Simultaneous Meckel’s diverticulitis and appendicitis: a rare complication in puerperium

D. SPILIOPOULOS, A.O. AWALA, P. PEITSIDIS, A. FOUTOULOGLOU

SUMMARY: Simultaneous Meckel’s diverticulitis and appendicitis: a rare complication in puerperium.

D. SPILIOPOULOS, A.O. AWALA, P. PEITSIDIS, A. FOUTOULOGLOU

We report a case of a 24-year-old woman who was delivered via caesarean section at 39 weeks and presented in the puerperium with symptoms of worsening abdominal pain and sepsis. Preoperative ultrasonography suggested the presence of a pelvic collection. Exploratory laparotomy revealed the simultaneous presence of Meckel’s diverticulitis and appendicitis without bowel perforation. The patient made an uneventful recovery following small bowel resection with end to end reanastomosis and appendicectomy.

KEY WORDS: Pregnancy - Puerperium - Meckel’s diverticulitis - Appendicitis.

Introduction

Meckel’s Diverticulum (MD) was first described by Fabricius Hildanus in the sixteenth century and was named after Johann Friedrich Meckel in 1809 (1). It is a remnant of the connection from the yolk sac to the small intestine present during embryonic development and results from failure of the omphalomesenteric duct to involute during the fifth to seventh week of gestation. It involves all layers of the intestinal wall and is the most common congenital abnormality of the gastrointestinal tract (2).

Pregnancy and puerperium can be complicated by common non-obstetric conditions such as appendicitis, cholecystitis, renal calculi or peptic ulcer disease. All these conditions can present with symptoms such as nausea, vomiting, abdominal distention and constipation that are also commonly found in pregnant women (2).

Meckel’s diverticulum is an atypical cause of acute abdomen and is diagnostically challenging because its symptoms mimic those of appendicitis. The differential diagnosis can be difficult, with presenting symptoms similar to preterm labour, placental abruption, chorioamnionitis or endometritis. Mortality and morbidity rates can be significant because of complications such as bowel perforation and peritonitis, often as a result of a delay in diagnosis (3, 4).

Case report

A 24-year-old woman in her first pregnancy was admitted to our hospital’s maternity unit, for a planned caesarean section at 39 weeks’ gestation. Her past medical history was unremarkable apart from the presence of polycystic ovaries. She had an uneventful antenatal period and on admission her fundal height measurement was appropriate for dates and the fetal heart beat was heard and regular. A full blood count revealed the following: White Blood Cell count (WBC) 9002/ L, Haemoglobin (Hb) 10.9 g/dl, Haematocrit (Hct) 33.3%. The patient delivered a healthy male neonate weighing 3300 grams, with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively.

On the second day postpartum, she was passing flatus, eating and drinking but she had a single febrile episode of 38.5°C. The following day, she had two more febrile episodes of maximum temperature 38.6°C with rigors.

On examination, chest auscultation was clear, her abdomen was soft, not distended but slightly tender in the left iliac fossa. The wound was intact without evidence of wound infection or haematoma. Vaginal examination was unremarkable, normal lochia seen and breast examination also revealed no signs of infection or tenderness. The patient did not complain of any urinary symptoms such as dysuria or frequency. Blood and urine cultures collected during the febrile episodes were negative.
Simultaneous Meckel's diverticulitis and appendicitis: a rare complication in puerperium

On the fourth day postpartum, she remained febrile (39.5°C) and tachycardic (123 bpm). Increasing abdominal tenderness on palpation with absent bowel sounds was noted. She was then started on empirical intravenous antibiotic therapy with piperacillin/tazobactam and metronidazole. She was also given prophylactic dose of anticoagulation (sc fraxiparine injection) once daily to reduce the risks of thrombosis and treat a presumed pelvic septic thrombophlebitis.

A chest x-ray showed atelectasis of the right lung base and the abdominal ultrasound revealed a complex multi-cystic area in the pouch of Douglas measuring 91x44x90 mm with diffuse echogenic elements of hemorrhagic or inflammatory origin.

During the next day, the patient remained afebrile but she developed generalized rebound abdominal tenderness on palpation, anorexia, nausea and vomiting. Her WBC count had risen to 9160/ L with 82.2% neutrophils. Indices of inflammation such as C - reactive protein (CRP) and Lactate Dehydrogenase (LDH) were within normal limits. A surgical consultation confirmed diffuse abdominal tenderness on deep palpation and a presumptive diagnosis of appendicitis with postoperative pelvic collection or appendiceal mass was made. She was then taken to the operating theatre for evacuation of a presumed infected pelvic haematoma or abscess. A computed tomography (CT) scan of the abdomen was not performed because given the clinical status of the patient; it would not significantly alter the management.

