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An uncommon cause of abdominal pain in a child: Meckel diverticulum

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ABSTRACT

Meckel diverticulum, a common congenital anomaly of the small intestine, can be responsible of several complications due to the presence of ectopic gastric mucosa and represents a challenge for diagnosis. We present the case of a 11-year boy suffering from intestinal pain and bleeding in which radiological examinations unexpectedly raised the suspicion of Meckel diverticulum. The diagnosis was confirmed using 99mTc-pertechnetate scintigraphy. At surgery, a fistulous tract between Meckel diverticulum and an inflamed appendix was found. The authors discuss the role of medical nuclear imaging which, notwithstanding its limitations, is of fundamental importance to achieve a correct and timely diagnosis. This is of particular relevance in unusual cases, as the one presented, in which Meckel diverticulum is found concurrently with other intestinal abnormalities.

1. Introduction

Meckel diverticulum (MD) is one of the most common congenital anomalies of the small intestine and occurs in 2%-4% of the population [1]. It contains ectopic gastric mucosa and thus it is responsible of intestinal disturbances in children, mainly hemorrhage but also intussusception, peritonitis and intestinal obstruction [2]. Abdominal 99mTc-pertecnetate scintigraphy has been used since 1967 to detect ectopic gastric mucosa and, notwithstanding technological advances, is currently the most effective diagnostic tool [3].

In the present paper, we present a case of intestinal pain and bleeding due to Meckel diverticulum, confirmed by nuclear medicine imaging, with an unusual fibrous connection to an inflamed appendix in a pediatric patient.

2. Case report

An eleven years old boy was referred to our Institution because

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of recurrent abdominal pain associated with blood in stools without anemia.

He had presented an episode of intestinal occlusion when he was 5 years old, spontaneously resolved. Moreover, he suffered from recurrent constipation treated with symptomatic medications.

On admission, clinical examination was unremarkable. Blood tests, including the search for ANCA and ASCA, were normal. However, fecal calprotectine was high, suggesting intestinal inflammation. To rule out the presence of intestinal polyps (inflammatory/ dysplastic), videocapsule endoscopy was performed and showed no abnormalities. Because of abdominal pain and previous episode of intestinal obstruction an intestinal malrotation was suspected. The patient underwent an upper gastro intestinal series that showed unexpectedly the presence of a long diverticulum in communication with a distal ileal loop, suggestive for Meckel diverticulum (Figure 1A).

In order to definitely establish a diagnosis, a 99 mTc-pertecnetate abdominal scintigraphy was performed. At the beginning, a mild diffuse increase of the radionuclide activity in the median abdomen was detected, due to inflammation. From the 15th minute an area of accumulation was observed in the same site identified by the X-ray, below the iliac bifurcation, thus confirming the diagnosis of Meckel diverticulum (Figure 1B-C).

The clinical conditions of the patient were stable so the surgical intervention was electively planned. A small incision in the inferior right quadrant was made and an autostatic disposable small retractor was used. A lot of adherences were found and the distal end of Meckel diverticulum was strictly adherent to the mesentery and to the distal end of an inflamed appendix with a fibrous connection. The diverticulum and the appendix were removed without complications. Post-operative course was uneventful; the patient experienced episodes of vomiting in the first 48 hours after surgery which resolved with symptomatic medications. He was then discharged 6 days after surgery.

Histopathologic findings confirmed the presence of ectopic gastric mucosa in the diverticulum and an acute inflammation with pus in the appendix.

Subsequent outpatient controls were negative for enterorrhagia, anemia and abdominal pain. The patient is going well 4 years after surgery.

3. Discussion

The key points of the presented case are: the difficulties in obtaining a diagnosis of Meckel diverticulum; the role of 99mTc-pertechnetate scintigraphy; the need for a careful evaluation of possible other concurrent intestinal abnormalities.

Meckel diverticulum was first described in 1809 and its presence depends on an embryonic remnant of the vitelline tract. Some surgical textbooks reported, for Meckel diverticulum, the “rule of two”: it occurs in 2% of population, is located about 2 feet from the ileo-caecal valve and it is long about 2 inches. Moreover, in the pediatric population, complications from Meckel diverticulum occur mainly in patients younger than two years [2].

In general, complications are not rare. The most common one is bleeding because of the presence of the ectopic gastric mucosa. Other serious complications are inflammation and obstruction due to fibrous bands, occurring in approximately 30% of cases of symptomatic diverticulum in patients without abdominal surgical history [4]. Contrarily, the occurrence of a fistula between Meckel and different tracts of the bowel (enterocolic, ileorectal, appendix and anus) and bladder is rare [5].

