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PHOTO QUIZ

A 23-year-old Female with Abdominal Pain in the Emergency Department; a Photo Quiz

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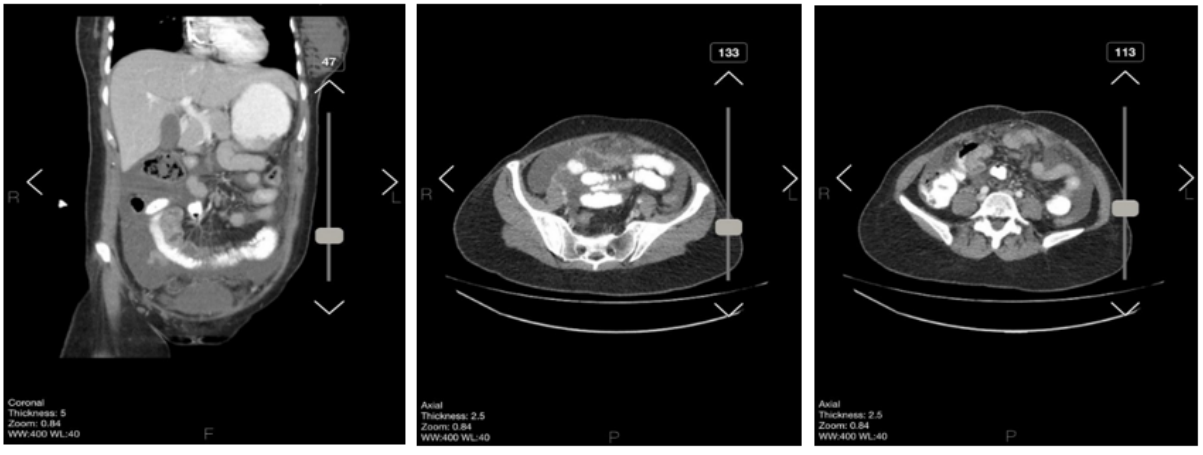

Figure 1: Different views of abdominal computed tomography scans of the patient with intravenous and oral contrast

1. Case presentation

A 23-year-old female patient with a history of heart disease and a pacemaker for the last four years and a cesarean section 22 days ago came to the emergency department (ED) complaining of abdominal pain. Abdominal pain started seven days ago, which was vague and intermittent at first and misdiagnosed as postpartum pain in an outpatient visit. After a few days, nausea and vomiting accompanied the patient's symptoms, the abdomen became distended, and episodes of abdominal pain occurred with shorter intervals and greater intensity. The patient was referred to the ED as the abdominal pain became more severe. The initial vital signs of the patient in the ED included a blood pressure of 100/60 mmHg, a heart rate of 98 beats/minute, respiratory rate of 18 /minute, oral temperature of 37.8 Celsius, and a saturation O2 of 96% on room air.

On examination, the patient appeared agitated; her abdomen was distended with reduced bowel sounds, no palpable mass was found in the abdomen, and generalized tenderness with rebound tenderness was present in the epigastrium and hypogastrium.

White blood cell (WBC) count was up to 14000 per microliter (84% neutrophil) and Hemoglobin 14 mg/dl. Arterial blood gas (ABG) analysis had evidence of metabolic acidosis and mild hypokalemia. A portable abdominal X-ray was performed, and no specific findings were observed.

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An emergency ultrasound of the patient reported dilated bowel loops and free fluid in the posterior cul de sac. After intravenous (IV) hydration therapy, antibiotic therapy, and stabilization of vital signs, the patient underwent an abdominal computed tomography (CT) scan with IV and oral contrast due to the suspicion of peritonitis (figure 1).

What is your diagnosis?

2. Diagnosis

2.1. Peritonitis due to intestine duplication cyst (IDC) rupture

Abdominal CT scan revealed a blind-ended loop with a thick and edematous wall and irregular enhancing mucosa adjacent to the mesenteric side of the distal ileum along with thick peritoneum, a large number of ascites, and engorgement of mesenteric vasa recta (Figure 1 with arrows). According to the imaging, laboratory, and clinical findings the patient was diagnosed with peritonitis due to intestine duplication cyst (IDC) rupture and underwent emergency surgery. Due to having a pacemaker and the clinical condition of the patient, an emergency consultation with the cardiologist was done, in which complete blood pressure and heart rate monitoring, as well as reduction of surgery time duration, were suggested. The patient was transferred to the operating room for exploratory laparotomy. After opening the patient's abdomen and draining purulent secretions, a perforated IDC was observed at a distance of 60 cm from the Ileocecal valve. About 20 cm of the small intestine, which included the IDC and the perforation site, was resected and anastomosed with a 75 linear Steller as a side-to-side anastomosis (Figure 2). In order to check histological pathology, samples were taken from IDC, which showed mucosal transition between squamous and glandular epithelia, as well as foveolar and oxyntic glands, secreting mucous substance (Figure 3).

