



Meconium Peritonitis With Multiple Distal Ileal Perforations, Meconium Pseudocyst, and Extensive Adhesions in A Low-Birth-Weight Neonate: A Case Report and Literature Review

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Abstract. Meconium peritonitis is a rare, life-threatening sterile chemical peritonitis resulting from antenatal gastrointestinal perforation. Despite significant advances in prenatal imaging and neonatal surgery, complex presentations continue to carry considerable morbidity and mortality risks. We report the case of a male neonate delivered at 37 weeks of gestation with low birth weight, who presented with progressive abdominal distension immediately after birth, respiratory distress, and failure to pass meconium. Urgent exploratory laparotomy revealed a giant meconium pseudocyst, extensive intra-abdominal adhesions, multiple distal small-bowel perforations, and secondary ischemic necrosis of the transverse colon. Surgical management entailed multiple segmental bowel resections, primary anastomoses, and a double-barrel ileostomy. The patient's critical postoperative recovery was supported by total parenteral nutrition, broad-spectrum antibiotics, and specialized intensive neonatal care. This case illustrates the complex diagnostic and therapeutic challenges of advanced meconium peritonitis, underscoring that early recognition, timely surgical intervention, and cohesive multidisciplinary collaboration remain paramount for optimal survival.

Keywords: Case Report; Ileal Perforations; Low Birth Weight; Meconium Peritonitis; Meconium Pseudocyst.

1. INTRODUCTION

Meconium peritonitis (MP) is an uncommon neonatal surgical emergency resulting from intrauterine bowel perforation and leakage of meconium into the peritoneal cavity. The condition has an estimated incidence of approximately 1 in 30,000–35,000 live births (Marsubrin et al., 2025). Although meconium itself is sterile in utero, exposure of the peritoneum to meconium triggers a severe inflammatory response characterized by fibrosis, calcification, adhesions, pseudocyst formation, and bowel obstruction. Bowel perforation may result from a temporary reduction of blood flow to one small area of the bowel which results in a small hole forming in the bowel. Meconium can escape through this hole into the abdomen, where it doesn't belong. This scenario is termed "simple meconium peritonitis" since no additional abnormalities are found in the fetus, and the prognosis is good (Lamrissi et al., 2022).

The underlying causes include intestinal atresia, volvulus, meconium ileus, vascular insufficiency, Hirschsprung disease, congenital bowel stenosis, and cystic fibrosis (Koga et al., 2021; Park et al., 2020; Wang et al., 2021). Prenatal ultrasonography may reveal abdominal calcifications, fetal ascites, dilated bowel loops, polyhydramnios, or meconium pseudocysts (Chen et al., 2019; Jiang et al., 2020). Nevertheless, some patients remain undiagnosed until the neonatal period.

Recent advances in fetal imaging, neonatal intensive care, parenteral nutrition, and pediatric surgery have significantly improved survival rates, exceeding 90% in specialized centers (Chen et al., 2019; Jiang et al., 2020; Koga et al., 2021). However, extensive bowel involvement, multiple perforations, sepsis, prematurity, and delayed intervention continue to be associated with poorer outcomes (Jiang et al., 2020; Koga et al., 2021). We present a complex case of neonatal meconium peritonitis characterized by a giant meconium pseudocyst, multiple distal ileal perforations, severe adhesions, bowel ischemia, and the need for ileostomy creation.

During the ultrasound exam, the doctor will see the leaked meconium as small bright spots (termed echogenic spots or calcifications) at various locations inside the fetal abdomen. During the scan, the doctor may observe additional findings including: (1) Ascites - free fluid within the abdomen but outside the bowels (normally, the abdomen should not contain free fluid). (2) Dilation of bowel loops - a point of blockage along the "gut tube" through which bowel content cannot pass, causing the bowel above the blockage to balloon out or dilate. (3) Intra-peritoneal cysts - these are small pockets of fluid inside the abdomen, caused by cells in the baby's body that try to wall off or encapsulate the leak. (4) Polyhydramnios - another word for an excessive amount of amniotic fluid within the pregnancy sac. This may occur when the first portion of the bowel is obstructed. In this condition, the fetus cannot swallow the normal amount of fluid as it usually does, leading to the accumulation of excess fluid outside the fetus.

