

Association of mesenteric lymphadenitis with abdominal pain in children – A case–control study



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Submission: 19-10-2023

Revision: 28-12-2023

Publication: 01-02-2024

ABSTRACT

Background: Enlarged mesenteric lymph nodes (MLNs) are a frequent ultrasonography finding in children with abdominal pain. Studies have shown that the incidence of enlarged mesenteric lymph nodes varies widely from 14% to 86%. The site, size, and number of lymph nodes are the distinguishing criteria for abnormal lymphadenopathy from normal lymph nodes.

Aims and Objectives: The aims and objectives of the study are to estimate the prevalence of mesenteric lymphadenitis in children aged 4–15 years, who have abdominal pain with age and sex-matched controls without abdominal pain. **Materials and Methods:** The study was conducted after getting approval from the Institutional Ethics Committee. The MLN of all sizes was evaluated and measured using an ultrasound abdomen. Age and gender-matched controls were included in the study. Children with MLN were divided into 2 groups based on the size of the lymph nodes. (group A-MLN <4 mm and group B MLN >4 mm). In some cases, the site and size of MLN were noted and correlated with the severity of abdominal pain. **Results:** The ultrasonogram of the abdomen revealed that 15 (22.7%) cases had ≤4 mm nodes and 38 (57.6%) had >4 mm nodes. Out of the 38 cases, 2 (3.8%) had >10 mm nodes. Among the controls, 16 (24.2%) had ≤4 mm, 8 (12.1%) had >4 mm nodes, and none had MLN >10 mm. The odds ratio (OR) of cases having mesenteric lymphadenitis over controls was 5.067 (OR = 5.067). **Conclusion:** Based on the results of our study, mesenteric lymphadenopathy >4 mm is associated with abdominal pain in children aged 4–15 years.

Key words: Abdominal lymph nodes; Acute appendicitis; Gastroenteritis

Access this article online

Website:

<http://nepjol.info/index.php/AJMS>

DOI: 10.3126/ajms.v15i2.59395

E-ISSN: 2091-0576

P-ISSN: 2467-9100

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INTRODUCTION

Abdominal pain is one of the most common and challenging presenting complaints in children. The prevalence of children presenting to hospital with abdominal pain of ≤3 days duration is 5.1%.¹ Abdominal pains can be acute or sudden in onset or chronic with continuous or intermittent symptoms. Enlarged mesenteric lymph node (MLN) is a frequent ultrasonography finding in children with abdominal pain. Inflammation of the abdominal lymph nodes without any additional abnormalities being found is frequently described as mesenteric lymphadenitis.² Normal mesenteric lymph nodes vary in size but typically have a short-axis diameter of 4 mm or less.³ The incidence

of enlarged MLN varies widely. Studies have shown the incidence ranges from 14% to 86% in children. The site, size, and number of lymph nodes are the distinguishing criteria for abnormal lymphadenopathy from normal lymph nodes.³⁻⁵ In recent years, due to the advances in the quality of ultrasonography the diagnostic value of mesenteric lymphadenitis in acute abdominal pain has increased. Although the enlarged MLN is a non-specific finding and is connected to several conditions such as adenoviral infection, appendicitis, gastroenteritis, and Yersinia infection, it can be seen in asymptomatic children as well. The enlarged MLN of AP diameter >4 mm on ultrasonography without demonstration of other organic diseases such as appendicitis and gastroenteritis is abnormal.

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Recent studies have shown mesenteric lymphadenitis as a cause for chronic or acute abdominal pain.⁶

Aims and objectives

The aims of the study are to determine the prevalence of enlarged MLN in children aged 4–15 years, with and without abdominal pain. (1) The objectives of the study are as follows: (2) to correlate the site of mesenteric lymph nodes with the severity of abdominal pain, and (3) to correlate the size of mesenteric lymph nodes with the severity of abdominal pain.

MATERIALS AND METHODS

This case–control study was conducted in the outpatient unit of the Department of Pediatrics at Pondicherry Institute of Medical Sciences, Pondicherry, from 2014 to 2017. The study was conducted after getting approval from the Institutional Ethics Committee (IEC No: RC/14/63).

Inclusion criteria

Cases: All children aged 4–15 years with abdominal pain.

Controls: Age and sex-matched children without abdominal pain.

Exclusion criteria

Children with abdominal pain need surgical intervention.

