



Case report

Triple presentation of acute appendicitis, Meckel's diverticulum, and hemorrhagic ovarian cyst: A rare case report and literature review[☆]Amr Elgazar, Ahmed K. Awad^{*}

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ABSTRACT

Introduction and importance: With 2% prevalence worldwide, Meckel's diverticulum is the most common congenital anomaly of the small intestine, which anatomically results from incomplete obliteration of the vitelline duct. It is usually difficult to differentiate clinically between acute appendicitis and Meckel's diverticulitis, thus in most clinical situations, it is asymptomatic and usually incidentally discovered intraoperatively. On the other hand, Acute appendicitis is one of the most common presentations in a surgical emergency with an 8.6% incidence in males and 6.7% in females. Triple presentation of acute appendicitis, Meckel's diverticulum, and a hemorrhagic ovarian cyst is a rare incidence in literature.

Case presentation and clinical discussion: A female patient 35 years old with no previous surgical history or known medical disease presented to our ER with right lower quadrant abdominal pain of one-day duration. On physical examination; there was right iliac fossa pain, tenderness, and rebound tenderness indicating acute appendicitis. Intraoperatively we operated appendectomy as usual through Gridiron incision. Upon opening of the parietal peritoneum, there was a hemorrhagic reaction with a catarrhal inflamed appendix. Ileal loops revealed a Meckel's diverticulum. With the peritoneal toilet, there was still a hemorrhagic reaction. Further exploration revealed a ruptured hemorrhagic ovarian cyst, which was managed using bipolar cautery and ligatures.

Conclusion: In the operative management of acute appendicitis, we recommend proper assessment for both the right ovary and at least two feet of ileum proximal to the ileocecal valve to exclude any ovarian abnormalities or Meckel's diverticulum respectively especially if the appendix was normal or just was catarrhal inflamed.

1. Introduction

Acute abdominal pain accounts for 7–10% of all emergency department accesses, and acute appendicitis is among the most common causes of lower abdominal pain leading patients to attend the emergency department [1]. The incidence of appendicitis is about 8.6% for males and 6.7% for females [2]. Acute appendicitis is usually presented clinically with right iliac fossa pain but can be also presented with unusual symptoms like diarrhea, urinary frequency, and vomiting.

Many Surgical and medical conditions like; Meckel's diverticulitis, mesenteric adenitis, right ureteric colic, ectopic pregnancy, ruptured ovarian cyst, intussusception, acute cholecystitis, perforated peptic ulcer, intestinal obstruction, gastroenteritis, terminal ileitis, and pneumonia share with appendicitis the same clinical presentation [1].

On the other hand; Meckel's diverticulum is the most common congenital anomaly of the small bowel. Its diagnosis preoperatively is

difficult, and, in most situations, it is diagnosed intraoperatively [3]. The presence of Meckel's diverticulum with acute appendicitis is a rare clinical condition, yet the superimposed presence of a hemorrhagic ovarian cyst is rarer. We present here a rare case report of simultaneous occurrence of acute appendicitis, Meckel's diverticulum, and hemorrhagic ovarian cyst. Our case report is reported in line with the SCARE 2020 criteria [4].

2. Case report

A female patient 35 years old with no previous surgical history or known medical disease presented to our ER with right lower quadrant abdominal pain of one-day duration. Patient was gravida 1 para 1, BMI 26, and nonsmoker. Her temperature was 37.5 °C. On taking history the presenting pain was the first episodes without any previous episodes. Pain started first periumbilical and then migrated to the right iliac fossa.

