Clinical Pediatrics: Open Access
ISSN: 2572-0775

Kuissi et al., Clin Pediatr OA 2017, 2:4
DOI: 10.4172/2572-0775.1000126

Research Article Open Access

Epidemiological Aspects of Abdominal Pain in Children at the El Rapha Polyclinic in Libreville - Gabon

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Received date: October 06, 2017; **Accepted date:** November 16, 2017; **Published date:** November 27, 2017

Abstract

Objective: To identify the causes of acute abdominal pain in children and evaluate their treatment (care).

Methods: Prospective study, including children from 4 to 16 years, having consulted for intense abdominal pain (≥ 5 Visual analog scale). We systematically requested Complete Blood Count, C - reactive protein, urine analysis, abdominal ultrasound, abdominal X-Rays and stool studies. Other paraclinical exams could be requested.

Results: On 1435 children in consultation, 103 (7.2%) were included; the average age was 8.0 ± 3.5 years. The average date of onset of symptoms was 4.6 ± 3.6 days. The pain was more diffuse (46.6%), with an abdominal guarding (26.2%). Fever was the main accompanying sign (55.3%). Kidney diseases (36.9%) and mesenteric adenitis (29.1%) were the most found in abdominal ultrasounds. The abdominal X-ray was predominantly normal (71%). The etiology was mainly malaria (22.3%), pyelonephritis (13.6%) and surgical causes (8.3%). Malaria was diagnosed in the 10 hours after the consultation, that of surgical cases in the 24th hour and pyelonephritis in the 96th hour.

Conclusion: The etiologies of pediatric abdominal pain are multifaceted and justify a codified approach.

Keywords: Child; Abdominal pain; Etiology; Infectious causes

Introduction

Abdominal pain is a frequent symptom in children and represents a significant part of daily practice in pediatrics [1]. It has no complications most of the time, but an acute and intense abdominal pain is usually a sign of an intra-abdominal pathology, and it can be the only indicator for surgery. Abdominal pain alarms children and their families, but also physicians, as the etiologic diagnosis is not easy, and may constitute a difficulty in pediatric emergency wards. Evident etiologies must be detected immediately to avoid a severe morbidity or the death of the child [1]. This study aimed to describe the epidemiological aspects of the abdominal pains of the children who attend our polyclinic to identify the causes of acute abdominal pain in children and to evaluate their treatment.

Methodology

We conducted a prospective study from January to December 2016 at the El Rapha polyclinic of Libreville. It included all the children aged from 4 to 16 years old who came to consult for intense abdominal pains, defined by a score superior to 4 on Bieri's revised face self-evaluation scale (validated in children) performed during the interrogation [2-4]. Chronic abdominal pain is defined as recurrent painful episodes lasting for a minimum of three months and acute events occurring in an inaugural manner. The parental informed consent was mandatory and obtained beforehand.

The children were systematically submitted to a complete clinical examination and did laboratory tests. The analyzed parameters were age, sex, the delay between the beginning of the symptoms and the consultation, accompanying signs, topography, and signs of defense. Complementary tests were complete blood count (CBC), C-reactive protein (CRP), an abdominal ultrasound, an abdominal x-ray, and stool analysis. In addition to these tests, additional tests were required:

- In case of fever: a thick smear, a chest x-ray, and a mid-stream urine sample.
- In case of epigastric localization pain: a gastroscopy.
- In case of diarrhea associated with fever or poor general condition: stool culture.

The delays between the consultation and the diagnosis, as well as the management of the pain, were also studied.

The viral origin of the pathology was defined in case of a leukocytosis superior to 10,000/mm^3 with a majority of lymphocytes, an absence of germs in bacterial culture, and/or the positivity of a virus detection test. The bacterial etiology was defined in case of a leukocytosis superior to 10,000/mm^3 with a majority of neutrophils and/or the positivity of a bacterial culture.

Data analysis

We managed the data obtained in Microsoft Excel 2010. The chi-square test was used to assess differences in categorical data between groups. The analysis of the student's t-test was used for comparisons of means. A p-value <0.05 was considered significant.