Sample size

A total of 66 cases and 66 age and sex-matched controls were selected. It was assumed that 4% of controls would have enlarged MLN and the plan was to detect an odd ratio (OR) of 5 with a power of 80% and a level of significance 0.05.

Data collection procedure

After obtaining informed consent and assent, a total of eligible 66 cases and 66 age and sex-matched controls were recruited in the study. Children with abdominal pain were managed as per the standard protocol of the department which included clinical examination. In both the study groups, complete blood profile, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Mantoux test and peripheral smear, urine routine and stool routine, ultrasound (USG) abdomen was done. In all the cases and controls, the USG abdomen was done with a Siemens S2000-USG machine by a single senior radiology consultant. All MLN size was measured along the short axis diameter. The site was also evaluated. Children with MLN were divided into two groups based on size. (group A – MLN <4 mm and group B – MLN >4 mm). The pain <4–6 weeks is categorized under acute abdominal pain and pain more than 12 weeks is considered chronic abdominal pain. The severity of abdominal pain was assessed by the

Wong-Baker Pain Rating Scale.⁷ In some cases, the site and size of MLN were noted and correlated with the severity of abdominal pain.

Statistical analysis

The data obtained were analyzed using Statistical Package for the Social Sciences software version 20. Mean and standard deviation (SD) for continuous variables, and percentages for dichotomous and categorical variables. The test of significance used was the Chi-square test, Fisher exact t-test, independent t-test, and logistic regression. OR was calculated to measure the association between mesenteric lymphadenitis and abdominal pain.

RESULTS

A total of 66 cases and 66 age and sex-matched controls were enrolled in the study after excluding three patients with severe abdominal pain who were diagnosed with acute appendicitis. The mean age was 9.06 years (SD=2.892) with 38 (57.6%) females and 28 (42.4%) males.

Among cases, 53 (80.3%) had acute abdominal pain and 13 (19.7%) had chronic abdominal pain. Of these, the majority (63.6%) had pain in the umbilical area. None of the cases had a fever, and three children (4.5%) of the control group had a history of fever. None of the cases and 2 (3%) controls had leukocytosis. In both cases and controls, ESR, CRP, urine routine examination, and stool routine examination were normal. In all the cases and controls the Mantoux test was negative. The most common diagnosis among cases was gastritis in 35 (53%) children. Ultra sonogram of the abdomen revealed, 15 (22.7%) cases had ≤4 mm nodes and 38 (57.6%) had >4 mm nodes. Out of the 38 cases with >4 mm nodes, 2 (3.8%) had >10 mm nodes. No sonographically identified nodes were reported in 13 (19.7%) cases. Among the controls, 16 (24.2%) had ≤4 mm and 8 (12.1%) had >4 mm nodes. None had >10 mm nodes. 42 (63.7%) controls had no sonographically identified nodes. The most common site of MLN in cases was umbilical, in 41 children (62.2%). The 2nd common site was iliac, in 12 children (18.1%). In comparison, the control group had 19 children (28.8%) who had nodes in the umbilical region and 4 children (6%), in the iliac region. None of the cases in the groups had mucosal or sub-mucosal thickening.

The mean number of nodes among the cases was 4.76 (SD=2.946) the mean number of nodes among the controls was 1.85 (SD=2.679). There was a statistically significant difference between the cases and controls (P=0.000). The OR of cases having >4 mm MLN over controls was 5.067. The mean size of the node among cases was 6.21 mm

(SD=2.373) and the mean size of the nodes among control was 4.54 mm (SD=1.841). This was statistically significant (P=0.002). Table 1 shows the association of MLN with abdominal pain and Table 2 shows the distribution of MLN (cases versus controls).

The severity of the abdominal pain was studied using the Wong-Baker Faces Pain Scale. 52 (78.7%) had Wong-Baker grade 3 and 14 (21.3%) had Wong-Baker grade 2. The size and site of the MLN in cases with severity of abdominal pain were statistically not significant (size P=0.783 and site P=0.145).

DISCUSSION

Mesenteric lymphadenitis has been postulated to be one of the medical causes of abdominal pain in children. This

case–control study included 66 children who presented to the pediatric outpatient department with abdominal pain (cases) and 66 children without abdominal pain (controls). The cases and controls were matched for age and sex.

