

# Stump appendicitis

## Appendicitis del muñón

Gonzalo López-Aguirre,\* Ángel Jesús Sosa-Canché,† Alfredo Briones-Aranda,§  
Rommel Ramírez-López,¶ Samantha Bershneister-Morales||

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### ABSTRACT

We present the case of a nine-year-old male patient with a history of appendectomy 30 months before his admission; he presented abdominal pain of 10 days of evolution, suggestive of an appendicular condition. An ultrasound and an abdominal resonance suggested a collection in the right iliac fossa, so exploratory laparotomy was performed, finding appendicitis of the stump. A bibliographic review of the subject is made. Stump appendicitis should be considered as a diagnostic possibility in cases of lower abdominal pain, mainly when there is a history of previous appendectomy. An early diagnostic suspicion can avoid important complications.

### RESUMEN

Se presenta el caso de un paciente masculino de nueve años con antecedente de apendicectomía 30 meses antes de su ingreso; presenta dolor abdominal de 10 días de evolución, sugestivo a un cuadro apendicular. Un ultrasonido y una resonancia abdominal sugirieron una colección en la fosa iliaca derecha, por lo que se realizó laparotomía exploradora, encontrando apendicitis del muñón. Se hace una revisión bibliográfica sobre el tema. La apendicitis del muñón debe ser considerada como una posibilidad diagnóstica en cuadros de dolor abdominal bajo, en particular cuando hay el antecedente de apendicectomía previa. Una sospecha diagnóstica temprana puede evitar importantes complicaciones.

\* Physician from the University of León, Spain. General Surgeon assigned to the General Surgery Service, Hospital Chiapas Nos Une "Dr. Jesús Gilberto Gómez Maza", Instituto de Salud del Estado de Chiapas. Full-time Professor, Faculty of Human Medicine "Dr. Manuel Velasco Suárez", Autonomous University of Chiapas. Tuxtla Gutierrez, Chiapas, Mexico.

† General Surgeon assigned to the Hospital 5 de Mayo of the Instituto Mexicano del Seguro Social. Tuxtla Gutierrez, Chiapas, Mexico.

§ PhD in Pharmacology. Member of the National System of

## INTRODUCTION

Acute appendicitis is the most frequent abdominal emergency, and appendectomy is the most common non-elective surgery performed by general surgeons, with more than 250 thousand cases per year in the United States alone. The inflammatory process begins with an obstruction of the appendiceal orifice, followed by an increase in intraluminal pressure and a decrease in lymphatic drainage (catarrhal phase), followed by venous obstruction (phlegmonous phase), which may progress and involve arterial compromise with ischemia (necrotic phase), culminating in perforation of the appendix and causing localized or generalized peritonitis.<sup>1</sup> The mortality rate of acute appendicitis is low; however, although there are common postoperative complications, we should not

overlook those less frequent, such as stump appendicitis.

Stump appendicitis (SA) is an inflammation of the appendiceal remnant after an incomplete appendectomy, which may result in local inflammation, abscess formation, peritonitis, or intestinal obstruction.<sup>2</sup>

## PRESENTATION OF THE CASE

We report the case of a nine-year-old male with a history of having undergone surgery for acute appendicitis two and a half years before his current condition, which began 10 days before his admission and was characterized by generalized abdominal pain and vomiting on two occasions with gastro alimentary characteristics, managed by a physician with unspecified analgesics and without improvement. He continued with abdominal



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Researchers. Full-time Professor, Faculty of Human Medicine "Dr. Manuel Velasco Suárez", Autonomous University of Chiapas. Tuxtla Gutierrez, Chiapas, Mexico.  
 ‡ Second-year resident of General Surgery, Hospital Chiapas Nos Une "Dr. Jesús Gilberto Gómez Maza", Instituto de Salud del Estado de Chiapas. Tuxtla Gutierrez, Chiapas, Mexico.  
 || First-year resident of General Surgery, Hospital Chiapas Nos Une "Dr. Jesús Gilberto Gómez Maza", Instituto de Salud del Estado de Chiapas. Tuxtla Gutierrez, Chiapas, Mexico.

