

Original Research Article

Jaundice in adult patients above 50 years of age: a comparative study of liver function tests

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Received: 10 March 2020

Accepted: 01 April 2020

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ABSTRACT

Background: Diagnosis of jaundice involves a range of tests. The liver function tests are done in all to arrive at a diagnosis and then manage the case appropriately. With advancing age, the incidence of liver disease increases. Understanding these changes is important for the management of liver diseases in the elderly. We conducted this study to find the difference in mean levels of Liver enzymes in younger and older age group of patients suffering with jaundice.

Methods: It was a prospective observational study. All patients admitted with jaundice in the medicine ward satisfying inclusion/exclusion criteria were enrolled. The results of liver function tests in younger age and older age participants were then compared.

Results: Total 100 participants were enrolled during the study period. 53 were enrolled in group one and the rest in group two. Anorexia (90%) was the most common symptom followed by abdominal distension (54%). The total bilirubin (8.8 ± 4.7) as well as conjugated bilirubin (3.4 ± 2.8) were higher in group one though they were not significant statistically ($p=0.10$ and 0.25 respectively). Mean AST and ALT levels were much higher in group 1 and statistically significant (p values <0.004 and 0.002 respectively). Conversely the mean PT values were higher in group two ($p=0.02$).

Conclusions: Although the symptom severity may be more in elderly, the LFTs are not deranged proportionately. So there is a need to devise separate cut offs and these have to be lower for the older age group patients with jaundice. More studies with larger sample size are required to confirm the results.

Keywords: Adult patients, Comparative study, Jaundice, Liver function tests

INTRODUCTION

The word “jaundice” is derived from old French word “jaundice”, a word rooted in Latin galbinus, meaning greenish yellow.¹ The bilirubin present in serum represents a balance between input from the production of bilirubin and hepatic/biliary removal of the pigment. Rise in serum total bilirubin levels indicate jaundice. Tissue deposition of bilirubin occurs only in the presence of serum hyperbilirubinemia and is a sign of either liver

disease or, less often, a hemolytic disorder. An inflamed liver or obstructed bile duct can lead to jaundice, as well as other underlying conditions. Diagnosis of jaundice can involve a range of tests. The presence of scleral icterus indicates a serum bilirubin level of at least 3 mg/dL. The liver function tests are done in all such cases of jaundice to arrive at a diagnosis and then manage the case appropriately.²⁻⁴ The blood flow to the liver gradually decreases with age. Geriatric populations of many countries are growing rapidly and they present major

problems to healthcare infrastructures from both medical and economic perspectives. The elderly are predisposed to a variety of diseases, which contribute to a marked increase in morbidity in this sub population. With advancing age, the incidence of liver disease increases in the elderly, but the cellular and sub cellular perturbations that underlie this suspected predisposition to pathology remain unresolved.⁵ Morphology and functions of the liver as well as other organs change with aging. Understanding these changes is important for the management of liver diseases in the elderly. There is limited data available regarding comparison of liver function of the younger age group patients with those patients above the age of 50 years. So authors conducted this study to find the difference in mean levels of Liver enzymes in younger and older age group of patients suffering with jaundice.

METHODS

The study was conducted in the department of medicine, at Dr Rajendra Prasad Government Medical College, Kangra, Himachal Pradesh. It was part of a larger prospective observational study and was conducted for a period of one year from 1st June 2016 through May 2017. The necessary permission from the institutional ethical committee was taken before commencing the study. A total of 100 patients having jaundice and admitted in the department of medicine, who satisfied the inclusion and exclusion criteria and also who gave their consent, were enrolled in the study.

Inclusion criteria

- All the patients with jaundice and admitted in the medicine ward of the medical college during the study period.

Exclusion criteria

- Those who were not willing to participate in the study and were below 18 years of age.

A total of 100 patients who satisfied the inclusion and exclusion criteria were enrolled by doing consecutive sampling for a period of one year. Authors wanted to compare the results of liver function tests in younger age

versus the older age participants. For this purpose authors divided the patients into two age groups: up to 50 years and above 50 years of age i.e. Group one and Group two respectively. The clinical, biochemical and socio-demographic details of the patients were collected in a self-designed, pretested and structured format. Clinical objectives were achieved by noting down a detailed history, general physical examination, chest X-ray PA view, abdominal ultrasonography, upper gastrointestinal endoscopy, final diagnosis and outcome at discharge. Biochemical objectives were achieved by doing investigations like complete blood count, liver function tests, Renal function tests alongwith tests for other serological markers of hepatitis and PT-INR. In this study authors limit this findings to the socio demographic profile and liver function tests of the cases enrolled.

