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Pak J Med Res
Vol. 64, No. 4, 2025

Original Article

Significance of Mesenteric Lymphadenopathy in Children with Recurrent Abdominal Pain Reported at Federal Government Polyclinic Hospital, Islamabad

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Abstract

Background: There is growing evidence linking recurrent abdominal pain (RAP) in children to mesenteric lymphadenopathy (MLA), which is often a benign and incidental finding. Evaluating MLA in broader clinical context is crucial to prevent unnecessary invasive procedures.
Objective: To assess the frequency of MLA in children aged 5-12 years with RAP compared to age-gender matched controls and to assess the association between MLA and symptoms.
Methods: Children aged 5-12 years who experienced RAP were included in this prospective case-control study, which was carried out at the outpatient of Paediatric Department of the Federal Government Polyclinic Hospital, Islamabad from June 2022 to December 2023. The controls were age and gender matched children without minor abdominal complaints, children with abdominal pain due to other causes were carefully excluded. MLA was diagnosed when lymph nodes size was ≥ 5 mm on abdominal ultrasound. Using SPSS V.23, odds ratios (OR) were calculated with statistical significance set at p <0.05.
Results: There were 300 children in the study (150 cases and 150 controls), all of whom had comparable ages and genders (p >0.05). Compared to controls, MLA was more prevalent in cases (30% vs. 8.7%, p =0.001) and mean lymph nodes size was significantly larger on both short and long axis (p < 0.05). For nodes larger than ≥ 5 mm, the OR was 4.5. MLA was not significantly associated with severity of symptoms (p >0.05).
Conclusion: Children with RAP had a much higher prevalence of MLA than matched controls. However, no significant association with severity of symptoms was found.
Key words: Abdominal lymph nodes, abdominal ultrasound, mesenteric lymphadenopathy, recurrent abdominal pain.

Introduction

First identified in 1958, recurrent abdominal pain (RAP) is a common yet difficult paediatric ailment that affects roughly 10-12% of school-age children.[1] It usually interferes with everyday activities and presents as recurrent pain in abdomen that lasts for at least a month.[2] RAP is often divided into two categories: functional causes (less than 10% of cases) and organic causes. Inflammatory bowel disease (IBD), food allergies, and gastrointestinal infections are among the ailments that cause organic instances.[3] Functional disorders, on the other hand, like dyspepsia, abdominal migraine, and unidentified functional abdominal pain, are more common and have a major effect on a child's general health and quality of life. [4-6]

RAP may be caused by mesenteric lymphadenopathy (MLA), which is characterized by mesenteric lymph node enlargement greater than 5 mm. MLA, which was once thought to be incidental finding, is now more frequently associated with abdominal pain.[7,8] In addition to nausea, discomfort, or moderate digestive distress, children with MLA frequently have localized pain, usually in the lower

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Received: 15 April 2025, **Accepted:** 15 December 2025
Published: 29 January 2026

Authors Contribution

NA, SN & AM conceptualized the project and did the drafting, revision & writing of manuscript. SN, SS, RT & RS did the data collection and performed statistical analysis. RS & SM did the literature search.

right quadrant. Its involvement in RAP is further complicated by infectious triggers such as viral gastroenteritis, bacterial infections like Yersinia, and systemic disorders like IBD, Henoch-Schönlein purpura, and tuberculosis, which makes diagnosis and treatment more difficult.[9]

It's still unclear if MLA has any clinical value in RAP. Does it directly contribute to the pathophysiology of RAP, or is it just a secondary finding that coexists with functional disorders? The discussion and debate go on. According to new research, irritation or inflammation brought on by swollen lymph nodes may be the primary cause of symptoms. Knowledge of this relationship is essential for establishing diagnostic standards, directing clinical judgments, identifying when additional imaging or intervention is required, and eventually enhancing treatment plans for affected children.[10-12]. Recent studies from Pakistan[13] and India,[14,15] report MLA prevalence ranging from 28% to 89% in children with RAP, highlighting regional variability.

The purpose of this study is to compare the frequency and features of MLA in children with RAP, ages 5 to 12 years, to those who do not have abdominal pain. Additionally, it aims to investigate the relationship between the severity of symptoms and MLA. The results could enhance care for children with RAP, reduce needless interventions, and improve diagnostic criteria.

