Aetiological Outcome of Mesenteric Lymphadenopathy and Pain Abdomen in Paediatric Population at a Tertiary Care Hospital (MRIMS-Hyderabad) - A Hospital Based Prospective Observational Study

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ABSTRACT

BACKGROUND

Abdominal pain is a common disorder in children and adolescents worldwide with prevalence rate ranging from 20 - 25 % in school-going children in India. It is a frustrating concern to the child, parents and the physician. Even though abdominal pain is one of the most common complaints in children, it poses a diagnostic challenge owing to the variety of underlying causes. The purpose of this study was to evaluate the aetiology of abdominal pain associated with significant mesenteric lymphadenopathy in a paediatric population.

METHODS

This is a hospital based prospective, observational study done in Department of Paediatrics, Malla Reddy Institute of Medical Sciences (MRIMS), Hyderabad.

RESULTS

Out of the 65 children studied, 30.8 % were of 5 - 8 years age group, 36.9 % were 9 - 12 years age group and 32.3 % were 13 - 15 years age group. In our study, we found 50.8 % were boys and 49.2 % were girls. 20 % of them were having fever, 16.9 % were having cough, 16.9 % were having diarrhoea, 13.8 % were having sore throat, 16.9 % dysuria, and 15.4 % were having constipation. All patients in our study group underwent ultrasound of abdomen. All cases were having significant mesenteric lymphadenopathy (more than 5 mm in short axis with three or more number of lymph nodes). In 53.8 % cases, etiological agent for the mesenteric lymphadenopathy was not proved with our investigations. In the remaining 46.2 % of children, cause of mesenteric lymphadenopathy was proved and 38.5 % were bacterial infections, 6.2 % were viral infections and 1.5 % were parasitic infections.

CONCLUSIONS

It is important to recognise mesenteric lymphadenitis as a clinical entity in paediatric cases presenting with abdominal pain. They should be evaluated for an etiological agent and if no proven source of infection and etiological agent is found, it can be considered as functional abdominal pain. If we are able to get a proper etiological diagnosis in these cases, we could treat them and we could make huge difference in terms of quality of life.

KEYWORDS

Abdominal Pain, Mesenteric Lymphadenitis, Ultrasound, Significant Mesenteric Lymphadenopathy

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BACKGROUND

Abdominal pain is a common disorder in children and adolescents worldwide with prevalence rates ranging from 20 - 25 % in school-going children in India.[1] Abdominal pain ranked as second in causing school absence all over the world.[2] Furthermore, abdominal pain in childhood has a huge economic burden to the country because majority of the cases of abdominal pain are functional in children. It is a frustrating concern to the child, the parents and the paediatrician. It affects the child's well-being, costs from missed school days, and the use of healthcare resources.[3] Even though abdominal pain is one of the most common complaints in children, it poses a diagnostic challenge owing to the variety of underlying causes. Abdominal pain in children can be classified into acute and chronic.[4] Abdominal pain can also be classified into surgical, non-surgical and functional.[5] The clinician should determine early on whether the abdominal pain is acute or chronic in nature, as this will help to indicate the urgency of treatment. Acute abdominal pain is usually a single episode.[6] Conversely, chronic abdominal pain typically lasts weeks to months. The definition of chronic abdominal pain clinically and in research over the last 40 years has used the criterion of at least three pain episodes over at least 3 months, interfering with functions.[7] Surgical causes of abdominal pain include all acute and chronic causes that can be treated surgically like appendicitis, bowel obstruction, intussusception and perforation.[8] Appendicitis is the most common surgical condition in children who present with acute abdominal pain.[9] Non-surgical causes of abdominal pain include all acute and chronic causes which does not need surgical interventions like constipation, colic or irritable bowel syndrome, gastroenteritis, kidney or bladder infections, food poisoning or food allergies, muscle strain, abdominal migraine and mesenteric lymphadenitis.[10] Acute and chronic constipation were the most frequent non-surgical causes of acute abdominal pain in majority of previous studies of paediatric population.[11]