Results

On 1,435 children who came to the emergencies during the study period, 103 were included, a prevalence of 7.2%. The mean age was 8.0 ± 3.5 years. The sex ratio was 1.10, boys represented 53.4% (n=55) p=0.31. The mean time of the beginning of symptoms was 4.6 ± 3.6 days, and there was no significant difference according to sex (p=0.78). Figure 1 shows the different localizations of the pain in this study. Pain was acute in 79.6% (n=82) and chronic in 20.4% (n=21) of the cases. Signs of struggle in the abdominal palpation were observed in 26.2% (n=27) of cases; among them, the defense was the most observed sign in 52% (n=14) of cases, and they all appeared in the group of children with acute abdominal pain (Figure 1). Table 1 shows the distribution of the different associated signs found.

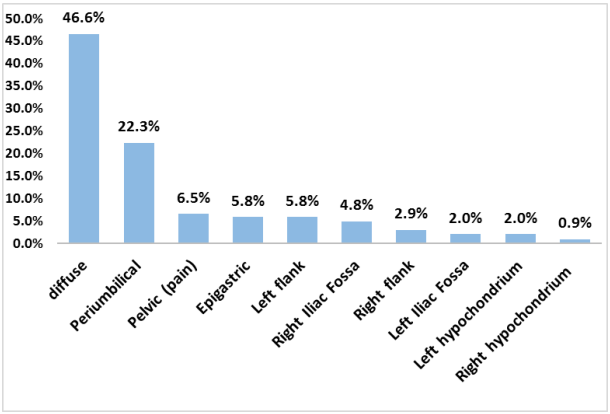

Figure 1: Localizations of abdominal pains.

Figure 2 shows the results of the abdominal ultrasound and the frequencies of abnormalities found in the abdominal ultrasound. Abdominal x-rays were normal in 70.8% (n=73) of cases. We observed stercoral stasis in 26.2% (n=27) of cases, associated with aerocoly in 2% (n=2) and hydro-aerial levels in 1% (n=1) of cases (Figure 2).

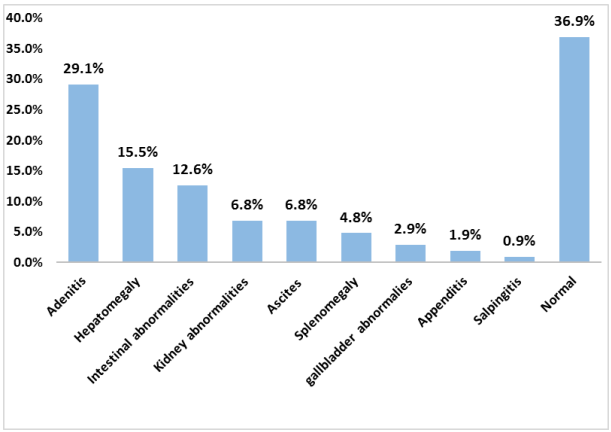

Figure 2: Results of abdominal ultrasounds.

Accompanying signs	Number	Percent
Fever	57	55.3
Vomiting	36	35
At least one sign of GA *	33	32
Diarrhea	15	14.6
Constipation	12	11.6
Abdominal distension	8	7.8
Rhinorrhea	5	4.8
Cough	4	3.9
Headaches	4	3.9
Hematuria	4	3.9
Dysuria	4	3.9
Polyarthralgias	3	2.9
Anemia	1	0.9
AUR**	1	0.9
Odynophagia	1	0.9
No	3	2.9
***GA = general alteration|**AUR= acute urinary retention**		

Table 1: Signs accompanying abdominal pain.

Table 2 shows the etiologies found in intense abdominal pain in the children of this study. When the diagnosis was malaria, abdominal pain and fever were the only clinical signs observed in 73.9% (n=17) of cases. The diagnosis of malaria was made within 10 hours after the consultation, surgical within 24 hours, and that of pyelonephritis and the bacterial gastroenteritis within 96 hours. There was no significant correlation between pathologies and age or between pathologies and gender (Table 2). The association paracetamol/ketoprofen was the only treatment of the vaso-occlusive crisis (VOC).

