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Mesenteric Lymphadenopathy in Children with Chronic Abdominal Pain – A Single-Center Retrospective Case-Control Study

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ABSTRACT

BACKGROUND

Mesenteric lymphadenitis (MLN), characterized by inflammation of the mesenteric lymph nodes that drain the gastrointestinal tract, is frequently observed in children experiencing chronic abdominal pain (CAP). However, its clinical significance is often overlooked in existing literature. This study aimed to determine the prevalence and importance of mesenteric lymphadenopathy in children with chronic abdominal pain.

METHODS

This retrospective case-control study was conducted at a single Government medical college in Puri-shri jagannath medical college puri, Odisha, India, within the Surgery department. Data spanning 20 months were collected from patient records. Cases included children aged 5-15 years presenting with chronic abdominal pain, while controls were children in the same age group who underwent abdominal ultrasonography for reasons other than abdominal pain. To ensure consistency in analysis, 150 children were selected for each group. Retrospective analysis of case records allowed for the calculation of MLN prevalence in both groups. The study excluded children with known organic causes of CAP (e.g., pancreatitis, dysmenorrhea, abdominal TB, renal calculi) and those with known causes of MLN (e.g., gastroenteritis, malignancy, abdominal tuberculosis, rheumatic disorders). The study protocol was approved by the Institutional Ethics Committee. Patient demographics, clinical features, and abdominal ultrasonography findings were recorded. Lymph node measurements (transverse and antero-posterior dimensions) were documented, with a size exceeding 5 mm in the short axis or 10 mm in the long axis considered significant. Statistical analysis was performed using SPSS V21.0, employing descriptive statistics for baseline characteristics and Pearson's chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The male-to-female ratio for chronic abdominal pain was 0.8:1, indicating a near-equal distribution between sexes. Significant MLN was observed in 87.3% of children with

chronic abdominal pain (n=131 out of 100 cases) and in 29.3% of controls (n=44 out of 100 controls). The association between significant MLN and chronic abdominal pain was statistically significant (P=0.01). CAP was more prevalent in the younger age group (5-10 years), accounting for 73% of cases. Among cases with significant MLN, 59 (45.3%) were boys and 72 (54.7%) were girls, resulting in a male-to-female ratio of 0.8:1. Approximately 68% of children with significant MLN were in the younger age group. Vomiting, pallor, and abdominal tenderness were the most common clinical findings in the case group. Mesenteric lymphadenopathy was the most frequent ultrasound finding in children with chronic abdominal pain, present in 87.3% of cases.

CONCLUSIONS

The study concludes that MLN is a very common finding in children with CAP, showing a higher and statistically significant incidence in cases compared to controls. Abdominal ultrasonography is a valuable tool for evaluating CAP and ruling out organic causes. When MLN is the sole finding on ultrasound, parents can be reassured about its benign and self-limiting nature and favorable prognosis.

Keywords: Chronic Abdominal Pain (CAP), American Academy of Pediatrics (AAP), Mesenteric Lymphadenopathy (MLN), Recurrent Abdominal Pain (RAP)

BACKGROUND

Recurrent abdominal pain (RAP) was characterized as a symptom complex by British paediatrician John Apley. He defined it as pain that fluctuates, occurring at least three times over a duration exceeding three months and intense enough to impact a child's activities[3]. Chronic abdominal pain is prevalent among school-aged children and young adolescents, with prevalence rates varying from 0.5% to 19%.2-5 The American Academy of Paediatrics (AAP)

The Subcommittee on Chronic Abdominal Pain, in 2005, defined CAP as persistent abdominal pain that can be either intermittent or constant, characterized by the presence of three or more lymph nodes measuring 5 mm or larger in the short axis or 10 mm or larger in the long axis.

Primary mesenteric lymphadenitis is diagnosed when enlarged mesenteric lymph nodes are observed without any other abnormalities. The enlargement of mesenteric lymph nodes has been linked to infections in the gastrointestinal or upper respiratory tract caused by a variety of viral, bacterial, mycobacterial, and parasitic organisms.