Functional abdominal pain are those that cannot be explained by structural or biochemical abnormalities.[12] Children with chronic abdominal pain are more likely to have functional abdominal pain and they will have non-specific symptoms like headache, joint pain, anorexia, vomiting, nausea, excessive gas and altered bowel symptoms. But there is insufficient evidence that the presence of the associated symptoms can help the physician to discriminate between functional and organic disorders. Clinically, abdominal pain falls into three categories: visceral (splanchnic) pain, parietal (somatic) pain, and referred pain.[13] There is considerable variation among children in their perception and tolerance for abdominal pain. This is one of the reasons why evaluation of abdominal pain is difficult. A child with functional abdominal pain (no identifiable organic cause) may be as uncomfortable as one with an organic cause. It has been commonly believed that functional abdominal pain disorders are more evident problem in western populations compared to developing countries.[14] Mesenteric lymphadenitis is defined as three or more lymph nodes with largest measuring 5 mm or greater in the short axis.[15] In the absence of other abnormalities, enlarged mesenteric lymph nodes (MLN) have been attributed to primary mesenteric lymphadenitis. Using a short axis diameter of > 8 mm might be a more appropriate definition for mesenteric lymphadenopathy in children and in Indian population.[16] Mesenteric lymphadenitis is commonly reported in children with acute, chronic or recurrent abdominal pain and no evidence of other pathologies. The term "mesenteric lymphadenitis" is frequently used in the radiologic literature to describe this finding, whereas in the paediatric literature, this term is reserved for specific inflammation of the lymph nodes.[17] Enlarged mesenteric lymph node is a non-specific finding seen in association with the variety of medical and surgical disorders in paediatric patients having abdominal pain. Mesenteric lymph node enlargement has been associated with infection of the gastrointestinal (GIT) or upper respiratory tract (URT) by a large number of viral, bacterial, mycobacterial, and parasitic organisms.[18] As an incidental finding, enlarged mesenteric lymph nodes are detected on occasion, especially when ultrasonography (USG) is performed with graded compression.[19]

Sydenham in 1723 was the first to describe enlargement of the mesenteric glands in children.[20] Enlargement of the lymph nodes of the mesentery has been recognised since the eighteenth century. Bertein and Worms credited Sydenham with the earliest description of mesenteric tumours or enlargements in children. The term "strumous abdomen" was used during the early nineteenth century to describe the condition. "Tabes mesenterica," a term which has endured, was first introduced in 1775 by Ball.[21] For a long time, enlarged mesenteric lymph nodes in the young were considered invariably due to tuberculosis.[22] A few years after the First World War, the existence of mesenteric lymphadenitis, as an independent clinical entity was recognised.

At that time, a definite diagnosis of mesenteric lymphadenitis was very difficult to make before surgery. Unsurprisingly, it was stated that "acute mesenteric lymphadenitis is almost invariably confused with acute appendicitis" and that "there is hardly an abdominal condition for which laparotomy is commonly performed that may not be simulated by diseased mesenteric glands". Initially, surgical management of mesenteric lymphadenitis with appendectomy was advised by some.[23] Very soon, however, it was recognised that there is no reason to believe that appendectomy affects the disease course, which in any case is self-limiting and from which ultimate recovery seems to be invariable. Mesenteric adenitis can be divided into two groups: non-specific (or primary) and secondary. Primary mesenteric adenitis is a lymphadenopathy, mostly right-sided, without an identifiable acute inflammatory process. Secondary mesenteric adenitis is associated with a detectable intra-abdominal inflammatory process.[24] Microbial agents are thought to gain access to the lymph nodes via the intestinal lymphatics. Organisms subsequently multiply and, depending on the virulence of the invading pathogen, elicit varying degrees of inflammation and, occasionally, suppuration. Grossly, the lymph nodes are enlarged and often soft. The adjoining mesentery may be

