

## Changing Incidence of Gall Stone Disease: A Single Centre Study from Eastern India

Dr Aftab Ahmed<sup>1</sup>, Dr Satish Kumar Ranjan<sup>2</sup>, Dr D K sinha<sup>3</sup>,  
Dr M D Kerketta<sup>4</sup>, Dr Preeti Usha<sup>5</sup>

<sup>1</sup>. Registrar, Department of General Surgery, RIMS, Ranchi.

<sup>2</sup>. Junior Resident, Department of General Surgery, RIMS, Ranchi.

<sup>3</sup>. Associate professor, Department of General Surgery, RIMS, Ranchi.

<sup>4</sup>. Assistant professor, Department of General Surgery, RIMS, Ranchi

<sup>5</sup>. Medical officer, PHC Sugauli, East Champaran, Bihar

**Corresponding author:** Dr Satish Kumar Ranjan

Hostel No.5, Room No. 43

RIMS, Bariatu, Ranchi

Pin -834009

---

### **Abstract:**

**Introduction:** Gall stone is the most common biliary pathology both in India and western countries. In UK prevalence of gall stone is approximately 17% at the autopsy and it may be increasing. In India high prevalence is reported in northern population. Aim of present study is to know the incidence pattern of gall stone at our institute.

**Aims and objective:** To find out the changing incidence of gallstones in various group of patients admitted at Rajendra Institute of Medical Sciences, Ranchi.

**Materials and Method:** This is prospective study of 50 patients admitted with symptomatic gall stone disease, diagnosed by detail history and clinical examinations. Diagnosis is confirmed by trans-abdominal Ultrasound. Then all the patients were posted for cholecystectomy followed by typing of stones. Finally data was analysed.

**Observation and Results:** Maximum incidence (28%) of gall stone disease occurs in female of age group 41 to 50 years and it is 4 times higher than male. Of total 60% of patients were obese and 8% of patients had history of oral contraceptive pills intake. 10% patients had family history of gall stone disease and only 8% were diabetic. After surgery, typing of stone done which showed 80% of patients had pigment stone and only 20% had cholesterol stone.

**Conclusion:** Gall stone disease is common in middle age female. Its incidence is increasing from 3<sup>rd</sup> to 5<sup>th</sup> decade of life. Obesity and diet rich in saturated fatty acids are strongest risk factor.

**Key words:** Cholecystectomy, Cholesterol, Gall stone, Pigment

---

### **I. Introduction**

Gallstone disease is one of the most common problems affecting the biliary tract. Autopsy reports have shown a prevalence of gall stones from 11 to 36% [1]. Stone forms as a result of solids settling out of solution or after precipitation of solutes in the solution. The major organic solutes in bile are bilirubin, bile salts, phospholipids & cholesterol [2]. Gall stones are classified by their cholesterol content as either cholesterol stone or pigment stone. Pigment stones can be further classified as either black or brown [2]. In western countries about 80% of gall stones are cholesterol stones and about 15 to 20% are black pigment stones [3]. In Asia both types of pigment stones are more common [2].

### **II. Aims And Objective**

The aim of present study is to find out the changing incidence of gallstones in various group of patients admitted at Rajendra Institute of Medical Sciences, Ranchi, during the period of July 2012- August 2013.

### **III. Material And Methods**

The present study is being done to observe the changing incidence of gall stone disease in patients admitted in surgical ward of Rajendra Institute of Medical Sciences, Ranchi, with sign and symptoms of gall stone disease. Fifty (50) patients were selected which were presented with the symptoms of gall stone disease. The diagnosis was made on the basis of history, physical examination, Ultrasonography and other respective investigation.

All the patient were prepared for surgery after taking consent of cholecystectomy. After the cholecystectomy, the stones were collected, washed with normal saline and cut into two halves by scalpel. On the basis of colour, surface morphology, and cut surface the stones were classified into different groups. The stones were dried at room temperature overnight. Half of the stone was grinded using mortar and pestle and was sent to Central Instrumentation Facility Lab at B.I.T, Mesra, Ranchi, Jharkhand. 2-3 mg of sample was mixed with 40 mg of spectral grade potassium bromide crystals and grind up as fine as possible to make 13 mm diameter sodium chloride disc. Fourier transform infrared (FTIR) spectroscopy [4] measurements were performed using at the frequency range  $4000-400\text{ cm}^{-1}$  at  $4\text{ cm}^{-1}$  resolution. To obtain a high signal to noise ratio 100 scans were performed for each sample.

