

Prevalence Of Cholelithiasis With Hypothyroidism In Paediatric Population At Upper Assam, India- A Single center study

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ABSTRACT:

Background: Cholelithiasis is one of the major causes of Abdominal morbidity throughout the world. The prevalence differs not only between countries but also between age, gender and ethnic groups. In India, a female preponderance has been observed as in other countries. Prevalence of Paediatric cholelithiasis is rare compared to adult. However, in recent decades cholelithiasis in paediatric population is being frequently reported with the wide spread use of Ultrasonography. Various etiologies of cholelithiasis in children are - Haemolytic disease resulting in pigmented stones, obesity among children leading to rise in Cholesterol and Mixed stones. **Materials and Methods:** This is a prospective observational study done at Assam Medical College and Hospital, Dibrugarh, Assam done for a period of 1 year (April 2023 – March 2024). Prevalence of cholelithiasis with hypothyroidism in Paediatric population has been studied. **Result:** In our study majority of cholelithiasis (50%) were in the age group of 10-18 years with female preponderance followed by male preponderance (53.57%) in the age group 1-10 and only male in infants. Overall, 11.66% were in hypothyroid state with majority were in the age group 10-18 years with female preponderance (23.07%) and male preponderance (3.57%) in the age group 1-10 years. **Conclusion:** Present study reveals incidence of cholelithiasis with hypothyroidism is more common among females of age groups 10-18 years followed by 1-10 years of age group. Hence, population-based screening of Thyroid profile in the paediatric age groups especially in females which will help to establish the correlation of hypothyroidism with cholelithiasis.

Key Word Paediatric Cholelithiasis, Paediatric Hypothyroidism

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I. INTRODUCTION:-

Cholelithiasis is one of the major causes of abdominal morbidity throughout the world¹. The prevalence differs not only between countries but also between age, gender and ethnic groups. In India a female preponderance has been observed as in other countries^{2,3}. Prevalence of Paediatric cholelithiasis is rare compared to adult. However, in recent decades cholelithiasis in paediatric population is being frequently reported with the wide spread use of Ultrasonography. Various etiologies of cholelithiasis in children are - Hypothyroidism, Haemolytic disease resulting in pigmented stones, obesity among children leading to rise in Cholesterol and Mixed stones. Also, genetic propensity to cholelithiasis has been reported and genes have been identified as risk factors for cholelithiasis in Paediatric population.

In Assam the demography profile pattern comprises various ethnic, religion and tribal groups. Every society has its own social customs, dietary preferences and inherited risk factors. So, it is necessary to look into the reasons behind the rising incidence of paediatric cholelithiasis in this population. This finding will help with future efforts to prevent and treat paediatric Cholelithiasis.

Gender :- Epidemiological studies shows the gender distribution by age groups and the impact of the higher incidence of cholelithiasis among girls may be attributed to puberty and the production of hormones, especially estrogen. Estrogen bound to estrogen receptors (ERs) in the liver which decreases bile salts secretion and increases the secretion of cholesterol into the bile, promoting the formation of gallstones⁴. Whereas progestins impair gallbladder emptying, causing stasis. These initiates stone formation.

Thyroid Disorder:- Hypothyroidism may act upon the bile secretion, flow of bile into intestine, cholesterol metabolism and action on sphincter of Oddi - by decreasing the tendency to relax the sphincter. Hence causing bile stasis which initiates supersaturation of bile and formation of Gall bladder stone. Also, hypothyroidism disturbs the lipid metabolism leading to changes in composition of bile⁴.

AIMS AND OBJECTIVES:- To assess the prevalence of cholelithiasis with hypothyroidism in pediatric population presenting at Assam Medical College and Hospital.

II. MATERIALS AND METHOD

Place of Study:- Department of Pediatric Surgery, Assam Medical College and Hospital, Dibrugarh.

Duration of Study:- 1 year (April 2023- March 2024)

Type of Study:- Prospective Observational Study

Study Population:- All the patients with cholelithiasis of Pediatric age group attending Pediatric Surgery Department of Assam Medical College and Hospital.

Sample Size:- Considering the prevalence of Cholelithiasis in Pediatric age group to be 4% ⁴, sample size for present study is calculated to be 60 with 95% Confidence and marginal error of 5%.

Selection Criteria

Inclusion Criteria:- Patients in age group 0-18 years.

:- Patients with USG proven Cholelithiasis.

Exclusion criteria:- -Acute Abdominal pain associated with Jaundice.

-Patient not willing to participate in the study.

- Patients with primary anatomical abnormalities of biliary system.