2. METHODS

Study Design

This study was designed as a descriptive case report accompanied by a narrative literature review. The case report describes the clinical presentation, diagnostic evaluation, surgical findings, operative management, postoperative treatment, and short-term clinical outcome of a neonate with complex meconium peritonitis.

Case Data Collection

Clinical data were obtained from the patient's medical records, including history taking, physical examination, laboratory investigations, radiological examinations, operative findings, postoperative treatment, and follow-up evaluation. Relevant clinical parameters, including gestational age, birth weight, APGAR scores, abdominal circumference, respiratory status, bowel function, and postoperative clinical progression, were documented.

3. CASE REPORT

A male neonate was born by cesarean section at 37 weeks of gestation. Birth weight was 2.400 gr, consistent with low birth weight. APGAR scores were 5 and 7 at 1 and 5 minutes, respectively. Prenatal ultrasonography had reportedly identified a congenital intra-abdominal abnormality. The mother was 28 years old and attended antenatal care three times during pregnancy. There was no history of smoking, alcohol consumption, herbal medication use, or significant maternal illness.

The patient was referred to our emergency department with progressive abdominal distension present since birth. Abdominal circumference increased from 33.5 cm at birth to 41 cm at presentation. The family denied fever, bilious vomiting, or projectile vomiting. Meconium passage occurred only a few hours before admission and was scanty and dark green. Associated respiratory distress was noted.



Figure 1. Anterior View Of The Neonate Demonstrating Marked Abdominal Distension and Prominent Abdominal Wall Venous Engorgement at Presentation.

Physical examination demonstrated a lethargic neonate with heart rate 168 beats/minute, respiratory rate 66 breaths/minute, temperature 37.9°C, and oxygen saturation 97% on nasal oxygen at 1 L/minute. Downes score was 3, indicating mild respiratory distress. Abdominal examination revealed marked distension, visible abdominal veins, reduced bowel sounds, and abdominal circumference of 41 cm. Genital examination demonstrated hydrocele with positive transillumination and bilateral undescended testes.

The initial differential diagnosis included meconium peritonitis, hydrocele, bilateral undescended testes (bilateral cryptorchidism), low birth weight for gestational age, mild respiratory distress secondary to suspected neonatal pneumonia, and hypoalbuminemia. Given progressive abdominal distension and respiratory compromise, emergency exploratory laparotomy was undertaken on the day of admission.



Figure 2. Lateral View Showing Severe Abdominal Distension Causing Increased Abdominal Wall Tension and Venous Prominence.



Figure 3. Genitalexamination Demonstrating A Large Hydrocele With Bilateral Cryptorchidism.