Statistical analysis

The data of all the enrolled patients was cleaned and entered in Microsoft Excel software spreadsheet. It was then analyzed using Epi info version 7.2.0.1 and the results are presented as means, standard deviations, frequencies and percentages along with various tables. The two groups were compared using Independent t-test and a p value of <0.05 was considered as statistically significant.

RESULTS

A total of 100 participants were enrolled during the study period. Out of these 77% were males and the average age of presentation was 47.5 years. Maximum patients were in the age group of 51-60 years (32%). 53 patients were below 50 years of age and were enrolled in group one while the rest were allotted group two (Table 1).

Table 1: Age and sex distribution.

Age group (Years)	Males	Females	Total (%)
18-20	3	2	5(5.0)
21-30	8	2	10(10.0)
31-40	2	4	6(6.0)
41-50	22	10	32(32.0)
51-60	32	5	37(37.0)
>60	10	0	10(10.0)
Total	77	23	100(100.0)

Table 2: Distribution of signs and symptoms.

Signs	Number of patients (n=100)	Symptoms	Number of patients (n=100)
Ascites	60	Anorexia	90
Pedal edema	44	Abdominal distension	54
Hepatic encephalopathy	43	Altered sensorium	41
Splenomegaly	36	Fever	33
Stigmata of chronic liver disease	21	Pain abdomen	31
Enlarged liver	03	Nausea	17

The most common cause of jaundice in hospitalized patients was found to be decompensation of cirrhosis. Anorexia (90%) was the most common symptom

followed by abdominal distension (54%). With regard to the signs, ascites was the commonest finding in 60% while pedal edema was present in 44% cases (Table 2).

Table 3: Comparison of liver function tests between Group 1 and Group 2.

Parameter	Group 1 Mean±SD (range)	Group 2 Mean±SD (range)	p value (* <0.05 is significant)
Age (years)	36.9±10.4 (18-49)	56.9±4.5 (50-70)	0.00*
Liver span (cm)	14.7±1.6 (12-18)	14.2±1.5 (11-18)	0.12
Duration of jaundice (days)	70.4±160.2 (2-900)	56.8±76.9 (2-365)	0.59
Serum bilirubin (T) mg/dl	8.8±4.7 (3.3-26.0)	7.2±5.0 (1.4-21.0)	0.10
Serum bilirubin (C) mg/dl	4.1±2.9 (0.35-15.0)	3.4±2.8 (1.0-10.7)	0.25
Aspartate transaminase (AST) (u/l)	625±846.1 (25-3337)	233±265.3 (46-1697)	0.004*
Alanine transaminase (ALT) (u/l)	788.9±1359.0 (21-5672)	140.2±193.1 (26-1200)	0.002*
Alkaline phosphatase (ALP) (u/l)	306.9±306.0 (55-1844)	237.8±169.2 (31-719)	0.17
Prothrombin time (PT)- prolonged (control-12.5)	6.7±4.6 (0.0-20.0)	8.9±4.4 (0.0-20.0)	0.02*
International normalized ratio (INR)	2.1±1.7 (0.9-12.0)	2.0±0.55 (1.3-3.6)	0.78
Serum protein (T) gm/dl	6.3±0.67 (5.0-8.4)	6.1±0.98 (4.0-8.4)	0.19
Serum albumin (gm/dl)	3.1±0.72 (1.8-4.7)	2.7±0.54 (1.8-5.0)	0.001*

On comparing participants of group one and group two authors found that the mean age of cases in group one was 36.9±10.4 and it was 56.9±4.5 in group two. The mean duration of jaundice was higher in group one as compared to group two, though it was not statistically significant (p=0.59). With regard to their liver function tests it was found that the total bilirubin (8.8±4.7) as well as conjugated bilirubin (3.4±2.8) were higher in group one than group two, though they were not significant statistically (p=0.10 and 0.25 respectively). Again the mean AST and ALT levels were much higher in group one as compared to group two and were statistically significant also at p values of 0.004 and 0.002 respectively. Conversely the mean PT values were higher in group two and were also statistically significant (p=0.02) (Table 3).