In paediatric cases, mesenteric adenitis is frequently observed and is often of viral origin, representing the most common cause of 'medical bellyache' encountered in clinical

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settings. It has been noted that the same etiological agents responsible for the swelling of the lymphoid tissue in Peyer's patches can also contribute to mesenteric adenitis-induced intussusception in children.

Mesenteric lymphadenitis is recognized as one of the most common findings in children suffering from chronic abdominal pain, yet its importance is seldom highlighted in the existing literature.

Mortality and complications related to mesenteric adenitis have not been observed. Ultrasonography serves as the most effective method to quickly distinguish this condition from acute appendicitis, and if diagnosed correctly, surgical intervention can often be avoided since most cases resolve with conservative management. In Indian children, mesenteric adenitis presents as a clinical syndrome commonly seen in a younger demographic, typically improving on its own unless specific antimicrobial treatments are warranted based on microbiological findings, such as those indicating tuberculosis or typhoid fever. This condition is benign and self-limiting, requiring neither medical nor surgical treatment; however, follow-up care is essential for these patients. Enlarged mesenteric lymph nodes are also linked to various pathological issues, including Crohn's disease, appendicitis, gastroenteritis, Yersinia infections, cat scratch disease, and AIDS. The prevalence and importance of such enlarged mesenteric lymph nodes have seldom been evaluated[9].

In paediatric patients, conditions such as adnexal torsion, rotavirus enteritis, neutropenic colitis, leukaemia, pelvic inflammatory disease, and staphylococcal pneumonia are additional causes of mesenteric adenitis. It is essential to maintain a high level of suspicion for tuberculous lymphadenitis in some of these individuals, given that India is endemic for tuberculosis. Clinicians should not rely exclusively on ultrasonography results, as the potential for misdiagnosis must be considered in patients presenting with abdominal colic.

This study was conducted to evaluate the prevalence and importance of mesenteric lymphadenopathy in children experiencing chronic abdominal pain, and to compare these findings with those of children who do not report any abdominal pain.

METHOD

This retrospective, single-centre case control study was carried out using data from the previous 24 months in the Surgery department of a government medical college- SHREE JAGANNATH MEDICAL COLLEGE & HOSPITAL, puri, Odisha. Children aged 5 to 15 who presented with persistent stomach pain were considered cases. Children aged 5 to 15 who

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had abdominal ultrasonography performed for purposes other than stomach pain were considered controls.

About 160 case records with complaints of chronic abdominal discomfort that were subjected to abdominal ultrasonography were found after records from the previous 24 months were examined. In contrast, approximately 152 case records were exposed to ultrasound of the abdomen for additional purposes. To ensure consistency in the analysis, a total of 150 children aged between 5 and 15 years, who displayed persistent stomach discomfort [CAP], were included as cases. Additionally, 150 other children underwent abdominal sonography for reasons unrelated to abdominal pain. Children with known remedies for persistent stomach discomfort, such as dysmenorrhea, abdominal tuberculosis, renal calculi, and pancreatitis, were excluded from the study's cases. Furthermore, children with identified causes of mesenteric lymphadenopathy, including cancer, gastroenteritis, rheumatic diseases, and abdominal tuberculosis, were also excluded from both the control and patient groups of the study. The study protocol received approval from the Institutional Ethics Committee. Clinical characteristics, along with the demographic profiles of the patients, and the results of the abdominal ultrasonography were meticulously documented. Data regarding the physical examination, medical history, and abdominal ultrasound findings were recorded in a proforma specifically designed for this research.

The proforma was filled out with information on each lymph node and measures in both transverse and anterior-posterior dimensions. Over 5 mm in the short axis in size or greater than 10 mm along the long axis was deemed significant.

ANALYSIS OF STATISTICS

The Statistical Package for the Social Sciences (SPSS) V21.0 was used to process the study data. Characteristic statistics were employed to analyse the study group's baseline characteristics. The mean and standard deviation for the variables that followed the normal distribution curve were calculated. The analysis was conducted using Pearson's chi-square test. Statistical significance was defined as a P value of less than 0.05.

