



Use of Ultrasound in Pediatric Patients with Suspected Acute Appendicitis in a General Hospital: Analysis of 3.5 Years

Guillermo Padrón Arredondo*

General Surgeon and Endoscopist, Surgery Service of General Playa del Carmen Hospital, Mexico

*Corresponding author: Dr. Guillermo Padrón Arredondo, General Surgeon and Endoscopist, Surgery Service of General Playa del Carmen Hospital, Cerrada Corales 138, Residencial Playa del Sol, Solidaridad Playa del Carmen, Quintana Roo CP. 77724, Mexico, Tel: 019841100707; 019848762267, E-mail: gpadronarredondo@hotmail.com

Abstract

Introduction: Acute appendicitis is the most common cause of abdominal pain in the pediatric population requiring surgery. However, the classic signs are not always present and symptoms may be nonspecific and overlap with other causes of abdominal pain.

Material and Method: A retrospective cohort study type in the pediatric population of 1-12 years of age with a diagnosis of acute appendicitis over a period of 3.5 years in a referral hospital was performed second level.

Results: During the study period 43 patients were analyzed between 1 and 12-years-old with abdominal ultrasound diagnosis; the most difficult group to diagnose: 1 to 4 years, presented 9 cases (21%); male female ratio was 1:1; the most affected age group was 10 to 12 years with 14 cases (32.56%); the duration of symptoms between 13-24 hours was the highest with 18 cases (41.86%); the postoperative hospital stay was increased from 2 to 3 days with 24 cases (55.81%); the degree of macroscopic appendicitis corresponded to grade II 20 cases (46.52%) and 4 minor postoperative complications (9.30%) occurred. The number of perforated appendices (grade IV) with 14 cases (32.56%).

Discussion: The diagnosis of appendicitis can be challenging particularly in patients younger than 4 years. Abdominal pain only corresponds to 2% of cases of acute appendicitis.

Keywords

Paediatric, Ultrasonography, Appendix, Appendicitis, Appendectomy

Introduction

Acute appendicitis is the most common cause of abdominal pain in the pediatric population and requires surgery. Its diagnosis is suspected on the basis of clinical findings widely known. However, the classic signs are not always present and symptoms may be nonspecific and overlap with other causes of abdominal pain. The clinical presentation is also complicated in the pediatric population for their limited communication skills.

In the pediatric population, acute appendicitis is a condition

requiring emergency abdominal surgery and this usually occurs in children between 10-18 years old and is very rare in children younger than 2 years, but can occur at any age. As the incidence of acute abdominal pain is common in children, differentiation of acute appendicitis from other self-limiting non-surgical abdominal diseases is important [1].

Historically it has been computed tomography study of choice in cases of acute abdomen with high sensitivity and specificity, however, in this population it is contraindicated for obvious reasons. Therefore, ultrasonography should be the primary diagnostic imaging modality for the evaluation of acute abdomen in children with suspected acute appendicitis [2-5].

Materials and Methods

In order to know the importance of abdominal ultrasound in the evaluation of acute abdomen in pediatric population with clinical suspicion of acute appendicitis, a retrospective cohort study type in the pediatric population of 1-12 years of age with a diagnosis of acute appendicitis was made and appendectomy during a period of 3.5 years on a second referral hospital level. We included patients aged between 1-12 years old with full file and performing abdominal ultrasound diagnosis. We excluded patients with appendicitis but abdominal ultrasound and those over 13 years regardless of their gender or incomplete file. Descriptive statistical analysis with measures of central tendency and dispersion were used.

Results

During the study period 166 appendectomies were performed in pediatric patients aged 1 to 17 years old with and without ultrasound which were analyzed 43 patients aged 1 to 12 years (25.90%) diagnosed with acute appendicitis and appendectomy with abdominal ultrasound and intra-hospital diagnosis, 74.10% had no ultrasound for diagnostic purposes; The youngest patient was one year and older than 12 years, the most difficult group to diagnose: 1 to 4 years showed 9 cases (21%) one-fifth of patients; male female ratio was 1: 1; the most affected age group was 10 to 12 years with 14 cases (32.56%); in the time of evolution of symptoms the period from 13-24 hours was the highest with 18 cases (41.86%); Most postoperative hospital stay was between 2-3 days with 24 cases (55.81%); the degree of

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Table 1: Epidemiologic dates of 43 pediatrics patients with acute appendicitis and ultrasound diagnostic.

