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RESEARCH ARTICLE

PRENATAL CYSTIC ABDOMINAL MASS REVEALING AN ENCYSTED MECONIUM PERITONITIS

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Abstract

Meconium peritonitis is a rare neonatal condition, often due to intra uterine bowel perforation. In some cases, peritoneal inflammation may lead to a pseudocyst formation. Prenatal diagnosis through ultrasound is important to ensure immediate post-natal treatment to enhance prognosis. We report the case of a 35-year-old woman, at term gestation, admitted for a fetal ultrasound before deliverance revealing a fetal peritoneal cystic mass with dilation of proximal small bowel, confirmed in post-natal imaging and surgery to be an encysted meconium peritonitis secondary to bowel atresia.

Introduction:-

Encysted meconium peritonitis is a rare fetal condition caused by meconium leakage into the peritoneal cavity leading to inflammation and sometimes formation of a fibrous-wall pseudocyst. This condition often occurs following an intrauterine bowel perforation.Prenatal diagnosis has improved through ultrasound or even fetal MRI, revealing characteristic imaging signs including bowel dilation, fetal ascites and calcifications. This article describesthe case of an encysted meconium peritonitis diagnosed in prenatal ultrasound and confirmed on post-natal imaging, in order to provide a comprehensive review of this etiology, its clinical aspects, diagnostic approach and treatment choices, for better understanding and management of this complex neonatal condition.

Case Description:-

A 35-year-old nulliparous woman presented at term gestation (40 weeks) with a history of no prenatal care. Upon admission, she was hemodynamically stable. Fetal ultrasound revealed a large, well-defined, cystic abdominal mass with anechoic and heterogeneous fluid and thin septations. The mass appeared to communicate with a dilated proximal jejunal loop. The fetus was male, and polyhydramnios was present (Figure1).Postnatal imaging demonstrated an air-fluid level on abdominal X-ray (at 6-hour old), following ultrasound (Figure 2) and CT scan showed the presence peritoneal cystic mass, with heterogeneous content, non-vascular, and without calcifications,

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with dilated proximal bowel, maybe jejunal, seeming to communicate with the cystic mass in some images (Figure 3).The newborn underwent immediate surgery (at 1-day-old) confirming a meconium pseudocyst due tojejunal atresia. Surgical repair was successfully performed with re-establishment of intestinal continuity (Figure 4).

« [insert Figure 1.] »