III. METHODOLOGY

Method of sampling was random and purposive. After admission detail history was taken and physical examination was conducted on each patient admitted under Pediatric surgery department with USG proven Cholelithiasis. Baseline investigations as routinely required was done followed by imaging studies. All the necessary information regarding the study was explained to the patients or their responsible guardian. Informed written consent was taken from the patient or their guardian participated in the study. Data was then collected in a predesigned and pretested proforma.

After completing the collection of data it was compiled in a systematic way, followed by assessment of the prevalence of Pediatric Cholelithiasis with hypothyroidism for the cases admitted under Paediatric Surgery by the following methods:-

- **Thyroid disorder** :- Can be assessed by Details history (Residence of Iodine deficiency area, maternal thyroid disease/ingestion of anti thyroid drugs), general and systematic examination followed by the investigations:- Serum TSH, fT3, fT4, antibody binding to TSH receptor, Anti TPO/ Thyroglobulin, Thyroid scan, USG neck.

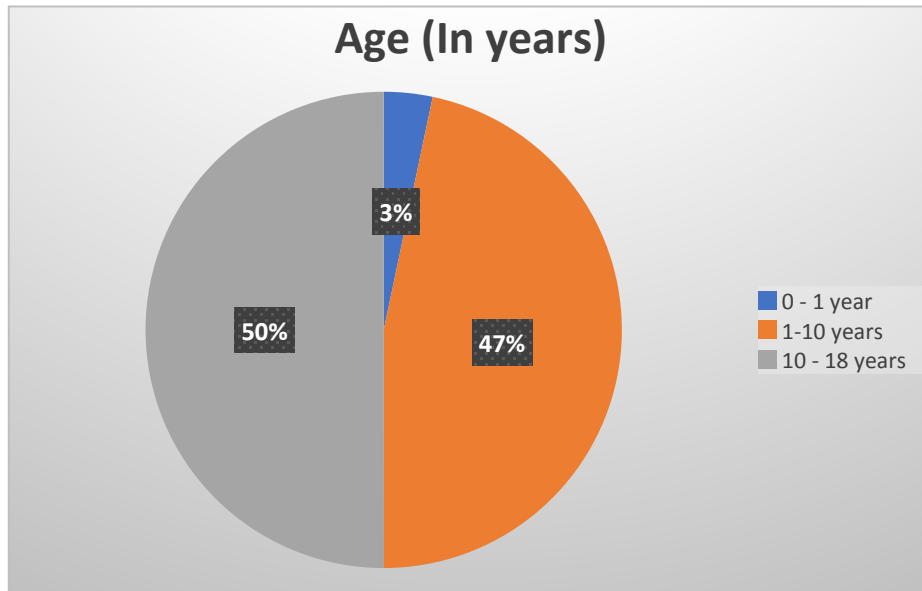
STATISTICAL ANALYSIS:-

Categorical data will present as frequency (percentage) and continuous data will be present as mean +/- SD. Pictorial presentation will also be made in terms of bar diagram and pie diagram. Statically significance will be tested using Chi square test/Fisher's exact test for categorical data and t-test for continuous data. A p- value of <0.05% will be considered as statistically significant.

IV. RESULT:-

Table-1: Age Distribution

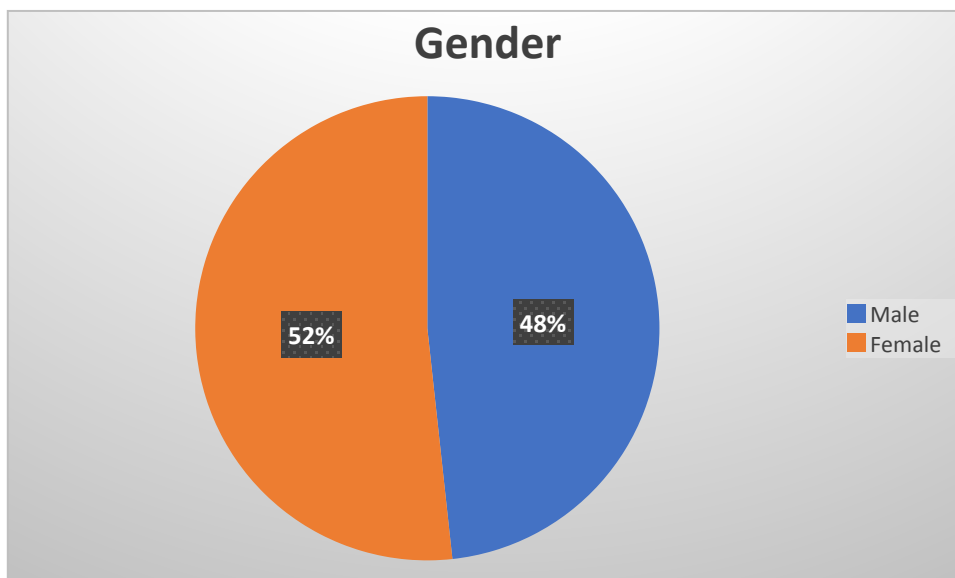
Age Group (in years)	Number (n)	Percentage (%)
0-1	2	3.33
>1-10	28	46.67
>10-18	30	50.00
TOTAL	60	100.00
Mean ±S.D.	9.64 ±4.45 years	
Range	8 months to 17 years	