oedematous, with or without exudates. If a contiguous primary source of infection (e.g., the appendix) is present, evidence of inflammation is often apparent. Microscopically, the lymph nodes show non-specific hyperplasia and, in suppurative infection, necrosis with numerous pus cells.[25] Numerous organisms have been cultured from mesenteric lymph nodes, such as streptococcus, staphylococcus species, *Escherichia coli*, *Streptococcus viridans*, yersinia species, *Mycobacterium tuberculosis*, *Giardia lamblia*, and non–Salmonella typhoid. Viruses, such as coxsackie viruses (A and B), rubeola virus, and adenovirus serotypes 1, 2, 3, 5, and 7, have also been implicated.[26] Mesenteric node involvement can also be part of infectious Epstein-Barr virus (EBV), human immunodeficiency virus (HIV) infection, and Cat-scratch disease (CSD). The frequent association of this condition, especially in children with upper respiratory tract infection, has popularised a theory that swallowed pathogen-laden sputum may be the primary source of infection. Feco-oral transmission occurs in *Y. enterocolitica* infection and may present as a common source of outbreak. This infection has also been associated with meat, milk, and water contamination. Rarely, person-to-person or zoonotic contacts with fecal carriers can lead to infection. Mesenteric lymphadenitis can occur in adults but is more common in children and adolescents younger than 15 years, and this condition during childhood or adolescence is linked to a significantly reduced risk of ulcerative colitis in adulthood[27] On imaging, primary mesenteric adenitis is described as right-sided mesenteric lymphadenopathy that does not have an identifiable acute inflammatory process or demonstrates only mild wall thickening of the terminal ileum. The aetiology may be an underlying infectious terminal ileitis.[28] Secondary mesenteric adenitis on imaging studies demonstrates lymphadenopathy that is associated with a specific, identifiable intra-abdominal inflammatory process. In the pre-multi-detector computed tomography (CT) era, mesenteric lymph nodes were only really appreciated when enlarged. Following the advent of routine volume acquisition CT (and especially coronal reformats) they are commonly seen in normal individuals, which has raised the obvious question of what counts as mesenteric nodal enlargement. So most appropriate and recent definition of mesenteric lymphadenopathy in Indian paediatric scenario is more than 3 lymph nodes and largest one measuring more than 5 mm in short axis.[15,24,29,30]

Even though mesenteric lymphadenopathy is a common diagnosis that every paediatrician will come across in routine practice in children with abdominal pain, a proper evaluation is usually not done to find the etiological diagnosis. Absence of a good diagnosis is reflecting on the prognosis of this disease and majority of children are coming back within 6 months with similar complaints. There are only limited studies especially in Indian scenario at present and majority of them are in last 20 years. In majority of the studies, they are evaluating mesenteric lymphadenopathy as a special entity and evaluating the clinical profile and etiological diagnosis. Abdominal pain may not be there in all cases. Our study has taken only those children with abdominal pain and also having mesenteric lymphadenopathy.

Objectives

To study the aetiology of abdominal pain associated with significant mesenteric lymphadenopathy in paediatric population presenting to a tertiary hospital in South India and describe the clinical picture of these cases of abdominal pain with significant mesenteric lymphadenopathy and treatment outcomes after standard care in all the above mentioned cases.

METHODS

This is a hospital based prospective observational study done in Department of Paediatrics, Malla Reddy Institute of Medical Sciences, multi-speciality hospital, which is 600 bedded tertiary care hospital, Hyderabad from May 2018 to May 2019. The study was approved by the institutional review board of Malla Reddy Institute of Medical Sciences.

Inclusion Criteria

All paediatric patients both males and females, aged 5 to 15 years admitted in the ward with abdominal pain and USG abdomen showing significant mesenteric lymphadenopathy (largest lymph node more than 5 mm in short axis and more than 3 lymph nodes in number).

Exclusion Criteria

Children admitted with significant mesenteric lymphadenopathy due to surgical causes. Children with abdominal pain but no significant mesenteric lymphadenopathy on USG abdomen. Age below 5 years and above 15 years.

All children in the age group 5 to 15 years admitted in the paediatric department with complaints of abdominal pain were subjected to ultrasound of abdomen by using MINDRAY machine with 3 - 7.5 transducer on a routine basis along with other basic investigations like complete blood profile and urine routine examination. Abdominal and pelvic ultrasound was done by experienced radiologist in Department of Radiology, Malla Reddy Institute of Medical Science, Hyderabad.

