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Strangulated internal hernia by giant Meckel diverticulum presented as acute appendicitis

Jhonny Mauricio Fuentes-Diaz[a,b], Camilo Andrés Trujillo-Vasquez[c,*], Ana María Parra-Vargas[d], Andrea Sofía Rovira-Chaves[e], Laura Viviana Tinoco-Guzman[d], Johana Marcela Garcia-Garcia[d]

[a] MD, FACS – ASURG, Carrera 14A #151A-39 Bogotá, Colombia
[b] Department of Surgery Hospital de Fontibón, Carrera 99 #16i-41, Bogotá, Colombia
[c] MD, ASURG Research, Carrera 14A #151A-39 Bogotá, Colombia
[d] MD, ASURG Clinical Research, Carrera 14A #151A-39 Bogotá, Colombia
[e] MD, ASURG Public Health Research, Carrera 14A #151A-39 Bogotá, Colombia

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ABSTRACT

INTRODUCTION: Internal hernia due to a Meckel diverticulum is a common presentation of bowel obstruction mostly seen in pediatric population. However, it has been stated that among 5% of the patients had a giant Meckel diverticulum (defined as a Meckel diverticulum with increased dimensions than the ones commonly found), being this condition very unusual.
PRESENTATION OF CASE: We presented a 19 year old male with acute abdominal pain suggestive of appendicitis. During appendectomy we discovered ischemic and necrotic signs in a bowel segment, leading us to perform a laparotomy that revealed a portion of ischemic and necrotic jejunum, and another bowel segment with a strong adherence to the mesentery root that created an internal hernia. The internal hernia was reduced and the injured bowel portions were resected. Necrotic bowel samples were sent to the pathology department who posteriorly reported a giant Meckel diverticulum. The patient had an excellent recovery after procedure.
DISCUSSION: After searching in PubMed for a similar association between Meckel diverticulum and internal hernia, we found few cases that reported a giant Meckel diverticulum and a low occurrence with internal hernias making our case not so common to find.
CONCLUSION: We concluded that a giant Meckel diverticulum in association with mesenteric defects producing internal hernias are not common pathologies to find together in a patient as our research and case suggest.

1. Introduction

Internal hernia due to a Meckel diverticulum (MD) is a common presentation of bowel obstruction mostly seen in pediatric population given an unusual development of the gut [1]. However, it has been stated that among 5% of the patients had a giant MD (defined as a MD with increased dimensions than the ones commonly found) [2], being this condition very unusual. There were only few cases reporting the condition [2,3]. Introducing this pathology, in the following case we want to present an even more unusual finding regarding a giant DM: a giant DM strangulating an internal hernia that was presented as clinical appendicitis.

2. Case report

A 19 year old male with no significant past medical history, presented to the emergency room complaining of abdominal pain associated with nausea and emesis for one day. He described the pain as crampy, initiated in epigastrium and then passed to the right lower quadrant (RLQ). Physical exam showed blood pressure 120/70 mmHg, heart rate 89 bpm, respiratory rate 20 rpm, temperature 37 °C; abdominal exam revealed tenderness in RLQ with positive McBurney and Rovsing signs. Blood tests showed leukocytosis of 11,200 cells/mm [3] with neutrophilia of 73%, the remainder

Abbreviations: MD, Meckel diverticulum; RLQ, right lower quadrant; RPM, respirations per minute; BPM, beats per minute.

* Corresponding author at: ASURG Research, Carrera 14A #151A-39 T4 Apto 202 Bogotá, Colombia/5607 Brookdale Way, Tampa, FL 33625, USA.
E-mail addresses: fuentesjhonny@unbosque.edu.co (J.M. Fuentes-Diaz), ca.trujillo950@uniandes.edu.co (C.A. Trujillo-Vasquez), anap22@hotmail.com (A.M. Parra-Vargas), andresofy@gmail.com (A.S. Rovira-Chaves), girlaura88@hotmail.com (L.V. Tinoco-Guzman), marce767@hotmail.com (J.M. Garcia-Garcia).