In our present study of 60 cases, majority i.e. 30 cases were more than 10 years of age followed by 28 cases in the age group 10-18 years and 2 cases in infants.

Table-2: Gender Distribution

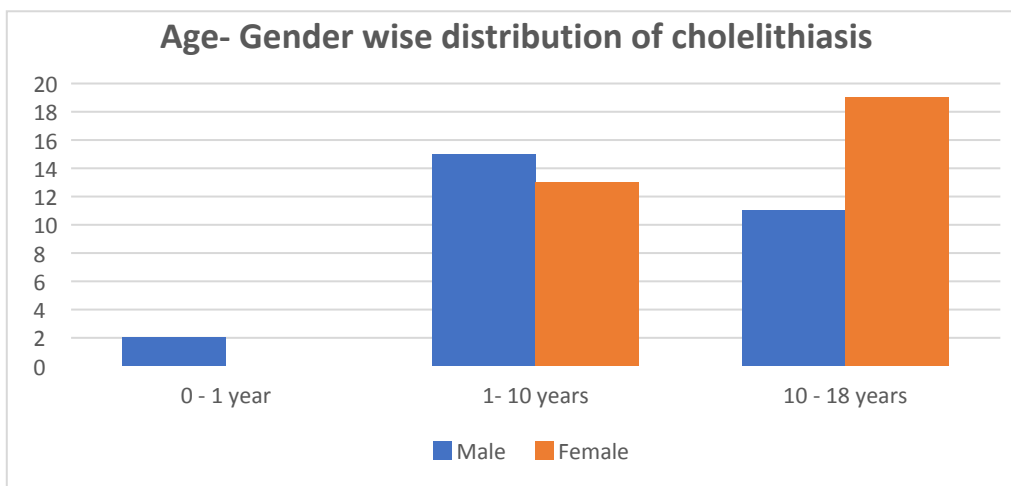
Gender	Number (n)	Percentage (%)
Male	28	46.67
Female	32	53.33
TOTAL	60	100.00
Ratio (Male : Female)	1 : 1.14	



In these study, female preponderance was seen with 32 out of 60 cases of cholelithiasis.

Table-3: Age and Gender wise Distribution

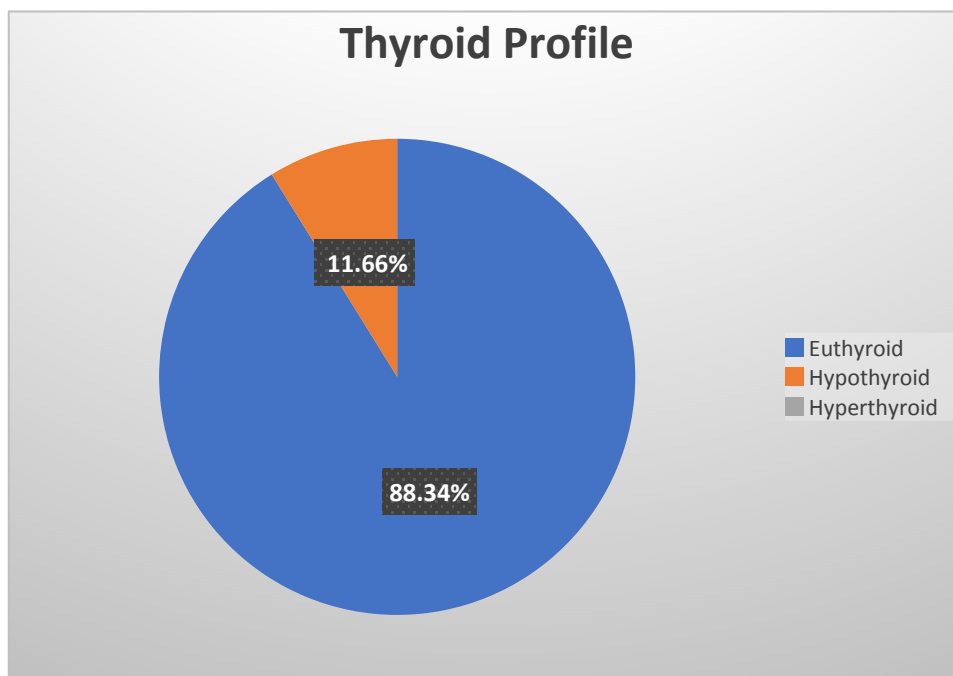
Gender	Age Group (in years)					
	0-1		>1-10		>10-18	
	n	%	n	%	N	%
Male	2	100.00	15	53.57	11	36.67
Female	0	0.00	13	46.43	19	63.33
TOTAL	2	100.00	28	100.00	30	100.00



