

CLINICO-IMAGING AND PATHOLOGICAL CORRELATION IN CASES OF MESENTERIC LYMPHADENITIS PRESENTED AS ABDOMINAL PAIN IN CHILDREN AGE GROUP AT TERTIARY CARE HOSPITAL, UTTAR PRADESH STATE, INDIA

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Abstract

Background: The mesenteric lymphadenitis is a syndrome characterized by pain in abdomen involving mainly periumbilical and right lower quadrant pain caused due to inflammation of lymph nodes covering wide range of causative factors. The objective is to describe the etiology, clinical presentations, laboratory investigations and differential diagnosis by imaging of mesenteric lymphadenitis. **Materials and Methods:** It was a retrospective study comprises of 150 children presented with pain in abdomen with suspicion of mesenteric lymph nodes. All the cases were advised high resolution sonography with color Doppler study for confirmation of diagnosis along with laboratory investigations. Further evaluation of suspected cases was evaluated with C.T. Scan, USG Guided FNAC and histopathological confirmation to differentiate from primary versus secondary type of mesenteric lymphadenopathy which is associated with etiological factor along with other constitutional symptoms. **Result:** More than 80% patients (children) were ranging from 2 to 13 years with males affected more than females. Pain in abdomen along with/ or without vomiting, fever and diarrhea were common presenting symptoms. The commonest cause was found to be Gastroenteritis (most likely viral than bacterial). Other causes were tubercular, Upper respiratory infection, Urinary tract infection, worm infestation, enteric fever and Yersinia infection. In some cases where etiological factor could not be identified were categorized as primary (Non-Specific). **Conclusion:** Mesenteric lymphadenitis is mainly categorized as primary (Non-Specific) with mild symptoms, self-limiting without an identifiable cause while other cases as Secondary presented with abdominal pain, with /or without vomiting, fever, diarrhea with an identifiable cause like Gastrointestinal infection, Upper Respiratory infection, Abdominal Tuberculosis, Enteric fever and Worm infestation, especially living in poor hygienic, low socioeconomic community. The delay in proper treatment play major role in developing countries. Hence confirmation of diagnosis by imaging and laboratory investigations will certainly reduce the overall incidences and differentiate from primary versus secondary mesenteric lymphadenitis.

INTRODUCTION

The Lymph nodes and Lymph Vessels is a type of network of lymphatic system of our body's immune system and found throughout the body that are responsible for filtering, bacteria, viruses, and waste products of the bloodstream.

The term Mesenteric Lymphadenitis was initially described by Walter D in the year 1939.^[1]

Mesenteric Lymphadenitis is an inflammation of lymph nodes in a membrane that attaches the intestine to the abdominal walls. It can be primary (no identifiable etiology; mostly self-limiting) and

secondary associated with identifiable cause as described earlier.

Pathophysiology

The causative agents (virus or bacteria) enters the body (via either oral or airway route) and invades the intestinal epithelium to enter the blood stream; and localized itself to nodal lymphoid tissue (commonly Peyer's patches) and spread regionally to cause mesenteric adenitis.

The mesenteric lymphadenitis can presents in a variable clinical spectrum of syndrome from acute abdomen to chronic; abdominal pain; with or without fever, loose motion, nausea/vomiting and cough/cold.^[2,3]

Mesenteric lymphadenitis may be causing inflammation of mesentery and resulted with pain in abdomen.^[4]

The spectrum of ethology is wide ranging from viral infection to bacterial infection; rarely due to primary or secondary malignancy, most common as lymphoma.^[5]

The evaluation of mesenteric adenitis have done using laboratory investigations like CBC (complete blood count), C-reactive protein (CRP), TLC (total leucocyte count), Urine analysis, ESR, Moux (PPD) test, CBNAAT for tuberculosis, FNAC From lymph node and other investigation such as Pleural / Ascitic fluid Aspiration, from tissue cultured pending on clinical scenario.