At laparotomy, a large amount of pus was discovered in the peritoneal cavity and the presence of filmy pseudomembranous deposits was noted. The involuted uterus was also covered with pseudomembranes and the cesarean scar was intact. An inflamed 4.5 cm long Meckel's diverticulum and a secondarily inflamed appendix were observed (Figure 1). Both large and small bowels were checked and there was no obvious perforation. Examination of the rest of the intra-abdominal organs revealed no abnormalities. Excision of the Meckel's diverticulum with small bowel resection and primary end to end reanastomosis, along with an appendicectomy was performed.

The histological report indicated the presence of suppurative inflammation and diffuse serositis. The Meckel's diverticulum mucosa was diffusely replaced by ectopic gastric mucosa and two small ulcers were observed with extension to the submucosa (Figures 2, 3). The postoperative course was uneventful and the patient was discharged on the seventh postoperative day.

Discussion

Meckel's diverticulum is referred to as the disease of the “2’s” because it affects 2% of the general population, it is 2 to 3 cm long, it is most often symptomatic before the age of 2, complications occur in 2% of cases and it is twice as common in men. In half of the specimens examined there is ectopic tissue of gastric or pancreatic origin, with a frequency of 62% and 16% respectively (2, 5-8).

The lifetime risk of complications from a Meckel's diverticulum is 4.2% with the risk decreasing with age (38). In the general population, one of the most common complications in symptomatic patients is small bowel obstruction (frequency of 37%). Other complications include intussusception (14%), inflammation (13%), bleeding (12%), perforation (7%) and others (17%). Small bowel obstruction affects the adult population (9,10) and heterotopic mucosa is found in 90%
**TABLE 1 - LIST OF THE REPORTED CASES DIAGNOSED WITH MECKEL’S DIVERTICULUM DURING PREGNANCY AND PUERPERIUM.**

<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>Gestational age/parity</th>
<th>Matermal Age</th>
<th>Gestational age/weeks</th>
<th>Perioperative diagnosis</th>
<th>Imaging studies</th>
<th>Complications</th>
<th>Surgical treatment</th>
<th>Mode/Time of delivery</th>
<th>Outcomes</th>
<th>Outcome on maternal</th>
<th>Outcome on neonatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botta (12) 1990</td>
<td>Spain</td>
<td>NS</td>
<td>27</td>
<td>3rd trimester</td>
<td>Obstruction/anastomosis</td>
<td>NS</td>
<td>Intestinal perforation</td>
<td>Diverolecotomy</td>
<td>CS-prenatal</td>
<td>Expired</td>
<td>Uneventful</td>
<td>Uneventful</td>
</tr>
<tr>
<td>Gov et al (13) 1995</td>
<td>USA</td>
<td>NS</td>
<td>NS</td>
<td>puerperium</td>
<td>Obstruction</td>
<td>X-ray</td>
<td>Diverciolecotomy/ ETE anastomosis</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Twin 1 survived</td>
<td>Twin 2 expired</td>
<td></td>
</tr>
<tr>
<td>Gibbains (14) 1953</td>
<td>UK</td>
<td>NS</td>
<td>NS</td>
<td>puerperium</td>
<td>Obstruction</td>
<td>X-ray</td>
<td>Diverciolecotomy/ ETE anastomosis</td>
<td>CS-prenatal</td>
<td>Uncertain</td>
<td>Twin 1 survived</td>
<td>Twin 2 expired</td>
<td></td>
</tr>