Studies have shown that the incidence of MLN ranges from 14% to 83% among children with abdominal pain.^{2,3,6} A study done by Sivit et al. found that 14% had MLN >4 mm.³ Karmazyn et al. found an incidence of 54% when a cutoff of 5 mm was taken.⁸ Simanovsky et al., in their study, used a cutoff of 5 mm and found an incidence of 83%.² In our study when a cutoff of >4 mm was used, among kids with stomach pain, the incidence of MLN was 57.6%.

The most common site of MLN in cases was found to be umbilical in 41 (62.2%). Studies have shown the most

Table 1: Association of MLN with abdominal pain			
Distribution of MLN based on the number among cases and controls			
USG findings	Case n (%)	Control n (%)	P-value
No sonographically detected nodes	13 (19.7)	42 (63.7)	<0.001
Lymph nodes≤4 mm	15 (22.7)	16 (24.2)	
Lymph nodes>4 mm	38 (57.6)	8 (12.1)	
Distribution of MLN based on site among cases and controls			
Site of MLN	Cases n (%)	Controls n (%)	P-value
Epigastrium	0 (0)	1 (4.2)	0.33
Umbilical	41 (77.4)	19 (79.2)	
Iliac	12 (22.6)	4 (16.7)	
Distribution of MLN based on size among cases and controls			
Size of MLN	Cases n (%)	Controls n (%)	P-value
1–4 mm	15 (28.3)	16 (66.7)	0.004
5–10 mm	36 (67.9)	8 (33.3)	
>10 mm	2 (3.8)	0 (0)	
Association of MLN with abdominal pain			
Size of the MLN	Number of cases	Number of controls	Total
<4 mm	15	16	31
>4 mm	38	8	46
Total	53	24	77

Odds ratio=5.067 (95% confidence interval=1.7944–14.3065) significance=0.002, MLN: Mesenteric lymph nodes, USG: Ultrasound

Table 2: Distribution of MLN (cases versus controls)				
Characteristic	Number of cases	Number of controls	OR (95% CI)	P-value
Number of nodes				
No nodes	13	42	1.00	
1–4 nodes	13	12	3.50 (1.29–9.53)	0.014
>4 nodes	40	12	10.77 (4.39–26.39)	<0.001
Size of nodes				
No nodes	13	42	1.00	
1–4 mm	15	16	3.03 (1.18–7.75)	0.021
>4 mm	38	8	15.35 (5.74–41.05)	<0.001
Site of nodes				
No nodes	13	43*	1.00	
Umbilical	41	19	7.14 (3.13–16.29)	<0.001
Iliac (L+R)	12	4	9.92 (2.73–36.07)	<0.001

*one participant with epigastric MLN was included in this category, MLN: Mesenteric lymph nodes, OR: Odds ratio, CI: Confidence interval

common site to be the right lower quadrant followed by the umbilical and right upper quadrant.⁹ Mesenteric lymphadenitis can be associated with mucosal and sub-mucosal layer thickening, especially in children with gastroenteritis.⁹ However, in this study, none of the cases had mucosal or sub-mucosal thickening. The most common diagnosis among cases was acute gastritis, in 35 (53%) children. This study has shown that among children presenting with abdominal pain, MLN is common. The OR of cases having mesenteric lymphadenitis over controls was 5.067 (OR=5.067). Hence, MLN of >4 mm is associated with abdominal pain in children.

Limitations of the study

A major limitation of our study is that it was done in a single centre tertiary care hospital with limited sample size of 132.

CONCLUSION

Mesenteric lymphadenitis is most commonly present among pediatric and young adult groups. Children below 10 years of age who present with acute onset right lower quadrant abdominal pain are more likely to have mesenteric lymphadenitis rather than acute appendicitis. In our study, mesenteric lymphadenopathy >4 mm is associated with abdominal pain in children aged between 4 and 15 years. Hence, from our findings, we conclude that all mesenteric lymph nodes more than 4 mm to be considered clinically significant.

ACKNOWLEDGMENT

Authors are acknowledging Institutional Research Committee for approval and Head of Department,

Pediatrics at Pondicherry Institute of Medical Sciences for providing support and facilities.

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BK- Data collection and literature review and patient interviews and physical examination, analysis, and interpretation of results; **PP**- Radiology support and assistance in coordinating patient follow-up, analysis, and interpretation of results; **PPKK**- Overall supervision of the study from conception till completion and coordination with co-authors for manuscript preparation, analysis, and interpretation of results

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Source of Support: Nil, **Conflicts of Interest:** None declared.