Original Resear	Volume - 12 Issue - 11 November - 2022 PRINT ISSN No. 2249 - 555X DOI : 10.36106/ijar Surgery SERUM IRON PROFILE IN PATIENTS OF GALLSTONE DISEASE
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	KEYWORDS :
INTRODUCTION	In our study, it was seen that overall maximum patients who had less

Gall Stone disease is a common clinical entity affecting adult population of both sexes. The old saying, that gall stone sufferer is a fat, fertile, female of forty is only partly true, as the disease has been observed in women after their first delivery and also in underweight and thin people.¹.Iron acts as a coenzyme for nitric oxide synthetase (NOS), and that is important for the maintenance of basal gall bladder tone and normal relaxation ²It was found that iron deficiency resulted in altered motility of gallbladder and sphincter of oddi (SO), leading to biliary stasis and thus increased cholesterol crystal formation in the gall bladder bile³. The present study was conducted on the randomly selected individuals of northeast Indian Population with gall stones to study the role of iron deficiency anaemia in gall stone formation.

AIMS AND OBJECTIVES

1. To correlate serum iron level as a marker for gallstone formation. 2.To study how serum iron and serum ferritin can be used as a diagnostic tool for iron deficiency anemia in patients of gallstone disease.

MATERIALS AND METHODS :-

A sample size of 70 patients were taken. The Patients lying in the age group of 18 -75 years who were admitted for OT in the department of general surgery Gauhati medical college and hospital from 31 st May 2020 to 1 st June 2021(with ultrasonographic evidence of gallstones) and giving consent were included in the study. Those with Gall bladder polyps, gall bladder wall irregular thickening, blurring of GBhepatic interface, patients with liver disease, acute cholecystitis and those who didn't give consent to participate in the study were excluded.

Serum iron was estimated by Ferrozine kit method for determination of iron. The normal reference values supplied with the kit, were for males (60-160 μ g/dl) and for females (35-145 g/dl) Patients were labeled as anaemic and nonanaemic when males with serum iron < 60 g/dl and females with serum iron <35g/dl.

All the routine investigations needed for preparing a case for OT were performed apart from the investigations to detect iron deficiency like Hb%,Serum iron, serum ferritin.

RESULTS AND OBSERVATIONS:-

In our study the gallstone patients were grouped according to age intervals and it was found that maximum patients were lying in age group of 48-57 years out of which majority patients 25 (35.7%) were females as described in the followin Bar diagram. This is consistent with the fact that mostly gallstone occurs in "Fat Fertile Female of Forty".



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our study it was seen that overall maximum patients v than normal serum iron levels were lying in the age range of 48-57 yrs, followed by 58-67 years. In both the age ranges, females have outnumbered males. In case of males, age range having maximum no of patients with less than normal serum iron level was 18-27years followed by equal incidence in 48-57 yrs, and 28-37 years. The findings are shown in the following table.

Table 2: Combined Age And Sex Distribution Of Serum Iron Level. (normal Serum Iron Level In Males Is 60 - 160 mg/dl And In Females It Is 35-145mg/dl)

Age	Female			Male		
(In	<normal< td=""><td>Normal</td><td>>normal</td><td><normal< td=""><td>normal</td><td>>normal</td></normal<></td></normal<>	Normal	>normal	<normal< td=""><td>normal</td><td>>normal</td></normal<>	normal	>normal
years)						
18 - 27	1 (2.8%)	0(%)	0	2(40%)	1(25%)	0
28 - 37	2 (5.7%)	1 (2.8%)	0	1(25%)	2(40%)	0
38 - 47	4(11.42%)	1(2.8%)	0	0(0%)	2 (40%)	1
48 - 57	18(51.4%)	5(14.2%)	2	1(25%)	3(60%)	1
58 - 67	9(25.7%)	29(5.7%)	2	1(25%)	3(60%)	1
68 - 75	0 (0%)	3(8.5%)	0	0(0%)	1(25%)	0
Total	35 (100%)	12	3	5(100%)	12(100%)	3

Serum Ferritin is a marker of low total body iron store. In infection free situation, it is an ideal indicator for diagnosis of iron deficiency and response to iron therapy in a community. It was seen that majority of patients with less than normal serum ferritin levels were females and lie in age group of 48-57 years followed by 58-67 yrs as given in table below:-

Table 3 : Combined Age-sex Distribution Of Serum Ferritin. (normal Serum Ferritin In Males Is 20 -250mg/dl And In Females Is 10-120 mg/dl)

Age Range	Females			Males		
in years	<normal< th=""><th>normal</th><th>>normal</th><th><normal< th=""><th>normal</th><th>>normal</th></normal<></th></normal<>	normal	>normal	<normal< th=""><th>normal</th><th>>normal</th></normal<>	normal	>normal
18-27	1(3.33%)	1	0	2	1	0
28-37	2(6.66%)	2	0	1	2	1
38-47	4(13.33%)	2	0	1	3	0
48-57	14(46.6%)	5	0	1	2	2
58-67	8(26.66%)	3	1	1	1	0
67-75	1(3.33%)	4	2	0	1	1
total	30(100%)	17	3	6	10	4

Anaemia



Chart 4: Distribution of anemia in study population according to sex(Anemia in the study population is defined as hemoglobin level less than 8gm/dl)

It was seen that maximum no of patients with anemia lie in the age range of 48-57 yrs followed by 58-67 yrs. This is in consistent with the low serum iron and feritin levels found in that age ranges.

Table 5: Distribution Of Age And Sex According To Hemoglobin Level.