If the ultrasound showed significant mesenteric lymphadenopathy (largest lymph node more than 5 mm in short axis and more than 3 lymph nodes in number), the number of lymph nodes and size of largest lymph node in short axis were recorded and then the child would be eligible to be enrolled in the study. After obtaining written informed consent from the parent, the children were enrolled in the study and were assessed by proper detailed history and clinical examination. The presence of BCG scar will be recorded. The following array of tests were performed on various samples from the child as to ascertain the aetiology: Blood for complete blood picture (include Hb, total count, differential count), C-Reactive Protein (CRP), erythrocyte sedimentation rate (ESR), blood culture and antibiotic sensitivity, Widal test, Mantoux test, Chest X-ray, Sputum

for culture and sensitivity, acid fast bacillus (AFB) smear examination, cartridge based-nucleic acid amplification test (CB-NAAT) and culture sensitivity, urine for routine examination and culture & sensitivity, stool for routine examination and culture & sensitivity, Throat swab for culture and sensitivity. CT / magnetic resonance imaging (MRI) abdomen (if indicated only).

Standard care of treatment was given according to diagnostic test results. Symptomatically all children were treated with antipyretics, antispasmodics, and proper rehydration with IV fluids if needed. All bacterial infections were treated with respective antibiotics which are more sensitive to that bacteria.

All tuberculosis (TB) cases were treated with anti-tubercular drugs for a minimum period of 6 months and cases were reviewed after the course. Enteric fever was treated with third generation cephalosporin-ceftriaxone for 7 days and result was noticed. Mesenteric lymphadenopathy with viral aetiology was treated conservatively, albendazole and metronidazole were given in case of parasitic gastrointestinal infections. All the patients were asked to come for review 2 weeks after treatment and repeat USG abdomen was done. It was done to assess the radiological change in mesenteric lymph nodes after the treatment. The number of mesenteric lymph node and size of the largest lymph node in short axis was noted. Clinically also they were assessed for any recurrence, and their treatment outcome was noted clinically and radiologically (improved, worsened, no change).

In TB cases, and other cases with no change with treatment, were advised to come after 6 months for a review of ultrasound of abdomen

Statistical Analysis

Sample Size

Cases meeting the above inclusion criteria presented to Department of Paediatrics, MRIMS during study period i.e. from May 2018 to May 2019.

Formula used

$[n = 4PQ/\mathrm{L}2]$
$= 4 \times 20 \times (100 - 20)/102$
$= (4 \times 20 \times 80)/100 = 6400/100$
$= 64$

P - Prevalence of mesenteric lymphadenopathy in children with abdominal pain in recent studies
Q – 100 - P
L - Absolute error (10 %)

Approximately we have taken a sample size of 65. The study was done in children aged 5 to 15 years of age who were admitted with abdominal pain. They were enrolled into the study if they had significant mesenteric lymphadenopathy on USG abdomen. A total of 65 children were included in our study keeping inclusion and exclusion criteria. Data was entered in Microsoft Excel and analysed using statistical package for social sciences (SPSS) version 16.0 software. Categorical variables were expressed as proportions.

RESULTS

Out of the 65 children studied, 30.8 % were of 5 - 8 years age group, 36.9 % were 9 - 12 years age group and 32.3 % were 13 - 15 years age group. In our study of 65 children, 50.8 % were boys and 49.2 % were girls. In our study 20 % of them were having fever, 16.9 % were having cough, 16.9 % were having diarrhoea, 13.8 % were having sore throat, 16.9 % dysuria, and 15.4 % were having constipation (Table - 1). For all patients in our study group, we evaluated the ultrasound abdomen report. All cases were having significant mesenteric lymphadenopathy (more than 5 mm in short axis and more than three lymph nodes). We found that 16.9 % children were having largest lymph node in short axis measuring 5 - 10 mm, 46.25 % of children between 10 – 15 mm, and 36.9 % were having more than 15 mm in short axis. Total number of lymph nodes were also included in our criteria and we found that 40 % of our patients were having 3 - 5 enlarged visible significant mesenteric lymph nodes in ultrasound of abdomen and 60 % were having more than 3 lymph nodes (Table - 3). In 53.8 % cases, etiological agent for the mesenteric lymphadenopathy was not proved with our investigations. In the remaining 46.2 % of children cause of mesenteric lymphadenopathy was proved and 38.5 % were bacterial infections, 6.2 % were viral infections and 1.5 % were parasitic infections.