#### **IV. Observation And Results**

Total 50 patients were taken for study. It was found that maximum incidence 14, (28%) of gall stone disease is found between 41-50 years of age and minimum (only 01 case) incidence is between 10-20 years of age. A rise in incidence was seen from 3<sup>rd</sup> decade to 5<sup>th</sup> decade after which there was decrease in incidence of gall stone disease [ Table 1]. Females are four times more commonly affected than that of male. Of total 60% (30) of patients were obese, 30% (15) patients were of average built, and only 10% (5) patients of thin built . Out of total studied patients 78% (39) of patients were fertile and 1(2%) female was unmarried. Forty-nine (98%) patients were taking mixed diet and only one patient was purely vegetarian. In present study 36 (72%) patients were from low income group and 14 (28%) patients were from medium income group. Out of fifty, 38 (76%) patient were non addicted, 9 (18%) were addicted to tobacco, 2 (4%) were addicted to alcohol and only 01 was addicted to tobacco and alcohol both. Family history was positive in only 5 (10%) patients. Of total 4 (8%) patients were diabetic and 46 (92%) were non-diabetic. Only 4 (8%) patients had the history of oral contraceptive pills intake. On investigation only 7 (14%) patients were associated with abnormality of liver function test. After cholecystectomy , stones were extracted from gall bladder and typing was done. Of total studied patients , 40 (80%) patients had brown stones and 10 (20%) patients had cholesterol stones , and there was no black stones in any of the patients [Table 2]

#### **V. Discussion**

Gall stone was first described by the great physician Alexander Trallianus who wrote about the calculi within the bile duct [4]. By the 16<sup>th</sup> century both Vesalius and Fallopius described gall stones found in the gall bladder of the dissected human bodies [5]. Worldwide gallstone is increasing in incidence [6,7]. In the last fifty years the prevalence of gall stone disease in Japan has doubled and there has been a change from pigment to cholesterol gall stone. Similar increases in incidence are noted elsewhere also. The highest prevalence of gallstone disease is noted in Native American Indians (Pima) in Arizona. An alarming frequency of 73% of Pima women having gall stones around the age of thirty was noted.

In India the prevalence of gall stone disease varies in different parts of India. Malhotra in 1996 conducted an epidemiological study in Indian Railway employees and showed that North Indians has 7 times higher prevalence of gall stones compared to South Indian employees. In northern states including Kashmir , a very high and increasing prevalence were reported [8-11]. Khuroo from Kashmir reported a prevalence of 61.2 % and the prevalence increasing progressively to reach a peak in the sixth decade [12].

In present study gall stone is rare below 20years of age and increasing incidence noted from 3<sup>rd</sup> to 5<sup>th</sup> decade. Similar result reported by Shaffer et al and oxford text book of surgery [12,13]. Its prevalence is about 4% of people in 3<sup>rd</sup> decade of life to 27% in 7<sup>th</sup> decade [13].

According to present study gall stone disease is four times more common in female than that of male. Oxford textbook of Surgery, 2<sup>nd</sup> edition and Schwartz principle of surgery 9<sup>th</sup> edition also reported that incidence of gall stone is three times more common in female [14]. Thirty patients (60%) were obese in present study , which is also reported in various studies [14,15]. Fertile multiparous women is more commonly affected then nonfertile. According to Valdivieso V et al, Women with more pregnancies and longer length of fertility periods appears to have a higher likelihood of having gall stones than those who remain nulliparous [16]. Forty-nine (49) patients were taking mixed diet and only one patient was purely vegetarian. Green field's Surgery states that gall stone formation is more common in people taking animal fat and carbohydrates [17]. In present study thirty-six patients were from low income group, this is not in accordance may be due to the fact that most of the patients admitted at RIMS are from the low socio-economic group. There is no role of addiction in the formation of gall stones and also no available data to compare. Family history was positive in only five patients out of fifty. This finding differs from data given in various textbook which mention that first degree relative of patient with gall stone have a twofold greater chance of developing gall stone [2,12]. History of diabetes was present in four patient and forty-six were non-diabetic. According to Oxford and Green field's textbook of Surgery diabetic are more susceptible for gall stone then non diabetic due to alteration in gall bladder motility

[12,16]. Most common type of stone in present study was pigment stone . Out of total 40 patients were having brown stone [figure 1] and 10 patients were having cholesterol stone [figure 2].

