

Pattern of Childhood Cholelithiasis- Experience in a Tertiary Level Hospital

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DOI: <https://doi.org/10.3329/jafmc.v16i1.53839>

Abstract

Introduction: Cholelithiasis is being frequently diagnosed in children, although not as often as in adult. The real aetiology of gallstone formation is poorly understood, but some inciting factors are assumed to be involved in gallstone formation in children. Traditionally cholelithiasis in children is classified as haemolytic or nonhaemolytic in origin. Nonhaemolytic cholelithiasis seems to be more frequent than haemolytic cholelithiasis at present.

Aim: To find out the pattern of childhood cholelithiasis presenting in a tertiary level military hospital.

Methods: This retrospective observational study was carried out in the Department of Paediatric Surgery, CMH Dhaka from January 2015 to December 2018. A total of 35 children with cholelithiasis were admitted in this hospital.

Results: During the study period 35 children with cholelithiasis were admitted. Among them maximum children 31(88.6%) were in the age group of 6-12 years. Out of them 23(65.7%) were female and 12(34.3%) were male making a female to male ratio of 1.92:1. Twelve children (34.3%) were asymptomatic and 23(65.71%) were symptomatic. Among symptomatic group 10(28.6%) had biliary colic, 10(28.6%) had nonspecific abdominal pain and 3(13.0%) had acute abdominal pain. Out of these 35 children, only 4(11.4%) had link with haemolytic anaemia.

Conclusion: Cholelithiasis in children is being recognized with increased frequency in recent years. The ratio of cholecystitis and cholelithiasis varies considerably in different countries and centres. Childhood cholelithiasis has less chance of complication and high rate of resolution.

Key-words: Cholelithiasis, Tertiary level hospital, Children.

Introduction

Cholelithiasis or gallstones, was found in Egyptian mummies dating back from the eighteenth dynasty (1550-1292 BC)¹. Gibson first reported gallstone in children in 1737. Gallstone disease in children usually presents as a unique pathological pattern². Gallbladder disease was thought to be an adult entity previously; the incidence is increasing in children in recent past³. This is related both to increased detection by widespread use of ultrasonography (USG) and to an increased incidence secondary to dietary changes⁴. There may be an absolute increase in number of cholelithiasis because of prolonged Total Parenteral Nutrition (TPN), ileal resections for necrotizing enterocolitis (NEC),

gastroschisis or Crohn's disease. The origin of gallstones in approximately 80% of children is unknown⁵. The North American Society for Paediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) reported that almost 2% of children may have gallstones⁶. Cholelithiasis is commonly classified as being haemolytic or nonhaemolytic in origin⁷. In the past, cholelithiasis in children occurred almost exclusively in children with haemolytic disease like hereditary spherocytosis, sickle cell disease, or thalassaemia. Now most paediatric gallstones are idiopathic⁸. The cause of gallstone formation is deemed to be multifactorial. Stasis of bile, infection, absence of oral feeding and change of the enterohepatic recirculation of bile may be responsible for biliary lithiasis⁹. Before puberty, sex ratio of gallstone in paediatric patients seems to be similar. But afterward, the ratio is altered, more in female in comparison to male as in adult ratio of 4:1 with female preponderance. Gallstones are defined on USG as mobile echogenic material in the gallbladder casting acoustic shadow. While biliary sludge is echogenic bile without acoustic shadows¹⁰. Obesity is intimately linked with gallstone disease. The influence of obesity is higher in female than male. Gender is mainly associated with pure cholesterol stone¹¹. The development of cholelithiasis in children may be affected by age, sex, genetic constituent, race and geographical influence¹². Cholecystectomy is recommended in paediatric patients with biliary complaints but is not advocated for those with vague complaints. Although the frequency of childhood cholelithiasis is increasing, no study was done in Bangladesh about the pattern of cholelithiasis in children. This study was carried out to find out the pattern of childhood cholelithiasis in a tertiary level military hospital.