A lot of children with constipation and other signs and symptoms of upper respiratory tract infection (URTI), lower respiratory tract infection (LRTI), diarrhoea were included in this group since we could not find any direct evidence. For taking virus as an etiological agent we depend mainly on clinical symptoms and signs and our total and differential count. As a routine way to know the chance to get tuberculosis as an etiological diagnosis, BCG scar was recorded in all subjects. Among the 65 cases we studied only four cases were consistent with symptoms and signs of viral fever. We did only routine blood test to confirm viral picture. Viral culture was not done since it was too expensive and there is no promising result, even if we confirm by viral culture. It may be the reason for low number of cases with viral aetiology. Among the bacterial causes (n = 25) all cases were confirmed by either culture and sensitivity, CB NAAT (for tuberculosis), or WIDAL (for enteric fever). We found that 16 % were diagnosed as tuberculosis, 28 % as upper respiratory tract infection (most commonly streptococci), 8 % as lower respiratory tract infections with sputum culture showing pneumococci, 40 % showing urinary tract infection confirmed by urine culture (most common organism was *E coli*.) and 8 % showing enteric fever with significant WIDAL test titres.

Out of 65 subjects, only two cases were found to be positive with stool routine showing parasite, and all of them improved symptomatically. Stool routine was negative for parasite at the time of discharge. After our all our investigations we found that a specific etiological agent cannot be found in 53.8 %. We believe that it can be diagnosed only after directly seeing the lymph node after surgical removal by an expert pathologist. Sometimes, this pain is just a functional abdominal pain and mesenteric

lymphadenopathy is an incidental finding. A lot of children with constipation and other signs and symptoms of URTI, LRTI, diarrhoea were included in this group since we could not find any direct evidence. For taking virus as an etiological agent we depend mainly on clinical symptoms and signs and our total and differential count. Complete blood count of children was done and 39 reports were normal, 20 reports showed neutrophilia, 5 cases showed lymphocytosis and only one case showed eosinophilia. As a routine test, CRP and ESR of all 65 cases was done and CRP of all 65 cases showed 16 positive results and 49 negative results. ESR of all cases also done and 11 of the total 65 reports were elevated and 54 reports were within normal range (Table - 2). As a routine protocol for ruling out any respiratory pathology and tuberculosis, Chest X-ray of all cases was done and 60 of them were normal, 3 X-rays showed features suggestive of consolidation. 2 X-rays were suggestive of TB (Table - 3). In all urine routine report, 13 were positive for pus plenty of pus cells. Among these 13 cases, 5 cases contain bacteria. 52 cue reports were normal. All children underwent stool routine microscopic examinations and in only 2 cases parasites were present. In all sputum CBNAAT reports, only 2 reports were positive and remaining 63 cases were negative.

