Clinico-Radiological Profile of Mesenteric Lymphadenitis in Children admitted in a Tertiary Care Centre - A Retrospective Cohort Study

ABSTRACT:

Background and Aim: Mesenteric lymphadenitis in pediatric population usually presents with abdominal pain mimicking appendicitis mounting a challenging task for physicians to diagnose. It is a self-limiting inflammatory process and resolves spontaneously. In addition to clinical features, ultrasonography is the primary diagnostic modality. We aimed to evaluate the incidence and clinico-radiological characteristics of mesenteric adenitis in patients presenting with abdominal pain.

Materials and Methods: A total of 108 patients attending paediatric out-patient and paediatric surgery clinic in Saveetha Medical College and Hospital, Chennai, between January 2018 and December 2020 with abdominal pain for several aetiologies were included in this study. The clinical presentation, laboratory parameters and the ultrasonographic findings were noted. Continuous variables were analyzed using Student's t-test and presented as Mean ± Standard Deviation (SD).

Results: The incidence of non specific mesenteric adenitis was found to be 16.7%. Peak prevalence was found to be at around 8 years range (6-10) years. Clinically, 58.3% had fever, 40.7% had dysuria and 36.1% had diarrhoea. Laboratory parameters were non-specific for this condition. Majority of the enlarged lymph nodes were found in the right lower quadrant (81.5%) followed by (10.2%) in the paraumbilical region and (8.3%) in left lower quadrant.

Conclusions: Mesenteric lymphadenitis as an individual clinical entity is a very challenging task for the paediatricians to evaluate and diagnose due to several possible variations in the clinical presentation. The incidence of non-specific mesenteric adenitis was found to be 16.7%. Mesenteric lymphadenitis is usually a self limiting entity.

Keywords: Abdominal pain, Mesenteric lymphadenitis, Paediatric, Ultrasonography

INTRODUCTION:

Mesenteric lymph nodes are approximately 100–150 in number. They are small, bean-shaped structures running along the course of lymphatic vessels. The mesenteric lymph node is the "first pass" organ for nutrients and microbial substances entering the lymph fluid in the intestinal lamina propria[1]. Their major functions are to act as a filter for particulate matter and micro-organisms, and are the site of antigen presentation.

They are usually distributed within the mesenteric fat and constitute three successive relays: the most peripheral nodes are known as the juxta-intestinal mesenteric nodes and lie close to the intestinal walls between the terminal jejunal and ileal arteries; the second group of nodes occupies an intermediate position within the mesentery between the primary or secondary loops of the superior mesenteric artery; the last nodes, which are less numerous but larger, are located along the main stem of this vessel, near the mesenteric root, and constitute the central mesenteric nodes.

Mesenteric lymphadenitis refers to nonspecific self-limiting inflammation of the mesenteric lymph nodes. This conditions Mesenteric lymphadenitis typically occurs in children, adolescents, and young adults of both sexes, although males might be slightly more frequently affected than females[2] .This condition is known to have varied clinical presentations that can include abdominal pain, fever, vomiting and diarrhea. Physical examination alone is often sufficient in the pediatric population but still requires imaging studies to make the diagnosis.

Laboratory parameters like white blood cell (WBC) and C-reactive protein (CRP) will generally be elevated, but the diagnosis cannot be ruled out even if they are within normal limits[3] .The diagnosis of lymph node enlargement by imaging modality is reported based on the size criterion. Majority of pediatric patients with abdominal pain are subjected to imaging studies, in particular, ultrasound examination of the abdomen[4], and a high prevalence of mesenteric lymph node (MLN) in the right lower abdominal quadrant has been previously reported[5]. The current radiological definition defines mesenteric adenitis as at least one abnormally enlarged lymph node measuring 8 mm or more in its short-axis diameter[6].

This retrospective study was aimed to evaluate the incidence and clinico-radiological characteristics of enlarged mesenteric nodes in pediatric patients presenting with abdominal pain.

METHODOLOGY:

Patients

This retrospective cohort study received approval from the Institutional Review Board and Ethics Committee of the hospital and was conducted in the outpatient Department of Paediatrics and Paediatric Surgery, Saveetha Medical College and Hospital, Thandalam, Chennai, Tamilnadu, India, over a period of 6 months (March 2021 to August 2021). All Children aged 1 to 15 years presenting with abdominal pain were included. The exclusion criteria included congenital anomalies, tuberculosis, lymphoma, gastrointestinal perforation, as well as children with tumors or systemic diseases. Children were divided into three groups – 1-5 years, 6-10 years and 11-15 years. The clinical data (age, sex, socio-economic status, symptomatology, and examination findings), laboratory data (WBC and CRP) and the ultrasound characteristics (location, number, size) of the patients over the past 3 years (January 2018 to December 2020) were collected from the medical records.

