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Appendiceal intussusception, a peroperative surprise: A case report

Peroperatuvar sürpriz; Appendiks intussusepsiyonu: Olgu sunumu

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Abstract

Intussusception of the appendix is very uncommon and when encountered, it may alter surgical procedures. For this reason, it should be kept in mind that appendiceal intussusception may occur in every patient diagnosed with acute appendicitis. It is critical to consider appendiceal intussusception in patients presenting with recurrent nausea, vomiting and chronic abdominal pain.

Keywords: Intussusception of appendix, Acute appendicitis, Surgical procedures

Öz

Apendiks intussepsiyonu nadir görülse de cerrahların ister ameliyat öncesi ister ameliyat sırasında karşılaştıklarında cerrahi işlem basamaklarını değiştirebilecek bir durumdur. Bu nedenle akut apandisit tanısı alan her hastada karşlaşılabileceğinin bilincinde olunması aynı zamanda tekrarlayan bulantı kusma ve kronik karın ağrılı hastalarda intussepsiyonun da akla getirilmesi önemlidir.

Anahtar kelimeler: Apendiks intussusepisyonu, Akut apandisit, Cerrahi prosedür

Introduction

Acute appendicitis (AA) is the most common condition encountered by general surgeons and emergency physicians that necessitates emergency surgery. Therefore, its differential diagnosis needs to be established precisely. Today, clinical scoring and imaging techniques are used for the diagnosis of AA. However, when imaging techniques are unavailable, the diagnosis of a substantial number of patients are based on anamnesis and laboratory analyses, after which they are operated on [1,2]. We herein present the diagnostic and therapeutic approach to a case diagnosed with AA based on clinical, laboratory, and ultrasonographic (US) findings, in which Type III intussusception of the appendix was determined during surgery.

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Case presentation

A 29-year-old male patient was admitted to our Emergency Service with severe nausea, vomiting, and abdominal pain lasting for 2 days. His physical examination revealed extensive abdominal tenderness together with defense and rebound positivity in the right lower quadrant. His laboratory findings were normal except for a leukocyte count of 17000 /mL. On US, appendix diameter had increased to 11 mm and there was enhanced echogenicity in the surrounding mesenteric tissue. The patient was operated on with a pre-diagnosis of AA. The surgical procedure was initiated with a McBurney incision. Appendix, curved on its own mesentery, was visibly inflamed and adherent to the ileal mesentery, which was separated with sharp and blunt dissections with bleeding control. Meanwhile, a mass-like formation was palpated at the point where appendix is attached to the cecum (Figure 1). Cecum was mobilized. The mass-like formation was considered an appendiceal intussusception (AI). When the appendix was slightly suspended after the division of the serosa, it was observed that the mass-like formation disappeared by sliding back to the appendix (Figure 2). Appendectomy was performed at the base of the cecum. Pathological examination revealed a material 7.3 cm in length and 1.3 cm in diameter with its serosa surrounded by purulent exudate and the appendix wall showing bleeding on serial sections, which was consistent with AA. Written and verbal informed consent form obtained from patient.

Figure 1: Palpable mass at the point where appendix attaches to the cecum

Figure 2: Reduction of intussusception after opening the serosa

Discussion

Acute appendicitis is the most common condition encountered in 6% of the general population during evaluation of acute surgical abdomen [1,2]. Differential diagnoses of patients visiting emergency services due to abdominal pain may range from urinary tract infections to peptic ulcer perforation, and from AA to ectopic pregnancy. Detailed medical history and physical examination are helpful in differentiating between various conditions.

The scoring systems used for diagnosis of AA establish a cost-effective control mechanism and save time by preventing unnecessary testing. Among these, Alvarado and RIPASA scoring systems are well known and widely used [1,2].

Appendix intussusception was defined in 1858 by Mckidd [3] during the post-mortem examination of a 7-year-old male patient. Afterwards, in 1897, Whright and Renshaw [4] and Pitts and McGraw [5] reported the successful surgery of a 13-year-old male patient. In 1963, Collins published a review investigating the surgical and autopsy examinations of 71000 appendices in a 40-year period and reported the prevalence of AI to be 0.01% [6]. In their literature review, Chaar et al. [7] determined 190 cases of AI reported between 1993 and 2009 worldwide.

The classification of AI, which was first defined in 1910 by Moschowitz [5], was modified in 1941 by McSwain [8] (Table 1).

Table 1: Classification of appendix intussusception modified in 1941 by McSwain [8]

Type I	The proximal end of the appendix invaginates into the appendix and intussusception occurs into the appendix.
Type II	Invagination begins anywhere on the appendix and intussusception of the adhered tissue occurs.
Type III	Invagination occurs from the junction of the appendix and cecum to the cecum. Intussusception occurs into the cecum.
Type IV	There occurs retrograde intussusception. The proximal appendix invaginates into the distal appendix.
Type V	Complete invagination of the appendix into the cecum from progression of type I, type II or type III.