Gender	n	%	Age Groups (años)	n	%	Evolution Time (hours)	n	%	MHS (days)	n	%	Clinical Classification	n	%
Male	22	51.17	1 - 4	9	20.93	6 - 12	14	32.55	2 - 3	24	55.81	I	2	4.65
Female	21	48.83	5 - 6	11	25.58	13 - 24	18	41.86	4 - 6	14	32.55	II	20	46.52
			7 - 9	9	20.93	25 - 48	7	16.27	> 7	5	11.62	III	7	16.27
			10 - 12	14	32.56	49 - 72	3	6.97				IV	14	32.56
						> 73	1	2.32						
Total	43	100		43	100		43	100		43			43	100

MHS: M Hospital Stay

Table 2: Statistical Analysis of 43 patients with acute appendicitis.

Descriptive Statistics	Age (years)	Clinic Clasification	Evolution (hours)	EIH
Median	7	3	30	4
Mediana	7	2	24	3
Moda	6	2	24	3
Standard Deviation	3.18	0.97	26.37	1.96
Coefficient of variation	43.45	35.12	87.48	49.66
Rango	11	3	138	9
Minim	1	1	6	2
Maxim	12	4	144	11

macroscopic appendicitis 20 cases corresponded to grade II (46.52%) and only 4 minor postoperative complications (9.30%) (Table 1) were presented. However, it is striking the number of appendices drilled (grade IV) with 14 cases (32.56%). Statistical analysis is presented in table 2. The ultrasonic obtained were as follows: ultrasonic diagnostic appendicitis 27 cases (63%); diagnostic ultrasound negative 13 cases (30%) and without ultrasound diagnosis (nonspecific) 3 cases (7%).

Discussion

Acute appendicitis is a disease entity that usually requires emergency abdominal surgery. Abdominal pain is actually one of the main symptoms that lead to infant to the emergency room where finally only corresponds to 2% of appendicitis cases aguda [6]. The diagnosis of appendicitis can be a challenge particularly in patients younger than 4 years [7]. Moreover, early diagnosis and surgical management can prevent complications especially in cases of atypical presentation involving misdiagnosis and where required for diagnostic imaging support and thus to delay surgery [8,9].

According to our results in the limitation of imaging study “gold standard” in some cases ultrasound itself delayed the operative management of appendicitis, lack of service permanently as 166 pediatric patients operated for acute appendicitis, only 43 of them they had the ultrasonographic study is only a quarter of them denoting the limited use of this resource and where also a number of these studies were conducted extrahospitalariamente [10,11].

Are well-known sensitivity and specificity of ultrasound for diagnosis of acute appendicitis: from 85 to 100% and 89 to 98% 10 to 12 respectively, which does not agree to that observed in our study where values were obtained below of recognized, however, a limitation in our case is that ultrasounds are performed by not trained medical radiologist but both internal and external, and still found generally satisfactory results in the accurate diagnosis of 27 cases, 13 cases without faults and 3 staff in diagnosing appendicitis ultrasonography [12]. It is also known that the study is operator-dependent which means that while more studies conducted by the staff engaged in performing ultrasounds, more experience you get and the greater number of correct answers (true positive) or (false negative) reach, for which convenient to carry out the study more frequently especially in the emergency department which is where these patients come first at all times [13].

So that the abdominal ultrasound is highly informative in assessing the pediatric population with acute abdominal pain and resulted in a marked change in the treatment plan of these. In addition, some unsuspected diseases can be diagnosed using ultrasound.

Moreover, in our patients is 100% undergoing abdominal radiographs as part of the evaluation protocol of abdominal pain with suspected appendicitis because it is a permanent resource 24 hours; Burr et al. They have studied the time that such a study should be conducted in order to clarify the diagnosis with good resultados [14]. It is shown that other imaging studies have greater potency in terms of sensitivity and specificity, such that Abo et al. [15] found that comparing ultrasound with computed tomography latter is superior to the disadvantages known about radiation, the cost and availability, likewise, Larso et al. They have documented the increased use of CT in these cases in developed countries [16]. In our patients, dramatically request CT. However, this does not mean they should not be used [17-20].

Conclusions

1. The diagnosis of acute appendicitis in minors is difficult.
2. The use of ultrasound in our hospital is limited and its widespread use would improve preoperative diagnostic accuracy.
3. CT studies (to reach) must be used judiciously.

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