

Is preoperative distinction between complicated and uncomplicated acute appendicitis feasible without imaging?



Elina Lietzén, MD,^{a,b} Jari Mällinen, MD,^c Juha M. Grönroos, MD, PhD,^{a,b} Tero Rautio, MD, PhD,^c Hannu Paajanen, MD, PhD,^d Pia Nordström, MD, PhD,^e Markku Aarnio, MD, PhD,^f Tuomo Rantanen, MD, PhD,^g Juhani Sand, MD, PhD,^e Jukka-Pekka Mecklin, MD, PhD,^f Airi Jartti, MD, PhD,^h Johanna Virtanen, MD, PhD,ⁱ Pasi Ohtonen, MSc,^j and Paulina Salminen, MD, PhD,^{a,b} Turku, Oulu, Kuopio, Tampere, Jyväskylä, and Seinäjoki, Finland

Background. One of the main aims of appendicitis research is the differential diagnostics between complicated and uncomplicated acute appendicitis that enable provision of the optimal treatment for each patient.

Methods. Data in the present study were collected prospectively in our randomized antibiotic treatment for uncomplicated acute appendicitis trial (APPAC) comparing surgery and antibiotic treatment for uncomplicated acute appendicitis (NCT01022567). We evaluated 705 patients who had acute appendicitis on computed tomography. Patients with uncomplicated acute appendicitis ($n = 368$) were compared with all complicated acute appendicitis patients ($n = 337$), and subgroup analyses were performed between uncomplicated acute appendicitis and an appendicolith appendicitis (CA1; $n = 256$) and uncomplicated acute appendicitis and perforation and/or abscess (CA2; $n = 78$). Age, sex, body temperature ($^{\circ}\text{C}$), duration of symptoms, white blood cell count (E9/L), and C-reactive protein (mg/L) were recorded on admission. Receiver operating characteristic curves were calculated for white blood cell count, C-reactive protein, and temperature.

Results. CA2 patients had significantly greater C-reactive protein levels (mean 122 and 47, respectively, $P < .001$) and longer duration of symptoms than uncomplicated acute appendicitis patients; 81% of CA2 patients and 38% of uncomplicated acute appendicitis patients had symptoms > 24 hours before admission ($P < .001$). In receiver operating characteristic analysis, C-reactive protein and temperature had clinically significant results only in comparison with uncomplicated acute appendicitis and CA2 (area under the curve > 0.7), but no optimum cutoff points could be identified.

Conclusion. In clinical decision making, neither clinical findings nor laboratory markers are reliable enough to estimate the severity of the acute appendicitis accurately or to determine the presence of an appendicolith. The current results emphasize the role of computed tomography in the differential diagnosis of complicated and uncomplicated acute appendicitis. (Surgery 2016;160:789-95.)

From the Division of Digestive Surgery and Urology,^a Department of Acute and Digestive Surgery, Turku University Hospital; Department of Surgery,^b University of Turku, Turku; Department of Surgery,^c Oulu University Hospital, Oulu; Department of Surgery,^d Kuopio University Hospital and University of Eastern Finland, Kuopio; Division of Surgery,^e Gastroenterology and Oncology, Tampere University Hospital, Tampere; Department of Surgery,^f Jyväskylä Central Hospital and University of Eastern Finland, Jyväskylä; Department of Surgery,^g Seinäjoki Central Hospital, Seinäjoki; Department of Radiology,^h Oulu University Hospital, Oulu; Department of Radiology,ⁱ Turku University Hospital, Turku; and Division of Operative Care and Medical Research Center Oulu,^j Oulu University Hospital and University of Oulu, Oulu, Finland

Supported by a Turku University Hospital Government Research Grant (TYKS EVO Foundation). Dr Salminen has received personal fees for lectures from Merck, Roche, and Lilly.

Accepted for publication April 20, 2016.

Reprint requests: Elina Lietzén, MD, Division of Digestive Surgery and Urology, Kiinanmyllynkatu 4-8, Turku 20520, Finland. E-mail: elina.lietzen@tyks.fi.

0039-6060/\$ - see front matter

© 2016 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.surg.2016.04.021>

IT IS GENERALLY ACCEPTED THAT ACUTE APPENDICITIS does not invariably progress to perforation, as complicated and uncomplicated acute appendicitis are suggested to have different pathophysiologies.¹ It also has been shown that the majority of patients with uncomplicated acute appendicitis can be treated safely with antibiotics as reported in our antibiotic treatment for uncomplicated acute appendicitis (APPAC) trial² and in 3 other randomized trials³⁻⁵ that emphasize the importance of accurate preoperative differential diagnosis of complicated and uncomplicated acute appendicitis.