In the review by Chaar et al. [7] only 32% of the patients were diagnosed during the preoperative period and 63% of the patients presented with chronic abdominal pain increasing and decreasing in intensity, intermittent nausea and vomiting, and occasional rectal bleeding for weeks or months. They reported that 11% were diagnosed by histopathological examination of the specimen and 57% were diagnosed peroperatively. Moreover, while 19% had inflammation only, 33% had endometriosis, 19% had mucocele, 11% had adenoma, 7% had carcinoid tumor, and 6% had adenocarcinoma. In that review, the surgical procedures performed on the patients ranged from appendectomy to right hemicolectomy [7].

The medical history of our case revealed complaints for 2 days. The patient described pain initially starting with nausea and vomiting. Besides, the patient was operated on without need for an additional analysis as his US confirmed the clinical and laboratory findings. During the surgery, a mass-like formation was detected in the cecum.

The review by Chaar et al. [7] opted us to think about two issues. First, whether the simple tests are adequate in establishing the diagnosis of AA and second, what should the decision of the resection margin be based on in such a case?

Rational use of clinical and laboratory findings when imaging modalities are unavailable is helpful in deciding on the surgical treatment of patients with acute abdomen. Rational use of either Alvarado or RIPASA scoring system is important for clinicians. Monitoring of clinical and laboratory parameters would be instructive in suspicious cases. While US examination is adequate in centers where imaging systems are available, in clinically suspicious cases, it is recommended to perform US

first, and computed tomography (CT) second. Laboratory and imaging techniques can be performed at intervals together with clinical follow-up in un-diagnosed cases [9].

Levine et al. [9] stated that in addition to US examination being user-dependent, CT also has pitfalls in diagnosing AA. Therefore, they emphasized that clinicians needed to act considering clinical examination, laboratory analyses, and imaging techniques all together. Although various facilities now initially perform CT for diagnosis, many other centers prefer US as the first choice, akin to this case. However, CT can be preferred when the diagnosis of appendicitis cannot be established [9].

With regards to the decision of resection margin, it has been demonstrated that malignancy or malignancy-related situations are the causes of AI in nearly 40% of the cases; however, potential burden of the surgical procedure on the patient should also be taken into account [10]. Obviously, it will be difficult to distinguish an AI caused by an inflammatory scar from an AI caused by malignancy. Although experience plays a significant role in peroperative evaluation, surgeons should act knowing that each surgeon has the potential of making mistakes. In this case, we preferred appendectomy alone for the patient who underwent surgery for AA, because AA was the primary cause of acute abdomen, it was an early diagnosis, the patient's blood parameters were stable and serosal thickening had newly developed in the base of the appendix. After this decision, examination of the pathologic frozen section during the surgery could have provided early diagnosis of malignancy and, if necessary, enabled surgery to be extended. Since pathological examination of frozen section is not available in our center, the treatment decision was based on the definite pathological findings.

Atkinson et al. [10] defined the clinical presentation of AI in four groups: patients presenting with classical signs of AA, those presenting with a clinical picture of intussusception, those with prolonged clinical history including recurrent pain in the right lower quadrant, vomiting, and rectal bleeding, and those not primarily determined to have AI clinically but incidentally detected to have AI during colonoscopy or radiological examination.

In patients suffering predominantly from nausea and vomiting, as was in the present case, or in those suffering predominantly from clinically overt intussusception, contrast-enhanced CT can be performed to better understand the intraabdominal event even when US suggests AA [11]. However, clinicians decide surgery without need for CT taking cost-effectiveness and necessity of rational use of time into account and due to the likelihood of overlooking AI as it is a rare condition.

According to the evaluation in the review by Chaar et al. [7], considering the malignancy-related situations in 40% of AI patients, it is the surgeon's decision to choose preventive approach by performing aggressive surgery for cases detected during surgery. Availability of pathological examination of frozen sections would be helpful to decide rapidly about the treatment in these patients. For the centers where frozen pathology is unavailable, we believe that there are two different alternatives: One of them is performing appendectomy after correcting AI and taking actions according to the definite pathology findings and the other is completing the procedure with extensive resection from the cecum and waiting for the definite pathology findings. In fact, both approaches can be considered inconvenient since malignancy is pointed out as the primary cause of intestinal intussusception in adult cases. Moreover, surgical intervention should also minimize mortality and morbidity. In our case, it was observed that intussusception was corrected as the serosa was divided, after which appendectomy was performed.

Another issue to be questioned is the potential pitfalls when laparoscopic appendectomy is planned in a similar case. The comfort of laparoscopic surgery for both the surgeons and patients cannot be underestimated. However, it is obvious that unavailability of palpation during laparoscopic surgery would make the intraoperative recognition of undiagnosed intussusception difficult for the surgeon. In addition, unrecognized intussusception would be associated with postoperative complications as well. For this reason, the guidance of collaborative radiologists is always valuable.

Conclusion

Surprising situations resulting from frequent emergency conditions such as AA might be the starting point of long-lasting efforts for both the patient and the surgeon. Intussusception should also be kept in mind among other pathological parameters as well as appendicitis in cases presenting with abdominal pain in the right lower quadrant and confirmation by CT and surgical planning are required in suspicious cases.

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