ABSTRACT

GALLBLADDER CONTRACTILITY IN CHILDREN WITH CHRONIC ABDOMINAL PAIN

Introduction: Child presenting with chronic abdominal pain is one of the most commonly encountered symptom. The exact prevalence of chronic abdominal pain is not exactly known, but the literature reports that 13% of middle school children and 17% of high school children experience weekly abdominal pain and this accounts for about 2% to 4% of all pediatric office visits. Chronic abdominal pain and recurrent abdominal pain terms are used interchangeably. The definition of "chronic" is from definition by Apley of recurrent paroxysmal abdominal pain in children between the ages of 4 and 16 years that persists for greater than 3 months duration and affects normal activity. At least as many children experience chronic pain but maintain normal activity and rarely come to the attention of the physician. Chronic abdominal pain in children is either organic or inorganic. An organic cause was found in 70 (82.4%) patients and non-organic cause identified (NORAP) in 15 (17.6%) cases. Cohort studies from India and Pakistan suggest that RAP is most likely to have an organic cause (up to 82% of cases), with giardiasis being the most common underlying condition. However, another Indian cohort and a Sri Lankan cohort showed that non-organic RAP is more prevalent (74% and 76%, respectively). In Malaysia, both urban and rural population-based cohorts had a similar prevalence of RAP at 9.6% and 11%, respectively.

Justification for the study: Children with chronic abdominal pain have various etiologies. This study focuses on the percentage of gallbladder dysfunction in varying diseases.

Aim: To evaluate gallbladder motility in children with chronic abdominal pain

Study Design: Hospital based prospective study

Sample Size: 60

Inclusion Criteria: Children aged 5 to 15 years of age with chronic abdominal pain according to ROME III criteria.

Exclusion Criteria: Non consent

Methodology: Children from 5 to 15 years of age attending Paediatric or Paediatric surgery OP/IP as chronic abdominal pain will be included in the study as cases and children undergoing routine abdominal ultrasound are taken as control group, 30 each. Prior to being subjected to ultrasound examination, all patients and controls were fasted for at least 6 hours. USG abdomen will be done twice, fasting and 30min following a fatty meal.

Dodd's Formula,

Volume (V) = 0.52 × L × W × A

Where,

L= greatest length,

W= greatest transverse width

A= greatest anteroposterior diameter

The gallbladder ejection fraction (EF) for each examination was obtained from two-volume data using the following equation. Where V0 = gallbladder volume before the test meal, Vn = gallbladder volume after the test meal, and n = 30 minutes.

EF (%) =[(Vo-Vn) / Vo] X 100%

Results: A total of 66 age and gender matched children were included in this study, of them cases were 31 and controls were 35. The mean age of cases and controls were 10.14 ± 2.71 years and 11.54 ± 1.94 years respectively. The mean weight of cases and controls were 27.3 ± 10.5 and 33.8 ± 6.6 respectively. The mean body mass index (BMI) was 14.9 ± 2.8 kg/m^2 (range of 11.3 to 26.3 kg/m^2) in case group and 15.9 ± 1.8 kg/m^2 (range from 11.9 to 19.5 kg/m^2) in the control group. Out of 31 cases there were 11 boys (35.5%) and 20 (64.5%) girls respectively. And in 35 controls there were 23 (65.7%) boys and 12 (34.3%) girls respectively. The mean pre-prandial and post-prandial gallbladder volumes of cases and controls were 8.35 ± 3.97 (cm^3), 7.46 ± 3.04 (cm^3) 3.52 ± 1.73 (cm^3) and 2.83 ± 1.04 (cm^3) respectively. Though both pre-prandial and the post-prandial gallbladder volumes were visibly greater than the control group, yet there was no statistical significance. The mean ejection fraction of cases and controls were 51.72 ± 17.76% and 57.37 ± 23.26% respectively, but there was no statistical significance. The mean ejection fractions of cases with upper abdominal pain and periumbilical or lower abdominal pain were

41.7 ± 17.1% and 57.2 ± 15.9% and it is statistically significant (*p* value – 0.000). The mean ejection fraction of cases with BMI< 15 and ≥ 15 were 54.28 ± 17.99 % and 48.19 ± 17.53 %, it is statistically significant (*p* value is 0.000). The mean ejection fraction of controls with BMI< 15 and ≥ 15 were 39.18 ± 28.16 % and 63.68 ± 17.94 % it is statistically significant (*p* value is 0.003). In the control group the mean ejection fraction was more in children with BMI ≥ 15. In the case group there were 8 children with gallbladder dysmotility (i.e. gallbladder ejection fraction less than 40%). Among the 8, 4 children had BMI < 15 and 4 children had BMI ≥ 15. And there were totally 9 children with gallbladder dysmotility in the control group. In them 5 children had BMI <15 and 4 of them had BMI≥ 15. On applying Chi-Square test, this observation was not statistically significant

Conclusion: Our study is the first of its type in evaluating causal association of gallbladder dysmotility in children with chronic abdominal pain**.** The ROME III questionnaire is a reliable tool to assess and classify chronic abdominal pain in children in an office setting**.** In our study among 31 children with chronic abdominal pain 25.8% had gallbladder dysmotility. The mean ejection fraction of children with chronic abdominal pain and gallbladder dysmotility was 30.2%. 36.3% of children with upper abdominal pain had gallbladder dysmotility as compared to 15% of children with lower / periumbilical abdominal pain. A statistically significant difference in the mean ejection fraction of children with upper abdominal pain and lower / periumbilical pain was observed (41.7 ± 17.1% versus 57.2 ± 15.9% *p* value – 0.000). The mean gallbladder volume among cases was higher than the healthy controls group but this difference was not statistically significant (3.52 ± 1.73 (cm^3) versus 2.83 ± 1.04 (cm^3) *p* value – 0.390). On applying Pearson's correlation for children with chronic abdominal pain and their BMI, there exists a negative correlation with increasing BMI (*p* value < 0.000). 25.7% of the controls also had an ejection fraction < 40% but were asymptomatic

Keywords: Gallbladder Contractility, Chronic Abdominal Pain, Gallbladder Dysmotility, Gallbladder Ejection Fraction