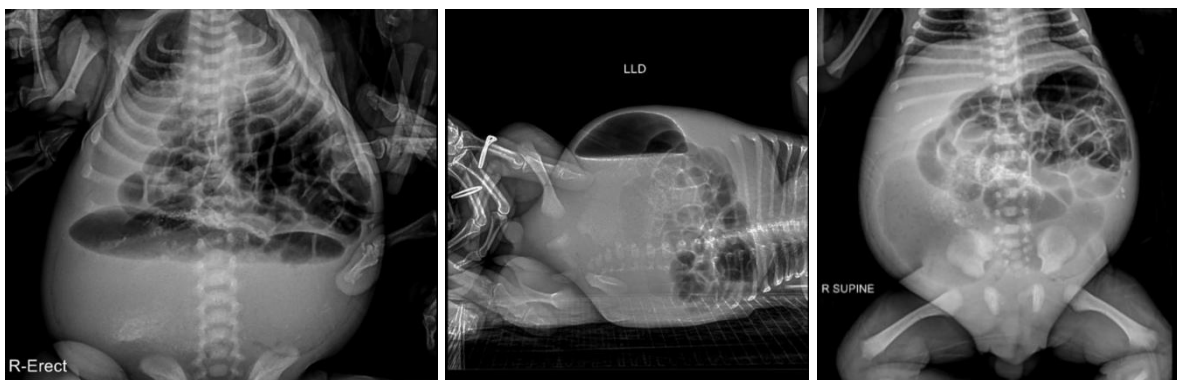


Figure 4. Preoperative Abdominal Radiograph Demonstrating Multiple Dilated Bowel Loops With Air–Fluid Levels and Diffuse Intra-Abdominal Calcifications, Suggestive Of Complicated Meconium Peritonitis With Bowel Obstruction.

Through a supraumbilical transverse laparotomy incision, markedly dilated small bowel loops were identified. A giant pelvic meconium pseudocyst containing meconium and calcified material was encountered and decompressed. Extensive adhesions between small bowel and colon within the pelvis were observed. Adhesiolysis was performed using both sharp and blunt techniques. Multiple perforations were identified in the distal small intestine. Segmental resections and multiple bowel anastomoses were performed using interrupted sutures. Further exploration revealed grade IV adhesions involving the distal small bowel and colon. The transverse colon appeared ischemic, with blackened serosa and absent peristalsis but without gross perforation. Owing to extensive disease burden and concern regarding bowel viability, a double-barrel ileostomy was created approximately 100 cm distal to the ligament of Treitz. An intra-abdominal pelvic drain was inserted before abdominal closure.

The operation lasted approximately three hours with estimated blood loss of 30 mL. Postoperatively, the patient was admitted to the neonatal intensive care unit. Management included total parenteral nutrition through a peripherally inserted central catheter, lipid supplementation, electrolyte correction, ceftazidime, amikacin, metronidazole, analgesia, and gradual initiation of enteral feeding. Serial abdominal circumference monitoring demonstrated progressive improvement. The patient remained hemodynamically stable without evidence of postoperative septic shock.

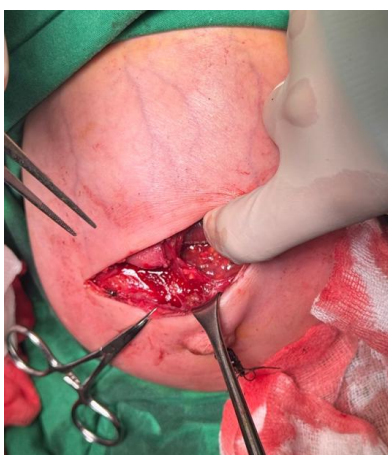


Figure 5. Intraoperative Photograph Showing Initial Abdominal Exploration Through A Transverse Supraumbilical Laparotomy Incision.



Figure 6. Early Postoperative Follow-Up Demonstrating A Viable Double-Barrel Ileostomy With Healthy Mucosal Appearance and Satisfactory Abdominal Decompression.

4. RESULTS AND DISCUSSION

Meconium peritonitis represents the final pathway of antenatal bowel perforation. The inflammatory response induced by meconium leakage leads to intense macrophage activation, fibrin deposition, calcification, and adhesion formation (Agrawal et al., 2020; Uchida et al., 2015). The extensive adhesions observed in our patient are consistent with advanced-stage disease and prolonged intrauterine inflammation. Prenatal diagnosis has become increasingly common with modern fetal ultrasonography. Characteristic findings include intra-abdominal calcifications, ascites, bowel dilatation, polyhydramnios, and meconium pseudocysts (Zangheri et al., 2007). In the present case, congenital abnormalities had already been identified antenatally, suggesting that the perforation process may have begun before delivery. The presence of a giant meconium pseudocyst and calcified material at surgery supports a chronic intrauterine process.

Several classification systems have been proposed. Zangheri and colleagues classified meconium peritonitis into isolated calcifications, ascites, pseudocyst formation, and complex forms (Zangheri et al., 2007). Our patient most closely fits the complex pseudocyst category because of massive pseudocyst formation, multiple perforations, extensive adhesions, and bowel ischemia. Such cases frequently require operative management shortly after birth.