Even though we were getting a lot of cases with Widal test significant titres from outside labs, we got only 1 Widal test significant enteric fever/typhoid case in our study. Sputum sample was also sent for culture and sensitivity from all cases and 2 cases came positive and the organism isolated was streptococcus pneumonia in both cases. In our total 65 cases, only 3 cases showed blood culture positivity and we have got 1 cases of streptococci pneumonia and 2 cases of coagulase-negative staphylococci (CONS). Surprisingly in our study, we had got 6 cases that were positive for throat swab culture and all of them were pneumococci. Urine culture was positive in 9 cases and all samples showed a colony count more than 100000 (E COLI) per HPF. Stool routine examination was followed by culture and sensitivity and none of them were able to show any significant bacterial growth (Table - 2). MRI or CT was our optional investigation and we found that in 32 cases MRI/CT was not indicated. In those indicated cases, only 5 reports showed some significant finding which can attributed to mesenteric lymphadenopathy, in remaining 28 cases reports were normal (Table - 3). All the cases with a proper diagnosis were treated according to our investigation results. Symptomatically all children were treated with antipyretics, antispasmodics, and proper rehydration with IV fluids. All bacterial infections were treated with respective antibiotics which are more sensitive to that bacteria. All TB cases were treated with anti-tubercular drugs for a minimum period of 6 months and cases were reviewed after the course. Enteric fever was treated with third generation cephalosporin-ceftriaxone for 7 days and result was noticed. Mesenteric lymphadenopathy with viral aetiology was treated conservatively. Albendazole and metronidazole were given in case of parasitic gastrointestinal infections. After the treatment course, all patients were discharged. In 93.8 % children, abdominal pain was relieved and in 6.2 % there was no change in their complaints (Table - 6).

Clinical Characteristics		Frequency (Number)	Percentage (%)
Age group (Years)	5 - 8	20	30.8
	9 - 12	24	36.9
	13 - 15	21	32.3
	Total	**65**	**100**
Gender	Male	33	50.8
	Female	32	49.2
	Total	**65**	**100**
Complaints other than abdominal pain	Fever	13	20
	Cough	11	16.9
	Diarrhoea	11	16.9
	Sore throat	9	13.8
	Dysuria	11	16.9
	Constipation	10	15.4
	Total	**65**	**100**
BCG Scar	Absent	11	16.9
	Present	54	83.1
	Total	**65**	**100**

Table 1. Distribution of Clinical Characteristics in the Present Study Group

Investigatory Parameters (LAB Test Results)	Findings	Frequency	Percentage (%)
Complete blood counts (CBC)	Normal	39	60
	Neutrophilia	20	31
	Lymphocytosis	5	8
	Eosinophilia	1	1
	Total	**65**	**100**
C-reactive protein (CRP)	Positive	16	25
	Negative	49	75
	Total	**65**	**100**
Erythrocyte sedimentation rate (ESR)	Normal	54	83
	Increased	11	17
	Total	**65**	**100**
Widal test titres	Not significant	64	98.5
	Significant	1	1.5
	Total	**65**	**100**
Throat swab	Negative	59	91
	Positive	6	9
	Total	**65**	**100**
Sputum culture	Negative	63	97
	Positive	2	3
	Total	**65**	**100**
Sputum CBNAAT	Negative	63	97
	Positive	2	3
	Total	**65**	**100**
Blood culture	Negative	62	95
	Positive	3	5
	Total	**65**	**100**
Urine routine	Normal	52	80
	Pus cells	13	20
	Total	**65**	**100**
Urine culture	Negative	56	86
	Positive	9	14
	Total	**65**	**100**
Stool routine	Normal	63	97
	Ova/ cysts	0	0
	Parasites	2	3
	Total	**65**	**100**
Stool culture	Negative	65	100
	Positive	0	0
	Total	**65**	**100**

Table 2. Distribution of Findings in Laboratory Investigations in the Present Study Group

Radiological Investigation	Findings	Frequency	Percentage (%)
Chest-X-Ray	Normal	60	92
	Consolidation	3	5
	TB Suspected	2	3
	Total	**65**	**100**
Abdominal ultrasound (Size of lymph nodes in short axis in MM)	5 - 10	11	16.9
	10 - 15	30	46.2
	> 15	24	36.9
	Total	65	100
Number of significant lymph nodes by ultrasound	3 - 5	26	40
	> 5	39	60
	Total	**65**	**100**
CT/MRI Abdomen	Not indicated	32	49
	Indicated pathology	5	8
	Indicated no pathology	28	43
	Total	**65**	**100**

Table 3. Distribution of Findings in Radiological Investigations in the Present Study Group