Age range	Females		Males	
(in years)	Hb <8gm/dl	Hb >8 gm/dl	Hb <8gm/dl	Hb >8gm/dl
18-27	1	0	1	2
28-37	2	1	0	3
38-47	3	2	1	2
48-57	15	10	1	4
58-67	8	5	0	5
68-75	1	2	0	1
total	30	20	3	17

Serum iron is a parameter that is directly affected in iron deficiency anemia. Its value is below normal in chronic nutritional anemia and may be normal in anemia due to acute reasons. It was seen that serum iron levels were low in 93.33% of anemic females and 33.33% of anemic males had less than normal values of serum iron. This shows the association between low serum iron with anemia and gallstone disease.

Table 6 : Distribution Of S. Iron According To Anaemia In Gallstone Patients (here Anemia Is Taken As Hb <8gm/dl)

Serum iron	Female		Male		
	anemic	Non anemic	anemic	Non anemic	
<normal< td=""><td>28(93.33%)</td><td>7</td><td>1(33.33%)</td><td>4</td></normal<>	28(93.33%)	7	1(33.33%)	4	
normal	2(6.67%)	10	1(33.33%)	11	
>normal	0(0%)	3	19(33.33%)	2	
total	30		3		

In our study,maximum Female anemic patients had less than normal serum ferritin levels but all anemic males had low serum ferritin as given in the table and bardiagrams below:-

Table 7 : Distribution Of S. Ferritin According To Anemia In Males And Females.(normal Serum Ferritin In Males Is 24-336 mcg/land In Females Is 11 To 307 mcg/l)

Serum	Female		Male		
Ferritin	Anaemia	Non anaemic	Anaemia	Non anemia	
<normal< td=""><td>20</td><td>10</td><td>3</td><td>3</td></normal<>	20	10	3	3	
normal	10	7	1	9	
>normal	1	2	2	2	
total	31	19	6	14	

DISCUSSION

The prevalence of anaemia is an important health indicator and when it is used with other measurements of iron status. The haemoglobin concentration can provide information about the severity of iron deficiency but Serum ferritin will act as more specific indicator for iron deficiency anaemia. Therefore, regulation of serum iron by ferritin needs to be studied. In infection free situation, serum ferritin should be used and complemented with hemoglobin level in all programmed evaluations

In our study it was found that incidence of gallstones was more in Females than males with a ratio of 2.49 : 1. The findings were consistent with other similar studies like in 2014, in a study Bansal et al⁴ it was 1.88:1. In 2016, in the study by Halgaonker et al⁵ it was 5.6:1.In 2018 by Sanjeev kumar et al⁶ where female : male ratio was found to be 3.7: 1. This female predominance in all the studies could be due to effect of estrogen and progesterone on the biliary tract.

In our study, gallstone disease was seen most commonly in 5th and 6th decade. Findings are consistent with other studies which showed similar results like in 2014, in a study by Arpit Bansal et al⁷, gallstones were more commonly seen in 4th to 5th decade . In **2017**, in a study by Kunal N Rathod and Nimish Jha⁸, it was seen in 4th and 5th decade.

In our study, majority of patients ie 50 % had less than normal serum iron levels out of which 51.4 % were females in 4th to 5th decade. Males with less than less than normal serum iron levels comprised of only 7.14%. Findings of the study were consistent with P.C Prasad et al'in 2015 of which 78% of patients with gallstones had the value of serum iron levels less than normal. Most of the patients whose serum iron levels were subnormal were females. In 2016, a study conducted by Priyesh Halgaonker et al⁵ showed that 93 % had low serum iron levels.

In our study, serum ferritin was overall low in 51.42% of the total patients. Females comprised of 42.85% with low serum ferritin and males comprised of 14.28%. Ferritin levels are lower in female population and the demography of gall stone disease suggests that it is more prevalent in female population. So, serum ferritin and its regulation by iron regulator protein, understandably, will affect gall stone formation.

In our study, out of the 70 patients, 33 were anemic and out of these, majority were females lying in 5th -6th decade, followed by 4th -5th decade . Among the males in our study, most of them were found to be non-anemic. Majority of the anemic patients had serum iron levels less than normal which comprised of 93.33%, but only 33.33% of male anaemic patients had less than normal serum iron levels .This shows that majority of anemic patients had iron deficiency anemia which is a type of nutritional anemia. The findings are similar to that of the study done in 2015 by PC Prasad et al', where 52% of anemic patients with gallstones had less than normal serum iron levels.

In our study, 66.66% of anemic females patients had less than normal Serum ferritin levels but 100% of the anemic males had less than normal serum ferritin levels. The females lie mostly in the age group of 48-57 years. There was significant association between serum ferritin and hemoglobin levels in patients with gallstone disease. In the study by Prasad et al'in 2015, 48% of anaemic gallstone patents had low serum ferritin levels¹⁵. However, in 2020, in a study done by Babu and Bille et al¹⁰, they found 66.7% of anaemic patients had normal serum ferritin while only 33.3% had low serum ferritin.

It is because of the very reason that every patient with gallstones and having age higher than 30 years should be screened for serum iron, while serum ferritin be used as marker of iron store in the body. This way low serum iron status could be diagnosed at early stage and their further progression towards severe iron deficiency can be checked.

CONCLUSION

Iron deficiency anemia was more prevalent in females gallstone patients. However in our study ,male anemic patients also had less than normal serum ferritin levels . This shows that serum ferritin is a marker of iron deficiency anemia in gallstone patients.We conclude from the present study that Iron deficiency anemia is a risk factor for gallstone formation. Hence early detection of Iron deficiency anemia and its prevention can decrease the incidence of gallstone disease in the population

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