at a later date. Patients identified as cases of cholelithiasis were classified as – (a) Chronic Cholecystitis (b) Uncomplicated Acute Cholecystitis (c) Complicated Acute Cholecystitis. Acute cholecystitis was defined when the patient had 2 or more of the following clinical and operative findings- fever $>37.5^{\circ}\text{C}$, right upper abdominal pain with tenderness, continuous symptoms > 48 hours despite medical treatment. Operative findings included – adhesions to adjacent organs, gross inflammation of gall bladder serosa and gall bladder wall thickness more than 4 mm. Complicated acute cholecystitis refers to the development of life threatening complications such as empyema, peri-cholecystic abscess or gangrene. The severity of inflammation for cholecystitis was prospectively graded as chronic, acute or complicated according to operative findings. BMI was calculated by dividing the patients weight (kg) by the square of the height (in

metres). Patients were placed in either group – Obese (BMI $\geq 25\text{kg/m}^2$) or Non-Obese (BMI $< 25\text{kg/m}^2$). The association between BMI and severity of cholecystitis was investigated. The study was approved by Institutional Review Board.

Statistical Analysis: The data was analyzed and compared using the Chi-Square test and a p value of < 0.05 was considered statistically significant.

RESULTS

Of the 70 patients included in the study, 47 patients (67.14%) were chronic cases of cholecystitis, 16 cases (22.85%) were diagnosed as acute cholecystitis and complicated acute cholecystitis was seen in 7 patients (10%) (Fig 1). Among the complicated cases, empyema was noted in 4 patients and peri-cholecystic abscess in 2 patients. 42 patients (60%) of the 70 patients who were studied were obese and 28 patients (40%) were non-obese (Fig 2).

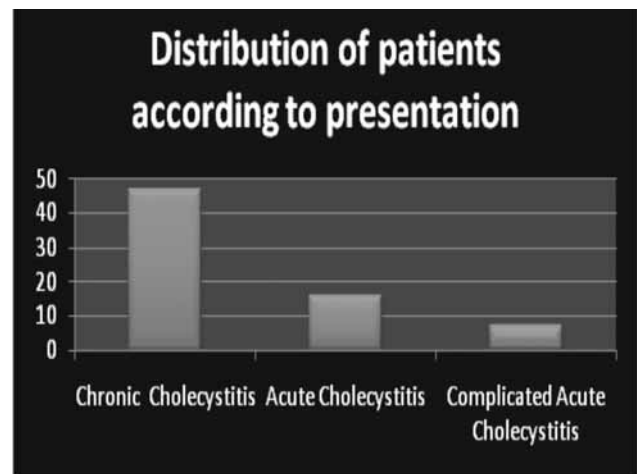


Figure 1: Distribution of patients according to presentation

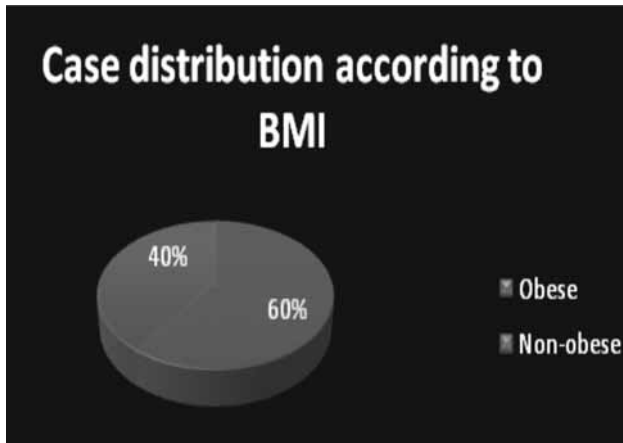


Figure 2: Case distribution according to BMI

In case of males the proportion of complicated acute cholecystitis was higher in non-obese patients (20%) compared with obese patients (9%). The results were statistically significant ($p < 0.05$) (Fig 3).