The High-Resolution sonography with color Doppler imaging considered gold standard for diagnosis and follow up of mesenteric adenitis due to cheap cost, easy availability, non-invasive nature and without hazard of radiation.

High resolution Sonography abdomen also helps to narrow down the differentials of mesenteric adenitis like pain abdomen with or without associated other constitutional symptoms due to, terminal Ileitis, appendicitis, renal / ureteric calculi, and intussusception, etc.^[6]

Radiologically to tag an enlarged or swollen mesenteric lymph node: lymph node should Measure more than or equal to 8mm in short axis dimension. The Lymph Nodes appear hypoechoic structure with or without necrosis (loss of normal central fatty hilum) and conglomeration/ matted (loss of individual border in multiple lymph nodes). Necrosis and conglomerated mesenteric lymph nodes are indicative of tubercular etiology in most scenario, particularly living in an Endemic area.

The most important differential diagnosis includes appendicitis which presents as acute abdominal pain; the ultrasound findings includes presence of blinded ended tubular structure measuring more than or equal to 6mm in diameter with few enlarged lymph nodes and raised WBC count.^[7,8]

Other important differential include the intussusception which present as round Mass with a target sign as bowel loop coiled within the Bowel (most common type ilio-colic) which usually

associated with mesenteric lymph nodes enlargement.

MATERIALS AND METHODS

Type of study - retrospective

159 patients from OPD and indoor pediatric department at G S Medical College and Hospitals, Distt Hapur, U.P. India.

The cases were selected from both out patients and indoor patients in the Department of Pediatrics, G.S. Medical College and Hospitals, district Hapur, U.P., India. It was a retrospective study conducted over a period of 24 months from January 2020 to 31st December 2021.

An informed consent was taken from patient and parent of suspected cases of mesenteric Lymphadenitis at the time of performing initial primary investigation of choice - High Resolution Sonography.

A total 159 number of clinically suspected patients to have mesenteric lymphadenitis underwent high resolution sonography.

Out of 159 cases, only 86 cases, who met the inclusion criteria were selected and remaining 73 were excluded.

Inclusion Criteria

- Patients of both sexes male and female of age 2 year to 13 years.
- The patients clinically suspected to have mesenteric lymphadenitis confirmed by high resolution sonography were selected.
- The criteria of selection were to have mesenteric lymph node/s of 8 mm or more in short axis dimension.

Exclusion criteria

- Patients below 2 year of age and above 13 years of age.
- Clinically suspected cases of mesenteric lymph node/s of less than 8 mm size
- Known case of Lymphoma, Leukemia, Malignancy, Infectious Mononucleosis, and HIV.

Clinical Evaluation: By clinical examination and detailed history, such as pain in abdomen with /without nausea, Vomiting, Diarrhea, Fever, Sore throat, common cold, Cough, Urinary Tract Infection, Malaise, Fatigue, Failure to gain weight, Loss of Appetite, Lump in Abdomen, etc

Laboratory Investigations – tests recommended

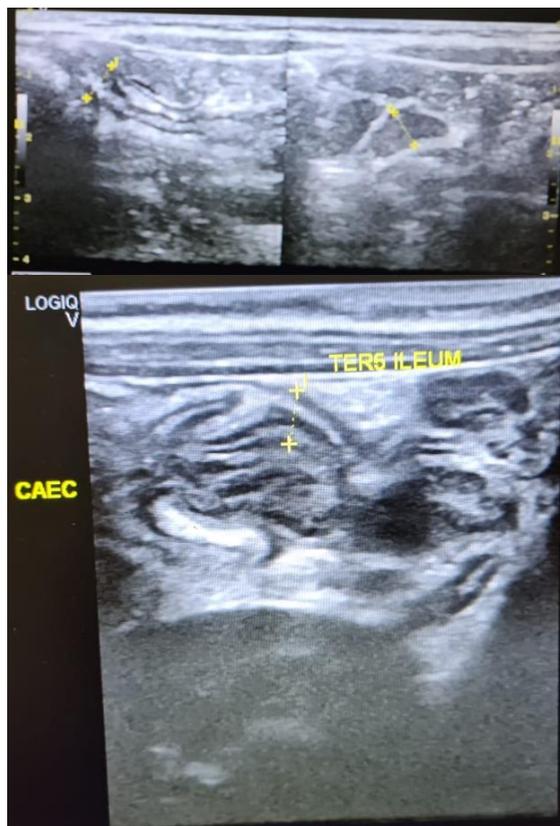
- Complete Blood count
- WBC raised, Leukocytosis present
- C-Reactive Protein 18.52 micrograms/ml in tuberculosis while in normal group is 2.7 micrograms /ml (p less than 0.001)
- LDH >320u/L high –independent prognostic factor for reducing disease free survival and increasing disease relapse rate.