2.2. Patient's fate

After the operation room, the patient was immediately transferred to the intensive care unit (ICU). The patient was transferred to the general surgery ward after three days of monitoring in the ICU with a conscious state and stable vital signs. After five days of hospitalization in the ward and complete tolerance of per os (PO), she was discharged with good general condition.

3. Discussion

IDC, which was first proposed by Fitz in 1840, manifests itself in about 80% of cases before the age of two in the form of acute intestinal or abdominal abstraction (1) and occurs in vast regions of the gastrointestinal tract, which usually involves the mesenteric border of the intestinal wall, but it can also be seen in the ante-mesenteric side with less prevalence. IDC's size varies from a few centimeters to 60-65 cm (2, 3). Peri et al. structurally classified IDCs into spiral and cystic forms attached to the intestinal wall.

Histologically, it is made of smooth muscle like the intestine, and its mucosal surface is similar to the part of the gastrointestinal tract to which it is attached (4). The signs and symptoms of IDC depend to a large extent on its location; these patients usually present with bowel obstruction or gastrointestinal bleeding. A palpable abdominal mass is observed in half of the patients, abdominal pain is present in 75% of patients, and abdominal distension is found in 30% of patients (5).

The primary diagnosis of IDC is challenging and it is usually misdiagnosed as Meckel's diverticulum, still there are two major differences between them in terms of histology: 1. The vascular system of Meckel's diverticulum is separate, while IDC is supplied by the intestinal vascular system 2. Unlike Meckel's diverticulum, the IDC wall is made of smooth muscle (6). In a study on IDC and Meckel's diverticulum conducted by Hamza et al., it was concluded that in the treatment of these conditions, resection surgery would be the best choice in both an acute or chronic stage, considering the complications and problems such as GI bleeding, acute abdomen, and malignancy that can be seen in both (7). Many cases of IDC remain undiagnosed before surgery; in a study conducted in South Korea, out of 16 IDC patients who underwent laparoscopy, only four cases were diagnosed before surgery, so it is an option that should be considered in cases of undiagnosed gastrointestinal system problems (8).

Surgical treatment is performed both laparoscopically and open. Due to the common vascular system and wall with the intestine, the part of the intestine to which the IDC is connected must also be resected (9). The IDCs near the Ampulla of Vater are challenging for surgeons due to difficult access. However, in cases of inability to remove IDC by surgery, drainage, and evacuation would be the option. In the presence of an expert endoscopist, IDCs in the proximal part of the digestive tract can be resected endoscopically. If there is gastric mucosa in the IDC, anti-acid drug treatment can be used to reduce the risk of bleeding and perforation.

According to the studies conducted in this field regarding the complications of non-surgical treatment for IDC, such as malignancy, peritonitis, and gastrointestinal tract obstruction, all patients suspected of IDC should undergo surgical resection.

The was treatment limitation in the reported case due to the underlying heart problems of the patient. Thus, according to the advice of the cardiologist, the duration of the surgery should be as short as possible. The strengths of treatment included the readiness of the radiologist and surgical team for imaging and preparing the patient for surgery.