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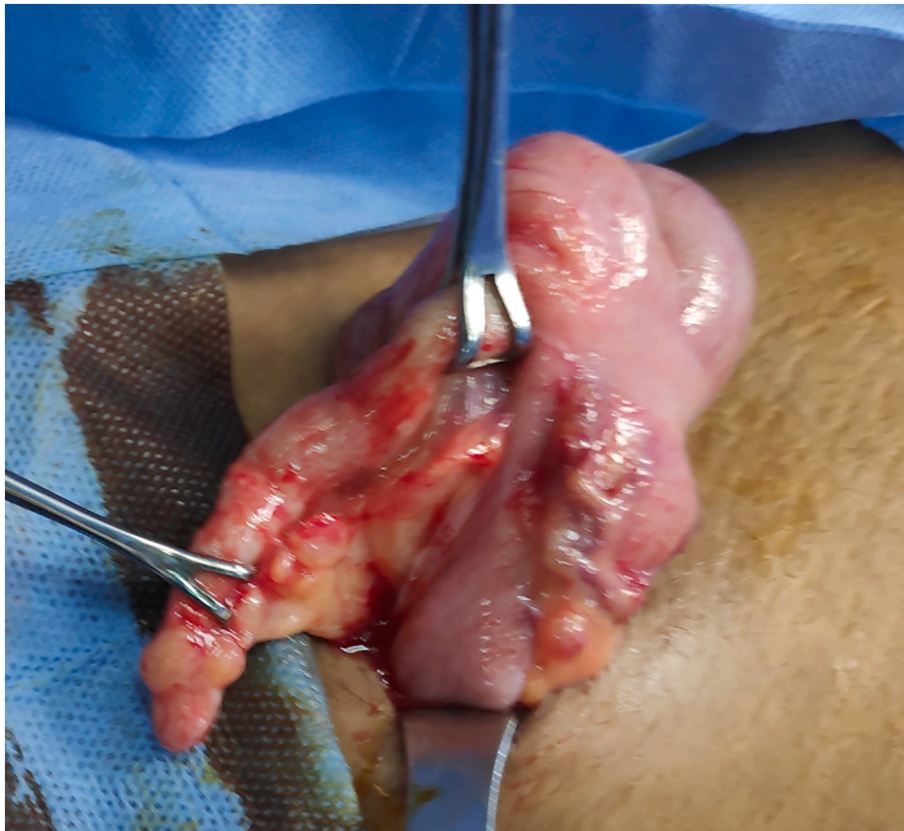


Fig. 1. Catarrhal inflammation of the vermiform appendix.



Fig. 2. Meckel's diverticulum.

On physical examination; there was right iliac fossa pain, tenderness, and rebound tenderness. Pelvi-abdominal Ultrasound showed a minimal clear pelvic collection in the Douglas pouch and simple right ovarian cyst measuring 4*3 mm. Her laboratory investigations were as

following; TLC: 11,000 mg/dL, INR: 1, and serum B-HCG less than 5 mIU/mL, CRP level 4 mg/L, and Alvarado score was 8/10. A provisional diagnosis of acute appendicitis was made with a decision of appendectomy after discussion with the patient about the possibility of antibiotics



Fig. 3. Ruptured ovarian cyst.

and the possibility of appendicitis recurrence while on antibiotics. The patient was scheduled for surgical operation a day after; furthermore, Appendectomy was performed as usual through Gridiron incision. Upon opening of the parietal peritoneum, there was a hemorrhagic reaction. The appendix was catarrhal inflamed as shown in Fig. 1. On examination of ileal loops, a Meckel's diverticulum was found 30 cm proximal to the ileocecal valve on the anti-mesenteric border of the small bowel Fig. 2. Although there were no signs of intestinal obstruction or bleeding and the diverticulum had a wide base but its tip looked abnormal, so a decision of diverticulectomy was taken -to exclude any diagnostic dilemma in the future- with the closure of the intestinal lumen in a transverse manner. The peritoneal toilet then was done and there still was a hemorrhagic reaction. Further exploration revealed a ruptured hemorrhagic ovarian cyst. We delivered the right ovary through the wound and a ruptured ovarian cyst was seen in Fig. 3. Hemostasis was achieved with bipolar cautery and ligatures. We put a tube drain size 18 Fr in the Douglas pouch and the incision was closed in layers.

Postoperatively the patient was NPO for 3 days, started to eat a soft diet on passing flatus on the 4th postoperative day, and then discharged on the 5th day with an uneventful course.

3. Discussion

Meckel's diverticulum is the most common congenital anomaly of the small intestine. 2% of populations have Meckel's diverticulum. Anatomically it results from incomplete obliteration of the vitelline duct [5]. It is difficult to differentiate clinically between acute appendicitis and Meckel's diverticulitis [6], thus in most clinical situations, it is asymptomatic and usually incidentally discovered intraoperative [5].

Senocak et al. described a case report of concomitant presentation of Acute Appendicitis and Perforated Meckel's Diverticulitis. Although the preoperative clinical examination and imaging investigations suggested a classic diagnosis of appendicitis, the presence of an intraabdominal large amount of pus raises the suspicion of the existence of another pathology [7]. Jumbi et al. reported also a concomitant presentation of acute appendicitis and perforated Meckel's diverticulitis in an infant. It was clinically presented at first with intestinal obstruction and later on complicated with such perforation [8]. Different approaches were described in the literature to manage Meckel's diverticulum. It depends on patient age, clinical presentation, and intraoperative findings.

