

Prevalence of different types of gallstone in the patients with cholelithiasis at Kathmandu Medical College, Nepal

Pradhan SB¹, Joshi MR², Vaidya A³

¹Lecturer, Department of Pathology, Kathmandu Medical College & Teaching Hospital, Sinamangal, Kathmandu, Nepal, ²Assistant Professor, Department of Surgery, Kathmandu Medical College & Teaching Hospital, Sinamangal, Kathmandu, Nepal, ³Lecturer, Department of Community Medicine, Kathmandu Medical College & Teaching Hospital, Sinamangal, Kathmandu, Nepal

Abstract

Background: Gallstone disease known as cholelithiasis is the most common digestive surgical disorder and account for an important part of health care expenditure. Attempt was made to analyse the gallstone for typing depending upon the composition.

Aims & objectives: The main objective of this study was to see the prevalence of different types of gallstone in Nepal and to correlate them with the clinical findings.

Materials & methods: Gallstones of 80 different patients who underwent cholecystectomy for cholelithiasis were collected from 20th January 2005 to 16th May 2006 in Department of Pathology, Kathmandu Medical College Teaching Hospital. Detailed history was taken. Stones were analyzed with chemical and enzymatic methods using clinical spectrophotometer.

Results & conclusion: The most commonly involved age group for cholelithiasis (32.5%) is found to be 30-39 years with a female predominance (M: F=1:3.2). Cholelithiasis was found more commonly among non-vegetarian with the vegetarian: non-vegetarian ratio 1:9.

Mixed type stone was found to be the most common type of stone comprising 78.75%, followed by cholesterol stone 12.5%, Brown pigment stone 7.5% and Black pigment stone 1.25%.

Key words: Gallbladder, cholelithiasis, Gallstone

Gallstone disease known as cholelithiasis is one of the most common digestive surgical disorder. Cholelithiasis is common with the incidence ranging from 10% to 20% of the world population, 11% of the general population of the US¹. The incidence is four times higher in women than in men with high prevalence among younger age group (20-30 years)².

Types of gallstone- based on components and location^{3,4}

- **Cholesterol stone-**
 - Pure cholesterol
 - Mixed stone
 - Combined stone
- **Pigment stone-**
 - Black stone
 - Brown stone
- **Other type-** unless otherwise specified

Morphology of the various Gallstones⁵

1. Cholesterol stone

Cholesterol stones are formed exclusively in gallbladder and contain cholesterol ranging from 50%-100%. They are pale yellow in colour and round to ovoid in shape with finely granular, hard external surface. Usually they consist of multiple stones and rarely a single large stone.

2. Pigment Stone

Usually pigment stones are associated with elevated level of unconjugated bilirubin in bile^{6,7}.

Black stone

These stones are found in sterile gallbladder^{6,8}. Usually they are less than 1.5 cm in size but invariably present in great number.

Correspondence

Dr. Sailesh B. Pradhan
Lecturer, Department of Pathology, KMC & TH.
Kathmandu, Nepal.
E-mail: saibinita@yahoo.com

Brown stone

These stones are found in infected intrahepatic or extra hepatic ducts^{6, 8,9,10}. They are composed of pure calcium salt of unconjugated bilirubin and mucin glycoprotein.

Cholesterol or cholesterol predominate (mixed) stones account for 80% of gallstones in UK³. Black pigment stones are uncommon and accounts for less than 5%.

In US, cholesterol stone account for only 27%, mixed stone with pigment core comprises 19%, mixed stone with pigment exterior 10%, black pigment stones 12% and brown pigment stone 32%. Bacteria were present within 92% of brown pigment stones while black pigment stones are most often sterile⁸.

Aims and objectives

- To measure the prevalence of different types of gallstone in patients with cholelithiasis at KMCTH
- To correlate the type of gallstone with clinical findings

Materials and methods

Gallstones of 80 different patients who underwent cholecystectomy for cholelithiasis and willing to provide stone for analysis were collected. Detailed history including age, sex, nature of pain, etc. was taken. After the morphological study, gallstones were washed, dried and grinded to a powder. Powder was weighed and 500mg of powder was taken into a test tube. It was then dissolved in 5 ml of distilled water, filtered with Whatman filter paper and the filtrate was taken for the following chemical analysis:

1. Billirubin
2. Calcium
3. Phosphate
4. Cholesterol

Results

The most commonly involved age group for cholelithiasis (32.5%) is found to be 30-39 years with a female predominance (M: F=1:3.2).

Most of the cases of cholelithiasis presented with pain either in RHC or in epigastric with periodicity (pain after shorten interval) in 87.5% of the cases however jaundice was present in only 5% cases.

Table 1: Relation between age and incidence of cholelithiasis.

No.	Age group	Frequency(M:F)	Percentage
1	10-19 years	01 (0:1)	1.25%
2	20-29 years	15 (2:13)	18.75%
3	30-39 years	26 (6:20)	32.5%
4	40-49 years	12 (5:7)	15%
5	50-59 years	17 (4:13)	21.25%
6	60-69 years	08 (2:6)	10%
7	>70 years	01 (0:1)	1.25%
Total		80 (19:61)	100%

Table 2: Presenting symptoms of patient with cholelithiasis.

No.	Symptoms	Frequency
1	Epigastric pain	46 (57.5%)
2	Right hypochondrium (RHC) pain	52 (65%)
3	Periodicity of pain	70 (87.5%)
4	Anorexia	32 (40%)
5	Nausea	40 (50%)
6	Vomiting	09 (11.25%)
7	Jaundice	4 (5%)

Table 3: Types of stone in cholelithiasis cases according to its composition.