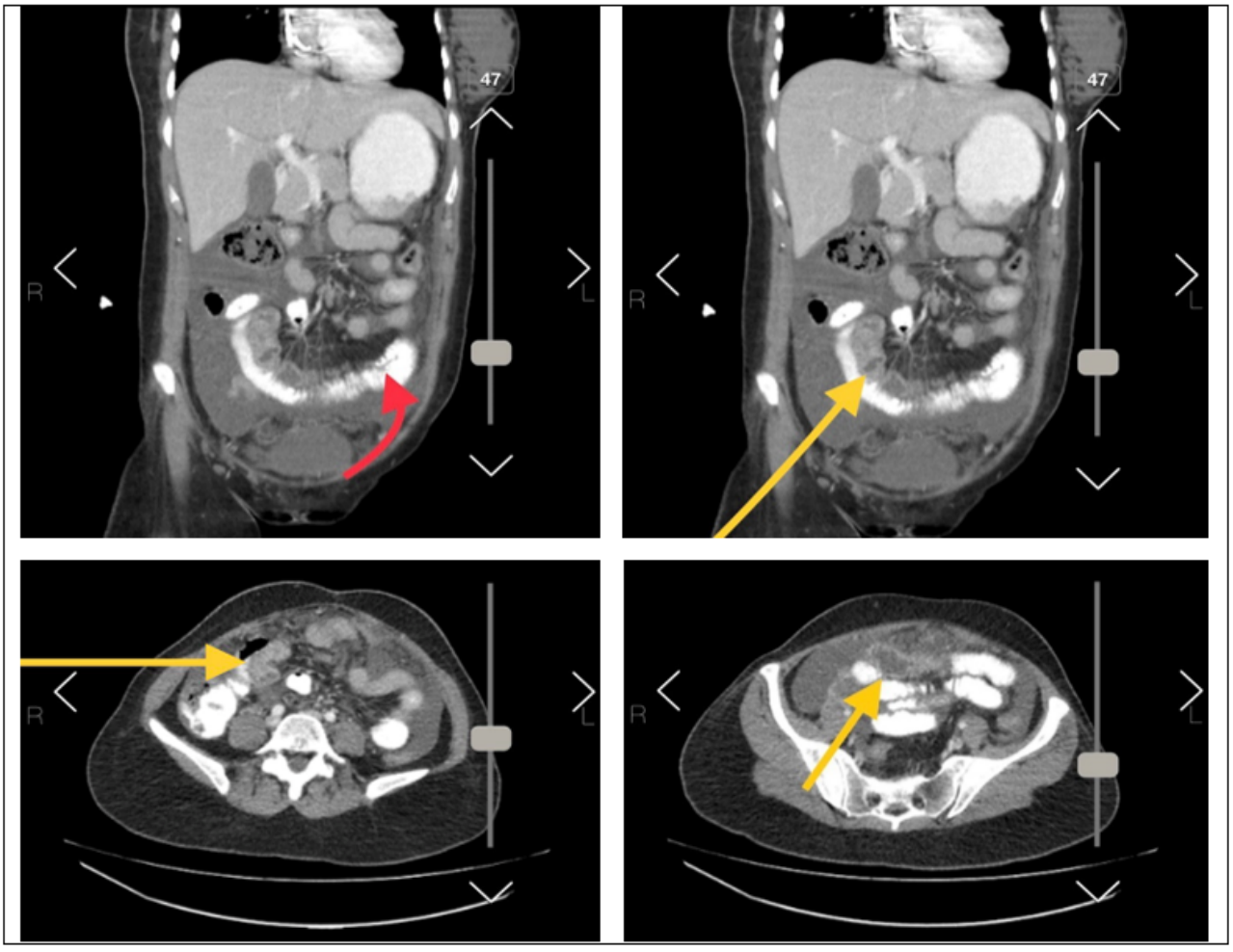

Figure 1: Abdominal computed tomography scan of patient with intravenous and oral contrast in different views. There is a blind-ended loop with a thick and edematous wall and irregular enhancing mucosa adjacent to the mesenteric side of the distal ileum that is not filled with oral contrast. Although the contrast material has completely filled the ileum loops and the cecum area, a small connection to the distal ileum is depicted in coronal images. Findings are in line with inflamed enteric duplication cyst. The adjacent loop of the ileum shows edematous wall thickening, too. A thick peritoneum, a large amount of ascites, and engorgement of mesenteric vasa recta are present.

4. Conclusion

In cases where the cause of the patient's abdominal pain is not found and he/she does not respond to outpatient treatment, despite the rarity of IDC, we should keep it among the differential diagnoses, because in most cases IDC leads to malignancy, obstruction, or peritonitis. The presented case was a 23-year-old woman who had experienced several episodes of abdominal pain in the previous days and had received analgesic and antacid treatments, but the abdominal pain was not resolved and the patient was finally diagnosed with peritonitis caused by the rupture of an IDC cyst and underwent emergency surgery.

5. Declarations

5.1. Acknowledgement

Not Applicable.

5.2. Funding

This research received no specific grant.

5.3. Consent for publication

Written informed consent was obtained from the patient for publication of this abstract and any accompanying images. A copy of the written consent is available for review by the Editor of this journal. The Ethics Committee of Mashhad University of Medical Science approved the study protocol (Ethics code: IR.MUMS.REC.1399.574).