- Urinalysis useful to exclude urinary tract infections.
- Stool Test and culture should be performed in case of patient present with diarrhoeal symptoms, Suspicion of worm infestations, yersinia infections.
- Blood culture in case of suspicion of infections /or septicemia.
- Specific Cytokine levels in conjunction with WBC counts may help to differentiate between pediatric acute mesenteric lymphadenitis and Acute Appendicitis.
- Chemistry Panel –Findings are generally within normal reference range except in patients with severe nausea and vomiting who may present with metabolic alkalosis and Azotemia
- FNAC / Biopsy of mesenteric lymph nodes
- Smear microscopy in AFB for confirmation of tuberculosis
- Bone Marrow sampling in suspicious cases of lymphoma
- Serology and culture can be supportive in diagnosis of etiological agents.
- **Histopathology**—The lymphoid tissue of mesenteric adenitis when examined under a microscope will show an increase density of plasma cells and immun blast cells in the cortical and para cortical regions, capsular edema, and thickening, lymphocyte accumulation with dilated sinuses and hyperplasia of germinal center.^[9]

Imaging Evaluation

High Resolution Sonography: Is the gold standard for the diagnosis of Mesenteric adenitis which reveals enlarged hypoechoic oval or spherical shape lymph nodes more than 8 mm in dimension and to rule out/confirm the inflamed appendix, in some cases thickened inflamed terminal ileum maybe visualized.^[10,11]

Recently color Doppler flow imaging and use of superb microvascular imaging (SMI), Shear Elastography has been used in the pediatric population for achieving a diagnosis of mesenteric lymphadenitis and to differentiate benign from malignancy lesions.^[12]



C.T. scan- Abdomen & Pelvis:

In Cases of non-conclusive Report of Sonography, Abdominal and pelvic C.T. Scan is advisable in pediatric patients in evaluation of Acute pain in Abdomen and Pelvis. The indications for C.T. Abdomen and Pelvis are Acute Appendicitis, Acute Terminal Ileitis, Appendicular Abscess, Diverticulitis, small Bowel Obstruction, Pancreatitis and right Renal/Ureteric calculus.^[13,14]

The main aim of C T Scan abdomen and pelvic is to differentiate primary from secondary causes of mesenteric adenitis. Primary mesenteric adenitis has been defined as right sided mesenteric lymphadenopathy without an identifiable acute inflammatory cause or with mild (<5 mm) wall thickening of the terminal ileum.^[15]

Secondary Mesenteric Lymphadenitis is usually associated with a specific underlying cause.^[16]

In most cases of primary mesenteric adenitis an underlying infectious terminal ileitis is thought to be the cause, where clinical presentation is non-specific and found more often in children.^[17]

Rao et al found that 82% of patients with Appendicitis have mesenteric lymphadenitis.

3. Magnetic Resonance Imaging – CE MRI abdomen can be safely used in pediatric cases for better detection of cause in acute abdomen like acute Appendicitis, intussusception, Infectious terminal ileitis, diverticulitis, ileo-caecal Tuberculosis, etc.

Barium Studies– to rule out associated bowel pathology.