In our study majority of cholelithiasis cases were female (63.33%) in the age group 10-18 years of age but male preponderance (53.57%) were seen in the age group of 1-10 years and no female cases were seen in infants.

Table-4: Thyroid Profile

Thyroid Profile	Number (n)	Percentage (%)
Euthyroid	53	88.34
Hypothyroid	7	11.66
Hyperthyroid	0	0.00
TOTAL	60	100.00



In this study, 7 out of 60 cases of cholelithiasis were suffering from hypothyroidism.

Table-5.: Mean Distribution of Thyroid Profile

Thyroid Profile	Mean	± S.D.	Range	
			Min	Max
TSH Level (mU/L)	2.69	1.72	0.61	8.90
fT3 Level (ng/dl)	2.52	0.74	0.02	3.70
fT4 Level (ng/dl)	137.88	33.95	21.40	193.80

In the present study mean TSH level was 2.69 (+/- 1.7) SD mU/L.

Table-6: Age with Thyroid Profile wise Distribution

Thyroid profile	Age Group (in years)					
	0-1		>1-10		>10-18	
	n	%	n	%	N	%
Euthyroid	2	100.00	27	96.43	24	80.00
Hypothyroid	0	0.00	1	3.57	6	20.00
Hyperthyroid	0	0.00	0	0.00	0	0.00
TOTAL	2	100.00	28	100.00	30	100.00

Here, 6 cases of Hypothyroidism were seen in the age group 10-18 years and 1 case in the age group of 1-10 years.

Table-7: Gender with Thyroid Profile wise Distribution

Thyroid Profile	Gender			
	Male		Female	
	n	%	n	%
Euthyroid	27	96.43	26	76.93
Hypothyroid	1	3.57	6	23.07

Hyperthyroid	0	0.00	0	0.00
TOTAL	28	100.00	32	100.00

In our study, there was female preponderance of hypothyroidism was seen with 23.07% cases.

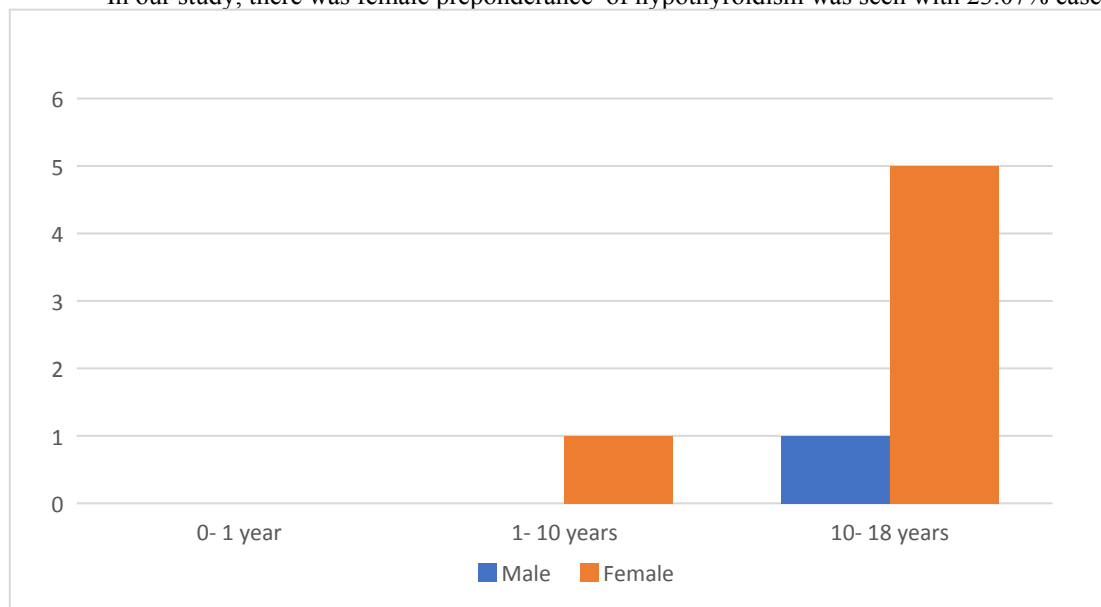


Fig:- In the age group 10-18 years majority were female i.e. 5 out of total 6 cases were in hypothyroid state followed by only 1 case in the age group 1-10 years and no case were found in infants.