Methods

This prospective case-control study was conducted at the Pediatric Department of the Federal Government Polyclinic Hospital (FGPCH), Islamabad, over 18 months, from June 2022 to December 2023. Written informed consent was obtained from parents or legal guardians of all participants prior to enrollment. The study included a case group and a control group, with the sample size determined using findings from a similar recent study.[12] Assuming 12.1% of controls and 57.6% of cases would exhibit enlarged mesenteric lymph nodes (MLN) with OR of 4.0, the confidence level was set at 95% and absolute precision as 10%. A total of 150 cases and 150 age- and sex-matched controls were selected. The study included children aged 5-12 years with functional RAP (abdominal discomfort occurring at least three times over a three-month period). Participants were thoroughly selected after excluding organic causes (e.g., inflammatory bowel disease, infections, allergies, renal calculi, dysmenorrhea) through comprehensive review of clinical history, physical examination and other medical records were included in this study. Controls having matched age and gender were considered, as aligned with prior studies,[12,13] drawn from the same outpatient paediatric population at same institution, presenting for routine check-ups or minor, transient complaints (e.g., unrelated upper respiratory issues) with no history of recurrent or significant abdominal pain. Abdominal ultrasound, the sole method for MLA detection was uniformly performed on all enrolled cases and controls by experienced, blinded radiologists using consistent protocols (enlarged lymph nodes in the mesentery were used to identify MLA). Both short and long axes were measured, and lymph nodes ≥ 5 mm of at least three lymph nodes were considered to be positive for MLA), with no selective verification or differential follow-up. Thus, ascertainment of the outcome (MLA presence) was unbiased across groups, and any potential detection bias was minimized through blinding and prospective data collection by researcher herself. Data analysis was performed using SPSS v23. Baseline characteristics were summarized with descriptive statistics. Odds ratios (OR) were calculated for mesenteric lymph nodes ≥5 mm in cases vs. controls, and the association between MLA and severity of symptoms was assessed. Chi-square test was used to analyze categorical differences, with statistical significance set at p <0.05.

Results

The study finally included 300 children, evenly divided into two groups: 150 children with RAP (cases) and 150 age- and gender-matched children without RAP (controls). Mean age was 9.0±2.2 years for cases and 8.8±2.4 years in control group. The age wise gender distribution were similar between the groups (Table-1).

Table 1: Age wise gender distribution in both study groups.

Gender	*Age Group (years)*	*Cases n(%)*	*Controls n(%)*
Male	5–7	25(16.7)	23(15.3)
	8–10	38(25.3)	36(24.0)
	11–12	27(18.0)	27(18.0)
	Subtotal	90(60)	86(57.3)
Female	5–7	10(6.7)	12(8.0)
	8–10	30(20.0)	28(18.7)
	11–12	20(13.3)	24(16.0)
	Subtotal	60(40)	64(42.7)
Total		150(100)	150(100)

The mean lymph node size was significantly larger in the case group compared to the controls in both the short-axis (6 mm vs. 5.5 mm) and long-axis (10.5 mm vs. 9.8 mm) measurements (p <0.05) (Table-2). Additionally, MLA prevalence was

Table 2: Distribution of MLA and association with symptoms.

Variables		*Cases*	*Controls*	*P- value/ Or**
Mesenteric Lymphadenopathy	MLN ≥5mm	45 (30%)	13 (8.7%)	0.001/4.5
	MLN <5mm	105 (70%)	137 (91.3%)	
Average Size (mm)	Short Axis	6.0	5.5	0.02
	Long Axis	10.5	9.8	0.03
Location (%)	Right Mesenteric	70.0	65.0	0.55
	Left Mesenteric	20.0	15.0	0.43
	Central Mesenteric	10.0	20.0	0.21
Association with Symptoms (%)	Fever	5.0	3.0	0.40
	Weight Loss	2.0	1.5	0.55
	Vomiting	4.0	2.0	0.34

*OR = Odds ratio.

significantly higher in cases than controls (p =0.001) (Table-2)". The odds ratio for cases having mesenteric lymph nodes ≥ 5 mm compared to controls was 4.5. No significant differences were observed in the location of lymph nodes, and there was no association between lymphadenopathy and severity of symptoms (p >0.05) (Table 2).

Discussion

The present study results showed that children with RAP had significantly larger mesenteric lymph nodes(MLN) than controls, with mean short-axis (6 mm vs. 5.5 mm) and long-axis (10.5 mm vs. 9.8 mm) measurements (p < 0.05), aligning with Javed et al.'s findings.[13] The predominance of MLN in the right mesenteric region reinforces abdominal ultrasound as an effective diagnostic tool for evaluating children with unexplained abdominal pain. Doğan et al.[9] identified a short-axis threshold of >5 mm for enlarged nodes, further supporting present study results and indicating that size criteria play a crucial role in diagnosing mesenteric lymphadenopathy. Present study findings of higher MLA prevalence in cases along with higher odds ratio for MLN ≥5 mm are consistent with a similar case control study by Kurian et al.[12] (57.6% vs. 12.1%, OR = 5.067) and Javed et al.[13] who reported prevalence of 28%. This suggests it may be a common finding in RAP, though its clinical significance remains unclear.In another case-control study, Sayamanasa et al.[14] reported a significant association between MLA and chronic abdominal pain (CAP), with an incidence of 89% in cases and 26% in controls. Allagadda et al.[10] reported that 53.8% of children with MLA had no identifiable cause, underscoring the need for further investigations into its aetiology to guide clinical management and reduce unnecessary interventions. These findings highlights the importance of distinguishing between incidental and clinically significant MLA, particularly in children with RAP.