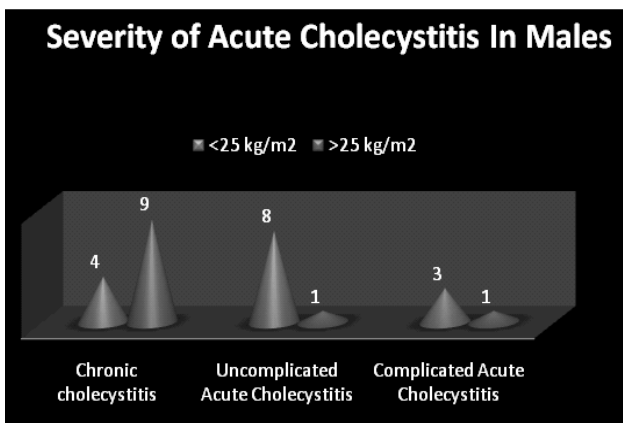


Figure 3: Severity of Acute Cholecystitis in Males
Chi square Test $\chi^2 = 7.94$, $P < 0.05$, statistically significant.

In case of females, there was no significant difference in proportion of complicated acute cholecystitis in obese and non-obese patients. (Fig. 4).

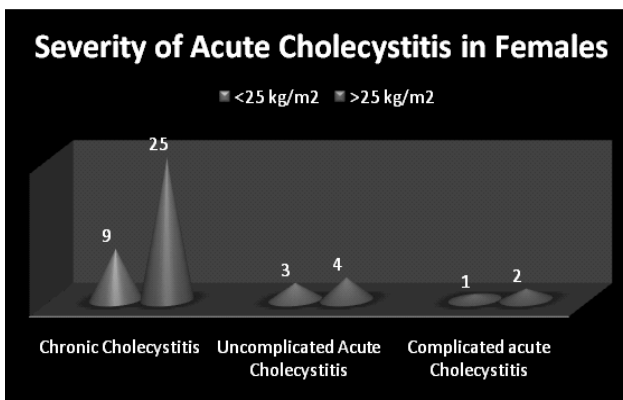


Figure 4: Severity of Acute Cholecystitis in Females
Chi Square test $\chi^2 = 0.77$, $p > 0.05$, statistically not significant

DISCUSSION

Obesity is the best established predictor of gall bladder disease.⁽⁷⁾ The supersaturated bile in the gall bladder of obese subjects may account for this phenomenon.⁽⁸⁾ Obesity increases the biliary secretion of the cholesterol, as a result of an increase in the HMG CoA reductase activity.⁽⁹⁾ Not only overweight /obesity, but weight loss also increases the risk of gallbladder disease. The three factors – cholesterol supersaturation of bile, impaired gall bladder motility and nucleation defects are further increased during weight loss.⁽³⁾ This study focusses upon the relationship between Body Mass Index and the severity of cholecystitis. The cut off point of 25 kg /m² is mentioned by the International Obesity Task Force for Asian and Pacific Island populations of WHO. ⁽¹⁰⁾ This study has showed that there is a higher incidence of severe cholecystitis in the non-obese patients. This is consistent with the findings given by Lee et al in their study.⁽⁶⁾ A possible explanation is that the body fat may have a protective effect on the inflammatory process of cholecystitis. This study also reports that the non-obese male patients were predisposed to complicated cholecystitis, but this was not seen in the non-obese female patients. Epidemiological studies have shown that BMI is sex dependent when it is used as an indicator of body fatness.⁽¹¹⁾ For the same BMI, women have significantly greater amounts of total body fat than do men throughout the entire adult life span. The higher content of body fat in females compared with the males with the same BMI may explain the reason why the negative association was not seen in females.

CONCLUSION

BMI was found to be negatively correlated with the severity of cholecystitis in male, resulting in higher incidence of severe cholecystitis in the non-obese male patients.

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