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pain, predominantly in the right lower quadrant, accompanied by nausea and vomiting. For this reason, he went to the Emergency Department of the hospital, where the patient was found with pain in the right lower quadrant, in the trigger position, and with data of peritoneal irritation. Laboratory tests were requested, reporting a hemoglobin level of 13.0 mg/dl, hematocrit of 38.2%,  $15.15 \times 10^9$  white blood cells, and 76.4%



**Figure 1:** Simple abdominal plain film showing an antalgic rectification of the spine. The arrow indicates a fixed loop in the right iliac fossa.



**Figure 2:** Ultrasonographic imaging shows a liquid collection at the lower right quadrant. The arrow points to the collection.

neutrophils. The plain abdominal X-ray showed a fixed loop image in the right iliac fossa (*Figure 1*). An abdominal ultrasound was requested, which reported a collection of  $5 \times 4$  cm (*Figure 2*), so the General Surgery Service was consulted since there was no pediatric surgeon on shift; 24 hours after admission, the patient was evaluated by surgery, finding the patient with discrete voluntary resistance in the right lower quadrant and peritoneal irritation. An abdominal MRI was requested to determine the probable etiology of the collection, which reported an amorphous collection in the right iliac fossa, with irregular and well-defined borders, measuring  $5.1 \times 4.3 \times 4.9$  cm in its longitudinal and transverse anteroposterior diameters, respectively, compatible with an abscess in the right iliac fossa.

He underwent an exploratory laparotomy, and an infraumbilical incision was made, finding a localized abscess of about 50 cm<sup>3</sup> in the right iliac fossa; also, an elongated appendicular stump of approximately 8 cm, perforated at the tip, with a friable base and a free fecalith in the cavity-resection of the appendicular remnant, drying of the cavity, and placement of drainage were performed. In the postoperative period, antibiotic therapy (ceftriaxone and metronidazole) was administered, leaving the patient fasting for 48 hours postoperatively and then progressively evolving to a regular diet; care of the surgical wound and monitoring the Penrose expenditure, which was withdrawn on the seventh day, were also included. The patient was discharged 10 days after the operation and seen at the outpatient clinic.

## DISCUSSION

Stump appendicitis is a rare complication that occurs after appendectomy and is caused by an obstructive and inflammatory process of the remaining portion of the appendix. Many factors can influence the presentation of stump appendicitis: failure to identify the base of the appendix, a sub serosal appendix or a retrocecal appendix, either partially or totally, and very severe inflammatory processes that hinder good dissection.<sup>3</sup>

Although the true incidence of stump appendicitis is unknown and difficult to

establish,<sup>4</sup> some authors estimate it to be one per 50,000 cases.<sup>5</sup> Different publications have proposed varied data regarding incidence: Dikicier,<sup>6</sup> based on different publications, established a frequency ranging from 0.06 to 0.15%. In contrast, Burbano and associates<sup>7</sup> considered the incidence not as rare as estimated since three different publications found the incidence was 1.37, 0.62, and 1.27 per 1,000 appendectomies performed. SA was first described by Rose in 1945. It can occur in any age group, with an average age of  $35.8 \pm 17$  years and a range of between 2 and 75 years.<sup>8</sup> It often occurs above the age of 50 years, with an interval after the original appendectomy ranging from four days to several decades.

Even though the signs and symptoms of stump appendicitis do not differ from those of acute appendicitis, its diagnosis *a priori* is not simple, taking into account the history of previous appendectomy and not infrequently it is performed at the time of surgery, which is why a delay in the diagnosis and an increase in the probability of complications is frequent.<sup>6,8,9</sup> The frequency of perforation varies according to the literature, ranging between 16 and 30%; however, it is closely related to the delay in diagnosis in the extremes of life or atypical presentations of the painful picture.

