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ORIGINAL ARTICLE

Acute Cholecystitis: A comparative study of hematological and ultrasonography findings among middle aged and elderly

NAILA IKRAM[1], SABAHAT GUL[2], NATASHA ZAHID[3], FARHEEN HAMEED[4], MAZHAR UL HAQUE[5]
[1,3]*Department of Physiology, Al Ameen Medical College Lahore*
[2]*Associate Professor Anatomy, QAMC, Bahawalpur*
[4]*Associate Professor Pharmacology, Shahida Islam Medical & Dental College, Lodhran*
[5]*Associate Professor Anatomy, Shahida Islam Medical & Dental College, Lodhran*
Correspondence to Dr. Mazhar ul Haque, Email: drmazhar79@gmail.com, Cell No: 03313565277

ABSTRACT

Aim: To determine the differences in-between hematological and ultrasonography findings of acute cholecystitis (AC) among middle-aged versus elderly patients.

Methodology: This retrospective study was carried out after ethical approval. Patients diagnosed as case of acute cholecystitis was included and patients without findings consistent with acute cholecystitis or with pancreatitic gall stones, co-existing hepato-biliary or intestinal malignancy or with autoimmune biliary disease were excluded. Patients were divided into two groups, one being patients between 30 to 59 years and other group 60 and above year olds.

Results: From total of 153 patients included, 87 patients were between 30 and 59 years (middle aged) while 66 patients were 60 years and older (elderly). In both the groups, higher ratios of females persisted (p-0.03). A significant differences between the values were observed only in WBC count (p-0.005) and CRP levels (p<0.001) between middle aged and older age group while all other laboratory variables were found to have an insignificant difference between both the groups.

Conclusion: WBC count and CRP level which were observed to be higher among older age patients, compared with middle aged patients. Such alterations in older aged patients ought to be considered when deciding treatment protocols which will have major influence on the prognosis.

Keywords: Acute Cholecystitis, C-reactive protein, Systemic Inflammatory Response, Aging Physiology

INTRODUCTION

The term acute cholecystitis (AC) is referred to as inflammation of the gall bladder due to either an infection, chemical stimulation or commonly by gall bladder duct obstruction due to stone. Among abdominal conditions, AC is the most commonly encountered clinically[1]. The criteria for diagnosing AC include a local inflammatory sign at right upper quadrant with tenderness, also called Murphy's sign[2]. In addition to local sign, systemic inflammatory sign includes fever, elevated levels of white blood cells (WBC) or C-reactive protein (CRP)[3]. Ultrasonography findings that are consistent with AC are either a thickened wall of gall bladder, pericholecystic fluid or stone in the gall bladder[4].

Even though the clinical course of AC might be self-limiting, but it can lead to dire consequences, i.e. sepsis, peritonitis secondary to the perforation of gall bladder and cholecystoenteric fistulas might result from being either untreated or under treated AC[5]. The reported mortality rate from AC is around 0.6 %[6]. Gall bladder disease frequency is observed to increase with increasing age. As it is known, aging of the most of the poor prognostic factors for any disease[7]. With aging, alterations in physiology is observed, therefore disease might reported different characteristics among elderly patients[8]. To define physiology of aging and indicate the similarities or differences in different age groups are vital for managing a disease especially in geriatric patients[9].

The objectives of this study was to determine the differences in-between main characteristic findings of AC among middle-aged versus elderly patients.

METHODOLOGY

This retrospective study was carried out in-between March 2019 February 2020. After the approval from institute review board, patients diagnosed as a case of acute cholecystitis were included in the study. All paper and electronic record confirming AC in patients by checking their detailed evaluation including history, findings on clinical examination, laboratory diagnosis and ultrasonography finding were confirmed. Patients without findings consistent with acute cholecystitis or with pancreatitic gall stones, co-existing hepato-biliary or intestinal malignancy or with autoimmune biliary disease were excluded. All patients were divided into two groups, one being patients in-between 30 to 60 years and above 60 years in other group.