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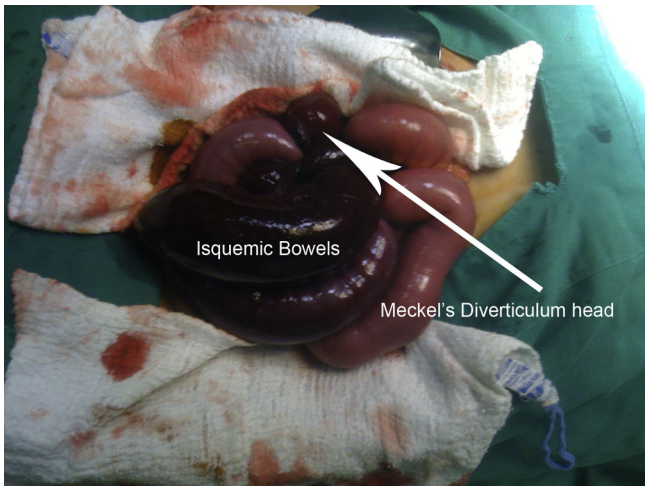

Fig. 1. Strangulation of the bowel segment leading to an ischemic process in the internal hernia.

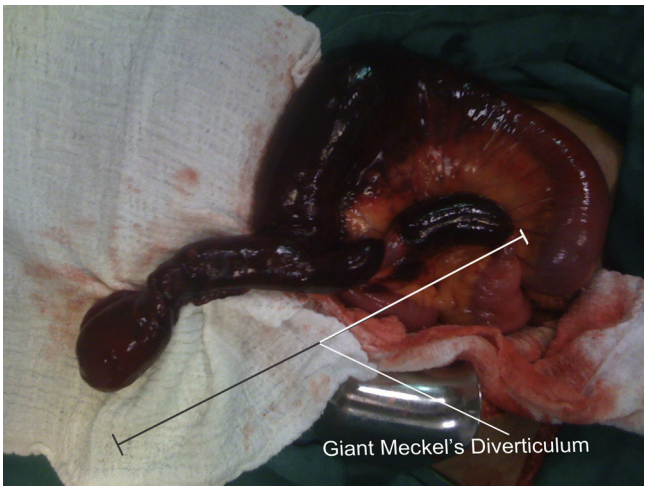

Fig. 2. Ischemic bowel segments after reduction of the hernia formed by giant Meckel's diverticulum.

parameters were normal. Upon this clinical presentation, a diagnosis of acute appendicitis was done and patient was taken to surgery.

Performing a Rockey–Davis approach, the abdominal cavity was explored finding serohematic fluid with an unexpected portion of Sigmoid colon instead of visualizing the terminal Ileum as it was supposed to be seen through the surgical wound. Furthermore, ischemic and necrotic signs in a bowel segment were detected and were extending from the right upper quadrant. Given the site of the latter findings, a laparotomy was performed. With a better view of the abdominal cavity, it was found that the sigmoid portion overlapped the ileum due to a longer than usual length. Once the anatomic rearrangement of the sigmoid was done, an 80 cm portion of the jejunum with ischemic and necrotic features was identified at 3.5 m from the Treitz angle. Moreover, we found that another bowel segment portion with a strong adherence to the mesentery root created a pathway in which the mentioned bowel loops went through it, giving rise to an internal hernia. Thus, strangulation of the bowel segment leading to an ischemic process with its posterior necrosis was generated (Fig. 1).

The mesenteric adherence was liberated after, allowing the intestinal hernia reduction; the ischemic and necrotic bowel portions were resected and intestinal anastomosis was done afterwards. At the end of the procedure the necrotic bowel samples were sent to the pathology department who posteriorly reported a giant Meckel diverticulum of 10 cm by 2.6 cm (Fig. 2). The patient had an excellent recovery and was discharged 2 days after the procedure.

3. Discussion

Our case describes clinical manifestations of acute abdomen, very suggestive of appendicitis. However, as it was documented previously, what we found was an internal hernia which involved a giant Meckel diverticulum, and an ischemic bowel segment. This discovery led us to search in PubMed case reports or any other research done in where a similar situation or association between the three entities was described.

It is known that Meckel diverticulum (MD) is a congenital anomaly resulting from incomplete obliteration of the omphalomesenteric duct commonly localized at the last meter of the ileum between 50 and 100 cm from the ileocaecal valve [4]. According to descriptions found in medical literature, usually in 90% of the patients its length is between 2.9 and 5 cm long by 1.9 and 2 cm of diameter [5,6]. However, as we mention previously, it has been also reported that about 5% of the patients presented a giant MD referred as bigger than normal MD [2], making this condition very unusual. There are few reported cases like the one of a female patient with 21 weeks of gestation, who was found to have a diverticulum that measured 12 cm long by 2.5 cm of diameter 2 or another case of a male patient with a MD of about 10 cm long [3].

