



## A Rare Case of Meckel's Diverticulum Perforation by the Gangrenous Appendicitis during Pregnancy

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### Abstract

**Objective:** Meckel's diverticulum is one of the most common congenital malformations of the small intestine and it results from an incomplete obliteration of the omphalomesenteric or vitelline duct. The position of Meckel's diverticulum along the length of the small intestine is variable, but is usually found within 100cm of the ileocecal valve. Perforated Meckel's diverticulum is a rare complication during pregnancy. Its presentation is similar to appendicitis and its diagnosis must be considered in all cases of intra-abdominal disease. Prompt diagnosis and appropriate treatment is imperative in these cases due to the high rate of perforation.

**Conclusion:** When Meckel's diverticulum is suspected or diagnosed, patients should be surgically treated to prevent any complications to the mother and her fetus.

### Keywords

Meckel's diverticulum, Appendicitis, Pregnancy, Abdominal pain, Surgery

ulcer, Chron disease, and therefore it has major implications in the abdominal pathology.

### Case Report

A paraguayen 24-year-old primigravida nullipara woman at 33+0 weeks of gestational age with abdominal pain, especially in the right side, without nausea and vomiting, was hospitalized. Familiar anamnestic record were negative, personal anamnestic record were characterized by hiatal hernia. During pregnancy she used only folic acid, pre-gravidic BMI was 22.6 and post-gravidic BMI was 33.7 (+17 Kg during pregnancy). Her blood pressure was regular (105/70 mmHg), with a temperature of 37.5°C. An ultrasound scan was performed: fetal growth was regular, with an estimated fetal weight of 2130 grammes and a cervix of 34 mm. Blood samples were collected with a PCR of 3.03 mg/dl and WBC 13.710/mL with 83% granulocytes. Urinalysis and urine culture were negative and also vaginal swabs were negative. During the abdomen ultrasound scan a monolateral hydronephrosis was observed; in the right side of the abdomen a painful mass was noticed supposing an hydrosalpinges. Therapy included fluids (2000cc e.v) and antibiotic (Ampicillin 1 g ×3/die). During the following days, a dietary counseling was request and an electrocardiogram was performed which resulted normal. During the days of hospitalization the symptoms seemed improved although cyclically reoccur. Administration of painkillers improved the symptoms. On day 5 blood samples were collected and despite the therapies, PCR was 8.84 mg/dl with WBC 12.060/mL. An abdomen ultrasound scan was repeated and any pelvic mass was observed. She was also given bethamethasone (12 mg repeated after 24 hours) to accelerate fetallung maturity. The day after blood sample were repeated and PCR was 4.61 mg/dl with WBC 14.400/mL, altered transaminase (AST 96 UI/l and ALT 111 UI/l) and alkaline phosphatase 111 UI/l and another antibiotic was added to the therapy. On day 7 blood sample showed a PCR of 10.12 mg/dl with WBC 7.730/mL and increased transaminase (AST 158 UI/l and ALT 257 UI/l), because of maternal hyperpyrexia (38.6°C), pathological cardiotocography, oligohydramnios and breech presentation, an emergency cesarean section was performed by conventional technique. A girl was born,

### Introduction

Meckel's diverticulum is one of the most common congenital malformations of the small intestine affecting 2-4% of the general population and it was first described by Wilhelm Fabricius Hildanus in 1598, but researches regarding the anatomy and the embryology belong to Johann Friedrich Meckel, the Younger in 1809 [1]. It is a vestigial remnant of the omphalomesenteric duct that normally disappears between 6<sup>th</sup> and 8<sup>th</sup> week of pregnancy. It is located in the distal ileum on the antimesenteric side usually within about 45-60 cm of the ileocecal valve and is 3-5 cm long. Normally it is asymptomatic and it is found incidentally during abdominal exploration for other pathologies. When the Meckel's diverticulum is symptomatic, it may be responsible for severe episodes of intestinal bleeding [2,3], intussusception, bowel obstruction, or recurrent abdominal pain with repeated vomiting and/or nausea. It is difficult to diagnose a Meckel diverticulum clinically and imagistically and it is often mistaken for other disorders like appendicitis, peptic

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APGAR score were 5 - 4 at one and five minutes, 2120 gr. Blood cultures were done. After repairing the uterus, the examination of the abdomen reveals a medium quantity of sero-purulent liquid and false membranes disseminated through the abdominal cavity, especially in the midsection and pelvis. Exploration of the right iliac fossa revealed the ipsilateral ovary and fallopian tube increased of volume, covered of fibrin which is present also in the posterior wall of the womb. Because of it was impossible to see the appendix, the help of the general surgeon was requested. Even if the exploration of the right iliac fossa was very difficult, it was shown the Meckel diverticulum perforated by the gangrenous appendicitis. The Meckel diverticulum and the appendix were removed. The following days after cesarean section the general conditions of the woman got better and antibiotic therapy was continued. On day 4 an advice from expert in infectious disease was request and the antibiotic therapy was modified (from cefazoline 1 g × 2/die to piperacillin/tazobactam 4.5 g × 3/die) and the monitoring of blood sample was advised; the use of fluids was continued. On day 5, an abdomen ultrasound scan was performed: some fluids were still present in abdomen between bowel loops in the right iliac fossa. The patient was discharged with her baby on day 8 post-operative. She was well at the six-week postpartum visit. The histological examination confirmed the gangrenous appendix, the perforated diverticulum and the acute peritonitis.

