Role of selected simple non-invasive laboratory investigations in assessing functional abdominal pain in children aged 5-15 years in Khartoum, Sudan

Karim E. Salih, MD, *Waly E. Elfaky,* MD, *Ali A. Salih,* MBBS, *Elfatih Z. El-Samani,* MD, SCD, *Kamal E. Hussien,* MD.

ABSTRACT

الأهداف: التحقق من نتائج الاختبارات المختبرية البسيطة لدى الأطفال المصابين بألم البطن الوظيفي، ومقارنة نتائج هذا الاختبارات بنتائج الأطفال الأصحاء، بالإضافة إلى محاولة معرفة أسباب هذه المشكلة، وتحديد أعراض وعلامات المرض.

الطريقة: أُجريت هذه الدراسة في مستشفى جعفر بن عوف التخصصي للأطفال، الخرطوم، السودان، واستمرت لمدة 3 سنوات من مارس 2007م إلى فبراير 2010م. شملت الدراسة 35 طفلاً مصاباً بألم البطن الوظيفي (مجموعة الدراسة)، و42 طفلاً سليماً (مجموعة الشاهد) والذين تتراوح أعمارهم ما بين 4–15 عاماً. لقد قمنا بهذه الدراسة من أجل التحقق من دور الاختبارات البسيطة في تشخيص ألم البطن الوظيفي لدى الأطفال المصابين به.

النتائج: أشارت نتائج الدراسة إلى أنه لم يكن هناك علاقة بين ألم البطن الوظيفي والتهابات المسالك البولية، وجرثومة المعدة، والالتهابات الطفيلية. وبالمقابل فقد كان هناك علاقة واضحة بين الإصابة بألم البطن الوظيفي وكلاً من: الجنس، والحالة الاجتماعية الاقتصادية، وزيادة الوزن عن 19 كلغ.

خاتمة: يعد ألم البطن الوظيفي من الحالات المحيرة للأطباء، والآباء، والمرضى، ولهذا فنحن بحاجة إلى تأسيس المراكز الطبية التعليمية حول مسببات ألم البطن الوظيفي وكيفية الوقاية منه.

Objectives: To determine simple laboratory test in children with functional abdominal pain, to compare this test in those with functional abdominal pain in normal children and to try to search for it cause if any, and to determine the symptoms and signs of the disease.

Methods: This study was carried out over a period of 3 years, from March 2007 to February 2010 at Gaffar Ibn Auf Specialized Hospital for Children, Khartoum, Sudan. The study was conducted to determine role of simple investigations for functional abdominal pain (FAP) in a group of 35 children with abdominal pain and compared it to the control group (42 children) with an age range of 4-15 years.

Results: The results showed no parasitic, no urinary track infection, no *Helicobacter pylori* infection association with functional abdominal pain. However, gender, socioeconomic status, weight >50th centile had a significant association with functional abdominal pain.

Conclusion: Functional abdominal pain is very confusing and puzzling condition to doctors, parents, and patients. Establishment of centers for medical education regarding this cause of abdominal pain is needed.

Saudi Med J 2011; Vol. 32 (9): 939-942

From the Department of Pediatrics (Salih), Juba University. Gaafar Ibn Aouf Children's Hospital, Department of Pediatrics (Elfaky), Juba University, Omdurman Children's Hospital, Academy Hospital (Salih A), Ahfad University for Women (El-Samani), and the El Ribat Elwatani University (Hussien), Kharotoum, Sudan.

Received 4th April 2011. Accepted 25th July 2011.

Address correspondence and reprint request to: Dr. Karim E. Salih, Paediatric Department, Juba University, PO Box 321/1, Khartoum, Sudan. E-mail: karimeldin_salih@hotmail.com

Functional abdominal pain (FAP) syndrome is a debilitating condition which causes constant pain for at least 6 months that affect daily activity.[1] Functional abdominal pain is defined by the American Academy of Paediatrics Subcommittee as abdominal pain without demonstrable evidence of pathologic condition such as anatomic, metabolic, infections, inflammatory, or neoplastic disorder. It may present as symptoms like dyspepsia, irritable bowel syndrome, abdominal

migraine or functional abdominal pain syndrome. It ranges from mild to severe pain.[2] It accounts for 50% of pediatric gastroenterology practice and of 2-4% of all pediatrics practice.[3] It may be associated with other non-abdominal conditions and psychiatric syndromes;[4] depression, anxiety, and other psychiatric disorders, such as phobias, and somatic disorders are also known associations.[5] Other studies like Apley and Norish, defined it as up to 3 or more episode of abdominal pain, which can affect childhood activity for at least 3 months.[6] The prevalence of this condition is estimated to be 3-15% in school children.[7] It is functional, meaning that the organic cause cannot be found.[6,7] The main stay of treatment is to reduce the suffering of the patient and to keep their activity within normal range.[1] The aim of this study is to determine the simple laboratory tests, to diagnose children with functional abdominal pain, to compare simple laboratory test in those with functional abdominal pain in normal children and to try to search for a cause if any, and to determine the symptoms and signs of the disease.

