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Original Research Article

Clinico-etiological profile and ultrasonographic evaluation of recurrent abdominal pain in children aged 5 years and above

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ABSTRACT

Background: Recurrent abdominal pain (RAP) is very common and the most troublesome health related issue in school aged children affecting up to 10-20%, but very rare below 5 years and above 15 years. Objective of this study was to assess clinico-etiological profile and ultrasonographic finding in children with recurrent abdominal pain at tertiary care hospital in southern Rajasthan.
Methods: This prospective observational study was carried out at tertiary care hospital Udaipur, from January 2019 to June 2020. Total 57 children aged 5 years and above who fulfilled the Apley's criteria for recurrent abdominal pain were enrolled. Patient's detailed history and physical examination including detailed per abdominal examination were recorded on pre-structured Performa. All patient underwent for routine investigation which consists of complete blood count, urine routine and microscopy with culture, stool examination and USG of abdomen and pelvis.
Results: Mean age of children with recurrent abdominal pain in this study was 9.9 years with SD±2.86 with male to female ratio was 1.28:1. Out of 57 children, organic cause was found in 21 (36.84%) children and in 36 (63.16%) children no organic cause was found for recurrent abdominal pain. Most common organic cause was urinary tract infection in 8 (38.09%) children. Total 19 (33.33%) children had mesenteric lymphadenopathy on ultrasonography, out of which organic cause was present in 10 (52.64%) children and no cause was found in 9 (47.36%) children (p value >0.05).
Conclusions: Recurrent abdominal pain might occur either due to organic or non-organic causes. Urinary tract infection is one of the most common organic cause in this study. Mesenteric lymphadenopathy was the most common ultrasonography finding in children presented with recurrent abdominal pain.

Keywords: Recurrent abdominal pain, Mesenteric lymphadenopathy, Ultrasonography

INTRODUCTION

Recurrent abdominal pain (RAP) is very common and the most troublesome health related issue in school aged children affecting up to 10-20%, but very rare below 5 years and above 15 years.[1]

A child is said to be having RAP if there are at least three episodes of abdominal pain which affect the daily activities of the child over a period of at least three months or more.[1,2]

There are certain causes of RAP according to Apley's which includes only 8% of patients having organic pathology.[1] Though it might occur either due to organic or nonorganic causes. Constipation, peptic disorders, dysmenorrhea, parasitic infestations, urinary tract infections and cholelithiasis have been reported as causes of organic RAP.[3] Psychological and emotional components like stressful events, sibling conflicts, school phobia, parenteral dispute etc. have been attributed as underlying component in non-organic RAP.[1,4]

Frequent abdominal pain is associated with increased psychological distress, especially with anxiety or depression. Frequently occurring abdominal pain is also associated with increased functional impairment in everyday life and school absence.[5]

In majority of children, the organic cause for pain is found but ultrasonography is usually performed to exclude other underlying abnormalities. Enlarged mesenteric lymph nodes are detected sometimes when ultrasonography is done with graded compression.[6]

The differential diagnosis of abdominal pain in children varies with age, gender, genetic predisposition, nutritional exposure and environmental factors hence this study was planned to assess clinico-etiological profile and USG finding in children with recurrent abdominal pain in tertiary care hospital in southern Rajasthan.

METHODS

This prospective observational study was carried out in department of pediatrics Geetanjali medical college and hospital Udaipur, over a period of 1 year and 6 months from January 2019 to June 2020 after obtaining permission from ethical committee of institute.

Inclusion criteria

Children aged 5 years and above who fulfilled Apley's criteria for recurrent abdominal pain visited department of pediatrics during study period were included.

A child is having RAP if there are at least three episodes of abdominal pain which affect the daily activities of the child over a period of at least three months or more.[1,2]

Exclusion criteria

Exclusion criteria for the study was age less than 5 years, pre-menstrual pain, known case of any surgical illness and children those guardians did not give consent.

Details of the study were explained to each parent and written informed consent was obtained voluntarily from at least one of the parents, before child enters the study. Patient's demographic data and detailed history were recorded on pre-structured Performa which includes details of abdominal pain and any associated stressors (scolded by teacher/peer, death of dear one, parental dispute). Physical examination including detailed per abdominal examination was recorded.