The exact etiology of bowel perforation remains uncertain in this patient. Hirschsprung disease was initially suspected because of delayed meconium passage. Other possibilities include congenital intestinal atresia, vascular compromise, meconium obstruction, or spontaneous fetal bowel perforation (Kitamura et al., 2016). Histopathological evaluation and future stoma reversal assessment may help determine the underlying cause. Respiratory distress in meconium peritonitis may result from severe abdominal distension causing diaphragmatic

splinting. The patient's progressive increase in abdominal circumference from 33.5 cm to 41 cm likely contributed to respiratory compromise. Early decompression through surgery therefore provided both gastrointestinal and respiratory benefits (Lamrissi et al., 2022; Marsubrin et al., 2025).

The operative findings in this case are notable for multiple distal ileal perforations and ischemic transverse colon. While isolated perforations may be treated with primary resection and anastomosis, extensive disease often necessitates stoma formation (Kitamura et al., 2016; Lee et al., 2015). The decision to create a double-barrel ileostomy was appropriate given the severity of inflammation, questionable bowel viability, and high risk of anastomotic failure in a low-birth-weight neonate.

Recent literature demonstrates excellent outcomes when surgical intervention is performed promptly after diagnosis. Survival rates now exceed 90–95% in modern neonatal surgical centers (Jiang et al., 2020; Koga et al., 2021). Delayed diagnosis may permit bacterial colonization of previously sterile meconium, increasing the risk of sepsis, multiorgan dysfunction, and death (Sharma et al., 2014; Shinar et al., 2022). Early surgical source control, broad-spectrum antibiotics, neonatal intensive care, and nutritional optimization remain the cornerstones of treatment. Another important aspect of this case is the coexistence of low birth weight, hypoalbuminemia, bilateral undescended testes, and hydrocele. Although these conditions may not be directly related to meconium peritonitis, they complicated perioperative management and increased the need for meticulous nutritional and intensive care support. The use of prolonged parenteral nutrition was justified because extensive bowel manipulation and multiple anastomoses increase the risk of postoperative ileus and feeding intolerance (Jiang et al., 2020; Koga et al., 2021). This case contributes to the growing literature on complex meconium peritonitis by illustrating severe intra-abdominal pathology despite relatively limited systemic manifestations at presentation. The presence of multiple perforations, giant pseudocyst formation, extensive adhesions, and ischemic bowel underscores the heterogeneous spectrum of disease and the necessity for individualized surgical decision-making (Lamrissi et al., 2022; Marsubrin et al., 2025; Various Authors, 2025).

During treatment, the patient received antibiotics and other supportive therapies, along with regular monitoring of oral intake, wound and stoma care, and periodic monitoring of laboratory parameters such as complete blood count, electrolytes, kidney function, etc. The patient's progress was very good; the patient was active, and milk intake increased. The patient was treated in the intensive care unit for 22 days and spent 2 days in a regular ward, and was discharged for outpatient care on the 25th day of treatment in a fairly good and stable condition.



Figure 7. Follow-Up on Day 2 After Discharged.



Figure 8. Follow-Up on Day 2 After Discharged: The Wound is Well Cared and The Stoma Is Viable.

5. CONCLUSION

Complex meconium peritonitis is a very rare condition due to an inflammatory reaction caused by the accumulation of meconium in the peritoneum. Progressive abdominal distension, delayed meconium passage, and respiratory distress in neonates should prompt immediate evaluation for intestinal perforation and meconium peritonitis. It is therefore imperative to maintain clinical suspicion and to be aware of the most expressive radiological signs, in order to establish an early diagnosis and to initiate management aimed at reducing the morbidity and mortality of this pathology. Prenatal recognition, early referral, prompt exploratory laparotomy, appropriate bowel resection, stoma creation when indicated, intensive postoperative support, and multidisciplinary collaboration are essential for favorable outcomes. This case demonstrates that even extensive disease involving multiple bowel perforations and giant meconium pseudocyst can be successfully managed through timely surgical intervention and modern neonatal intensive care.

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