



# Intestinal intussusception in the context of acute appendicitis: a case report and review of the literature

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## Abstract

**Introduction:** Intussusception is an idiopathic abdominal pathology secondary to intestinal processes that act as starting points for intussusception. Cases of dragging of structures that lead to other inflammatory processes, such as acute appendicitis, have been described.

**Clinical case:** A 3-year-old boy with abdominal pain of 6 hours of evolution. On physical examination, he appeared pale, drowsy, tachycardic, and dehydrated. The abdomen had positive appendiceal signs, with palpation of a mass in the right iliac fossa.

**Diagnostic workshop:** leukocytes 9690 u/mm<sup>3</sup>, neutrophils 58.1%. Ultrasound with an image suggestive of intestinal intussusception with inflammatory changes in the mesenteric fat. An abdominal tomography was performed that reported ileocolonic intussusception of 47 x 50 mm, with multiple mesenteric reactive nodes, an appendicular image in the pelvic direction, and an appendicolith inside.

**Evolution:** Surgical management included an exploratory laparotomy with manual evagination and conventional appendectomy. The pathology report was acute suppurative appendicitis. The patient was hospitalized for 48 hours and received ampicillin + sulbactam and analgesia. When abdominal function improved, he was discharged.

**Conclusions:** In this case, acute appendicitis was the cause of intestinal intussusception with the ultrasound sign of the "target" in a 3-year-old patient.

**Keywords:** MESH: Appendicitis; Child; Appendectomy; Echogenic bowel.

## Introduction

Intussusception is a frequent cause of acute abdomen in childhood, with a prevalence of 0.33 - 0.71 cases/1000 children and a peak between 3 and 9 months of age, up to 2 years, being more frequent in

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men and the white race [1]. It is usually challenging to identify due to its atypical course, which requires a high level of suspicion for timely diagnosis and treatment to prevent complications such as ischemia, intestinal perforation, and shock [2].

It is the telescopic invagination of one intestinal segment into another, causing compression of vascular and tissue structures, edema, venous stasis, and ischemia. It usually involves the small intestine but sometimes also consists of the cecum and the colon [2].

The gold standard in diagnosis is ultrasound, which has been used since 1980 due to its high sensitivity and specificity in characterizing the disease and the absence of irradiation compared to other diagnostic methods. Historically, treatment was based on the use of air enemas, followed by the incursion of surgical resolution in 1940, improving the survival of these patients [3].

Below is the case of a patient who suddenly presented severe acute abdominal pain and presented an unusual clinical course of intussusception and its complications.

## Clinical case

### Clinical history

A 3-year-old male patient, a product of the second pregnancy, had no prenatal history. He had a history of hip dysplasia at three months without other relevant data in his past. He went to the emergency room with a picture of abdominal pain of great intensity, of sudden onset, of 6 hours of evolution, without irradiation, which manifests itself in paroxysms, with periods of relief between episodes of pain, accompanied by vomiting on several occasions and soft stools with a blackish appearance.

### Physical exam

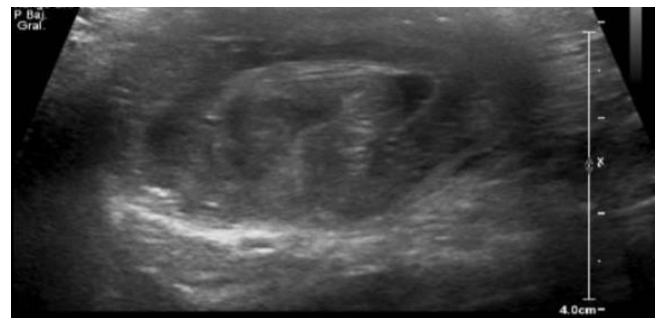
On physical examination, he appeared pale, drowsy, tachycardic, and dehydrated. The abdomen had positive appendiceal signs, with palpation of a mass in the right iliac fossa.

### Complementary exams

Complementary tests: blood count: leukocytes 9690 u/mm<sup>3</sup> (reference value 5500-15500/mm<sup>3</sup>), neutrophils 58.1% (reference value 25-60%), lymph: 34.2% (reference value 25-50%), CRP 3.7 mg/dL (reference value 0 to 0.5 mg/dL).

Abdominal ultrasound: The image of a pseudo kidney in the right flank, with a target sign in the cross-section (Figure 1), is suggestive of intestinal intussusception with inflammatory changes in the mesenteric fat.

**Figure 1.** Target sign in cross-section at the level of the right iliac fossa.



An abdominal tomography was performed that reported ileocolonic intussusception of 47 x 50 mm, with multiple mesenteric reactive nodes, an appendicular image in the pelvic direction, and an appendicolith inside.

### Clinical and surgical management

The clinical management carried out in the emergency area was aimed at compensating for the state of dehydration and providing. The surgical management included an exploratory laparotomy plus manual dedusting and conventional appendectomy, obtaining the following findings:

1. Intussusception involving the ileum, cecum, appendix, and ascending colon (Figure 2), good perfusion with no signs of necrosis, ileal mesenteric lymph nodes, and swollen terminal ileum.
2. Appendix included in intussusception with the edematous distal third, serous fluid of approximately 5 ml.