Patient's data included their information from time of admission, including baseline demographics, laboratory investigations such as complete blood count, liver function tests and C-reactive protein (CRP) levels, findings on ultrasonography indicating thickened wall of gall bladder and gall stones. White blood cell (WBC) count above 10,000 mm^3 was considered as elevated and CRP levels above 3 mg/dl were also regarded as above normal limit. Both were termed after Tokyo Guidelines [10]. All the findings of the patients were compared in-between both the groups. Data was analyzed using SPSS version 23.0. For qualitative variables, frequency and percentages were reported. Chi-square test was applied between the findings of both the groups keeping p-value of <0.05 as statistically significant.

RESULTS

From the total of 153 patients included in the study, 87 patients were between 30 and 59 years (middle aged) while 66 patients were 60 years and older (elderly). In both the groups, higher ratios of females persisted (p-0.03). The ultrasonography findings in both the groups together were observed to have gall bladder wall's thickness >4 mm in 105(68.6%) of patients. 57 were in middle age group while 48 in older age group having an insignificant difference of p-0.18. Presence of gall stones was seen in 123(80.4%) of patients, among which 72 were middle aged while 51 old age, having an insignificant difference of 0.19 [Table I].

With regards to the laboratory investigations of patients in both the groups, significant differences between the values were observed only in WBC count (p-0.005) and CRP levels (p<0.001) between middle aged and older age group while all other laboratory variables were found to have an insignificant difference between both the groups [Table II, Figure I].

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Figure I: Differences in-between WBC count and CRP levels between both age groups

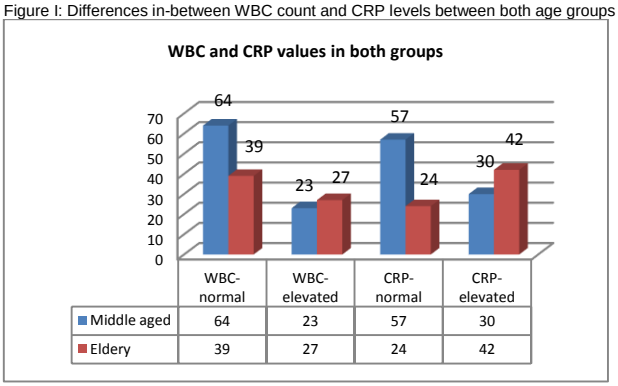

Table I: Baseline demographic and ultrasound findings of study patients according to age

Variable	Overall n=153	30-59 years n=87	>60 years n=66	p-value
Gender				
Male	62 (40.5)	30 (34.5)	31 (47)	0.03
Female	91 (59.4)	57 (65.5)	35 (53)	
Thickness of gall bladder wall				
Normal	48 (31.4)	30 (34.5)	18 (27.3)	0.18
Elevated > 4 mm	105 (68.6)	57 (65.5)	48 (72.7)	
Gall stones				
Absent	30 (19.6)	15 (17.2)	15 (22.7)	0.19
Present	123 (80.4)	72 (82.8)	51 (77.3)	

Table II: Clinical laboratory investigations of study patients according to age

Variables		Overall (n=153)	30-60 years n=87	>61 years n=66	p-value
Total Bilirubin	Normal	83 (54.2)	52 (59.8)	32 (48.5)	0.13
	Elevated	70 (45.8)	35 (40.2)	34 (51.5)	
Direct Bilirubin	Normal	68 (44.4)	43 (49.4)	26 (39.4)	0.13
	Elevated >1.2 mg/dl	85 (55.6)	44 (50.6)	40 (60.6)	
ALT	Normal	48 (31.4)	26 (29.9)	22 (33.3)	0.38
	Elevated	105 (68.6)	61 (70.1)	44 (66.7)	
AST	Normal	53 (34.6)	30 (34.5)	23 (34.8)	0.38
	Elevated	100 (65.4)	57 (65.5)	43 (65.2)	
ALP	Normal	98 (64.1)	58 (66.7)	41 (62.1)	0.41
	Elevated	55 (35.9)	29 (33.3)	25 (37.9)	
GGT	Normal	45 (29.4)	24 (27.6)	21 (31.8)	0.46
	Elevated	108 (70.6)	63 (72.4)	45 (68.2)	
WBC count	Normal	102 (66.7)	64 (73.6)	39 (59.1)	0.005
	Elevated >10,500 mm^3	51 (33.3)	23 (26.4)	27 (40.9)	
CRP	Normal	80 (52.3)	57 (65.5)	24 (36.4)	<0.001
	Elevated >3 mg/dl	73 (47.7)	30 (34.5)	42 (63.6)	