Etiological groups	Pathologies	Acute Pains n (%)	Chronic Pains n (%)
Bacterial 31 (30.1%)	Pyélonéphritis	14 (45.2%)	
	Pneumonia	7 (22.5%)	
	Pleuropneumonia	1 (3.2%)	
	Hepatic abscess	3 (9.7%)	
	Bacterial gastroenteritis	3 (9.7%)	
	Acute cholecystitis	3 (9.7%)	
Parasitic 28 (27.2%)	Malaria	23 (82.2%)	
	Intestinal amoebiasis	2 (7.1%)	
	Bilharzia		2 (7.1%)
	Ascariasis		1 (3.6%)

Viral infections 10 (9.7%)	Gastroenteritis (rota virus)	5 (50%)	
	Viral disease	3 (30%)	
	Hepatitis B	2 (20%)	
Surgical 7 (6.8%)	Appendix	4 (57.1%)	
	Hirschsprung's disease		1 (14.3%)
	Intestinal occlusion	1 (14.3%)	
	Hydro-salpingite		1 (14.3%)
Constipation 8 (7.7%)		3 (37.5%)	5 (62.5%)
Vaso occlusive crisis 6 (5.8%)		3 (50%)	3 (50%)
Other 6 (5.8%)	Gastric ulcer		2 (33.3%)
	Still's disease		1 (16.7%)
	Renal lithiasis	1 (16.7%)	
	Nephritic Colic	1 (16.7%)	
	Dysmenorrhea		1 (16.7%)
Unknown 7 (6.8%)		1 (14.3%)	6 (85.7%)
Total 103 (100%)		**82 (79.6%)**	**21 (20.4%)**

Table 2: Etiologies of intense abdominal pain.

Discussion

Abdominal pain represents one of the most frequent causes of consultation in pediatric units [5,6]. Epidemiological studies of these illnesses in children are rare in Africa. The frequency of abdominal pain is not precise. In our study, the prevalence in consultation was 7.2%. In 2002 in the Pediatric Complex of Bangui, acute abdominal pain in children was among the first causes for consultations, with a frequency of 8.5% [7]. In Switzerland in 2014, in preschool and primary school children, abdominal pain was the most frequent painful symptom before headaches, with a rate of 6% in kindergarten and 10% in primary schools [8]. In 2007, 9% of 962 children from ages 4 to 17 went to a university hospital in Iowa to consult for acute abdominal pain [9]. The mean age of the children in our study was 8.0 ± 3.5 years, close to Loening-Baucke's survey in the USA, which was 9.1 years [9]. The elevated mean age can be justified by the fact that we excluded from the study all the children that were less than 4-years old, so as to obtain a good self-assessment of the pain. The reliability and the validity of self-assessment from 4 years are well documented in the literature [10]. Loening-Baucke found that girls are more likely to have abdominal pain than boys [9]. We did not find a difference between genders, probably due to the small size of our sample.

One particular aspect of abdominal pain in children is its frequency in a large number of diseases so that in time, it hardens the confirmation of an etiologic diagnosis. The main groups of causes are intra-abdominal, extra-abdominal, and psychogenic [11]. Although in the majority of cases, abdominal pains have a benign origin, some lead to complications with different degrees of severity requiring a rapid diagnosis and treatment. The proficiency of the infantile pathology, a well-driven medical interrogatory, a well-led clinical examination or even a simple complementary test such as abdominal x-ray or abdominal ultrasound is enough to specify etiologies [1,7].