Endoscopy– in cases of inconclusive results from other investigations, endoscopy is also used to find out cause of mesenteric lymphadenitis.

RESULTS

During our study, it was found that out of 86 patients, 59 were males (69.7%) more than Females which represent 37(30.3%)

Table 1: Gender of Patients affected mesenteric lymphadenitis

Sr no	Sex	Number	Percentage
1	Male	59	59.3
2.	Female	27	31.3

It was observed further that peak incidence of mesenteric lymphadenitis being more in 5 to 9 yrs group followed by 10 to 13 years.

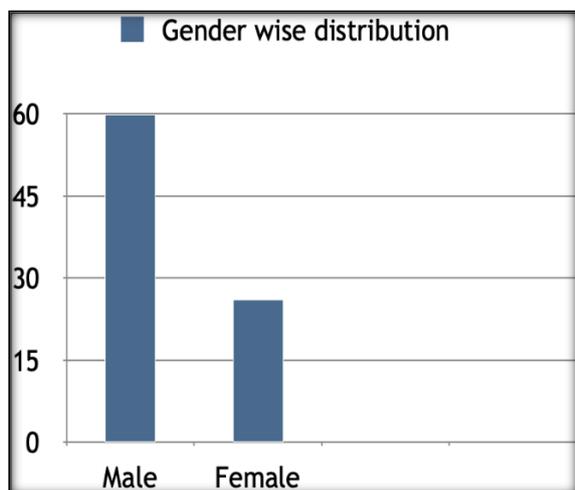


Table 2: Reveals that the most common age group affected is 5 to 9 years of age (51.1%), followed by 10 to 13 years (36.2%) and 1 to 4 years (12.7%).

	Age group of patients	numbers	%
1	1 to 4 years	11	12.7
2.	5 to 9 years	44	51.1
3.	10 to 13 years	31	36.2

Table 3: Mode of presentation

Sr no	Presentation	Number	%
1.	Acute	11	12.7
2.	Sub-Acute	23	26.7
3.	chronic	52	60.4

Our study showed that 11 cases presented as Acute, 23 cases as sub-acute and 52 cases as chronic.

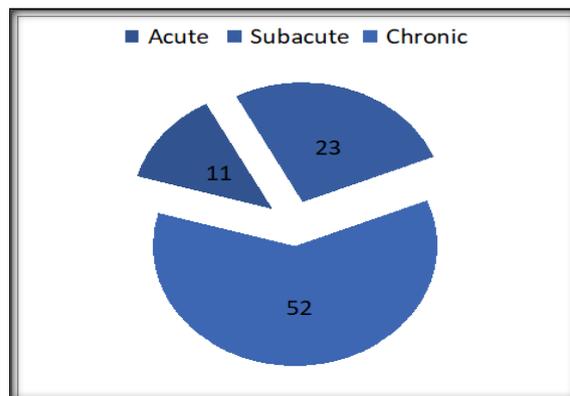
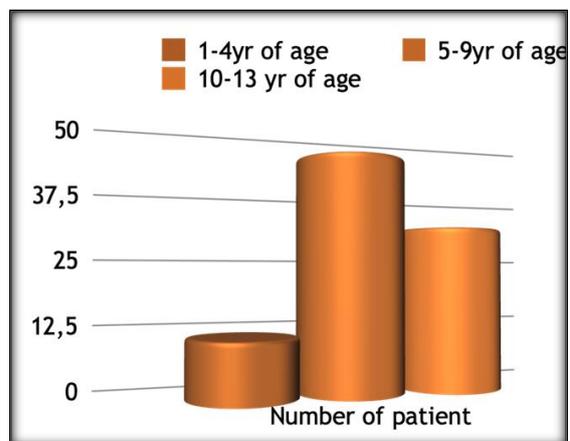


Table 4: Clinical profile of cases mesenteric lymphadenitis

NO	Symptoms	Number	%
1.	Pain in abdomen	36	41.8
2.	Nausea, vomiting	12	13.9
3.	Loose motions	16	18.6
4.	Cough & cold	14	16.2
5.	Fever	8	9.3



The pain in Abdomen was observed as main complaint 41.8% followed by nausea, vomiting and diarrhea (Loose Motions) 12 % and 18% respectively. Next presenting symptoms were cough and cold & Fever (16.2%,9.3%).