V. DISCUSSION:-

Age Distribution of Cholelithiasis in paediatric age group:- The present study shows that there is an increase incidence of cholelithiasis in 0-18 years age group with maximum incidence being in 10-18 years age followed by 1-10 years and mean age is 9.64 +/- 4.45 years which is similar with study conducted by Serdaroglu et.al⁵ with mean age group 9.3 +/- 5.2 years (0.3-18 years). Studies conducted by Kirsaciloglu et.al⁶ shows maximum number of cases with mean age 8.9 +/- 5.2 years.

Gender distribution of Cholelithiasis in paediatric age group:- The present study shows that females are at higher risk of developing cholelithiasis in the age group 0-18 years with 53.33% cases. Similar study conducted by Kirsaciloglu et.al⁶ where a total of 150 symptomatic patients included of which 52.8% were female. Serdaroglu et.al⁵ conducted a study, showed a female predominance for developing cholelithiasis with 55.7% cases

Hypothyroidism with Cholelithiasis in paediatric age group:- In our study 7 cases (11.66%) of total 60 cases of cholelithiasis had hypothyroidism. Study conducted at Northeast region of India by S. Debabrata et.al⁷ where 69 (13.8%) cases of total 500 cholelithiasis cases were suffering from hypothyroidism. Similar studies in adults by Ahmad et.al⁸ in adults shows 8% of cholelithiasis cases had hypothyroidism. A. Mukhtiar et.al⁹ conducted a study where 13 (7.5%) cases out of 174 total cases of cholelithiasis were detected with hypothyroidism.

VI. CONCLUSION :-

This study was done in the paediatrics population to determine the prevalence of Hypothyroidism in cholelithiasis. Present study reveals incidence of cholelithiasis with hypothyroidism is more common among females of age groups 10-18 years followed by 1-10 years of age group. Hence, population based screening of Thyroid profile in the paediatric age groups especially in females which will help to establish the correlation of hypothyroidism with cholelithiasis. This study will establish the prevention and risk factors for the formation of gall stone in the paediatric age group.

REFERENCE:-

- [1]. Johnston DE, Kaplan MM. Pathogenesis and treatment of gallstones. *N Engl J Med.* 1993;328:412-2.
- [2]. National Institute of Diabetes and Digestive and Kidney Diseases. *Digestive Diseases Statistics.* Bethesda: U.S. Dept of Health and Human Services, NIH Publication; 1995: 95-3873
- [3]. <https://www.cureus.com/articles/96000-demographic-and-risk-factor-profile-in-patients-of-gallstone-disease-in-central-india>
- [4]. Zdanowicz, K.; Daniluk, J.; Lebensztejn, D.M.; Daniluk, U. The Etiology of Cholelithiasis in Children and Adolescents—A Literature Review. *Int. J. Mol. Sci.* 2022, 23,13376. <https://doi.org/10.3390/ijms232113376> Academic Editor: Pavel Strnad Received: 4 October.
- [5]. Serdaroglu F, Koca YS, Saltik F, Koca T, Dereci S, Akcam M, et al. Gallstones in childhood: etiology, clinical features, and prognosis. *Eur J Gastroenterol Hepatol.* 2016 Dec;28(12):1468–72.
- [6]. Ceyda tuna Kirsaciloglu, Bahar Cuhaci Cakir. Risk factors, complications and outcome of cholelithiasis in children: A retrospective, single-centre review - Tuna Kirsaciloglu - 2016 - *Journal of Paediatrics and Child Health - Wiley Online Library*
- [7]. Singha D, Pawar NM, J PB, Kumar N, Gopalarathnam S. Prevalence of previously undiagnosed hypothyroidism in patients with cholelithiasis in a tertiary care center, North-East India. *International Surgery Journal.* 2017 Feb 25;4(3):932–5.
- [8]. Ahmad MM, Nazir MI, Dar HM, Ali U, Mirza M, Kawoosa K. Evaluation of thyroid profile in biliary tract stones. *International Surgery Journal.* 2015;2(3):344–7.
- [9]. Ali M, Ullah W, Raza AA, Shahana N, Khan J. Prevalence of hypothyroidism in patients with cholelithiasis: A cross sectional study. M Ali.