Results of Diagnostic Workup for Mesenteric Lymph Adenitis Cases		Frequency	Percentage (%)
Possible etiological agent of mesenteric lymphadenitis (N = 65)	Viral	4	6.2
	Bacterial	25	38.5
	Parasitic	1	1.5
	Miscellaneous	35	53.8
	Total	**65**	**100**
Classification of bacterial aetiology of mesenteric lymphadenitis (N = 25)	Tuberculosis	4	16
	URTI	7	28
	LRTI	2	8
	UTI	10	40
	Enteric fever	2	8
	Total	**25**	**100**
Working diagnosis among miscellaneous causes of mesenteric lymphadenitis (N = 35)	Functional	22	62
	LRTI	1	2.8
	URTI	1	2.8
	G I infection	3	8.5
	Constipation	8	22.8
	Total	**35**	**100**

Table 4. Distribution of Results of Diagnostic Workup for Mesenteric Lymphadenitis Cases in the Present Study Population

Repeat Ultrasound after Treatment	Findings	Frequency	Percentage (%)
Lymph node size (diameter in short axis)	Decreased	43	66
	Increased	4	6
	No change	18	28
	Total	**65**	**100**
Number of lymph nodes	Increased	5	7.6
	Decreased	40	61.6
	No change	20	30.8
	Total	**65**	**100**

Table 5. Distribution of Repeat Ultrasound Findings after Treatment on Mesenteric Lymph Nodes in the Present Study Group

	Clinical Condition	Frequency	Percentage (%)
Patient Condition at Discharge	Improved	61	93.8
	Worsened	0	0
	No change	4	6.2
	Total	**65**	**100**

Table 6. Distribution of Patient Condition at Discharge in the Present Study Group

Parameter		Siroska et al. 2004 (%) (N = 127)	Maheswari et al. 2014. (%) (N = 129)	Murthy Nagaraj et al in 2016 (%) (N = 172)	Present Study. (%) (N = 65)
Gender (%)	Male	61.4	75.5	64	51.8
	Female	38.6	24.5	36	49.2
Peak age incidence (Years)		Around 9	5 - 10	7 - 12	9 - 12
Major complaints	Abdominal pain	49.6	59.8	60.5	65
	Fever	14	20	11.5	20
	Cough	23.4	12	5	17
	Diarrhoea	3	2.2	10	17
	Sore throat	6.5	4.5	9	14
	Dysuria	3.5	1.5	4	17
Most common associated diseases in mesenteric lymphadenitis cases	UTI	-	-	-	15.4
	RTI (U&LRTI)	14.9	36.8	-	10.8
	Diarrhoea	15.7	28	-	3.1

Table 7. Comparison of Different Parameters between Previous Studies and the Present Study

All the patients were asked to come for review 2 weeks after treatment and repeat USG abdomen was done. It was done to assess the radiological change in mesenteric lymph nodes after the treatment. By doing ultrasound, size of the largest measuring lymph node in short axis was measured and also total number of lymph nodes were also reviewed. Results showed that, in 66.15 % of patients, size of the largest measuring lymph node in short axis decreased. In 4.15 % of patients even after treatment, size increased and there was no change in size for 28 % of patient. Number of lymph node was also reviewed and we found that in 7.69 % patients, number of lymph nodes increased, in 61.53 % patients, number of lymph node decreased after successful treatment and in 30.76 % there was no change in number of lymph nodes (Table - 5).