Acute abdominal pain

Acute abdominal pain in child can be due to several cause which is well documented in the literature [1,6]; a real diagnostic challenge exists in this group because of the threat of a surgical issue. We observed that 6.8% of our patients presented a surgical pathology. In Iowa, surgical causes represented 2% [9] of cases. In Bangui in 2002, Serengbe declared that 32.4% of the children who consulted for abdominal pain presented a case of appendicitis, 4.8% had a strangulated hernia, and 1.3% had an occlusion syndrome [7]. Appendicitis represented more than half of the children presenting a surgical cause in our study. Appendicitis is a common cause of abdominal pain in children and a frequent pediatric surgical pathology with 20.8% of children hospitalized for abdominal pain [12,13]. In our study, the diagnosis of appendicitis was made 24h after the consultation. Due to the multiplicity of its clinical aspects (age of the child, topography of the appendix), it is still problematic to have the formal diagnosis of appendicitis in our context despite the currently good technical support [14]. This difficulty has, as a consequence, delayed the decision about the surgery. Infectious pathologies were the leading causes of abdominal pain. They first were bacterial pathologies, in which the principal was pyelonephritis. All this explains that fever was the most observed associated sign. In Bangui, urinary infection represented 3.5% [7]. In Iowa, chronic and acute constipation were the most frequent causes of the acute abdominal pain in children [9]. Urinary tract infection is the most recurrent bacterial infection in pediatrics after acute otitis media [15]. Pyelonephritis is a complicated infection that can cause renal parenchymal lesions in 50% to 60% of the children. Also, for half of them, it creates renal scarring, which can lead to high blood pressure, microalbuminuria, proteinuria, and chronic renal failure [15]. Clinical and experimental data show that a long delay in establishing an appropriate treatment increases the risk of renal scarring [16]. The length of 96 hours in our results is too long a delay. In this polyclinic, physicians are not accustomed to using urinary strips during consultations. Even so, they are aware that the positivity of a reactive strip confirms the diagnosis because of the positive predictive value of "leukocytes and positive nitrites" of 70% and the negative predictive value being close to 100% in children [15,16]. Pneumonia and pleuropneumonia constituted the second bacterial pathology observed in our study. The fact that symptoms of pneumonia are non-specific, especially in infants and young children, can explain this result [17]. Bacterial pathologies are followed by parasitic pathologies. Among them, malaria is the most observed pathology in 82.2% of cases. In Bangui, malaria was observed in 5.8% of all the children who were being consulted for abdominal pain [7]. This rate was higher in our study with 22.3% (22/103) children having malaria. Fever is the master sign of malaria in an endemic zone, but it is not specifically characteristic of malaria [18]. In our study, 73.9% of the children suffering from malaria had a fever and abdominal pain but nothing more. As such, the small sample size does not allow us to conclude that abdominal pain is a significant symptom of malaria in children, but this finding opens the path for a study with a more substantial number of sick patients.

Chronic abdominal pain

Chronic abdominal pain (defined by a constant or intermittent abdominal pain of organic, functional, or psychogenic cause and a

minimum duration of three months) is one of the most frequent painful syndromes in children. Its prevalence is from 10% to 15% between the age of 4 to 16 years, and it represents 2% to 4% of the motive for the consultation of young patients [19]. A significant part of chronic abdominal pains is not due to a lethal cause, but they disrupt the quality of life of affected children and their families. The rate of chronic abdominal pain was 20.4% in our study population. Most of the time, the etiology is functional in children aged more than 4 years, namely without organic cause or psychogenic factors [19]. An average of 8% of the children is affected in Western countries [8]. In our results, constipation, which is an organic cause, was the most observed. Constipation is a frequent problem that affects up to 22% of children. Its global prevalence is 3%, and it can go unnoticed because parents are unaware of their child's defecation habits [20,21]; this justifies the fact that 27 of our patients presented a stercoral stasis on the abdominal x-rays while only 12 were said to have constipation in the anamnesis.

Unknown causes

The absence of etiology during the investigations of abdominal pain in children is typical. No origin was found in 22.8% of the Serengbe study and 19% in Loening-Baucke's in Iowa [7,9]. In our series, we did not find any identifiable cause for abdominal pain in 6.8%, and in almost all cases (6/7), these children presented a chronic abdominal pain. Psychogenic factors were not screened in this study because of the difficulty of exploring this group of etiologies in our context: the absence of numerous pediatric gastroenterologists or pediatric psychologists.

Conclusion

Abdominal pains are frequently encountered in the pediatric medical practice. Their etiologies are multiform and constitute a real dilemma in consultation. The acute or chronic causative factors of abdominal pains, localization, and accompanying signs, ease the diagnosis in the majority of cases. Etiologies are indeed mostly benign, but appropriate care is a key to reducing morbid consequences usually observed. This treatment involves a systematic approach to the problem and justifies that a codified approach must be implemented in our pediatric emergency departments.

Conflict of Interests

The authors do not report any conflicts of interest.

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