<tr>
<td>Vlais (15) 1956</td>
<td>Bulgaria</td>
<td>a) G1P0</td>
<td>21</td>
<td>a) 3rd trimester</td>
<td>a) Obstruction/anastomosis</td>
<td>a)NP</td>
<td>a)Obstetric shock</td>
<td>a)Diverciolecotomy</td>
<td>a)VD-term</td>
<td>b)Uneventful</td>
<td>a)Uneventful</td>
<td>a)Uneventful</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) G1P0</td>
<td>20</td>
<td>b) 2nd trimester</td>
<td>b)Obstetric shock</td>
<td>b)NP</td>
<td>b)Obstetric shock</td>
<td>a)Diverciolecotomy</td>
<td>a)VD-term</td>
<td>b)Uneventful</td>
<td>a)Uneventful</td>
<td>a)Uneventful</td>
</tr>
<tr>
<td>Wawryk (16) 1997</td>
<td>Poland</td>
<td>G1P0</td>
<td>26</td>
<td>puerperium</td>
<td>Acute abdomen</td>
<td>X-ray</td>
<td>Perforation/ perforation</td>
<td>Diverolecotomy</td>
<td>VD-term</td>
<td>Expired</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Waker et al (17) 1962</td>
<td>USA</td>
<td>G1P0</td>
<td>23</td>
<td>18</td>
<td>GI-Hemorrhage</td>
<td>NP</td>
<td>GI-Hemorrhage</td>
<td>Diverolecotomy</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Meairs (18) 1965</td>
<td>UK</td>
<td>G1P0</td>
<td>18</td>
<td>Obstruction</td>
<td>NP</td>
<td>Diverciolecotomy/ ETE anastomosis</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dworski (19) 1969</td>
<td>Germany</td>
<td>NS</td>
<td>29</td>
<td>3rd trimester</td>
<td>Obstruction</td>
<td>NP</td>
<td>Perforation/ perforation</td>
<td>Diverolecotomy</td>
<td>CS-prenatal</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td></td>
</tr>
<tr>
<td>McLean (20) 1969</td>
<td>USA</td>
<td>G1P0</td>
<td>22</td>
<td>23</td>
<td>Perforated appendectomy</td>
<td>NP</td>
<td>Perforation/ Pneumonitis</td>
<td>Diverolecotomy</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td></td>
</tr>
<tr>
<td>Wilkie (21) 1972</td>
<td>Germany</td>
<td>A1 G1P0</td>
<td>A2</td>
<td>Term</td>
<td>Pyloroplasty</td>
<td>NS</td>
<td>NS</td>
<td>Diverolecotomy</td>
<td>CS-term</td>
<td>Expired</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B1 G1P0</td>
<td>B2</td>
<td>Term</td>
<td>Pyloroplasty</td>
<td>NS</td>
<td>NS</td>
<td>Diverolecotomy</td>
<td>CS-term</td>
<td>Expired</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Aliyu (22) 1974</td>
<td>UK</td>
<td>G1P0</td>
<td>17</td>
<td>18</td>
<td>Appendicitis</td>
<td>NP</td>
<td>Gangrene of MD</td>
<td>Diverolecotomy</td>
<td>NS</td>
<td>Uncertain</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Webb (23) 1984</td>
<td>UK</td>
<td>G1P2</td>
<td>19</td>
<td>19</td>
<td>Appendicitis, acute abdomen</td>
<td>NP</td>
<td>Gangrene of MD</td>
<td>Diverolecotomy</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td></td>
</tr>
<tr>
<td>Kankovski (24) 1987</td>
<td>Finland</td>
<td>NS</td>
<td>23</td>
<td>31</td>
<td>Lower GI bleed</td>
<td>NS</td>
<td>Perforation/ Pneumonitis</td>
<td>Diverolecotomy</td>
<td>VD-term</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td></td>
</tr>
<tr>
<td>Martin (25) 1986</td>
<td>USA</td>
<td>G1P0</td>
<td>26</td>
<td>Acute abdomen</td>
<td>NP</td>
<td>Ecopic pregnancy</td>
<td>Diverolecotomy/ Splenicectomy</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Simultaneous Meckel’s diverticulitis and appendicitis: a rare complication in puerperium