Ultrasonography

All the ultrasound examinations were performed by a single experienced sonographer with a Siemens SONOLINE G50 ultrasound machine. After scanning of the whole abdomen and pelvis with a curved 4 MHz transducer, mesenteric lymph node evaluations were performed with a linear 9 MHz transducer. The antero-posterior diameter and the transverse diameter of the largest mesenteric lymph node were recorded for each child. The current radiological definition defines mesenteric adenitis as at least one abnormally enlarged lymph node measuring 8 mm or more in its short-axis diameter[7].

Laboratory parameters

An EDTA-anticoagulated whole-blood specimen was collected on the same day of the ultrasound examination. All blood samples were collected and analyzed by the Central Clinical laboratory of the hospital. WBC and CRP of each child was provided post blood sample analysis using a Sysmex KX-21 fully automated Hematology Analyzer (East Asia Co., Japan), and Bhat BIO-SCAN C-REACTIVE PROTEIN LATEX SLIDE TEST KIT respectively. Elevated WBC and CRP[8] is defined in children as $\geq 11.0 \times 10^9$/L and > 10 mg/dL respectively.

Statistical analysis

Data was entered in MS Excel and was analysed using Statistical Package for the Social Sciences (SPSS) program for Windows (SPSS Inc, Chicago, version 19.0). Categorical variables were presented in the form of frequencies and percentages. Continuous variables were analyzed using Student's t-test and presented as Mean ± Standard Deviation (SD). The threshold level for statistical significance was $p<0.05$.

RESULTS:

Cohort Characteristics

A total of 108 paediatric patients with abdominal pain of various etiologies visited the outpatient department of paediatrics and paediatric surgery between January 2018 and December 2020. Of these children, 75 (69.4%) were boys, giving a male to female (M:F) ratio of 2.3:1, with median age of 8 years old (6 to 10 years old). There was parity in the distribution between sexes, with more male preponderance in the distribution. 77 (71.3%) patients were in age group between 6 and 10 years. The demographic characteristics of study population are presented in Table 1.

Clinical Characteristics

Clinically [108 (100%)] children had abdominal pain, [63 (58.3%)] had fever, [44 (40.7%)] had dysuria and [39 (36.1%)] had diarrhoea, as shown in Figure 1.

Elevated WBC was seen in [77 (71.3%)] patients. Predominantly lymphocytosis was detected in [63 (81.8%)] patients. CRP was found to be elevated in [23 (21.3%)] patients only.

Ultrasonographic Characteristics

Distribution of enlarged mesenteric lymph nodes was analyzed, with the location of the node (Left lower quadrant, Right lower quadrant and para-umbilical region). The largest proportion of the nodes was seen in the right lower quadrant [88 (81.5%)], followed by the para-umbilical region [11 (10.2%)] and the left lower quadrant [9 (8.3%)]. The distribution of mesenteric adenitis is elucidated in Table 2.

Analysis of dimensions of the lymph nodes revealed that the transverse diameter was by and large always greater than the antero-posterior diameter. The range for transverse diameter was seen between 10 mm to 17 mm, on the other hand the antero-posterior diameter was between 6 mm to 9 mm.

Ultrasonographic diagnosis for abdominal pain in the study population was observed to be cystitis [67 (62%)], primary mesenteric lymphadenitis [18 (16.7%)], colitis [15 (13.9%)], appendicitis [5 (4.6%)], intussusception [3 (2.8%)], as depicted in Figure 2. The incidence of non-specific mesenteric lymphadenitis was found to be 16.7%.

DISCUSSION:

Mesenteric lymphadenitis is an age old term. In the year 1723, Sydenham was the first to describe enlargement of the mesenteric glands in children[9]. During the early 19th century, "strumous abdomen" was the term utilized to describe the condition. And later on; few years after First World War, mesenteric lymphadenitis was recognized as a clinical entity.