RESULTS

Abdominal sonography was performed on 40 of the 150 controls who had genetic disorders and congenital defects, 21 had renal diseases, 18 had hepatic disorders, and 21 had pyrexia of unknown origin, in order to rule out renal or gastrointestinal anomalies. The prevalence of chronic abdominal discomfort was about similar in the sexes, with a male to female ratio of 0.8 to 1. As shown in Table 1 among the cases, CAP was more common in

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the younger age group in the current study (68% of children with CAP were between the ages of 5 and 10).

VARIABLES		CASES (N=150)	AMONG CASES SIGNIFICANT MLN (N=131)	CONTROLS (N=150)
SEX	MALE	68(45.3%)	59 (86.7%)	81(54%)
	FEMALE	82(54.7%)	72 (87.8%)	69(46%)
AGE	5-10 YEARS	102(68%)	89(87.2%)	84(56%)
	11-15 YEARS	48(32%)	4287.5%)	66(44%)

TABLE: 1: BASELINE DEMOGRAPHIC CHARECTERISTICS OF THE STUDY GROUP

AGE GROUP	MALE	FEMALE	TOTAL
5-10 YEARS	40(67.7%)	49(68%)	89(67.9%)
11-15 YEARS	19(32.3%)	23(32%)	42(32.1%)
TOTAL	59(100%)	72(100%)	131(100%)

TABLE: 2: BASELINE DEMOGRAPHIC CHARECTERISTICS OF CHILDREN WITH SIGNIFICANT MESENTERIC LYMPHADENOPATHY AMONG CASES

In the current study, 87% of children with persistent stomach pain had significant MLN. It accounts for a male to female ratio of 0.8:1, with 59 [45%] being boys and the remaining 72 [55%] being females.

As shown in table no. 2, about 67.9% of the kids with significant MLN were younger. Vomiting is the most frequent clinical symptom among the patients' group, followed by pallor and discomfort in the abdomen. As shown in Table No. 3, vomiting and stomach pain and soreness are usually linked to significant MLN.

VARIABLE	NUMBER (N=150)	SIGNIFICANT MLN (N=131)
VOMITTING	45	42(93.3%)
CONSTIPATION	10	4(40%)
FEVER	22	12(54.5%)
PALLOR	42	33(78.5%)
ABDOMINAL TENDERNESS	42	39(92.8%)
HEPATOMEGALY	7	0(0%)

TABLE: 3: SYMPTOMS AND SIGNS IN CHILDREN WITH CHRONIC ABDOMINAL PAIN AND MLN

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The ultrasonography results of kids with persistent stomach pain in this investigation are listed in table no.4. According to table no. 4, mesenteric lymphadenopathy is the most often observed ultrasonography finding in children with persistent stomach pain (89%).

ULTRASOUND FINDING	CHRONIC ABDOMINAL PAIN(N=150)
MESENTERIC LYMPHADENOPATHY	131(87.3%)
GB CALCULUS	2(1.3%)
LEFT HYDRONEPHROSIS	3(2%)
TRANSIENT INTUSUSCEPTION IN IC JUNCTION	2(1.3%)
HEPATOMAGALY	7(4.6%)
NO SIGNIFICANT ABNORMALITY	5(3.3%)

TABLE: 4: ULTRASOUND FINDINGS IN CHILDREN WITH CHRONIC ABDOMINAL PAIN

In our research, the occurrence of significant MLN in children experiencing chronic abdominal pain was found to be 87.3% [N = 131, from a total of 150 cases], while it was 26% in the control group, as illustrated in Table No. 5. This indicates that the correlation between significant MLN and chronic abdominal pain in children is statistically significant, with a P value of 0.01.

SIGNIFICANT MESENTERIC LYMPH NODE	CASE (N=150)	CONTROL (N=150)	P VALUE*
PRESENT(N=170)	131(87.3%)	39(26%)	0.01 (SIGNIFICANT)
ABSENT (N=130)	19(12.7%)	111(74%)	

TABLE: 5: DIVISION OF STUDY GROUP WITH REFERENCE TO MESENTERIC LYMPH NODES IN ABDOMINAL ULTRASONOGRAPHY

DISCUSSION

In our research, chronic abdominal pain was found to be equally prevalent among both genders, with a male to female ratio of 0.8:1. The majority of affected individuals were from the younger demographic, specifically 67.9% of children with chronic abdominal pain (CAP) were aged between 5 to 10 years. In a study conducted by Vaisakh Sambasivan et al.

regarding mesenteric lymphadenopathy in children suffering from chronic abdominal pain in Sri Lanka, it was observed that the occurrence of chronic abdominal pain was more common in the 5 to 10-year age group, with both boys and girls being equally impacted[6].