**Figure 2.** Operative finding, intussusception.**Histopathological study:**

**Macroscopic examination:** The specimen received consisted of a cecal appendix measuring 6.0 x 1.0 cm, lined by serosa, with congested vessels. When cut, light with fecaloid material. **Microscopic examination:** appendix wall with mixed infiltrate and hyperplastic lymphoid follicles in the mucosa. Neutrophils reaching the muscle are observed. Serosa with congestion, the diagnosis of acute suppurative appendicitis is established.

**Evolution**

The patient remained hospitalized for 48 hours, and an antibiotic based on ampicillin + sulbactam and analgesia were administered. During the stay, he showed improvement in abdominal function and was discharged without complications.

**Discussion**

Intussusception is an entity of idiopathic origin in 90% of cases. Nevertheless, it has been related to pathological causes such as gastrointestinal infections, lymphoid hyperplasia, Meckel's diverticulum, Henoch-Schönlein purpura, lymphomas, polyps, hemangiomas, enteric duplication, and iatrogenic causes (10% of cases) [4].

followed by ileoileocolic, colocolic, ileocolocolic, ileoileal, and jejunojejunal [5-9]. In the present case, the ileocolic location associated with appendiceal invagination is described, leading to acute appendicitis that required surgical resolution. Wang (2010) [10]

reported a similar case in a 10-year-old male who presented with intussusception and acute appendicitis secondary to ileocecal Burkitt lymphoma. This finding correlates with that reported by Sheng-Miao (2022) [9], who describes the experience of cases where the appendix acts as a site susceptible to intussusception due to infections or unusual anatomical positions, representing appendiceal congestion during the release of intussusception, a finding also described in the present clinical case [9].

It presents with the triad of colicky abdominal pain, bloody stools (currant syrup), and palpable abdominal mass (50% of cases), demonstrating this triad in the present case [4]. Other symptoms, such as fever, diarrhea, constipation, bloating, and rectal bleeding, may appear [11-13]. According to the progression of the picture, it is accompanied by bilious vomiting, lethargy, dyspnea, paroxysms of pain, and sepsis.

The diagnosis is based on clinical and imaging findings. Ultrasound has 97.9% sensitivity and 97.8% specificity, showing a hypoechoic ring with central echogenicity (target sign) in transverse vision and enhancement of the intestinal wall containing mesenteric fat (target sign). pseudo kidney) in longitudinal view [4].

The finding of reactive lymph nodes within the lesion is pathognomonic of intussusception due to dragging of the peritoneal structures in telescopic movement. Doppler imaging makes it possible to identify the vascularity in intussusception, showing the presence of associated vascular complications, which contributes to decision-making in management. Tomography allows thorough characterization of the lesion, vascular compromise, and related complications, as well as the cause of intussusception (anatomic abnormalities or tumor processes) [12].

Conservative treatment is based on reduction with pressurized air enema at 6-12 kPa or hydrostatic enema with saline solution at 30 ml/kg or barium, with ultrasound, fluoroscopic, or radiological assistance in case of contrast [12]. Zhihuan (2022) reported a 96%

success rate in reduction by enema, being the preferred treatment in these patients, especially in pictures <48 hours of evolution [5].

According to a study carried out by Lampl (2017), each hour of delay in diagnosis was associated with failure in the effectiveness of conservative management, with a 5.2% risk of requiring surgical intervention to resolve intussusception [6]. As a management alternative, the use of adjuvants such as glucagon and dexamethasone during enemas has been reported, but there is insufficient evidence to recommend their routine use [7].

Surgical reduction is indicated when there is failure to disinvaginate with enema or complications such as peritonitis, intestinal perforation, or shock occur. The laparoscopic technique is currently preferred, as it is safer and more effective. It requires a shorter hospital stay [8], with a success rate of 88% with laparoscopic surgery and only a 5.4% risk of conversion to laparotomy [9].

In cases of intestinal compromise or an approach to the cause of intussusception, the open technique or, as an alternative, the extension of the umbilical wound in laparoscopy is indicated. In the present case, open surgery was preferred for the resolution of acute appendicitis during the procedure. Some studies have described resection of the intestinal segment that caused intussusception and fixation to the retroperitoneum. Nevertheless, no clinical benefit has been found, especially in the absence of necrosis or perforation [10].

The recurrence rate of intussusception is between 2-20%, mainly associated with secondary causes as a starting point, with intervals between episodes of 24 hours up to 21 months, with 3.4% of cases of spontaneous reduction and only 0.7%. % of cases managed surgically [5].

## Conclusions

In this case, acute appendicitis was the cause of intestinal intussusception with the ultrasound sign of the "target" in a 3-year-old patient.

## Abbreviations

PCR: C-reactive protein.

## Supplementary information

No supplementary materials are declared.

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Does not apply.

## Author contributions

María Alejandra Mafla: Conceptualization, Data conservation, Acquisition of funds, Research, Resources, Software, Writing - original draft.

Eduardo Zambrano: Conceptualization, Data conservation, Supervision, Acquisition of funds, Research, Resources.

Johanna Álvarez: Conceptualization, Supervision, Acquisition of funds, Investigation, Resources.

All authors read and approved the final version of the manuscript.

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## Availability of data and materials

The data sets generated and analyzed during the current study are not publicly available due to clinical case confidentiality.

## Statements

### Ethics committee approval and consent to participate

Not required for clinical cases.

## Publication Consent

The authors have permission for publication from the patient's parents.

## Conflicts of interest

The authors declare they have no conflicts of interest.

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