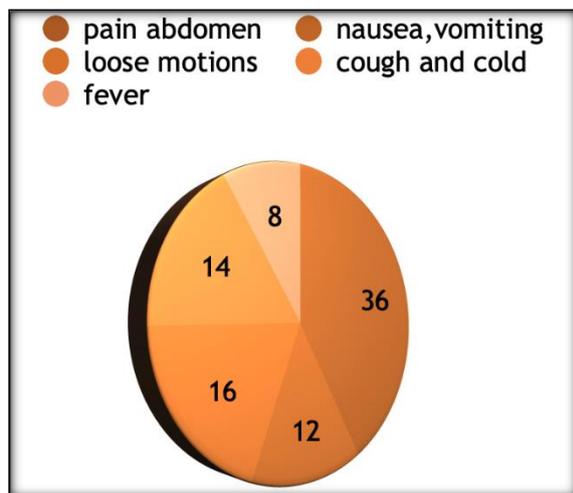


Table 5: Aetiological Cause of mesenteric lymphadenitis in children

Causes	Number	%
Gastrointestinal infection	32	37.2
Respiratory tract infection	16	18.6
Urinary tract infection	12	13.9
Tubercular	11	12.7
Enteric infection	7	8.1
Worm infestations	8	9.3
Yersinia & other infections	4	4.6

It has been observed that most common sign and symptoms of mesenteric lymphadenitis are Gastrointestinal infection (37.2%) followed by respiratory 18.6% and urinary tract infection 13.9%, tubercular (12.7%), Terminal Ileitis, Enteric infection (8.1%) worm infestations (9.3%) and finally Yersinia and other infections (4.6%).

Statistical Analysis

The data were analyzed using SPSS version. An independent t-test was used to analyze continuous variables. The chi-Square test was used to compare categorical variables. The potential associated factors for identifying enlarged and normal mesenteric lymph nodes on sonography, color Doppler flow imaging and power Doppler imaging were analysed using univariate and multivariate logistic regression analysis.

DISCUSSION

Our study has shown that affected patients were more Males (69.7%) than females (30.3%). Aird I has also revealed a similar results with Males being more affected than females.

In another study conducted by sikorska et al, it was seen that out of 127 children ,78 were males and 49 were females.

Gorden et al has mentioned that acute mesenteric lymphadenitis occurs most commonly between 3 to 15 years of age.

Sikrosha et al has also shown that peak incidence of mesenteric lymph adenitis in children is 9 years. Our study also showed that maximum number of cases belong to 5 to 9 years of age group.

Sikrosha et al has shown that Pain in abdomen was observed in 49.6% of cases while our study represented 41.8%. Shakya et al has found that Mesenteric adenitis was the cause of pain in abdomen in 5.1% of children presenting with abdominal pain.

McFadden has noted that Nausea and vomiting were seen in 71% of cases while our study revealed 12% only. Sikorsha et al has observed that most common cause of Mesenteric Lymphadenitis was diarrhea in 15.7% of cases followed by 14.9 % cases of Respiratory infections. Similarly our study reveals Gastroenteritis as main cause followed by respiratory infections.

In case of medical bellyache in children, Non-specific mesenteric lymphadenitis of viral origin is frequently encountered. We also observed that mesenteric lymphadenitis of viral origin is non-specific, self-limiting and required symptomatic treatment and monthly follow up.

Mesenteric Lymphadenitis is a very common clinical condition presented in children with pain in abdomen. Vayner et al conducted a prospective study to evaluate the prevalence of enlarged mesenteric lymph nodes in 189 children with mesenteric lymphadenitis.