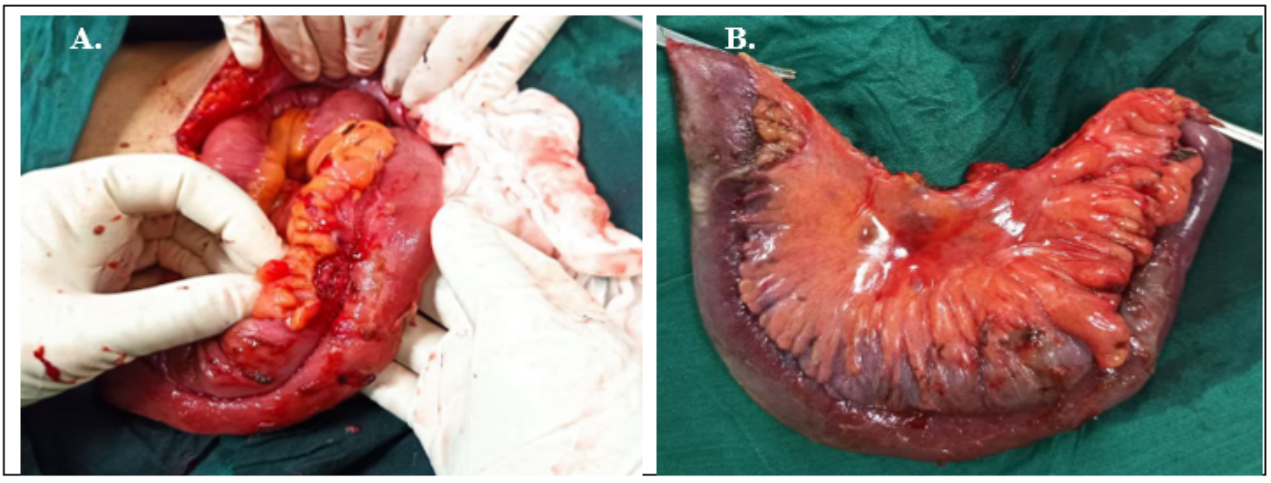

Figure 2: An exploratory laparotomy for intestine duplication cyst (IDC). A: perforated IDC; B:20 cm of perforated bowel loop with IDC.

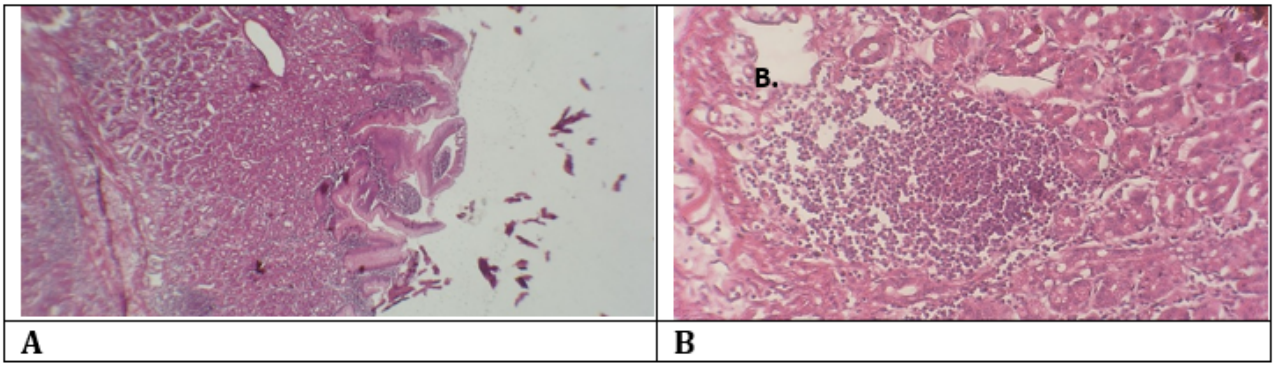

Figure 3: Histological picture of intestine duplication cyst (IDC) showing mucosal transition between squamous and glandular epithelia (A) and foveolar and oxyntic glands, secreting mucous substance (B).

5.4. Competing interests

The authors declare no conflicts of interest.

5.5. Authors' contributions

M.H acquisition of samples and interpretation/ author of manuscript
N.S acquisition of samples, interpretation, and analysis
A.M examination and analysis
M.A examination and analysis
All authors read and approved the final version.

5.6. Availability of data and materials

N/A.

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