Present study findings align with previous studies, demonstrating that most children with MLA did not exhibit severe symptoms such as fever, significant weight loss, or systemic illness as there was no significant association between lymphadenopathy and symptom severity (p >0.05), reinforcing its benign nature. Lahel et al.[11] and Javed et al.[13] similarly found no significant difference in MLA prevalence between symptomatic and asymptomatic children, suggesting that MLA is frequently incidental rather than a reliable indicator of pathology. Singh[15] and Balakrishnan et al.[16] reported that MLA is often present in children with RAP but rarely signifies severe disease. Rajindrajith et al.[17] emphasized the contribution of functional disorders in paediatric abdominal pain, while Abbott et al.[18] advocated for prioritizing symptom relief over excessive diagnostic testing to avoid unnecessary medical interventions. Adeniyi et al.[19] found that many children with RAP had normal endoscopic results, further supporting the conclusion that MLA is not typically associated with serious gastrointestinal pathology and should not automatically prompt invasive testing.

The diagnostic challenges of RAP are well-documented, with Reust and Williams[20] along with Rajindrajith et al.[17], highlighting its predominantly functional nature, often linked to irritable bowel syndrome or functional dyspepsia rather than organic disease. A single-center study linked MLA with functional abdominal pain disorder not otherwise specified (FAP-NOS), suggesting that current lymph node size criteria may need reconsideration in paediatric populations.[8] Present study did not account for variations in lymph node size across different subgroups, and this represents an important avenue for future research. Toro Monjaraz et al.[21] explored parasitic infections in RAP, finding their impact on MLA to be minimal, a factor not examined in the present study but one

that could be further explored in future research. Additionally, Abbott et al.[18] emphasized that a pragmatic, symptom-focused approach is essential in order to reduce unnecessary diagnostic procedures and for easing parental anxiety.

Present study findings, along with existing literature, strongly suggest that MLA is often an incidental ultrasonographic finding, not the main cause of RAP. As it is frequently observed, this may have significant implications towards managing children with RAP and a more deliberate diagnostic approach is suggested avoiding unnecessary invasive tests while emphasizing on symptom management and functional treatments. The prospective case-control design of the present study is a major strength, though there are certain limitations—namely, the smaller sample size and the fact that it's a single-center study. Present study did not account for variations in lymph node size across different subgroups, and this represents a potential area for future research. Potential biases include selection bias, which was minimized by recruiting age and gender matched cases and controls from the same outpatient paediatric population and meticulously excluding organic causes of abdominal pain. Verification bias was addressed by performing uniform abdominal ultrasounds on all participants by blinded, experienced radiologists using consistent diagnostic criteria, making sure unbiased determination of MLA across groups. Residual confounding from unmeasured variables (e.g., socioeconomic factors) cannot be entirely ruled out, though the prospective approach and exclusion criteria aimed to mitigate this. Future multicentre studies with larger cohorts could further validate these findings.

Conclusion

The present study found that children with RAP had a significantly higher prevalence of MLA than matched controls. However, no significant association with symptom severity was observed, suggesting MLA is a benign finding. While commonly detected in children with RAP, MLA should be evaluated within a more comprehensive clinical framework. It is emphasized that extensive diagnostic procedures are generally not justified by mere presence of MLA unless accompanied by concerning symptoms. This will help in avoiding unnecessary interventions while focusing on effective symptom management. It is recommended future longitudinal studies using advanced imaging techniques to further clarify MLA's role in RAP, in order to refine diagnostic and management strategies.

Acknowledgement: We extend our gratitude to the Institutional Research Committee, as well as the nursing and technical staff of the Pediatric Department at the Federal Government Polyclinic Hospital, Islamabad, for their invaluable support during this research. No financial disclosures are to be made, and no conflicts of interest are declared.

Funding: None.

Availability of Data: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethical Approval: The Ethical Review Committee of Federal Government Polyclinic Hospital, Islamabad approved the study via letter no. FGPC.1/12/2020/ ethical committee.

Conflict of Interest: None declared.

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