DISCUSSION

This research demonstrated the similar and dissimilar demographic, ultrasonography and laboratory findings between middle aged and older age group. Gender distribution substantially varied between the groups, which indicated that male and females were almost equal in old age group, slightly higher ratio was of females while in the middle age group, female dominancy was observed. Ultrasound findings were almost similar in both the groups; hence the differences between them were insignificant. Among laboratory findings, CRP levels and WBC count were found to be substantially higher among older age group as compared with the values seen in middle age group.

In managing complications related to biliary system can pose a challenging task among older age patients. Rising age is regarded as an independent factor predicting complications and mortality[11]. Presence of mild or atypical symptoms accompanies older age group more frequently and co-morbidities significantly influence prognosis and treatment modalities[12]. Even though recently, advancements have been observed in treating acute biliary conditions having significant improvements in patients' prognosis, rates of mortality and morbidity, yet there are substantially seen in older age group than middle age group[13]. Delay in surgical intervention especially in acute setting tends to have exerts much higher risk among old age patients in comparison to middle age patients[14]. As a result, to define baseline characteristics of such disease among old age patients is vital in emerging management. In most researches done on old age patients of AC, the studies have evaluated methods of surgical intervention and time duration of surgery. Nonetheless, data regarding clinical features of AC among old age patients is not sufficient[15, 16].

In this study, we observed that some demographic differences were seen between old age and middle aged AC patients. For example, female were found to have higher frequencies of AC. Nevertheless, it was found that female to male ratio was almost similar in old age group with slight female pre-dominance, however in middle age group; females were seen to be much higher than males. In line with our study, a study observed no significant differences of gender in old age AC patients[17]. In another research, similar findings were reported in AC old age patients as compared with middle age patients[18].

Among laboratory values, we observed significant differences of inflammatory markers among middle aged and older aged patients. Old age patients had substantially higher levels of CRP than middle age patients. Additionally, while 40.9 % old age patients reported elevations in WBC count, in middle aged patients, 26.4 % had elevated count of WBCs. Likewise; a study reported 59 % of old age patients to have elevated counts of WBCs[19]. The above findings might be due to alterations in immune-pathology with age. Even though various inflammatory cells tend to decline with age, aging in humans tends to be accompanied in general with elevations in systemic inflammatory conditions. Therefore, inflammation-associated biomarkers are a powerful predictor of old age patient's mortality[20].

Old age patients in general show prolong pro-inflammatory response in comparison to middle age patients. This reflects a challenge in clearance of inflammatory agents in which studies have shown that among old age patients, higher inflammatory biomarkers are reported. CRP is termed as an acute-phase inflammatory marker, where high CRP levels in old age AC patients in our study might have been due to elevations in normal systemic inflammatory conditions related to aging[21]. In contrast, natural killer (NK) cells tend to increase with age, but their lytic activities might be diminished with increasing age. This may be a reason for increased WBC count among old age group, as reported in our study as well[22].

In our study, substantially differences regarding increased gall bladder wall thickness were not seen in our study among

both the groups. Similar findings were reported in another study as well[23]. Additionally, the physiological alterations associated with aging might also influence functions of gastrointestinal system like reduced gall bladder's sensitivity to stimulation by cholecystokinin. Moreover altered gastrointestinal physiology increases levels of oxidative stress with time and with chronic exposure to infectious agents might lead to higher inflammatory levels among old aged AC patients[24].

There were some limitations of the study. Firstly the study design was retrospective in nature and single-centered with limited sample size, dependent upon hospital record and subjective nature of collected data. Since this was single-center study, results may give incomplete clinical picture of the overall course of disease.

CONCLUSION

Baseline demographics and other findings according to age tend to influence the WBC count and CRP level which were observed to be higher among older age patients, compared with middle aged patients. Such alterations in older aged patients ought to be considered when deciding treatment protocols which will have major influence on the prognosis.

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