Materials and Methods

This retrospective observational study was carried out on children with cholelithiasis, who were admitted and treated in Paediatric Surgery Department of CMH Dhaka during the period of January 2015 to December 2018, to share our experience with cholelithiasis in children. All children with cholelithiasis irrespective of age, sex, body weight, presentation were included in the study. During this period a total of 35 children with cholelithiasis were admitted and treated in the hospital. They were divided into 2 groups depending on symptoms: asymptomatic and symptomatic. Particulars of all these patients were recorded which included age, sex, height, body weight, clinical feature etc. Data were collected from detailed history, thorough clinical examination and relevant investigations (ultrasonography and Hb electrophoresis). All children who required surgery underwent operative treatment as elective procedure. They were followed up at 01 month, 03 months and 06 months. All relevant clinical information, investigation results were analyzed.

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Results

During the study period, a total of 35 children with cholelithiasis were admitted in the Department of Paediatric Surgery, CMH Dhaka. Among them maximum children 31(88.6%) were in the age group of 6-12 years. Out of them, 23(65.7%) were female and 12(34.3%) were male making a female to male ratio of 1.92:1 (Table-I). As per BMI (body mass index) none of the children were obese, 2(5.7%) were overweight, 8(22.9%) had normal weight and 25(71.4%) were underweight (Table-I). Twelve children (34.3%) were asymptomatic and 23(65.7%) were symptomatic. Among symptomatic group 10(28.6%) had biliary colic, 10(28.6%) had nonspecific abdominal pain and 3(13.0%) had acute abdominal pain (Table-II). Out of these 35 children, only 4(11.4%) had link with haemolytic anaemia. HbE β thalassaemia was the commonest haemolytic anaemia found in 2 children (Table-III). Chemical analysis of gallstones was not done in this series.

Table-I: Distribution of children by Age, Sex and BMI (n=35)

Characteristics	Number of children	%	
Age	<1 year	1	2.9
	1-5 years	3	8.6
	6-12 years	31	88.6
Sex	Male	12	34.3
	Female	23	65.7
BMI	Overweig ht	2	5.7
	Normal weight	8	22.9
	Underweight	25	71.4

Table-II: Distribution of children by complaints (n=35)

Complaints	n	%
Asymptomatic	12	34.2
Symptomatic	23	65.7
Biliary colic	10	28.6
Nonspecific abdominal pain	10	28.6
Acute abdominal pain	3	13.0

Table-III: Distribution of children in relation to haemolytic disease (n=35)

Type	Children (n)	%
Non haemolytic	31	88.6
Haemolytic	4	11.4
HbE β thalassaemia	2	5.7
β thalassaemia	1	2.9
Hb E trait	1	2.9

Discussion

Cholelithiasis is increasingly found in children. It is not only due to increased use of USG but also because of rise in obesity throughout the world and increased haemolytic anaemias in children¹³. The actual number of patients in paediatric group could be under estimated earlier as children with gallstones can report with vague abdominal symptoms³. Children with cholelithiasis can report with classical biliary complaints, vague complaints, without any symptom (incidental finding) or complications¹⁴. Increased USG resulted in enhanced detection of asymptomatic gallstones. There can be true increase of gallstones due to prevalence of recognized aetiologies like TPN, cephalosporin, furosemide use has increased¹⁵. Study of gallstone is very important to understand