After thorough history and clinical examination patient underwent for routine investigation which consists of complete blood count, urine routine and microscopy with culture, stool examination and ultrasonography of abdomen and pelvis. Mesenteric lymphadenopathy was labeled significant using a short axis diameter of >8 mm on ultrasonography.

Additional investigation was done if above mentioned investigation, history and clinical examination suggested some other etiologies, which included: kidney function test, serum amylase, serum lipase, liver function test, TTGIgA for celiac disease, upper GI endoscopy and RUT for *H. pylori* infection, gastric aspirate for tuberculosis, X-ray of abdomen, CT/MRI of abdomen were done whenever required.

Children who had a probable organic cause were treated accordingly and were followed up for a period of at least three months. Only those patients who satisfied the following criteria were considered to be suffering from organic recurrent abdominal pain (ORAP): (1) An organic cause was demonstrated, (2) There was both clinical and laboratory improvement with treatment and (3) There was sustained clinical remission for at least three months after therapy.

The patients who did not meet the above criteria were considered to have non-organic RAP.

Statistical analysis

Data was entered using computer software, MS excel. Data was analyzed using SPSS software (version 20). Descriptive data were expressed in mean, frequency and percentages. To elucidate the associations and comparisons between different parameters, chi square ($\chi 2$) was used for categorical data and student's t test was used for quantitative data.

RESULTS

Total 57 children were enrolled in this study. Total number of males were 32 (56.14%) and females were 25 (43.86%). Males were affected more than females with male to female ratio was 1.28:1. Mean age of children with recurrent abdominal pain in this study was 9.9 years with SD±2.86. Children with recurrent abdominal pain were more from urban area (61.41%) as compared to rural residential area (38.59%) in this study (Table 1).

Table 1: Demographic characteristics of study population.

Characteristics	Number of children (%)
Gender	
Male	32 (56.14)
Female	25 (43.86)
Age group (years)	
5-9	25 (43.8)
10-13	25 (43.8)
14-18	7 (12.26)
Area of residence	
Rural	22 (38.59)
Urban	35 (61.41)

Out of 57 children, organic cause was found in 21 (36.84%) children and in 36 (63.16%) children no organic cause was found for recurrent abdominal pain. Most common organic cause was urinary tract infection in 8 (38.09%) children followed by celiac disease in 4 (19.04%) children, parasitic infection in 3 (14.28%) children, helicobacter pylori infection in 3 (14.28%) children and abdominal tuberculosis in 3 (9.52%) children (Table 2).

Table 2: Etiological factors of RAP.

Factors	Percentage (%)
Organic	21 (36.84)
Urinary tract infection	8 (38.09)
E. coli	5 (62.5)
Klebsiella	2 (25)
Enterobacter	1 (12.5)
Parasitic infection	3 (14.28)
Giardia lamblia	2 (66.67)
Entamoeba histolytica	1 (33.33)
Celiac disease	4 (19.04)
Abdominal tuberculosis	3 (14.28)
***Helicobacter pylori* Infection**	3 (14.28)
Non-organic	36 (63.16)

49 (85.96%) children had <6-month duration of pain and only 8 (14.04%) children had >6-month duration of pain. Out of 8 children who had >6-month duration of pain, organic cause was identified in 1 (12.5%) child and in 7 (87.5%) children no cause was identified (p value of <0.05).

Abdominal pain was occurred once in a month in 12 (21.05%), once in a week in 21 (36.84%) and daily in 24 (42.11%) children. Out of 24 children who had daily episode of abdominal pain, organic cause was identified in 7 (29.16%) children and in 17 (70.84%) children no cause was identified (p value <0.05) (Table 3).

29 (50.88%) children had pain away from umbilicus and 28 (49.12%) children had umbilical pain. Out of 29 children who had pain away from umbilicus, 8 (14.03%) children had organic cause and in 21 (36.84%) no cause was identified which is statistically significant (p value <0.05).

