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Challenges in uncomplicated acute appendicitis

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ABSTRACT

Acute appendicitis is one of the most common abdominal emergencies requiring surgery. It still represents, however, a challenging diagnosis. In order to facilitate this process, several scoring systems were developed, namely, the Alvarado score, acute inflammatory response and Raja Isteri Pengiran Anak Saleha Appendicitis scores, which are the most used in clinical practice. This clinical condition encompasses a wide spectrum of clinical presentations, from the uncomplicated form to the one with diffuse peritonitis. Treatment of uncomplicated acute appendicitis remains a matter of discussion. Although appendectomy has been regarded as the gold-standard, conservative management with antibiotics is gaining more and more acceptance. The approach to appendectomy constitutes another controversial issue, namely, its performance through an open or a laparoscopic approach, which seems to be establishing itself, in some centers, as the standard of care. With this paper, we intend to give some insight on the aforementioned topics, through a review of the available literature on uncomplicated appendicitis.

1. Introduction

Acute appendicitis is one of the most common abdominal emergencies requiring surgery, with a lifetime prevalence of 7%^[1,2]. However, it may pose a diagnostic challenge as it may mimic other conditions in the early phases of disease. Acute appendicitis encompasses a wide spectrum of clinical presentations, from the uncomplicated form to the one with diffuse peritonitis. While diffuse peritonitis remains an undisputed indication for urgent surgery, discussion focusing on the management of appendicular abscess in uncomplicated appendicitis, revolves around the need for surgery and the surgical approach.

The diagnosis continues to be mainly clinical and the decision whether to operate, observe or perform further workup is not always clear. Most patients with pain in the right lower quadrant do not have acute appendicitis. Several scoring systems were developed to help the clinicians in the diagnosis with the Alvarado score, the Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score and the acute inflammatory response (AIR) being the most used.

The decision whether to operate or not, is key in the management of acute appendicitis. Historically, appendectomy has been the gold-standard for the treatment of acute appendicitis, either via an open or a laparoscopic approach. However, this strategy has been challenged in recent years with the advent of antibiotic therapy and studies documenting less morbidity with this nonoperative strategy^[3].

Authors who advocate a non-surgical approach argue that recurrent appendicitis seems to be a rather infrequent event (ranging from 3% to 30%), usually milder in presentation^[4], and that those who require appendectomy did not experience significant complications^[5].

Having this in consideration, it is important to weigh the benefits and potential disadvantages of both treatment options, keeping in mind that appendectomy itself carries risks and even mortality^[6]. In this setting, it would be beneficial to develop instruments to select patients to either approach^[7].

With this study, we intend to provide some insight on the questions arising nowadays when dealing with non-complicated acute appendicitis.

2. Diagnosis

The diagnosis of acute appendicitis can be achieved by several clinic, radiologic and laboratory criteria.

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The typical presentation includes symptoms such as abdominal pain with migration to the right iliac fossa (RIF), anorexia, nausea and vomiting and signs such as rebound tenderness in the RIF and fever. However, it is important to acknowledge that these signs and symptoms are common to many abdominal conditions, making the diagnosis more challenging, particularly among the young, elderly and females at reproductive age^[2].

Several scoring systems have been developed in order to facilitate early diagnosis of acute appendicitis, with the Alvarado, the RIPASA and the AIR score being the most used in clinical practice (Table 1). They are also applicable for risk stratification, which is a key recommendation of emergency surgical care guidelines^[8,9].

Table 1

Clinical scores in acute appendicitis.