In our study, there is sex (gender) difference in children having mesenteric lymphadenopathy (males 69.4% and females 30.6%). This is similar to the study done by Maheswari et al[10] that concluded most affected patients were males (75.4%) than females (24.5%). In another study conducted by Murthy Nagaraj et al[11] it was seen that majority of the affected cases were males (64%).

In the present study, the peak incidence of mesenteric lymphadenitis was seen in 8 year of age (range 6 -10 years). Sikorsha et al[12] has shown that the peak incidence of mesenteric lymphadenitis is in 9 year of age. Yet another study conducted by Maheswari et al[10] revealed the peak incidence was between 5 and 10 years of age.

In our study, we have taken those cases presenting with abdominal pain and hence, all cases had abdominal pain (100%) as a symptom. On clinical grounds, we also found few associated symptoms. Accordingly, fever (58.3%) was the most common associated symptom, followed by, dysuria (40.7%), and diarrhoea (36.1%). These results are similar to the study conducted by Nagaraj et al[11].

On the analysis of the laboratory parameters, we found no correlation in regard to WBC count and C-Reactive Protein. CRP was found to be elevated in [23 (21.3%)] patients only. This analysis is in accordance to the study done by Allagadda et al[13] in which CRP was positive in 16 (25%) only.

In the present study, the range of transverse diameter was observed between 10 mm and 17 mm, on the other hand the antero-posterior diameter was between 6 mm and 9 mm. Majority of enlarged lymph nodes was found to be in right lower quadrant [88 (81.5%)] followed by para-umbilical region [11 (10.2%)] and left lower quadrant [9 (8.3%)]. Our findings correlated with the study published by Roshan Chanchlani[2] regarding the size and location of the mesenteric nodes.

CONCLUSION:

Mesenteric lymphadenitis is a self limiting inflammatory condition usually caused by pathogens of viral origin. It is one of the most common medical causes of abdominal pain in paediatric patients. Mesenteric lymphadenitis is a benign, self-limiting condition frequently found in young age groups which resolves spontaneously. This condition usually does not require any medical or other surgical intervention unless specific anti microbial agents are indicated by microbiological tests.

LIMITATION:

Since this research was a retrospective study, other characteristics that could only be assessed by observation or history-taking were not possible.

REFERENCES:

1. Jorge Henao-Mejia, Eran Elinav, Christoph A. Thaiss, Richard A. Flavell. In: The Intestinal Microbiota in Chronic Liver Disease. Frederick W. Alt editors. Advances in Immunology. Academic Press, 2013, p. 73-97.

2. R. Chanchlani. Clinical profile and management of mesenteric lymphadenitis in children-our experience. Int. J Orthop. Traumatol. Surg. Sci. 2015;1(1):1–4.

3. Otto M, Nagalli S. Mesenteric Adenitis. [Updated 2020 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560822/

4. Pilhatsch A, Riccabona M. Role and potential of modern ultrasound in pediatric abdominal imaging. Imaging Med. 2011;3(4):393–410.

5. Vayner N, Coret A, Polliack G, Weiss B, Hertz M. Mesenteric lymphadenopathy in children examined by US for chronic and/or recurrent abdominal pain. Pediatr Radiol. 2003; 33(12):864–867.

6. Wang WG, Tian H, Yan JY, Li T, Zhang TD, Zhao YP, et al. Enlarged mesenteric lymph nodes in children: a clinical analysis with ultrasonography and the implications. Nan Fang Yi Ke Da Xue Xue Bao. 2011;31(3):522–524.

7. Simanovsky N, Hiller N. Importance of sonographic detection of enlarged abdominal lymph nodes in children. J Ultrasound Med. 2007;26(5):581-4.

8. Nehring SM, Goyal A, Bansal P, et al. C Reactive Protein. [Updated 2021 May 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441843/

9. Ireland J. Etiologic factors of mesenteric lymphadenitis. Archives of Surgery 1938;36(2):292-302.

10. Maheswari K, Wadhwa L. Clinical profile and causes of mesenteric lymphadenitis in children. Int J Contemp Pediatr 2016;3(2):550-552.

11. Murthy N, Raman R. Non-specific mesenteric lymphadenitis and cervical lymphadenopathy in pediatric age group – a correlative study. Asian Journal of Medical Radiological Research 2018;6(1):20-25.

12. Sikorska-Wiśniewska G, Liberek A, Góra-Gebka M, et al. Mesenteric lymphadenopathy-a valid health problem in children. Medycyna Wieku Rozwojowego 2006;10(2):453-462.