9 (15.79%) children had interference with sleep out of which 5 (55.55%) children had organic cause and in 4 (44.45%) children no cause was identified for recurrent abdominal pain (p value >0.05). 11 (19.29%) children had school absence out of which 5 (45.45%) had organic cause and 6 (54.55%) had non-organic cause for recurrent abdominal pain (p value >0.05) (Table 3).

Out of 57 children enrolled in the study, stressors were identified in 18 (31.57%) children whereas in 39 (68.43%) children no stressors were identified. Out of 18 children in which stressors were identified, 2 (11.11%) children had organic etiology as compared to 16 (88.89%) children who had non organic etiology (p value <0.05) (Table 3).

Table 3: Characteristics of pain: organic RAP versus non-organic RAP.

Parameters	Organic RAP (n=12)	Non-organic RAP (n=35)	P value
Duration of abdominal pain (months)			
<6	20 (40.81)	29 (59.19)	0.0037
>6	1 (12.5)	7 (87.5)	
Abdominal pain frequency			
Once a month	3 (25)	9 (75)	
Once a week	11 (52.38)	10 (47.62)	0.0061
Daily	7 (29.16)	17 (70.84)	
Site of pain			
Away from umbilicus	8 (27.59)	21 (72.41)	0.0007
Umbilical	13 (46.43)	15 (53.57)	
Duration of pain episode (hour)			
1	9 (47.36)	10 (52.64)	
1-2	8 (61.53)	5 (38.47)	<0.0001
Most of the day	4 (16)	21 (84)	
Interference with sleep	5 (55.55)	4 (44.45)	0.6801
School absence	5 (45.45)	6 (54.55)	0.6468
Stressor			
Identified	2 (11.11)	16 (88.89)	<0.0001
Not identified	19 (48.72)	20 (51.28)	

Out of 57 children enrolled in the study, 35 (61.40%) children had no significant findings, 19 (33.33%) children had mesenteric lymphadenopathy, 2 (3.50%) children had cystitis and 1 (1.75%) child had hydatid cyst (liver) on ultrasonography. It was observed that mesenteric lymphadenopathy was the most common USG finding in children presented with recurrent abdominal pain (Table 4).

Total 19 (33.33%) children had mesenteric lymphadenopathy on ultrasonography, out of which organic cause was present in 10 (52.64%) children and no cause was found in 9 (47.36%) children (p value >0.05) (Table 5).

Table 4: USG findings in children with RAP.

USG finding	Number of children (%)
Hydatid cyst (liver)	1 (1.75)
Cystitis	2 (3.50)
Mesenteric lymphadenopathy	19 (33.33)
No significant finding	35 (61.40)
Total	57 (100)

Table 5: Mesenteric lymphadenopathy in children with RAP.

Etiology of RAP	Number of children (%)
Organic	10 (52.64)
Non-organic	9 (47.36)
Total	19 (100)
P value=0.8078	

DISCUSSION

In the present study total 57 children with recurrent abdominal pain, aged 5 years and above were enrolled to study clinico-etiological profile and ultrasonographic evaluation of recurrent abdominal pain.

Mean age of children with recurrent abdominal pain was 9.9 years with SD±2.86 in this study. Singh et al observed that mean age was 10.5 years with SD±2.7 in their study.[7]

In the present study, males (56.14%) were affected more than females (43.86%) with male to female ratio of 1.28:1. Similar results were found in study done by Hirekerur, Bansal, Reddy, Saraswat and Alam et al in which they found males were affected more than females.[8-12]

EI-Matary, Singh and Dutta et al, in their study have demonstrated that non-organic cause constitutes 70, 75 and 76% of study group respectively.[4,7,13] The present study also revealed that non-organic etiology was more common i.e., 63.16% compared to organic etiology i.e., 36.84% in study group. most common organic cause was urinary tract infection which was present in 38.09%. Saraswat et al, found that urinary tract infection was the most common organic cause i.e., 49.05% in their study.[11]

Rasul, Devnarayana and Liebman et al found that most common site of pain was periumbilical region in their study.[14-16] In the present study, 50.88% children had pain away from umbilicus and 49.12% children had umbilical pain. Non-organic etiology was more common as compared to organic etiology among children who had pain away from umbilicus.