Abdel Gawad et al showed that Mesenteric lymph nodes with a mean diameter of 19 mm (range 4.7 m.m.to 6 cms)

Karmazyn et al examined mesenteric lymph nodes of 61 children with pain in abdomen and found enlarged lymph node in 54 % study population (20). The cut off value of least diameter of >5 m. m.to consider as enlarged lymph node.

Puylart JB showed involvement of terminal ileum in some cases in children presented with mesenteric lymphadenitis. Patients with mesenteric adenitis can have symptoms as diarrhea, Nausea, Vomiting with increased wall thickness of Terminal Ileum in 25% cases in our study.

India is an endemic area of Tuberculosis so we should suspect tuberculosis as cause in case of more than 5 enlarged lymph nodes, matted /conglomerated with symptoms of fever, pain in abdomen off and on, loss of appetite and not gaining weight.^[18]

Recurrent attacks separated by periods of discomfort free time in spite of persistent ill health with frequent recurring fever with evening rise associated with fatigue, pain in abdomen have been found to be tubercular nature on further evaluation.^[19]

As per the study of Sivit C.J et al, Enlarged Mesenteric lymph nodes were detected in Children at ultrasound examination.^[20]

In 14% of symptomatic cases, enlarged lymph nodes in children with acute pain represent a non- specific finding.

Singha HS found mesenteric Lymph nodes in children with history of worm infestations.

Zouzhuang Lin reported that High frequency ultrasound can show enlarged lymph node clearly with accurate clinical diagnosis.^[21]

Recently Bayramoglu Z et al in a comparative study showed the role of Superb Micro vascular Imaging (SMI), Shear Wave Elastography and shape index in diagnostic accuracy and categorization of pediatric mesenteric lymph nodes.^[22,23]

CONCLUSION

Mesenteric Lymph adenitis is more common in Males than Females with peak incidence between 5 to 9 year's age group (ranging from 2 year to 13 years) of children.

Abdominal pain is a common medical problem in Indian pediatric population. High Resolution Sonography with color Doppler flow imaging is a best tool as initial investigation of choice for better depiction of mesenteric lymph nodes and to differentiate primary versus secondary Mesenteric Lymphadenitis & to rule out/or confirm other causes of abdominal pain such as Appendicitis, Acute Terminal ileitis, Intussusception, Koch's Abdomen etc.