On the other hand, the main factor for the incomplete removal of the appendix is the lack of good visualization of its base and its origin in the cecum, either by following the path of taenia coli to its base or by locating the branch of the appendicular artery that indicates the base of the appendix. This difficulty may also be due to a severe inflammatory process or the appendix's retrocecal or subserosal position.<sup>4,10</sup>

Imaging studies, such as ultrasound and computed tomography, are often helpful in guiding the diagnosis. Ultrasound has a sensitivity and specificity of 44 and 93%, respectively, and computed tomography has a sensitivity and specificity of 97 and 94%, respectively.<sup>5,11</sup>

An ultrasound scan can detect an increase in the size of the stump, evidence of free fluid in the right iliac fossa, and edema in the cecum;<sup>12,13</sup> while computed tomography can show inflammatory changes in the perirectal region, thickening of the cecal wall (arrowhead

sign), fluid in the pericecal and paracolic area, and even demonstrate the presence of a tubular structure related to the cecum or even the appendicolith.<sup>14</sup>

The incidence and prevalence of stump appendicitis have been increasing in recent years, and it occurs in both open and laparoscopic procedures.<sup>9</sup> Most of the cases reported in the literature associate stump appendicitis in open procedures in 55 to 66% of the reported cases.<sup>5,10</sup> It has been found that stump appendicitis is more frequent in patients with a history of previous open appendectomy, which could be explained by different reasons: either because open appendectomy is more frequent than laparoscopic appendectomy, because not all cases of stump appendicitis are diagnosed or reported, or because more experienced surgeons perform most endoscopic procedures and they are usually more careful, among other factors.<sup>5</sup>

Regardless of whether an open or laparoscopic appendectomy is performed, optimal visualization of the appendicular region is recommended, placing the appendix at 10 o'clock, the free taenia at 3 o'clock, and the terminal ileum at 6 o'clock, in addition to complete exposure of the mesoappendix and ligation of the accessory branch of the appendicular artery (artery of Seshachalam).<sup>15</sup>

The delay in diagnosis goes hand in hand with the delay in treatment. Dikicier and collaborators<sup>6</sup> report an average of two days from patient arrival to surgical treatment. Complications can range from an abscessed appendix<sup>9</sup> to necrosis of the cecum, secondary to the infectious process.<sup>6</sup> The condition most related to stump appendicitis is the length of the appendiceal remnant. This complication is particularly present when the residual appendix exceeds 5 mm.<sup>15</sup>

Einem and associates,<sup>10</sup> based on a review of 35 cases, reported that the average length of the appendicular remnant in patients initially operated on laparoscopically was 3.9 cm. In contrast, the average length in patients operated on by open surgery was 2.6 cm, a statistically significant data ( $p = 0.048$ ).

The treatment of choice for SA is to complete the resection of the appendix, conventionally or laparoscopically; however,

up to 18% may require ileocecal resection. Reports in the literature have shown that an open approach has done more than 50% of the cases, and almost a third have required intestinal resection;<sup>15</sup> likewise, some authors report that up to 68% of the cases of stump appendicitis that were operated on presented a perforation.<sup>6,15</sup>

## CONCLUSIONS

Although a rare complication, appendicitis of the stump should be considered a diagnostic possibility in patients with a history of appendectomy who have symptoms and signs compatible with acute appendicitis, mainly if there is no other apparent cause. Imaging studies, primarily computed tomography, are advisable to rule out other possible causes of pain and support the diagnostic suspicion.

The treatment is surgical intervention, either by conventional or laparoscopic means, to complete the resection of the appendicular remnant without leaving a length greater than 5 millimeters.

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### Correspondence:

**Dr. Gonzalo López Aguirre**

**E-mail:** gonzalo.lopez@unach.mx  
drloagon@hotmail.com