Reddy et al found mesenteric lymphadenopathy in 22.8% children in their study.[10] Vayner and Balakrishnan et al found mesenteric lymphadenopathy in 61.4 and 72.1% children respectively.[17,18] Mesenteric lymphadenopathy was the most common ultrasonography finding in children presented with recurrent abdominal pain i.e., 19 (33.33%) in present study. There is no statistically significant difference was found between organic and non-organic etiology among children with mesenteric lymphadenopathy.

CONCLUSION

Recurrent abdominal pain might occur either due to organic or non-organic causes. Urinary tract infection is one of the most common organic cause in this study. Therefore, it is suggested that urine examination should be done in all children with recurrent abdominal pain for early diagnosis and timely management.

Pain away from umbilicus, long duration (>6 month) of pain, daily episodes of pain was more common in non-organic etiology compared to organic etiology.

Mesenteric lymphadenopathy was the most common ultrasonography finding in children presented with recurrent abdominal pain. No significant difference was found between organic and non-organic etiology in children with mesenteric lymphadenopathy.

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REFERENCES

1. Apley J, NaIsh N. Recurrent abdominal pain. A field survey of 1000 school children Arch. Dls child. 1958;33165-70.
2. Lissauer T, Clayden G. Gastroenterology. Illustrated textbook of Paediatrics. 4th ed. Philadelphia. Elsevier. 2012;227.
3. Balani B, Patwari AK, Bajaj P, Diwan N, Anand VK. Recurrent abdominal pain - a reappraisal. Indian Pediatr. 2000;37:876-81.
4. Dutta S, Mehta M, Verma IC. Recurrent abdominal pain in Indian children and its relation with school and family environment. Indian Pediatr. 1999;36:917-20.
5. Hyams JS, Burke G, Davis PM, Rzepski B, Andrulonis PA. Abdominal pain and irritable bowel syndrome in adolescents: a community-based study. J Pediatr. 1996;129:220-6.
6. Sivit CJ, Newman KD, Chandra RS. Visualization of enlarged mesenteric lymph nodes at US examination. Pediatr Radiol. 1993;23:471-5.
7. Singh M, Sinha S. Etiology of recurrent abdominal pain in children. Int J Med Health Res. 2017;3(4):147-51.

8. Hirekerur V, Bhagawat A. Study profile of recurrent pain abdomen in children examined by USG. Int J Contemp Pediatr 2016;3:1197-9.
9. Bansal S, Une L. Recurrent abdominal pain in children attending pediatrics OPD. Int J Pediatr Res. 2020;7(3):114-21.
10. Reddy M, Regidi S. Study of Recurrent Abdominal Pain in Children of Telangana. Indian J Public Health Res Devel. 2019;10(12):246-8.
11. Saraswat S, Mohanty S. Recurrent pain abdomen among children- an emphasis on base line investigations. Int J Contem Med Res. 2016;3(8):2419-22.
12. Alam HS, Ahsan MR, Hoque MA, Mamun AM, Ahmed S. Diagnosis Pattern and Outcome of Adolescents Admitted with Recurrent Abdominal Pain in a Tertiary Care Hospital. Bangl J Child Health. 2017;41(1):4-8.
13. El-Matary W, Spray C, Sandhu B. Irritable bowel syndrome: the commonest cause of recurrent abdominal pain in children. Eur J Pediatr. 2004;163(10):584-8.
14. Rasul CH, Khan MAD. Recurrent abdominal pain in school children in Bangladesh. J Ceylon Coll Phys. 2000;33:110-4.
15. Devanarayana NM, De Silva DGH, De Silva HJ. Recurrent abdominal pain syndrome in a cohort of Sri Lankan children and adolescents. J Trop Pediatr. 2008;54:178-83.
16. Liebman WM. Recurrent abdominal pain in children: a retrospective survey of 119 patients. Clin Pediatr. (Phila). 1978;17(2):149-53.
17. 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.
18. Balakrishnan VS, Aroor S, Kumar S, Kini PG, Saseendran A. Mesenteric lymphadenopathy in children with chronic abdominal pain. S Lanka J Child Health. 2018;47(4):348-53.

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