

Axial Torsion and Infarction of Meckel's Diverticulum in the 3rd Trimester of Pregnancy

Radu Botezatu¹, Radu Marian², Nicolae Gica¹, George Iancu^{1,3}, Gheorghe Peltecu^{1,3}, Anca Maria Panaitescu^{1,3}

¹Filantropia Clinical Hospital Bucharest, Romania

²Emergency Clinical Hospital Bucharest, Romania

³"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

Corresponding author:

Gheorghe C. Peltecu, MD, PhD, FACS
Professor of Obstetrics and Gynecology
Carol Davila University of Medicine and
Pharmacy, Filantropia Clinical Hospital
11-13, Blvd. Ion Mihalache
Bucharest, Romania
E-mail: gheorghe.peltecu@gmail.com

Rezumat

Torsiunea axială și infarctizarea diverticulului Meckel în trimestrul 3 de sarcină

Diverticulul Meckel este o malformație congenitală care se poate complica sau rămâne asimptomatic pe parcursul vieții. În timpul sarcinii însă, infecția diverticulului poate deveni o complicație importantă. Necroza diverticulară și perforația sunt complicații care cresc morbiditatea maternă și fetală în sarcină. Raritatea afecțiunii și modificările fiziologice de sarcină fac diagnosticul dificil. Prezentăm cazul unei gangrene a diverticulului Meckel în trimestrul trei de sarcină, caz cu simptomatologie atipică datorită sarcinii avansate în care balanța risc-beneficiu a fost atent evaluată pe de o parte datorită riscului infecțios în cazul expectativei și pe cealaltă parte, a riscului și arsenalului de complicații date de nașterea prematură iatrogenă înainte de termen. Rezultatele au fost favorabile atât pentru mamă cât și pentru nou-născut.

Cuvinte cheie: diverticul Meckel, sarcină, torsiune axială, gangrenă

Abstract

Meckel's diverticulum is a congenital anomaly which can become complicated or remain asymptomatic throughout life. During pregnancy, however, diverticulum infection could become a serious complication. Diverticulum necrosis and perforation are complications that increase morbidity in pregnancy, both maternal and fetal. The rarity of the condition and the maternal physiological changes

Received: 07.03.2017
Accepted: 03.05.2017

in pregnancy make the diagnosis difficult. We present the case of a Meckel's diverticulum gangrene in third trimester pregnancy, atypical case due to advanced pregnancy where the risk-benefit balance was carefully evaluated on one hand because of the risk of infection associated with expectant management and on the other hand the risk and complications of iatrogenic preterm premature birth. The outcome was favorable for both mother and newborn.

Key words: Meckel diverticulum, pregnancy, axial torsion, gangrene

Introduction

Meckel's diverticulum (MD) is the most common congenital anomaly of the gastrointestinal tract and is present in 1% of women. It results from incomplete obliteration of the vitelline duct leading to the formation of a true diverticulum of the small bowel (1). It is located on the antimesenteric border of the ileum at 10 to 60 cm from the ileo-cecal valve. Meckel's diverticulum is lined by ileal-type mucosa but in about 20% of cases it contains heterotopic tissue represented by gastric or pancreatic mucosa. Heterotopic tissue is responsible by hemorrhage and inflammation (diverticulitis). Obstruction, another severe complication, follows intussusception or torsion. Meckel's diverticulum is often clinically silent, particularly in the adult. Most complications from MD are during early childhood. Asymptomatic MD may be discovered during abdominal exploration for the evaluation of unrelated pathology. Less commonly, it is found incidentally on diagnostic imaging. When symptomatic, MD may present with abdominal pain or symptoms of gastrointestinal bleeding or bowel obstruction. Most frequently MD may mimic acute appendicitis.

Diverticulitis in pregnancy has been described in several case reports over time, part of them involved Meckel's diverticulum (2,3,4). Perforation of a MD is a rare complication of pregnancy. Its diagnosis, however, must be considered in all cases of intra-abdominal emergencies, as its presentation is similar to appendicitis. Imaging methods recommended in the diagnosis of appendicitis (US, CT) may be used, but a high degree of clinical suspicion and surgery is usually necessary to establish the diagnosis. Perforation of a MD is usually second-

ary to inflammatory diverticulitis or peptic ulceration. Axial torsion leading to perforation is the rarest of the complications that have been reported (5). Prompt diagnosis and appropriate treatment is imperative in these cases due to the high rate of perforation leading to increased fetal and maternal morbidity and mortality (6).