#### **VI. Figures And Tables**



Figure1. Cholesterol stone in gall bladder

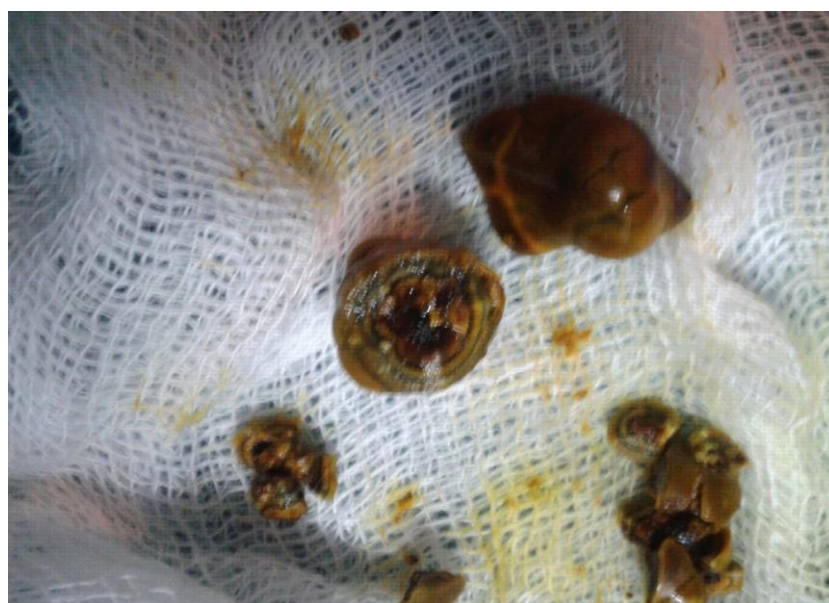


Figure2. Specimen of Brown stone removed from gall bladder

**Table 1 . Age of the patients**

AGE GROUP	NO.OF PATIENTS
10-20 year	01
21-30 year	12
31-40 year	10
41-50 year	14
51-60 year	11
>60 year	02

Table 2. Type of stone

TYPE	NO. OF PATIENTS
BROWN	40
BLACK	00
CHOLESTEROL	10

### VII. Conclusion

In the present study females of age group 41 to 50 years are more commonly affected due to gall stone disease, and it is 4 times higher, than in male. Obesity is one of the strongest risk factor. Other probable risk factors are family history, diet rich in saturated fatty acid and multiparity. Pigment stones were more common than cholesterol stones.

### References

- [1]. Brett M, Barker DJ: The world distribution of gall stones. *Int J Epidemiol*; 5:335, 1976.
- [2]. Schwartz Principles of Surgery 9<sup>th</sup> ed. 2010; 32:1142-45.
- [3]. Bellows CF, Berger DH, Crass RA: Management of gall stones. *Am Fam physician* 72:637, 2005.
- [4]. Selvaraju R, et al. FTIR Spectroscopic Analysis of Human Gall stones, *Romanian J.Biophys*, 2008;18(4):309-316.
- [5]. Blumgart L.H."Gall stones and gall bladder". *Textbook of Surgery of liver and biliary tract*, LH Blumgart, Y FONG, Harcourt Publishers,2002 vol. 1;chap:617-791.
- [6]. Caddy GR, Tham TC.Gallstone disease:Epidemiology, pathogenesis and classification of biliary stones(common bile duct and intrahepatic) *Best Pract Research Clini Gastroenterol*, 2006;20:1075-1083.
- [7]. Shaeffer EA, Gallstone Disease:Best Pract Res Clini Gastroenterol 2006;20:981-96.
- [8]. Sarin SK, Negi VS, Dewan R, et al.High family prevalence of gallstones in the first degree relative of gallstone patients.*Hepatology*, 1995;22:138-41.
- [9]. Tandon, R.K.Saraya A, et al."Dietary habits of gallstone patients in Northern India." *J Clin Gastroenterol*, 1996;22:23-27.
- [10]. Sharma, M.P. Duphare HV, et al."Gallstone disease in North India: Clinical and ultrasound profile in a referral hospital." *J Clin Gastroenterol* 1990;12:547-9.
- [11]. Khuroo, M.S. Mahajan R, et al."Prevalence of peptic ulcer in India: an endoscopic and epidemiological study in urban Kashmir." *Gut*, 1989; 30:930-4.
- [12]. Shaffer EA. Epidemiology of gall bladder stone disease. *Best Pract Res Clin Gastroenterol* 2006;20:981-996.
- [13]. Oxford textbook of Surgery, 2<sup>nd</sup> edition,2000;31.1:167
- [14]. Attili AF, De Santis A, Capri R, Repice AM, Maselli S. The Natural History of Gallstone: the GREPCO experience.The GREPCO Group.*Hepatology*,1995;21:655-660.
- [15]. Blumgart's Surgery of the liver, biliary tract and pancreas 5<sup>th</sup> edition vol.1,2012;30:483-485.
- [16]. Valdivieso V, Covarrubias C, Siegf F, Pregnancy and cholelithiasis:Pathogenesis and natural course of gallstone diagnosed in early puerperium.*Hepatology* 1993;17:1-4.
- [17]. Green field's Surgery,5<sup>th</sup> edition,2011;60:963-964.