The diagnosis of acute appendicitis is challenging, even though it the most common reason for a surgical emergency department visit. Several scoring systems involving patient history, physical examination, and laboratory findings have been created to aid in the diagnosis of acute appendicitis,⁶⁻⁹ but in clinical practice, the accuracy of diagnosis without preoperative imaging can vary greatly.¹⁰⁻¹³ These scoring systems were developed to identify patients with appendicitis among all patients who present with suspected appendicitis, and none of the scoring systems enable the differential diagnosis of complicated and uncomplicated disease.^{7,14,15} So far there are no specific biomarkers available either for accurate diagnosis of acute appendicitis¹⁶⁻¹⁹ or for predicting the severity of the inflammation or the presence of an appendicolith.²⁰ We have recently established that imaging plays an important role in the diagnosis of acute appendicitis.^{12,13,21}

Improved diagnostic accuracy resulting from the increased use of imaging has been shown to markedly decrease the negative appendectomy rate. After the implementation of the Dutch guideline for mandatory imaging before operation for all patients with suspected appendicitis, the Netherlands' negative appendectomy rate markedly decreased (from 23% to 6%²¹ and from 19% to 5%²²) from 2008–2011 and resulted in cost savings. Atema et al²³ recently described a novel scoring system that combines clinical and imaging features with promising discriminative performance in identifying complicated and uncomplicated acute appendicitis. The presence of an appendicolith in acute appendicitis has been shown to be associated with a more complicated course of the disease²⁴ and also constitutes a major risk factor in the failure of nonoperative management of acute appendicitis.^{5,25} Computed tomography (CT) has become the gold standard imaging modality for diagnosing acute appendicitis, with a sensitivity of 95–100% and a positive predictive value of 96%.^{22,26,27} CT also enables the important differential diagnosis

between complicated and uncomplicated acute appendicitis. In this study, we aimed to evaluate the feasibility of clinical history and clinical and laboratory findings in establishing the differential diagnosis between uncomplicated and complicated acute appendicitis without the use of imaging in a large, prospective patient cohort with a special interest in predicting the presence of an appendicolith.

METHODS

Patients and data collection. The present study is based on data from our patient material and study protocol, designed to compare surgical and antibiotic treatments for uncomplicated acute appendicitis (APPAC trial).^{2,28} Six Finnish hospitals participated in this multicenter study: 3 university hospitals (Turku, Tampere, and Oulu) and 3 central hospitals (Mikkeli, Jyväskylä, and Seinäjoki). The details of the APPAC study protocol²⁸ and the 1-year follow-up results² have been previously published. Data used in the current study were collected from the patients who underwent a CT scan performed according to APPAC trial protocol. The surgeon on call examined all patients admitted to the emergency department with a clinical suspicion of acute appendicitis. Age, sex, body temperature (taken via the ear, °C), and the duration of symptoms (<12 hours, 12–24 hours, or >24 hours) before admission to hospital were recorded. If acute appendicitis was suspected on the basis of clinical history and physical investigation, blood tests (blood hemoglobin [Hb, g/L]) and white blood cell count (WBC, upper limit of the reference interval 8.2 E9/L), plasma C-reactive protein (CRP, reference <10 mg/L) and creatinine ($\mu\text{mol/L}$), serum human chorionic gonadotropin (HCG, U/L) and urine analysis were undertaken. All patients aged 18–60 years were invited to participate in the APPAC trial and informed of the study protocol. After this, a CT scan was performed to confirm the diagnosis. A total of 1,379 patients were evaluated for enrollment in the APPAC trial.² In the present study, we included all patients ($n = 705$) who had complicated or uncomplicated acute appendicitis on CT as well as patients >60 years old and those who declined to participate in the APPAC trial. The APPAC trial was approved by the Ethics Committee of Turku University Hospital, and all patients gave written informed consent to participate in the study.

Study groups. The patients were divided into complicated and uncomplicated acute appendicitis according to CT findings. Acute appendicitis was

Download English Version:

<https://daneshyari.com/en/article/6254916>

Download Persian Version:

<https://daneshyari.com/article/6254916>

[Daneshyari.com](https://daneshyari.com)