the pathogenesis of gallstones¹⁶. The epidemiology and aetiological factors of gallstone disease in children vary in different areas. Gallstones are asymptomatic in most of the cases. In asymptomatic cholelithiasis patients the average risk of developing symptom is 2-2.6% per year¹⁷. Childhood cholelithiasis is caused by a number of metabolic disorders influenced by both environmental and genetic factors¹⁸. Predisposing factors of childhood cholelithiasis are separate from those of adults¹⁹. Predisposing factors include TPN, ileal resection, septicaemia, prolonged diuretic use, dehydration, diabetes mellitus, cystic fibrosis (CF), short bowel syndrome etc²⁰. Obesity is an established predisposing factor for gallstone disease in children and increase in childhood cholelithiasis parallels the rise of obesity in children. According to Centre for Disease Control (CDC), Overweight is defined when Body Mass Index (BMI) is at or above the 85th percentile and less than 95th percentile, Normal weight (<85%) and Obese (>95%). USG study found gallstone in 0.6% children with normal weight but 2% of children had gallstones who had BMI above 2 standard deviations²¹. Idiopathic cholelithiasis in children and adolescents is around 20% to 65%²². It is needed to create awareness among child specialists and general practitioners about the diagnosis and referral of symptomatic gallstone patients for surgical treatment²³.

The frequency of childhood cholelithiasis is increasing in CMH Dhaka although no previous published data available to compare as reported in other studies¹⁵. This increase can be due to increased incidence, increased awareness or increased diagnosis due to availability of USG as diagnostic tool.

Lugo-Vicente described population growth, increased awareness of the entity and frequent use of modern imaging techniques like USG as the cause of increased childhood cholelithiasis²⁴. The age of detection of cholelithiasis is related to aetiological factors and median age of detection is between 5 and 10 years²⁵. In this study, 31(88.6%) children were in the age group 6-12 years and only 1 patient (2.9%) was below the age of 1 year. Literature shows 15.2% children with gallstone in this age group¹⁵. This difference could be due to lack of awareness of the condition among treating physicians and USG is not routinely done in these small kids. In this study, out of 35 children with cholelithiasis 23(65.7%) were female and 12(34.3%) were male making a female to male ratio of 1.92:1. The sex ratio of gallstone disease before puberty seems to be equal although in adult female to male ratio is 4:13.

Obesity was reported as significant aetiological factor for gallstone in children²⁶. But in this study obesity was not a contributing factor, as no child was found obese; only 2 children (5.7%) were overweight as per BMI. This difference can be due to the fact that obesity is not an epidemic in the country as elsewhere and the age group we included was up to 12 years not 16 or 18 years as included in other studies. There were 12(34.3%) children in the asymptomatic group in this study. Della corte found 64 patients (35.3%) in the asymptomatic group²⁶. Others reported 51% in the asymptomatic group¹⁵. Out of symptomatic children 23 (65.7%),

10(28.6%) had biliary colic, 10(28.6%) had non-specific abdominal pain and 3(13.0%) had acute abdominal pain. Other studies reported 43(52.0%) had biliary colic, 6(7.0%) acute abdominal pain and 19(24.0%) nonspecific abdominal pain and 14(17.0%) were asymptomatic²⁷. In this study, haemolytic anaemia was an aetiological factor in 4 children (11.4%) and 31(88.6%) had nonhaemolytic cholelithiasis. Studies reported nonhaemolytic cholelithiasis more frequent than haemolytic cholelithiasis recently²⁸. Adequate support was not found in laboratory tests in the diagnosis as only half of the children with biliary symptoms showed altered results. This means that laboratory tests may not coincide with the diagnosis of cholelithiasis. Studies revealed similar findings²⁷. USG was the main diagnostic tool in this study as shown in other studies. In this study chemical analysis of stone was not done and as such composition of gallstone is not known. The composition of gallstone is unknown in most of the studies and composition was determined depending on visual impression rather than chemical analysis²⁹.

Conclusion

Childhood cholelithiasis is being recognized with increased frequency in recent past. The ratio of cholecystitis and cholelithiasis in children and adult varies considerably in different countries and centres. Childhood cholelithiasis can be either symptomatic or asymptomatic. It is quite difficult to differentiate gallbladder disease from other causes of abdominal pain in children. So cholelithiasis should be excluded in all cases of vague, intermittent abdominal pain in susceptible paediatric age group.

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