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REFERENCES

- Helbling R, Conficconi E, Wytenbach M, Benetti C, Simonetti GD, Bianchetti MG, et al. Acute Nonspecific Mesenteric Lymphadenitis: More Than "No Need for Surgery". *Biomed Res Int.* 2017;2017:9784565. doi: 10.1155/2017/9784565.
- Adams WE, Olney MB. Mesenteric Lymphadenitis and the Acute Abdomen: Report of Thirteen Cases. *Ann Surg.* 1938;107(3):359-70. doi: 10.1097/0000658-193803000-00004.
- Sikorska-Wisniewska G, Liberek A, Góra-Gebka M, Bako W, Marek A, Szlagatys-Sidorkiewicz A, et al. Mesenteric lymphadenopathy - a valid health problem in children. *Med Wieku Rozwoj.* 2006;10(2):453-62.
- Shakya KN, Dongol UM, Khadka SB. A study of abdominal pain in children. *JNMA J Nepal Med Assoc.* 2008;47(172):193-6.
- Özdamar MY, Karavaş E. Acute mesenteric lymphadenitis in children: findings related to differential diagnosis and hospitalization. *Arch Med Sci.* 2018;16(2):313-320. doi: 10.5114/aoms.2018.79430.
- Collins DC. Mesenteric Lymphadenitis in Adolescents Simulating Appendicitis. *Can Med Assoc J.* 1936;34(4):402-5.
- Simanovsky N, Hiller N. Importance of sonographic detection of enlarged abdominal lymph nodes in children. *J Ultrasound Med.* 2007;26(5):581-4. doi: 10.7863/jum.2007.26.5.581.
- Özdamar MY, Karavaş E. Acute mesenteric lymphadenitis in children: findings related to differential diagnosis and hospitalization. *Arch Med Sci.* 2018;16(2):313-320. doi: 10.5114/aoms.2018.79430.
- Toorenvliet B, Vellekoop A, Bakker R, Wiersma F, Mertens B, Merkus J, et al. Clinical differentiation between acute appendicitis and acute mesenteric lymphadenitis in children. *Eur J Pediatr Surg.* 2011;21(2):120-3. doi: 10.1055/s-0030-1267979.
- 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):864-7. doi: 10.1007/s00247-003-0985-7.
- Helbling R, Conficconi E, Wytenbach M, Benetti C, Simonetti GD, Bianchetti MG, et al. Acute Nonspecific Mesenteric Lymphadenitis: More Than "No Need for Surgery". *Biomed Res Int.* 2017;2017:9784565. doi: 10.1155/2017/9784565.
- Rao PM, Rhea JT, Novelline RA. CT diagnosis of mesenteric adenitis. *Radiology.* 1997;202(1):145-9. doi: 10.1148/radiology.202.1.8988204.
- Rao PM, Rhea JT, Novelline RA. CT diagnosis of mesenteric adenitis. *Radiology.* 1997;202(1):145-9. doi: 10.1148/radiology.202.1.8988204.
- Sivit CJ, Newman KD, Chandra RS. Visualization of enlarged mesenteric lymph nodes at US examination. Clinical significance. *Pediatr Radiol.* 1993;23(6):471-5. doi: 10.1007/BF02012457.
- Puylaert JB. Mesenteric adenitis and acute terminal ileitis: US evaluation using graded compression. *Radiology.* 1986;161(3):691-5. doi: 10.1148/radiology.161.3.3538138.
- Zu DM, Feng LL, Zhang L, Ma SL, Zhu YC. Evaluation of Mesenteric Lymph Nodes in a Pediatric Population with Mesenteric Lymphadenitis Using Superb Microvascular Imaging. *Med Sci Monit.* 2019;25:5336-5342. doi: 10.12659/MSM.914903.
- Lucey BC, Stuhlfaut JW, Soto JA. Mesenteric lymph nodes seen at imaging: causes and significance. *Radiographics.* 2005;25(2):351-65. doi: 10.1148/rg.252045108.
- Helbling R, Conficconi E, Wytenbach M, Benetti C, Simonetti GD, Bianchetti MG, et al. Acute Nonspecific Mesenteric Lymphadenitis: More Than "No Need for Surgery". *Biomed Res Int.* 2017;2017:9784565. doi: 10.1155/2017/9784565.
- Basu S, Ganguly S, Chandra PK, Basu S. Clinical profile and outcome of abdominal tuberculosis in Indian children. *Singapore Med J.* 2007;48(10):900-5.
- Sinan T, Sheikh M, Ramadan S, Sahwney S, Behbehani A. CT features in abdominal tuberculosis: 20 years experience. *BMC Med Imaging.* 2002;2(1):3. doi: 10.1186/1471-2342-2-3.
- Karmazyn B, Werner EA, Rejaie B, Applegate KE. Mesenteric lymph nodes in children: what is normal? *Pediatr Radiol.* 2005;35(8):774-7. doi: 10.1007/s00247-005-1462-2.
- Zu DM, Feng LL, Zhang L, Ma SL, Zhu YC. Evaluation of Mesenteric Lymph Nodes in a Pediatric Population with Mesenteric Lymphadenitis Using Superb Microvascular Imaging. *Med Sci Monit.* 2019;25:5336-5342. doi: 10.12659/MSM.914903.
- Bayramoglu Z, Caliskan E, Karakas Z, Karaman S, Tugcu D, Somer A, et al. Diagnostic performances of superb microvascular imaging, shear wave elastography and shape index in pediatric lymph nodes categorization: a comparative study. *Br J Radiol.* 2018;91(1087):20180129. doi: 10.1259/bjr.20180129.