	Alvarado	AIR	RIPASA
Gender			
Female			0.5
Male			1
Age			
< 40 years			1
≥ 40 years			0.5
Symptoms			
Migration of pain	1		0.5
Anorexia	1		1
Nausea	1		
Vomiting		1	
Nausea and vomiting			1
RIF pain		1	0.5
Symptoms < 48 h			1
Symptoms ≥ 48 h			0.5
Signs			
Rebound pain	1		1
Tenderness in right lower quadrant	2		1
Rebound tenderness or muscular defense			
-Light		1	
-Medium		2	
-Strong		3	
Guarding			2
Rovsing's sign			2
Temperature			
≥ 37.3 °C	1		
≥ 38.5 °C		1	
37 °C–39 °C			1
Laboratory values			
Leukocytosis	2		1
White blood cell count			
10.0–14.9 × 10 ⁹ /L			1
≥ 15.0 × 10 ⁹ /L			2
Shift of white blood cell count to the left	1		
Polymorphonuclear leucocytes			
70%–84%		1	
≥ 85%		2	
C-reactive protein (CRP) concentration			
10–49 g/L		1	
≥ 50 g/L		2	
Negative urinalysis			1
Other			
Foreign national registration identity card			1

The Alvarado score is a ten-point scoring system consisting of the following items: migration of pain, anorexia, nausea, rebound pain, elevated temperature, shift of white blood cell count to the left, scoring 2 points each; in turn, tenderness in right lower quadrant and leukocytosis, scoring 1 point each^[10]. This score also encompasses a management strategy, with

proposing to discharge those patients with scores under five, to keep under vigilance those scoring five or six and to operate those with scores over six. Some authors suggest that this system can facilitate the diagnostic process particularly in low-resource countries where imaging modalities are not widely available^[11].

Studies show that Alvarado score is best used as a rule out (scores < 5) diagnostic tool, because even scores > 7 are not specific enough to proceed to surgery without further workup. It is also important to stress that this score's performance is affected by age and gender, for instance, apparently over-predicting acute appendicitis in females of reproductive age and with inconclusive results when it is applied to the pediatric age group (17 or less)^[12].

Another issue regarding the Alvarado score is its applicability to the oriental population where it seems to have less sensitivity and specificity. In this setting, a new scoring system, the RIPASA has been proposed^[13]. The RIPASA system includes several factors which are absent in the Alvarado score, namely, age, gender and duration of symptoms. A study conducted at the Raja Isteri Pengiran Anak Saleha Hospital in Brunei comparing the application of the two scores in a population of two hundred patients with RIF pain observed in the Emergency Department showed that the RIPASA score performed better than the Alvarado score in terms of sensitivity, negative predictive value and diagnostic accuracy^[13]. These authors state that RIPASA might reduce unnecessary testing with a beneficial effect in terms of healthcare costs. Similar results were obtained in another study conducted in India^[2].

The AIR score is based on the same principles of the Alvarado score, similarly stratifying patients in one of three categories: low, medium or high probability of acute appendicitis^[14]. Incorporation of CRP into the score is the most significant difference to the Alvarado score. Considering its performance, according to Kollar *et al.*, both scores are accurate in terms of ruling out appendicitis. However, in terms of specificity, AIR seems to be superior^[11]. Despite of these results, it is important to stress that more studies need to be conducted in order to assess applicability of the score systems mentioned in clinical practice. It is important to stress that these tools not only can be used for diagnostic purposes, but also for stratification, separating those patients who require further workup and those who can be assigned for a certain treatment strategy^[15,16].

Imaging is an important part in the diagnosis of acute appendicitis as well. CT scan is classically considered the best radiological modality for this condition^[1]. However, what radiation exposure and the possible delay might bring to the diagnosis are concerns associated with the widespread application of this diagnostic tool. Ultrasound imaging would obviate some of these concerns, but its operator-dependence weighs against it. Furthermore, it is less accurate than CT scan in making the diagnosis. It is worth mentioning that some studies showing the widespread use of CT scan, even in the absence of an expedited imaging protocol, was not associated with an increased risk of appendiceal perforation^[17]. Despite of the role of imaging tools in diagnosing acute appendicitis, clinical assessment remains the key in the decision-making process. Routine use of imaging techniques including CT in all patients with RIF pain seems not only unnecessary but also potentially prejudicial to the patient. Scoring systems like those

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