## Discussion

Acute abdomen in pregnancy remains one of the most challenging diagnostic and therapeutic dilemmas today. The incidence of acute abdomen during pregnancy is 1 in 500-635 pregnancies. Despite advancements in medical technology, preoperative diagnosis of acute abdominal conditions is still inaccurate. Laboratory parameters are not specific and often altered as a physiologic consequence of pregnancy [4].

Appendicitis is the most common cause of acute abdomen during pregnancy, occurring with a usual frequency of 1 in 500-2000 pregnancies, in particular during the second trimester (40% of cases), which amounts to 25% of operative indications for non-obstetric surgery during pregnancy [5]. In literature it was described the migration of the appendix during pregnancy reaching the level of the iliac crest at the end of the sixth month. The appendix returns to its normal position 10 days after delivery. The most common symptom is pain located in the right lower quadrant of the abdomen [6]. Rebound tenderness and guarding are not very specific because of the distension of the abdominal wall muscles and the interposition of the uterus between the appendix and the anterior abdominal wall. This displacement of the cecum and the appendix can result in back pain, which is often confused with a urinary tract infection or pyelonephritis, especially late in the pregnancy. In case of acute appendicitis, perforation rate rise from 30% in the first and second trimesters to 70% in the third trimester [7], fetal mortality depends on whether appendix perforation occurs and fetal loss rate may be as high as 20-35% in contrast to 1.5% if no perforation occurs [8]. Preterm contractions caused by localized peritonitis are common (83%) overall, preterm labor and delivery are not common (5-14%), but preterm delivery in the third trimester can be up to 50%. Maternal mortality is uncommon in the first trimester, but increases with advancing gestational age and is usually associated both with a delay in diagnosis and appendix perforation. Overall, maternal mortality should be less than 1% when appendicitis is promptly diagnosed and treated. In pregnant women, even if it is difficult and limited by the enlarging gravid uterus and displacement of the surrounding bowel as pregnancy progresses, ultrasound scan represents the first diagnostic choice in the evaluation of bowel conditions such as small-bowel obstruction, inflammatory bowel disease, diverticulitis, volvulus and intussusceptions. If sonography is inconclusive, magnetic resonance imaging may be appropriate to identify the normal appendix [7]. It is known that surgical procedures during pregnancy are associated with the risk of adverse fetal outcome. Although, for many years, pregnancy has been considered to be an absolute contraindication to the laparoscopic approach, because of the theoretical effects

of the pneumoperitoneum on the fetus and the occupation of the working space by the gravid uterus, successful reports of laparoscopic appendectomy during pregnancy have appeared in the surgical literature [9]. Even though, different authors reported that laparoscopic appendectomy is a safe and feasible procedure for the treatment of acute appendicitis in all trimesters of pregnancy if maternal and fetal monitoring during and after the operation is intensive [10], other authors reported that during pregnancy, the open appendectomy remains the standard approach [11]. Moreover, the outcome of surgery during pregnancy is not dictated by the type of procedure but by the type of disease. The gain for fetal outcome in the future most likely lies in the diagnostic pathway rather than the type of surgery [12,13].

Meckel's diverticulum occurs with equal frequency in both sexes; although symptomatic Meckel's diverticulitis is rare in pregnancy, it can be potentially fatal because diverticulitis is often difficult to diagnose [14,15]. It usually presents with abdominal pain which may mimic different disorders such as acute appendicitis, gastroenteritis, and peptic ulcer [16].

When our patient was hospitalized, she presented a monolateral hydronephrosis located in the right lower quadrant of the abdomen and it was thought of a renal colic which was treated with antibiotics and painkillers. She then developed abdominal pain, peritonitis, and ileus.

## Conclusion

Appendicitis is the most common cause of acute abdomen during pregnancy, on the contrary, diverticulitis is a rare complication of pregnancy and it is often difficult to diagnose because it usually presents with abdominal pain which may mimic other different disorders. Appendicitis is the most common pre-operative diagnosis in patients with complications of Meckel's diverticulum. Its diagnosis must be considered in all cases of intra-abdominal disease in which the cause is not readily apparent, particularly when the diagnostic radiographic studies do not suggest appendicitis. An appropriate treatment is always require: non operative management is not always the safest option, both for fetal and maternal outcome; incidence of complications are related to perforation of the appendix and to peritonitis which are truly the cause of significantly higher incidence of preterm birth and/or fetal demise.

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