Symptomatic or complicated Meckel's diverticula are either removed through diverticulectomy or segmental resection but the removal of incidentally discovered asymptomatic Meckel's is controversial [9]. Ueberrueck et al. recommended that the removal of

asymptomatic Meckel's should depend primarily on the severity of inflammation of the appendix. According to his retrospective study, the resection of normal Meckel's in presence of appendicular complications like gangrene or perforation increases the postoperative morbidity [10]. Some Authors suggested diverticulectomy of incidental Meckel's only in cases of suspicion of ectopic mucosa or presence of fibrous band [11]. Furthermore, Groebli et al. recommended resection of incidental Meckel's especially in case of unconfirmed appendicitis. Also, the morphology of the diverticulum and the hemodynamics of the patient should be considered while making the decision [12].

The concomitant presence of acute appendicitis with Meckel's diverticulum is well established in the literature; on the other hand upon reviewing the literature- we didn't find any similar case-report reporting such triple presentation. Thus, we are bringing the physicians' mind into although there is no relation between appendicitis, Meckel's diverticulum, or ovarian cyst and any of them can be presented separately, their presence in one patient can still happen marking a big challenge in the diagnosis, the treatment, and the management.

4. Conclusion

In the operative management of acute appendicitis, we recommend proper assessment for both the right ovary and at least two feet of ileum proximal to the ileocecal valve to exclude any ovarian abnormalities or Meckel's diverticulum respectively especially if the appendix was normal or just was catarrhal inflamed. We also recommend the resection of incidentally discovered Meckel's in case of unconfirmed or overlap diagnosis of appendicitis.

Abbreviations

Not applicable.

Ethics approval and consent to participate

The case report was performed following the declaration of Helsinki and approved by Ain-Shams University Hospital ethics committee- Ain Shams institute- according to the international guidelines and ethics.

Consent to publish

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Availability of data and materials: All data generated or analyzed during this study are included in this published article and its supplementary information files.

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Ahmed K. Awad: Helping in surgery, Conceptualization, Methodology, Writing, Reviewing, and Editing.

Declaration of competing interest

All authors declared no conflict of interests.

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References

- [1] S. Di Saverio, M. Podda, B. De Simone, et al., Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines, *World J. Emerg. Surg.* 15 (1) (2020 Apr 15) 27, <https://doi.org/10.1186/s13017-020-00306-3>. PMID: 32295644; PMCID: PMC7386163.
- [2] M. Van de Moortele, G. De Hertogh, X. Sagaert, E. Van Cutsem, Appendiceal cancer: a review of the literature, *Acta Gastroenterol. Belg.* 83 (3) (2020 Jul-Sep) 441–448. PMID: 33094592.
- [3] L.C. Garfunkel, J. Kaczorowski, C. Christy, *Pediatric Clinical Advisor E-book: Instant Diagnosis and Treatment*, Elsevier Health Sciences, 2007 Jul 5.
- [4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [5] R.G. Holzheimer, J.A. Mannick, *Surgical Treatment: Evidence-Based and Problem-Oriented*, Zuckschwerdt, Munich, 2001. PMID: 21028753.
- [6] C. Palanivelu, M. Rangarajan, R. Senthikumar, M.V. Madankumar, Laparoscopic management of symptomatic Meckel's diverticula: a simple tangential stapler excision, *J. Soc. Laparoendosc. Surg.* 12 (1) (2008 Jan) 66.
- [7] R. Senocak, M. Ince, S. Kaymak, Z. Kilbas, M.T. Ozer, Coexistence of acute appendicitis and perforated Meckel's diverticulitis: a rare presentation in older adults, *J. Clin. Gastroenterol. Treat.* 2 (2016) 17.
- [8] T. Jumbi, S. Swaleh, F. Osawa, Perforated Meckel's diverticulum with acute appendicitis in an infant, *Ann. Afr. Surg.* 17 (1) (2020 Feb 7).
- [9] C.C. Hansen, K. Soreide, Systematic review of epidemiology, presentation, and management of Meckel's diverticulum in the 21st century, *Medicine* 97 (35) (2018 Aug).
- [10] Torsten Ueberrueck, et al., The significance of Meckel's diverticulum in appendicitis—a retrospective analysis of 233 cases, *World J.Surg.* 29 (4) (2005) 455–458.
- [11] D. St-Vil, M.L. Brandt, S. Panic, A. Bensoussan, H. Blanchard, Meckel's diverticulum in children: a 20-year review, *J.Pediatr.Surg.* 26 (11) (1991 Nov 1) 1289–1292.
- [12] Y. Groebli, D. Bertin, P. Morel, Meckel's diverticulum in adults: retrospective analysis of 119 cases and historical review, *Eur.J.Surg.* 167 (7) (2001 Jul) 518–524.