Meckel diverticulum represents a challenge for diagnosis. First-

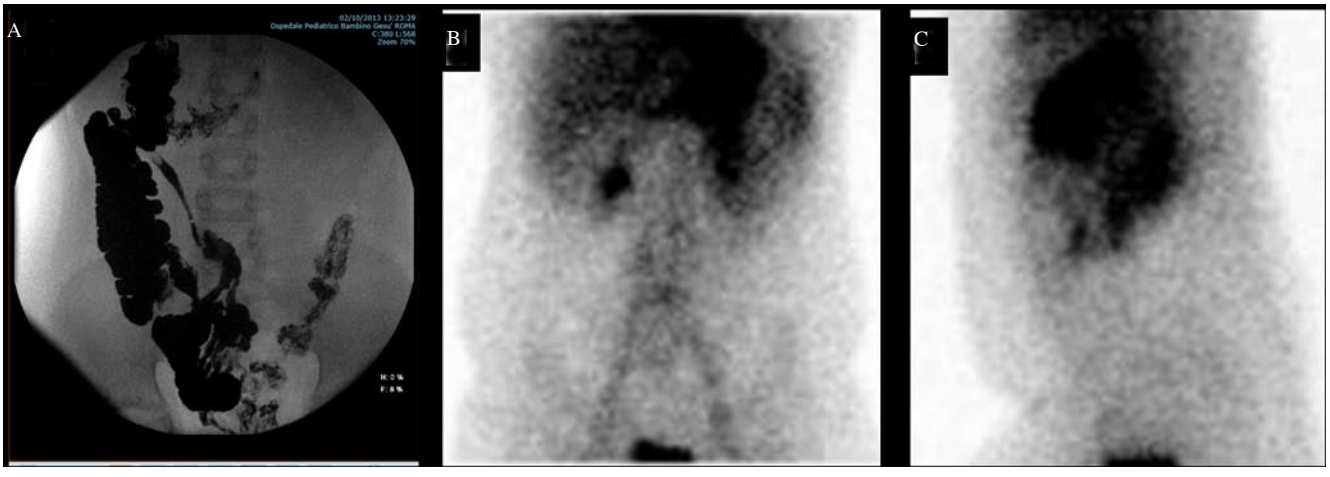

Figure 1. Imaging.

A. Abdominal series showing a long diverticulum originating from a distal ileal loop, suggestive for MD. 99mTC-pertechnetate scintigraphy 15 minutes after radionuclide injection, anteroposterior view (B), and 65 minutes after injection, lateral view (C) showing the presence of the ectopic gastric mucosa of MD.

level examinations (ultrasound, plain abdomen X-ray) are not useful. Gastrointestinal series and CT scan can be of help to detect complications of Meckel diverticulum, but their findings are nonspecific [2]. Therefore functional imaging, namely 99mTc-pertecnetate scintigraphy, is currently needed to definitely establish a diagnosis. This test allows the detection of ectopic gastric mucosa. There are conflicting data about the reliability of this exam, with some studies suggesting optimal rates (80%-90% sensitivity and 95% specificity) [6], and others wider ranges of sensitivity, among 25%-92% [7]. Moreover, it is known that the reliability of the exam is influenced by medications (H2 blockers, glucagon, pentagastrin), peristalsis and active intestinal bleeding [7]. Therefore, the possibility of false positives and false negatives must be taken into consideration. In case of an ectopic mucosal area inferior to 2 cm^2 [8], or of mucosal ischemia or necrosis, scintigraphy could be negative. Intestinal duplication, ectopic kidney, intussusception, vascular tumors and inflammatory foci are conditions in which it could be false positive [7].

Reports in literature are conflicting about the approach to Meckel diverticulum during appendectomy and someone proposed a specific approach depending on clinical aspects and appendix inflammation[9].

In the presented case, a connection between Meckel diverticulum and the appendix, with a concomitant purulent appendicitis, was present. This kind of inflammatory connection is not commonly described in literature and has to be taken into consideration together with other classical presentations as tarry stool, abdominal pain, intestinal obstruction, volvulus, intussusception and diverticulitis [5]. Radiographic study of the abdomen allowed to raise a suspicion of Meckel diverticulum, however 99mTc-pertechnetate scintigraphy was eventually needed. Notwithstanding the limitations of scintigraphy, in the case described different elements supported the positivity of the exam: the site, the onset of the activity together with gastric activity and the increase of the activity during the procedure according to recent diagnostic criteria for Meckel diverticulum[10] and according to clinical manifestations.

This was of fundamental clinical importance because a decision for surgical intervention was promptly made avoiding useless attempts at conservative measures. Moreover, at surgery, we were prepared to face not only a simple appendicitis but a more complex situation linked to Meckel diverticulum.

Surgical approach to Meckel diverticulum can vary among different techniques. Nowadays laparoscopic abdominal exploration is the preferred tool to confirm the diagnosis and minimize the incision[11]. However in the present case preoperative studies had already defined the precise site of the disease, therefore we could avoid laparoscopy by using a disposable retractor in order to maximize local exposure.

In conclusion, notwithstanding its limitations, 99mTc-pertecnetate scintigraphy is currently the mainstay in the diagnosis. Meckel diverticulum can be associated with other intestinal abnormalities like in the present case, so a thorough and wise application of all the diagnostic tools available is fundamental to adopt the right therapeutic strategy with the right timing.

Conflict of interest statement

We declare that we have no conflict of interest.

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