The clinical presentation is variable and preoperative diagnosis is hampered by the various anatomical and physiological changes induced by pregnancy that can obscure serious underlying intra-abdominal pathology (7,8).

Case Report

We present the case of a 30 years old nulliparous, 34 weeks pregnant, admitted for colicky pain in the right lower abdominal quadrant. Her past history was unremarkable. On examination, she had no fever and her vital signs were within normal range. The patient had no bowel sounds and was more symptomatic in the lower abdominal quadrants, with rebound tenderness in the right quadrant. Rectal examination was unremarkable.

Fetal movements were reported as normal. On ultrasound examination the pregnancy was evolving normally with an intrauterine fetus corresponding biometrically to 34 weeks gestation and estimated fetal weight 2200 g. During US examination moderated free abdominal fluid was noted but this was difficult to assess properly due to technical anatomical conditions (pregnant uterus, bowel distension); also free intraperitoneal fluid was noted in perihepatic and perisplenic spaces. Blood tests revealed a hemoglobin of 9.8g/dL which is classified as a low-grade anaemia of pregnancy and an elevated WBC (23,700/mL with 78% granulocytes); all

other blood results were in the normal range. Urinary specimens and vaginal swabs were sent to microbiology. The patient had no uterine contractions and fetal monitoring (cardiotocogram) was normal. The decision made was for clinical observation and symptomatic medication.

On day 2, abdominal ultrasound revealed dilated ileal loops without peristalsis, Douglas pouch and perihepatic fluid up to 4 cm thickness. Abdominal X-ray showed distended small and large bowel loops with multiple air-liquid levels. Clinically, the patient status was progressively deteriorating with increasing lower abdominal pain and signs of peritoneal irritation, nausea and vomiting and a low grade fever. Bowel obstruction and/or perforation was suspected and surgical treatment was indicated. A nasogastric tube was inserted for decompression and prevention of aspiration syndrome.

Results

The opening of the peritoneal cavity revealed approximately 100 ml purulent peritoneal fluid and a twisted, necrotic and perforated MD (Figs. 1, 2). This was 5 cm long and 1 cm wide and was situated at 55 cm from ileocecal valve. Specimens for culture were taken from peritoneal fluid and a cesarean section was performed. A female fetus of 2250 g, with Apgar scores of 6 and 9, at one and five minutes, was delivered. Peritoneal cavity was extensively washed with saline.

Because there are no definitive data demonstrating superiority of segmental resection over diverticulectomy (9), simple diverticulectomy was performed, MD was excised and the bowel was closed transversally (Fig. 3). No resection was required because the bowel was not in jeopardy of being narrowed (the neck of the diverticulum was < 2 cm) and closure was made with mechanical suture, a linear gastrointestinal stapler. Normal intestinal mucosa was noticed in the adjacent small bowel. Peritoneal cavity was drained for 2 days.

Antibiotics were administered for 3 days and the WBC decreased to normal range. Postoperative outcome was uneventful and the



Figure 1. Meckel's diverticulum gangrene - open surgery. Note the modified colour of Meckel's diverticulum wall suggesting necrosis



Figure 2. Twisted Meckel's diverticulum - open surgery. Note the twisted axis of diverticulum, the possible underlying mechanism of necrosis.



Figure 3. Mechanical closure with linear stapler of small bowel after excision. Note the transverse approach to avoid iatrogenic narrowing of the bowel

mother and baby were discharged on day 5. They were both doing well at the seven weeks postpartum follow up visit.

Postoperative histopathologic examination confirmed a MD with normal ileal epithelial layer. Bacteria found in the peritoneal specimen was *Escherichia coli*.

Discussions

Most of the acute symptoms of MD result from inflammation, hemorrhage, obstruction and perforation. Axial torsion is the rarest complication, leading to infarction, gangrene and perforation.

Symptomatic MD is often difficult to diagnose because it mimics acute appendicitis, peptic ulcer, pelvic inflammatory disease (PID) or gastroenteritis. During pregnancy, the diagnosis is even more difficult. Clinical condition could mimic labor if the patient has no fever and no rebound tenderness. If the diagnosis is delayed, the risk of developing peritonitis and ileal obstruction is high. No specific imagistic investigation is diagnostic.

Surgical treatment is mandatory. When necrotic changes are extended to the ileum, segmental resection and end-to-end anastomosis is required.