DISCUSSION

The average age of patients was 47.7±12.7 years, majority between 41-60 years (69%). Hung et al, reported mean age of 53.8±16.9 years and maximum cases were also in the range of 40-59 years (41%).⁵ Similarly, in Chacko and Chacko, Sarin et al, and Maskey et al, studies, average age of patients was 48±11 years, 43±8.7 years and 49.06±11.27 years respectively.^{6,7,8} Other studies conducted on alcoholic liver disease by Hemang Suthar et al, in India, and Pathak et al, in Nepal, mean age was 41 years and 52 years respectively.^{9,10}

The male: female ratio in this study was 3.3:1 while L.N. Hung et al, reported a male: female ratio of 1.3:1.5 Maskey et al, reported a ratio of 2.1:1, while in

Bangladesh it was 3.16:1 which is comparable with this study.^{8,11}

Authors found anorexia the most common symptom (90%) followed by distension of abdomen (54%). Maskey et al, and Suthar et al, found abdominal distension as a presenting complaint in 84%, and 60% of their patients respectively.^{8,9} In another study conducted in Peru, the main clinical presentation was upper gastrointestinal bleeding, followed by ascites and encephalopathy.¹² Hajiani et al, also found abdominal distension as the chief complaint in most of their patients.¹³

As per Deetman et al, and Dong et al, Liver enzyme levels can increase due to factors such as liver damage and injury, and can decrease due to factors such as hepatic ageing, frailty and reduced hepatic blood circulation.¹⁴⁻¹⁵ Authors found that all the liver enzymes increased due to various factors which had led to jaundice in the study participants. The mean increase in the liver enzymes was proportionately more in younger age group as compared to the older age group.

According to Kim H et al, aging is associated with the vulnerability to acute liver injury, severity and poor prognosis of various liver diseases.¹⁶ Tietz NW et al, found that the liver enzymes are well preserved in elderly while bilirubin levels may decline due to decreased muscle mass and haemoglobin concentrations.¹⁷ In this study also the mean bilirubin levels of jaundice patients were lower at 7.2±5.0 in group 2 as compared to group 1 (8.8±4.7. Dong et al, found that the albumin, ALT and gamma-glutamyl transferase levels decrease with aging

suggesting decrease in liver function.¹⁸ Authors also found that though all the patients were suffering from Jaundice and had markedly raised levels of liver enzymes, but the mean levels of ALT, AST and ALP were lower in older age group. But in chronic liver disease as found by Roche et al, these can be normal or slightly elevated as there is little parenchyma left to damage. Similar findings were observed by Fargo MV et al.^{19,20} According to them Elevated alanine transaminase and aspartate transaminase levels can indicate hepatocellular damage. However, levels may be normal in chronic liver disease (e.g., cirrhosis). In such cases, there may not be enough normal liver parenchymal tissue to release elevated levels of these enzymes.

Shah AA et al, observed that the development of jaundice in elderly patients was associated with better prognosis.²¹ This result may represent robust immunity in these elderly patients with sepsis, which may be responsible for their survival. Premoli et al, state that a cautious individual evaluation is therefore required in aged patients. No significant differences in diagnostic investigations or treatment options occur between the elderly and the young.²² But authors found that the liver enzymes were markedly lower in older age group. The AST, ALT, PT and Serum albumin levels were found to be significantly lower than the younger age group.

Boland BS et al, found that the Bilirubin levels increased significantly ($p < 0.0001$) with advancing age.²³ But the reverse was seen in this study where the increase in mean total bilirubin as well as the conjugated bilirubin levels were found to be lower in the elderly age group. According to Neki NS, the prothrombin time may be prolonged because of vitamin K malabsorption in elderly.²⁴ Here also authors found that the mean PT levels in group two were 8.9 ± 4.4 and were significantly higher than the younger age group.

CONCLUSION

It is known fact that liver function decreases with age, but although the symptom severity may be more in elderly the LFTs are not proportionately deranged. These findings suggest that there is a need to devise separate cut offs of liver function tests in the elderly. These cut offs need to be lower for the older age group patients of jaundice because here there may be a decrease in levels due to damage to the liver tissue due to some chronic ailment. More studies with larger sample size are required to confirm the results. The elderly patients show different changes of the liver that may affect the clinical presentation and further the management of liver pathology in these patients.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Chauhan S, Barwal VK, Sharma GA, Vaid A, Sood N, Rana N. Jaundice in adult patients above 50 years of age: a comparative study of liver function tests. *Int J Res Med Sci* 2020;8:1823-7.