Methods. This is a case control study, hospital-based, conducted over a period of 3 years from March 2007 to February 2010, at Gaffar Ibn Auf Specialized Hospital for Children, Khartoum, Sudan. The children who were selected for the study were pre-school and school age (4-15 years). Control group were those children presented normally in baby clinics, with vaccine, had checkups before Kindergarten and school entry and those who were referred by surgeon for routine investigations before surgery.

Inclusion criteria were children who had simple abdominal pain with no organic cause of pain. Exclusion included those with organic evidence of abdominal pain, acute pain, pain that prevent sleeping, weight loss, hematemesis, bloody stool, abdominal mass, more than 15 years old, less than 5 years old, very ill children, children with tuberculosis (TB), human immunodeficiency virus (HIV), protein energy malnutrition, and parents refusal. Ethical approval was taken from Gafar Ibn Auf Hospital Ethical Committee, Khartoum, Sudan, and verbal patient informed consent was obtained.

Questionnaire including basic data, past history, present history, systemic inquiry and general examination were performed, over a period of 3 years. Then general investigations, complete blood count (CBC), stool, urine, abdominal ultrasound, serology for *Helicobacter pylori* were performed for both patients and control. Patient symptoms and signs were treated symptomatically and reassured.

Data were analyzed using Chi-square test (Mantil Hazel Test) and odds ratio was calculated with confidence interval at confidence level of 95%.

Results. Seventy-seven children (35 with FAP and 42 healthy children), were recruited for this study, no significant difference between children with FAP and healthy children regarding age, gender, CBC (**Table 1**), parasitic infection, urinary tract infection, *Helicobacter pylori* were $p<0.05$ (**Tables 2-5**). However, weight more than 19 kg (>50th centile) and good socioeconomic status had significant association with FAP ($p>0.05$) (**Tables 6 & 7**). Functional abdominal pain had mild tendency towards females than males. Stool examination showed Giardiasis in 5 (14.3%) cases and *Hymenolepis nana* in 3 (8.6%), while in the control group Gardiasis were seen 7 (16.7%) and *Hymenolepis nana* in 4 (9.5%). Most of the complaints were abdominal pain, aside from associated nausea and diarrhea (19/77 [24.7%]). Cases with nausea, diarrhea, and abdominal pain showed Gardiasis and *Hymenolepis nana* in both groups. Functional abdominal pain showed school absence for 15 (42.9%) cases and 7 days (16.7%) in the control group ($p=0.05$).

Table 1 - Patients characteristics.

Character	Case (n=35)	Control (n=42)	*P*-value
Gender			
Male	16	19	
Female	19	23	
Age (years)			<0.05
5-7	7	9	
8-10	9	12	
11-13	11	14	
14-15	8	7	
Mother's education (years)			<0.05
4-8	16	18	
8-12	17	21	
>12	2	3	
Father's education (years)			<0.05
4-8	10	14	
8-12	18	22	
>12	7	6	
Stool analysis for parasites			<0.05
Gardiasis	5	7	
Hymenolepis nana	3	4	
Urine analysis for UTI	5	8	<0.05
Average TWC	8,000	8500	<0.05
Average neutrophile	50	45	<0.05
Average hemoglobin	10.8	11.0	<0.05
Helicobacter pylori	3	5	<0.05
Abdominal ultrasound (non specific findings)	2	3	<0.05
School absence	15	7	>0.05

Table 2 - Serology for *Helicobacter pylori* (*H. pylori*) for children with FAP and control group.

Serology for *H. pylori*	Case (n=35)	Control (n=42)	Total
Yes	3	5	8
No	32	37	69
Odds ratio = 0.69 (95% confidence interval: 0.42-5.29) DF = 1, x^2 = 0.4666, p=0.495			

Table 3 - Stool analysis for children with functional abdominal pain and control group.

Result of stool analysis	Case (n=35)	Control (n=42)	Total
Yes	8	11	19
No	27	31	58
Odds ratio = 0.83 (95% confidence interval: 0.26-2.28) DF = 1, x^2 = 0.114, p=0.73			

Table 4 - Urine analysis for children with functional abdominal pain and control group.

Result of urine analysis	Case (n=35)	Control (n=42)	Total
Yes	5	8	13
No	30	34	64
Odds ratio = 0.69 (95% confidence interval: 0.17-2.66) DF = 1, x^2 = 0.371, p=0.5433			

Table 5 - Esinophilia of children with functional abdominal pain and control group.

Result	Case (n=35)	Control (n=42)	Total
Yes	1	1	2
No	34	41	75
Odds ratio = 1.2 (95% confidence interval: 0.03-46.2) DF = 1, x^2 = 0.017, p=0.89			

Table 6 - Comparison of weight in children with functional abdominal pain and control group.

Weight (kg)	Case (n=35)	Control (n=42)	Total
≤18	16	9	25
≥19	19	33	52
Odds ratio = 3.92 (95% confidence interval: 1.03-9.4) DF = 1, x^2 = 5.01, p=0.023			

Table 7 - Comparison of socio-economic status in children with functional abdominal pain and control group.