Attitude towards pregnancy is based on the pregnancy age and fetus viability. After 32 weeks of gestation, cesarean delivery is indicated at the time of surgery. Attitude before 30 weeks of gestation is debatable. Surgery itself and peritoneal infection increase the risk of abortion or premature labor. Uterine contractions are common, but tocolysis with β -mimetics is not recommended in the presence of sepsis (10).

Although extremely rare in pregnancy, torsion and perforation of MD should be considered in all cases of acute abdomen. Early diagnosis and prompt surgical treatment are mandatory to reduce fetal and maternal morbidity.

Conclusions

Among emergency diagnoses in pregnancy it is mandatory to remember peritonitis, especially appendicitis and Meckel's diverticulum pathology although the incidence of the last one is very rare. Diagnosis and management in pregnancy is much difficult, on one hand because it can mimic many conditions related to pregnancy, on the other hand delayed diagnosis can result in unfavorable outcome. Management is also very difficult because in most cases the pregnancy needs to be terminated

at the time of surgery. During the third trimester, after a short course of steroids given to mature fetal lungs (11), the fetus can be delivered without risk of serious complications, in a tertiary obstetrical center. Serious complications can occur if Meckel's pathology is diagnosed in late second trimester when fetal morbidity and long term outcome related to prematurity is poor (12).

Because Meckel's pathology in pregnancy is a surgical condition, the management requires a multidisciplinary team approach consisting in a general surgeon, an obstetrician and also a neonatal specialist in order to achieve a favourable outcome for both mother and neonate.

Authors' Contributions

All authors have equal contribution.

Conflict of Interests

The authors declare no conflict of interests.

Reference

1. Sagar J, Kumar V, Shah DK. Meckel's diverticulum: a systematic review. *J R Soc Med.* 2006;99(10):501-5. Erratum in *J R Soc Med.* 2007;100(2):69.
2. Ragu N, Tichoux C, Bouyabrine H, Carabalona J, Taourel P, Bruel J, et al. Complicated diverticulitis during pregnancy. *J Radiol.* 2004; 85(11):1950-2. French
3. Chanrachakul B, Tangtrakul S, Herabutya Y, Chakkaphak S, Hamontri S. Meckel's diverticulitis: an uncommon complication during pregnancy. *BJOG.* 2001;108(11):1199-200.
4. Wong YS, Liu SY, Ng SS, Wong VW, Mak OS, Li JC, et al. Giant Meckel's diverticulitis: a rare condition complicating pregnancy. *Am J Surg.* 2010;200(1):184-5. doi: 10.1016/j.amjsurg.2009.10.019. Epub 2010 Apr 21.
5. Limas C, Seretis K, Soultanidis C, Anagnostoulis S. Axial torsion and gangrene of a giant Meckel's diverticulum. *J Gastrointest Liver Dis.* 2006;15(1):67-8.
6. Huerta S, Barleben A, Peck MA, Gordon IL. Meckel's diverticulitis: a rare etiology of an acute abdomen during pregnancy. *Curr Surg.* 2006;63(4):290-3.
7. Rudloff U, Jobanputra S, Smith-Levitin M, Kessler E. Meckel's diverticulum complicating pregnancy. Case report and review of the literature. *Arch Gynecol Obstet.* 2005;271(1):89-93. Epub 2004 Jul 28.
8. Malhotra S, Roth DA, Gouge TH, Hofstetter SR, Sidhu G, Newman E. Gangrene of Meckel's diverticulum secondary to axial torsion: a rare complication. *Am J Gastroenterol.* 1998;93(8):1373-5.
9. Arnold JF, Pellicane JV. Meckel's diverticulum: a ten-year experience. *Am Surg.* 1997;63(4):354-5.
10. de Veciana M, Towers CV, Major CA, Lien JM, Toohey JS. Pulmonary injury associated with appendicitis in pregnancy: Who is at risk? *Am J Obstet Gynecol.* 1994;171(4):1008-13.
11. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins - Obstetrics. Practice Bulletin No. 171: Management of Preterm Labor. *Obstet Gynecol.* 2016 Oct;128(4):e155-64. doi: 10.1097/AOG.0000000000001711.
12. Delorme P, Goffinet F, Ancel PY, Foix-L'Hélias L, Langer B, Lebeaux C, et al. Cause of Preterm Birth as a Prognostic Factor for Mortality. *Obstet Gynecol.* 2016;127(1):40-8. doi: 10.1097/AOG.0000000000001179.