Table 1 - List of the reported cases diagnosed with Meckel’s diverticulum during pregnancy and puerperium. NS - Not Stated; NP - Not Performed; GS - Cesarean section; VD - Vaginal delivery; ETE - End to end; U/S - Ultrasound; MRI - Magnetic Resonance Imaging; CT - Computed Tomography; GI - Gastrointestinal; MD - Meckel’s diverticulum; ICU - Intensive Care Unit. (continued)

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Country</th>
<th>NS</th>
<th>GI</th>
<th>U/S</th>
<th>GI hemorrhage</th>
<th>GI hemorrhage from MD</th>
<th>Diverticulectomy, ETE Anastomosis</th>
<th>CS-periton</th>
<th>Uneventful</th>
<th>Uneventful</th>
<th>Uneventful</th>
<th>Uneventful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerk (1992)</td>
<td>USA</td>
<td>NS</td>
<td>26</td>
<td>25</td>
<td>GI hemorrhage</td>
<td>Endo-scopic Angiography</td>
<td>GI hemorrhage from MD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Kim (1995)</td>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diverticulectomy</td>
<td>Uneventful</td>
<td></td>
<td></td>
<td></td>
<td>Self-limited</td>
</tr>
<tr>
<td>Chomchuck et al. (2001)</td>
<td>Thailand</td>
<td>G1P0</td>
<td>50</td>
<td>35</td>
<td>Partial intestinal obstruction</td>
<td>X-ray</td>
<td>Inflammation, appendicitis</td>
<td>Diverticulectomy, ETE Anastomosis</td>
<td>CS-periton</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Hildebrand (2002)</td>
<td>Canada</td>
<td>G1P0</td>
<td>16</td>
<td>16</td>
<td>Polymenitis</td>
<td>NP</td>
<td>Perforation, peritonitis</td>
<td>Diverticulectomy</td>
<td>NS</td>
<td>Uneventful</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Raffo (2004)</td>
<td>USA</td>
<td>G1P0</td>
<td>14</td>
<td>32</td>
<td>Perforated appendicitis</td>
<td>Ultrasound and CT scan</td>
<td>Perforation, appendicitis</td>
<td>Diverticulectomy, ETE Anastomosis</td>
<td>VD-uncomp</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Gavrov (2006)</td>
<td>Bulgaria</td>
<td>G1P0</td>
<td>32</td>
<td>16</td>
<td>Appendicitis</td>
<td>NP</td>
<td>Inflammation, Appendicitis, Peritonitis</td>
<td>Diverticulectomy, appendectomy</td>
<td>VD-periton</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Huerta (2006)</td>
<td>USA</td>
<td>G2P1</td>
<td>50</td>
<td>29</td>
<td>Appendicitis</td>
<td>Ultrasound and CT scan</td>
<td>Perforation, peritonitis</td>
<td>Diverticulectomy, appendectomy</td>
<td>VD-periton</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Zapater (2010)</td>
<td>Spain</td>
<td>G1P0</td>
<td>35</td>
<td>27</td>
<td>Appendicitis</td>
<td>Ultrasound and MRI</td>
<td>Obstruction</td>
<td>Diverticulectomy, ETE Anastomosis</td>
<td>VD-uncomp</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
<tr>
<td>Wong (2010)</td>
<td>Hong Kong</td>
<td>NS</td>
<td>33</td>
<td>21</td>
<td>Appendicitis</td>
<td>Ultrasound</td>
<td>No</td>
<td>Diverticulectomy, appendectomy</td>
<td>NS</td>
<td>Uneventful</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Lago (2010)</td>
<td>Mexico</td>
<td>G2P1</td>
<td>27</td>
<td>40</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Diverticulectomy, ETE Anastomosis</td>
<td>CS-periton</td>
<td>Uneventful</td>
<td>Uneventful</td>
<td></td>
</tr>
</tbody>
</table>

Simultaneous Meckel’s diverticulitis and appendicitis: a rare complication in pregnancy. Inflammation of Meckel’s diverticulum is the third most common complication in adults (3, 36–38). Meckel’s diverticulitis is difficult to diagnose because symptomatology is similar to acute appendicitis. In our case, the point of major tenderness initially, was on the left iliac fossa due to the inflamed diverticulum and there was no tenderness on the right side, despite the presence of appendicitis. In pregnancy, it can present with symptoms mimicking preterm labour, placental abruption, chorioamnionitis or endometritis in the puerperium. That is why only 10% of cases are diagnosed preoperatively (11).

In addition, imaging studies such as computed tomography scan (CT scan) and ultrasound examination are not helpful in distinguishing a Meckel’s diverticulum from adjacent bowel loops (12). In our patient, the abdominal ultrasound was not helpful in identifying the
actual cause, as the pelvic collection was not specific and there was no evidence of bowel perforation/obstruction. The most common detection method is technetium-99m pertechnetate scan.

A delay in the diagnosis can lead to significant maternal and fetal morbidity and mortality rates (12). For this reason prompt surgical management is crucial. In our case, there was a delay between presentation of initial symptoms and definitive management, but the decision to proceed with laparotomy was therapeutic.

In the review of the published cases with Meckel’s diverticulum in pregnancy and puerperium since 1950 (Table 1), there were only two reported cases with a correct preoperative diagnosis of Meckel’s diverticulum (16, 28). In all of them, the onset of symptoms was late in the third trimester or in the puerperium. Interestingly enough, 17 of the women were primiparous and the mean gestational age of diagnosis was 23.2± 8.9 weeks with only 4 cases, including ours, being diagnosed in the puerperium. Cesarean section was performed in 8 patients, while vaginal delivery was reported in 13 patients. In total 8 pre-term deliveries were reported. With regard to maternal and neonatal outcomes, 4 maternal deaths, 2 stillbirths, and 1 neonatal death were reported.

We believe that each case should be managed on an individual basis after taking into consideration the clinical status of the patient and her past medical history. It is also very important to realise the necessity of taking prompt action in cases of septicemia in the puerperium and not delaying the management of these patients, in order to lower maternal and fetal morbidity and mortality rates.

Conclusion

Symptomatic Meckel’s diverticulum complicating pregnancy and puerperium is a rare disease. The diagnosis must be taken into consideration in cases of abdominal disease in which the diagnosis is not clear even with imaging techniques. It can cause significant morbidity and mortality if left undiagnosed. The mainstay of treatment includes surgical intervention with excision of the diverticulum and/or small bowel resection. If a Meckel’s diverticulum is incidentally found at laparotomy, prompt removal to avoid the risk of developing complications is suggested in both pregnant and non-pregnant patients.

References

Simultaneous Meckel’s diverticulitis and appendicitis: a rare complication in puerperium

19. Dworski S. Meckel’s diverticulum leading to reaction of the small intestine in a hospital. Zentralbl Gynakol 1969 Jul;26(9):50;984-.