Socio-economic status	Case (n=35)	Control (n=42)	Total
Low to moderate	4	6	10
Good	31	36	67
Total	**35**	**42**	77
Odds ratio = 1.97 (95% confidence interval: 9.3-10.43) DF = 1, x^2 = 0.96, p=0.3222			

Discussion. It is very obvious from this hospital-based study, simple basic non-invasive investigations like CBC, stool analysis, urine analysis, abdominal ultrasound and serology for *Helicobacter pylori* had no significance in establishing causative factors for FAP. No strong association between parasitic infection and gender with a minor tendency towards female gender. This study agreed with other studies.[8-10] This paper suggested that the use of screening test also had no significance, however, it is very important to rule out organic diseases as suggested by other reports.[7] A large number of patients with weight more than 50th centile in the study group were found to suffer from FAP as compared to the control group. This is evident in recent American data.[10] The reasons for this can be associated with alternating bowel movements due to excessive and irregular nutritional regimens which could cause bouts of constipations flatus and even diarrhea. A different paper also from the USA,[11] predicts that obesity and its persistence can lead to a negative prognosis. School absence and decreased activity encountered in 15 (42.9%) cases comes in agreement with literature.[12] The symptomatic treatment had for aim to reduce loss of activity was in agreement with Teitellaum et al.[10] Functional abdominal pain is a diagnosis of exclusion and it is a challenging condition to assess by doctors. Obesity and high socioeconomic status were associated with the diagnosis of FAP.

The data found that no simple investigations have a significant role in determining causation. Better assessment of this clinical presentation should be promoted in order to determine causation, develop ideal diagnostic tools and management. Assessing functional abdominal pain, which is a common pediatrics problem needs a larger sample size, and it should be carried out at community level rather than hospital base. Another limitation of this study is due to the smaller sample size.

References

1. Sperber AD, Drossman DA. Review article: The functional abdominal pain syndrome. ***Aliment Pharmcol Ther*** 2011; 33: 514-524.
2. American Academy of Pediatrics Subcommittee of Chronic Abdominal Pain. Chronic Abdominal Pain in children. ***Paediatrics*** 2005; 115: 812-815.

3. Di Lorenzo C, Colletti RB, Lehmann HP, Boyle JT, Gerson WT, Hyams JS, et al. Chronic Abdominal Pain In Children. ***J Pediatr Gastroenterol Nutr*** 2005; 40; 249-261.
4. Strodal K, Nygaard EA, Bentsen BS. Recurrent abdominal pain, a five year follow up study. ***Act Paeditr*** 2005; 94: 234-236.
5. Bremner AR, Sandhu BK. Recurrent abdominal pain in childhood: the functional element. ***Indian Pediatr*** 2009; 46: 375-379.
6. McOmber MA, Shulman RJ. Pediatric functional gastrointestinal disorders. ***Nutr Clin Pract*** 2008; 23: 268-274.
7. Schurman JV, Friesen CA, Danda CE, Andre L, Welchert E, Lavenbarg T, Cocjin JT, Hyman PE. Diagnosing functional abdominal pain with the Rome II criteria: parent, child, and clinician agreement. ***J Pediatr Gastroenterol Nutr*** 2005; 41: 291-295.
8. European Society for Paediatrics Gastroenterology. Chronic abdominal pain in children. ***Journal of Paediatric Gastroentrol Nutr*** 2007; 44: 524-526.
9. Uc A, Hyman PE, Walker LS. Functional gastrointestinal disorders in African American children in primary care. ***J Pediatr Gastroenterol Nutr*** 2006; 42: 270-274.
10. Teitelbaum JE, Sinha P, Micale M, Yeung S, Jaeger J. Obesity is related to multiple functional abdominal diseases. ***J Pediatr*** 2009; 154: 444-446.
11. Bonilla S, Wang D, Saps M. Obesity predicts persistence of pain in children with functional gastrointestinal disorders. ***Int J Obes (Lond)*** 2010; 16.
12- Youssef NN, Murphy TG, Langseder AL, Rosh JR. Quality of life for children with functional abdominal pain: a comparison study of patients' and parents' perceptions. ***Pediatrics*** 2006; 117: 54-59.

Related topics

Liu F, Li J. Repair of large abdominal wall defects using the Proceed™ surgical mesh with open intra-peritonium onlay method. ***Saudi Med J*** 2011; 32: 504-509.

Alnabulsi BK, Miro JT, Faidah OH, Hamo MA. Laparoscopic duodenojejunostomy omega loop with braun anastomosis as a treatment for superior mesenteric artery syndrome. ***Saudi Med J*** 2011; 32: 188-191.

Brekeit KA, Baig MA, Al-Massod AA, Dahduli SA. Management of infected abdominal aortic aneurysm associated with vertebral destruction due to chronic leak. ***Saudi Med J*** 2010; 31: 1371-1374.

Haflah NH, Jaarin K, Abdullah S, Omar M. Palm vitamin E and glucosamine sulphate in the treatment of osteoarthritis of the knee. ***Saudi Med J*** 2009; 30: 1432-1438.