Mesenteric adenitis is typically of viral origin and follows a self-limiting course. The clinical presentation of this condition includes pain in the right lower quadrant accompanied by fever. It can resemble appendicitis in paediatric patients and involves the mesenteric lymph nodes located in the right iliac region. The primary diagnostic tools for assessing abdominal pain in children are the erect view X-ray of the abdomen and ultrasonography with graded compression. Brennemann was the first to document mesenteric adenitis, which is also referred to as Brennemann syndrome[10]. The condition is mainly linked to acute appendicitis, intussusception, and lymphoma[10]. In our current study, the prevalence of significant mesenteric lymphadenopathy (MLN) among children experiencing chronic abdominal pain was found to be 87.3%. Of these cases, 59 (45%) were boys, while the remaining 72 (55%) were girls, resulting in a male-to-female ratio of 0.8:1. Approximately 67.9% of the children with significant MLN belonged to the younger age group. A comparable study conducted by Vayner et al[7]. reported a prevalence of mesenteric lymphadenopathy at 61.4% among children with recurrent abdominal pain, with around 45% being boys and 45.6% aged between 5 and 8 years.
172 children with RAP and mesenteric lymphadenopathy were followed up with for a year, and no obvious illness had developed. 55 children with mesenteric lymphadenopathy underwent a repeat USG study; in 18 of these cases, the result was normal study and the abdominal pain also went away. Mesenteric lymphadenopathy persisted in the remaining 37 cases. While some lymph nodes had shrunk in size, the shape of the lymph nodes remained unchanged in these kids.

The abdominal pain had subsided in 34 out of the 55 patients, while the remaining 11 patients reported a decrease in discomfort[7]. In the current investigation, children exhibiting significant mesenteric lymphadenopathy (MLN) were more likely to experience chronic abdominal pain and vomiting. The predominant ultrasound finding in children suffering from chronic abdominal pain is identified as mesenteric lymphadenopathy, observed in 87.3% of cases. Similar findings were reported in research conducted by Vaisakh Sambasivan et al[11]. Consistent with our findings, several studies have indicated that the right lower quadrant of the abdomen is the most common site for MLN, followed by the periumbilical area. A review of a study conducted in Islamabad revealed a 22% incidence of mesenteric lymphadenitis among patients presenting with abdominal tuberculosis[12]. The most frequently observed sites in abdominal TB were the peritoneum and abdominal lymph nodes. In our research, the prevalence of significant MLN in children experiencing

chronic abdominal pain was 87.3%, which is higher than that observed in the control group. Furthermore, it is clear that the correlation between significant MLN and children with chronic abdominal pain were determined to be statistically significant. Comparable findings were reported by several researchers[8,12]. When MLN is the sole observation in abdominal ultrasonography, parents can be assured of the benign nature of this finding and the potential for a favourable prognosis.

CONCLUSION

MLN is frequently observed in children diagnosed with CAP, with a prevalence rate of 87.3%. In our research, significant MLN was notably linked to children experiencing chronic abdominal pain when compared to those in the control group.

In instances where MLN is the sole finding on abdominal ultrasonography, parents can be assured of the benign and self-limiting nature of this observation, along with a potentially favourable prognosis. In cases of mesenteric adenitis, stools may exhibit minimal traces of blood; however, the child typically appears well between episodes of pain and does not experience weight loss. An abdominal ultrasound may reveal a significant number of enlarged lymph nodes within the mesentery, yet a negative ultrasound result does not rule out this diagnosis.

In this study, comprehensive laboratory tests aimed at investigating the aetiology of MLN could not be conducted. Additionally, long-term follow-up of these patients was not carried out in our research, which would have been beneficial for assessing the natural progression of MLN. These represent the limitations of our study.

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