13. Allagadda DK, Appana H, Pedada R, et al. Aetiological outcome of mesenteric lymphadenopathy and pain abdomen in paediatric population at a tertiary care hospital (MRIMS-Hyderabad) - a hospital based prospective observational study. J Evid Based Med Healthc 2021;8(29):2601-2608.

TABLE 1: GENDER AND AGE DISTRIBUTION OF THE STUDY POPULATION

AGE (IN YEARS)	MALE n (%)	FEMALE n (%)	TOTAL n (%)
1-5	10 (13.3)	1 (3)	11 (10.2)
6-10	54 (72)	23 (69.7)	77 (71.3)
11-15	11 (14.7)	9 (27.3)	20 (18.5)
TOTAL	75 (69.4)	33 (30.6)	108 (100)

FIGURE 1: DISTRIBUTION OF CLINICAL CHARACTERISTICS IN THE STUDY POPULATION

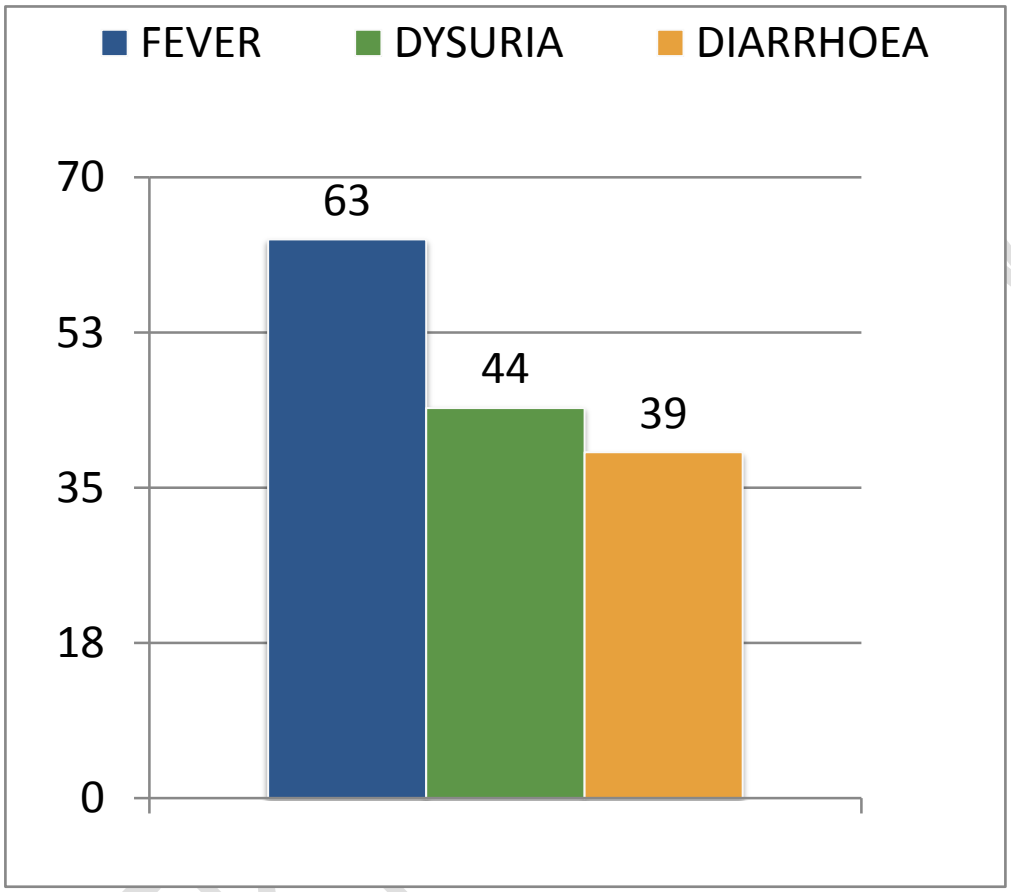

TABLE 2: LOCATION AND DISTRIBUTION OF LYMPH NODES BASED ON SONOGRAPHY

LOCATION	n (%)
Right lower quadrant	88 (81.5)
Para-Umbilical	11 (10.2)
Left lower quadrant	9 (8.3)

FIGURE 2: DISTRIBUTION OF CLINICAL CHARACTERISTICS IN THE STUDY POPULATION