DISCUSSION

In our study, there is no sex (gender) difference in children having mesenteric lymphadenopathy and pain abdomen (males 51.8 % and females 49.2 %). But in a study done by Maheswari et al. has shown that affected patients were more often males 75.4 % than females 24.5 %[31] (Table - 7). In another study conducted by Sikorska et al. it was seen that out of 127 children, 78 were males and 49 were females.[32] In a study by Murthy Nagaraj et al. out of the 172 cases 110 were males, making up 64 % of the cases and 36 % of the affected cases were females. In the present study seen that the peak incidence of mesenteric lymphadenitis was in 9 - 12 years of age. According to Maheswari et al. the peak incidence was in 5 to 10 years of age.[31] Sikorsha et al. has shown that the peak incidence of mesenteric lymphadenitis is in 9 year of age[32] (Table - 7). In the study done by Nagaraj et al. showed that, most common age group affected with non-specific mesenteric adenitis was 7 years to 12 years[33] (Table - 7). In our study, we have taken only those cases with abdominal pain and mesenteric lymphadenopathy. So, in all of our cases, main complaint was abdominal pain. But we also found that some associated symptoms are also there which will give clue for our diagnosis. Fever was the most common associated complaint (20 %), followed by, cough (16.9 %), diarrhoea (16.9 %), dysuria (16.9 %), constipation (15.4 %) and sore throat (13.8 %). According to Nagaraj et al. pain abdomen was the major complaint in 60.5 %, followed by URTI, fever, diarrhoea and UTI.[33] Sikorska et al. has showed that pain abdomen was seen in 49.6 % of cases, 6.3 % presented as generalised lymphadenopathy, rest as vomiting and fever. It was seen that in our study the commonest cause of mesenteric lymphadenitis is bacterial (38.5 %), followed by viral (6.2 %) causing diarrhoea and respiratory tract infections and parasitic (1.5 %) mainly causing diarrhoea. (Table - 4) In majority of cases exact aetiology was not found (53.8 %). It may be due to the lack of extensive evaluation like surgery and biopsy for each case. Among bacterial causes of mesenteric lymphadenopathy (n = 24) UTI was the major problem (44 %), followed by URTI (30 %), tuberculosis (17 %) and LRTI (9 %).

According to Maheswari et al. it was seen that in their study the commonest cause of mesenteric lymphadenitis is respiratory tract infection in 36.8 % of cases, diarrhoea in 28 % of cases, followed by urinary tract infection, worm infestations, gastritis, and enteric fever. Sikorsha et al. has found that the most common cause of mesenteric lymphadenitis was acute diarrhoea in 15.7 % of cases followed by respiratory tract infection in 14.9 % of cases followed by gastritis.[32] We believe that it is not possible to get etiological diagnosis of all cases or to draw any conclusion of statistical significance, since the diagnosis

cannot be confirmed unless the histopathological and microbiological evaluation of lymph node done. In our study all children got discharged after the treatment and majority of them got relief clinically after the treatment. We asked them to come for the follow up after 2 weeks and we found that there was radiological improvement in mesenteric lymphadenopathy. In other studies, they also have similar outcomes. According to Maheswari et al. 90 % of patient are improved clinically and radiologically after starting treatment for specific etiological agent. According to Nagaraj et al. majority of patient with mesenteric lymphadenopathy improved with symptomatic medication and proper rehydration. Only a minority of cases did not show any improvement.

CONCLUSIONS

In 53.8 % cases, the aetiological agent for the mesenteric lymphadenopathy was not proved with our investigations. In the remaining 46.2 % of children, cause of mesenteric lymphadenopathy was proved and 38.5 % were bacterial infections, 6.2 % were viral infections and 1.5 % were parasitic infections. In our study of mesenteric lymphadenopathy in paediatric population there is no difference in incidence between boys and girls. We also found that it is more common between 9 – 12 years age group. After second decade, the condition is relatively uncommon. Among the bacterial causes, most common infection is UTI, followed by, URTI, tuberculosis, LRTI and typhoid. As India is an endemic area of tuberculosis, we should also suspect tubercular lymphadenitis in children with associated symptoms and signs of tuberculosis. We also found that it is important to recognise mesenteric lymphadenitis as a clinical entity in cases presenting as abdominal pain. They should be evaluated for an etiological agent and all cases with a proper source of infection should be treated accordingly for the clinical and radiological cure of disease. If there is no proven source of infection and no etiological agent found it can be considered as functional abdominal pain and symptomatic treatment and rehydration are only needed as a treatment modality. Mesenteric adenitis has never been proved to be responsible for any mortality nor have any complications been attributed to it. Recently a few relevant studies came up on this regard and showing different results. If we are able to get a proper etiological diagnosis in these cases, we could treat them and we could make huge difference in terms of quality of life.

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