MD is commonly asymptomatic, nevertheless when symptomatic is due to the presence of a complication. This occurs in 4% of the patients being more often in the pediatric population [7]. Within the MD complications we can find bowel obstruction caused mostly by adhesions, neoplasia and in a 15% by hernias, where about 0.5–4.1% are internal hernias generated by the entrapment of the small intestine through a normal or abnormal opening of the peritoneum or mesentery [8]. These types of internal hernias are usually presented in the transmesenteric, transmesocolic, paraduodenal, pericaecal regions and in Winslow foramen.

But in association to appendicitis simulation, we found that internal hernias are usually presented as epigastric pain of intermittent colic, nausea and emesis features, clinical manifestations that can easily mimic the pathology [9]. Using the words "Internal Hernia AND Appendicitis" between November of 1946 to November of 2013 we found in PubMed few reports about appendicitis as initial diagnosis and later changed with internal hernia diagnosis. There were just four articles that mentioned cases of internal hernia that were thought initially as appendicitis [9–12]. From these four case reports that were diagnosed as appendicitis, the final diagnosis was change to: internal hernia to the broad ligament; paracecal hernia; small intestine and ascendant colon through the sigmoid mesentery internal hernias; and finally lateral abdominal incarcerated hernia.

Furthermore, laboratory tests do not have a very high specificity or sensibility for being used as diagnostic for either pathology and diagnostic imaging like abdominal radiography in many cases is nonspecific, leading to use more sensitive and specific diagnostic images as computerized tomography scan [9]. Thus an accurate diagnosis of abdominal internal hernia is not always obvious just with the medical history and physical examination and needs complementary studies [11].

It is noteworthy to mention a study done by Bani-Hani and Shatnawi [13] comparing cases of patients who presented symptomatic MD and its incidental finding, reveling statistically significant differences. The study was done with 68 patients (65% male and 35% females) divided in 2 groups. In 40 individuals the diagnosis was incidental and 28 presented complications related with MD. Within the second group (which corresponds to the symptomatic presentation) most of the patients presented bowel obstruction as a

complication. This showed that bowel obstruction occurs in 40% of the symptomatic cases with MD and that it might be produced by volvulus or internal hernia as main causes. They also conclude that, within the symptomatic patients having bowel obstruction as chief manifestation, that it is most common in males having a male–female relation of 2:1 to 5:1; more than 50% of symptomatic patients were less than 10 years old and the characteristics of the diverticula in this group revealed to be longer and with a narrower base.

4. Conclusion

Although it is common to find MD in patients as the causal of gut complications, we found that a giant MD is not a common pathology to find and it is even more unusual if we find it in association with mesenteric defects as our research and case suggest. Internal hernias may be found when anomalous anatomic structures as MD are present and they can mimic acute appendicitis as well like it happened in our case, so we encourage keeping in mind this differential diagnosis when having an appendicitis-like manifestation in children and young adults. We also want to highlight that this types of hernias are not easy to diagnose clinically and images are strongly recommended when suspecting any case of internal hernia presented as appendicitis in this population.

Conflict of interest

None.

Funding

None.

Ethical approval

None.

Consent

Consent by the patient for the publication of the case was done. The consent as a summary stated that only images of his bowels were going to be shown and no other body parts or privacy information of him is going to be disclosed without patient's authorization.

Author contribution

Jhonny Mauricio Fuentes-Díaz: Surgeon who performed the surgery. Description of the case and procedure. Images selection. Reviewer of the final paper.

Camilo Andrés Trujillo-Vásquez: In charge of gathering case information. Distribution of tasks for the rest of the researchers, main editor of the paper. Organization of images and responsible for the group as main contact (corresponding author). Reviewer of the final paper.

Ana María Parra-Vargas: Researcher. Gathering information regarding features of Meckel's Diverticulum, dimensions, cases of giant diverticula. Contribution in writing of the discussion of the paper. Reviewer of the final paper.

Andrea SofíaRovira-Chaves: Researcher. Gathering information regarding dolicocolon, Hirschsprung's disease and unusual long colon. Contribution in the writing of the discussion of the paper. Reviewer of the final paper.

Laura Viviana Tinoco-Guzmán: Researcher. Gathering information regarding Meckel's Diverticulum, etiology, association with internal hernias and cases similar to our case. Contribution in writing of the discussion of the paper. Reviewer of the final paper.

Johanna Marcela García-García: Researcher. Gathering information regarding internal hernias in association with appendicitis. Contribution in writing of the discussion of the paper. Reviewer of the final paper.

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Further reading

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