Nos.	Type of stone	Frequency	Percentage
1	Mixed stone	63	78.75%
2	Cholesterol stone	10	12.5%
3	Brown pigment stone	06	7.5%
4	Black pigment stone	01	1.25%
Total		80	100%

Discussion

This is the first study in Nepal in which the gallstones were analysed using chemical and enzymatic methods.

Gallstone disease known as cholelithiasis is the most common digestive surgical disorder and account for an important part of health care expenditure.

The most commonly involved age group for cholelithiasis (32.5%) is found to be 30-39 years with a female predominance (M:F=1:3.2) where as Shrestha et al² found the higher incidence of cholelithiasis among younger age group of 20-30 years with male to female ratio 1:4. In a similar retrospective study, Maskey CP et al¹¹ also found similar findings that the commonest age group for cholelithiasis was below 30 years comprising 37.5%.

Non-vegetarians were found to be more commonly involved with cholelithiasis than vegetarians. The ratio of incidence of cholelithiasis in non-vegetarian and vegetarian was found to be 9:1. The exact cause can not be stated however it could be due to the consumption of high protein and fat. The findings were similar with the findings in a study done by Maskey et al¹¹ in 1990 AD in Nepal where incidence of cholelithiasis was found more frequently among the people who consumed more fat and protein. In the similar study done by Katwal MR¹² et al in Sikkim and North Bengal, India, 97% cases of cholelithiasis were found in non-vegetarian.

In this study, most of the cases of cholelithiasis presented with pain either in the epigastric (57.5%) or in right hypochondriac region (65%) with periodicity in 87.5% of the cases. Anorexia (40%), nausea (50%) and vomiting (11.25%) often accompanied the pain however these symptoms are non-specific and may occur due to the upper gastrointestinal tract problem or malignancy. Jaundice was present in only 5% of the cases. It will be difficult to differentiate the cause however, with the advance of ultrasonogram, Computerised tomography (CT) scans etc., it is much easier to rule out the cause.

Mixed stone was found to be the commonest comprising 78.75%, followed by pure cholesterol stone 12.5%,

brown pigment stone 7.5% and black pigment stone 1.25%. The findings are similar with the findings in the study done by Maskey et al¹¹ in the year 1990 AD in Nepal where the classification of the stone was done by the morphological study only. Gallstones in Tamil Nadu and Pondichery, South India are probably due to the infection rather than supersaturation as evidenced by the predominance of the Pigment stones where as in Sikkim and North Bengal, only cholesterol stones were found.¹² Similarly, in a study done by Kamiya T et al¹³ in Bolivia, the incidence of cholesterol stone was 56.6%. But, in the studies done in Singapore and San Francisco, the incidence of Black pigment stone was high comprising 12% and 30.5% respectively.

Conclusion

The most commonly involved age group for cholelithiasis (32.5%) is found to be 30-39 years with a female predominance (M: F=1:3.2). Cholelithiasis was found more commonly among non-vegetarian with vegetarian: non-vegetarian ratio 1:9. Mixed type stone was found to be the most common type of stone comprising 78.75%, followed by cholesterol stone 12.5%, Brown pigment stone 7.5% and Black pigment stone 1.25%.

References

1. Rosai J. Ackerman's Surgical Pathology, Vol. one, 8th edition, Harcourt Brace & co. Asian Pvt Ltd 1996;943-63.
2. Shrestha HG, Bajracharya M. Incidence of cholelithiasis and its correlation with cancer of gallbladder at TU Teaching Hospital. JNMA. 1991; 29:264-7.
3. Beckingham, IJ. ABC of diseases of liver, pancreases and biliary system. Gallstone disease. BMJ. 2001; 322:91-4.
4. Cetta F. The classification of biliary calculi and the clinico-therapeutic implications. Ann Ital Chir. 1998 Nov-Dec; 69(6): 701-8.
5. Cotran RS, Kumar V, Collins Tucker. Robbins pathologic basis of disease. Sixth edition. A Harcourt Asia Pte Ltd.2000. 893-7.

6. Usui R. Pathogenesis of black gallstones with hemolytic disease. *Nippon Shokakibyo Gakkai Zasshi*. 1991 Jul. 88(7). 1426-35.
7. Bond LR, Hatty SR, Horn ME. Gallstones in sickle cell disease in the United Kingdom. *BMJ (Clin Res Ed)*. 1987 Jul 25; 295: 234-6.
8. Stewart L. Infectious and sterile gallstones: morphology, chemical composition and bacterial beta-glucuronidase production. *SSAT*. 1998.
9. Swidsinski A, Lee SP. The role of bacteria in gallstone pathogenesis. *Front Biosci*. 2001. 1:93-103.
10. Amin AM. Composition of gallstones and sequential events in biliary lithogenesis- is it different in south India compared to North? *J Assoc Physicans India*. 2000 Sept. 48(9). 885-90.
11. Maskey CP, Shrestha ML, Sato Y. Gallstone in TUTH. *JIOM*. 1990. 12:45-54.
12. Kotwal MR, Rinchen CZ. Gallstone disease in the Himalayas (Sikkim and North Bengal): causation and stone analysis. *Indian J Gastroenterol*. 1998. 17(3). 87-9.
13. Kamiya T, Peredo R, Chavez C. Chemical composition of gallstone in Santa Cruz-Bolivia. *Acta Gastroenterol Latinoam*. 1992. 22(1):9-13.
14. Ti TK, Wong CW, Yuen R. The chemical composition of gallstones: its relevance to surgeons in Southeast Asia. *Ann Acad Med Singapore*. 1996 Mar. 25(2). 255-8.
15. Jayanthi V, Palanivelu C, Prasanthi R, Mathew S, Srinivasan V. Composition of gallstones in Coimbatore of Tamil Nadu State. *Indian J Gastroenterol*. 1998. 17(4). 134-5.