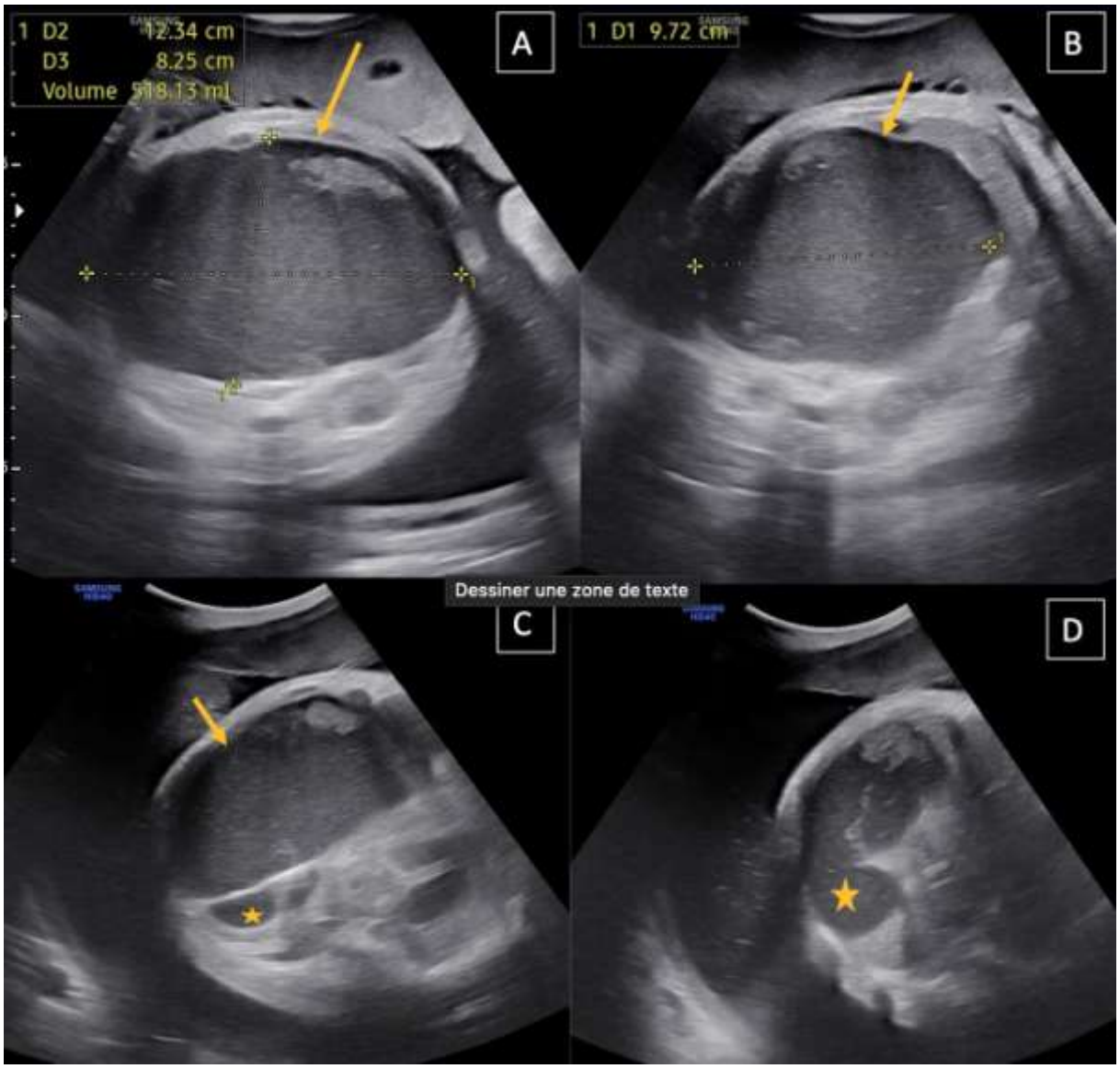

Figure 1: Prenatal ultrasound (40 weeks of gestation) showing a large peritoneal cystic mass, encapsulated, with heterogeneous and echogenic content (yellow arrow, images A and B).

Note the aspect of a distended small bowel loop in contact with the mass (yellow star, images C and D).

« [insert Figure 2.] »

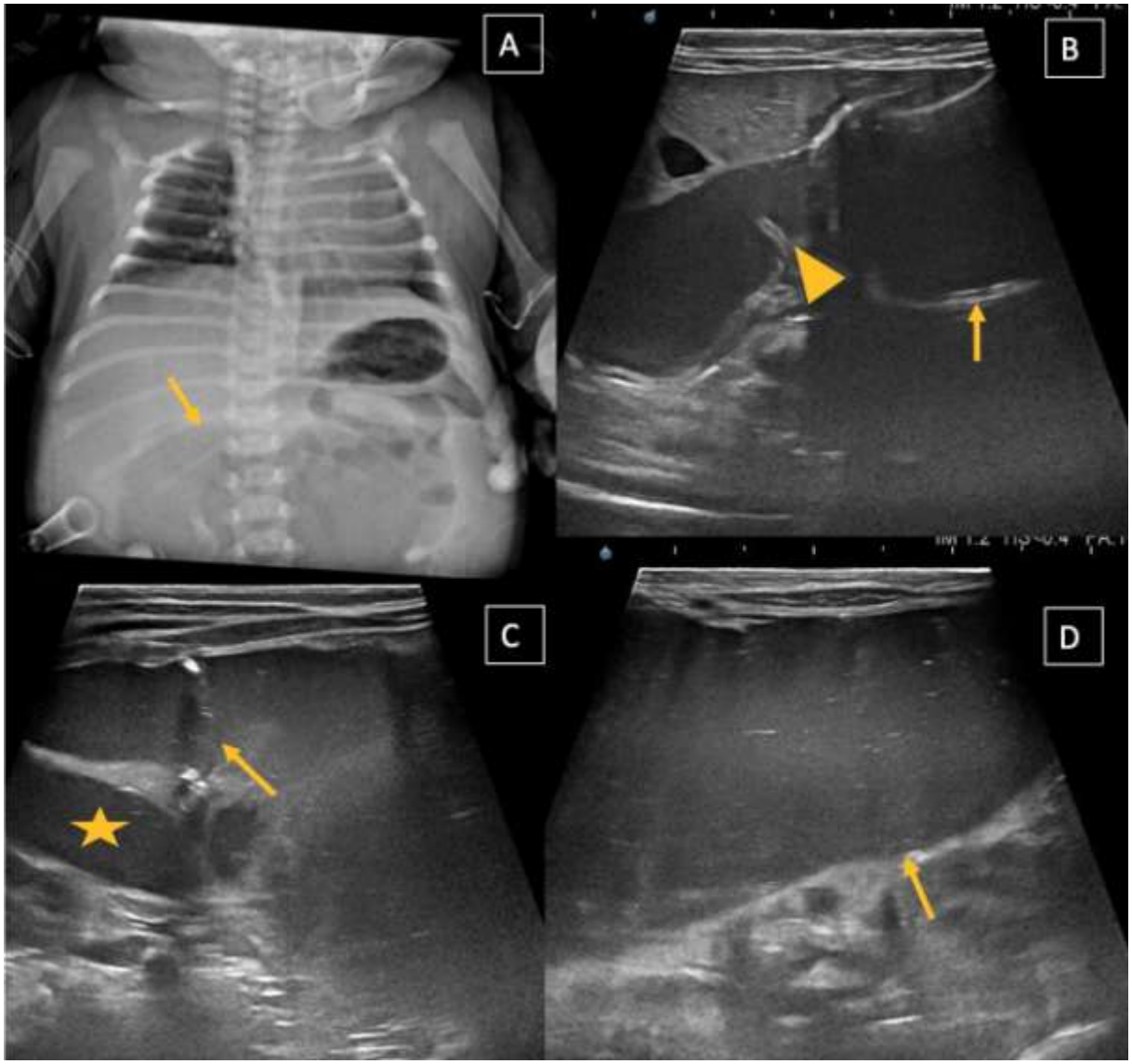

Figure 2: Image A: Chest X-ray at 6 hours of life showing a well-defined abdominal air-fluid level (yellow arrow), corresponding on ultrasound to an air-fluid level with air bubbles (hyperechoic images, yellow arrow, C) within the peritoneal cystic mass (yellow arrow, B and D). Image B reveals a dilated proximal small bowel loop (yellow star) in contact with the mass.

« [insert Figure 3.] »

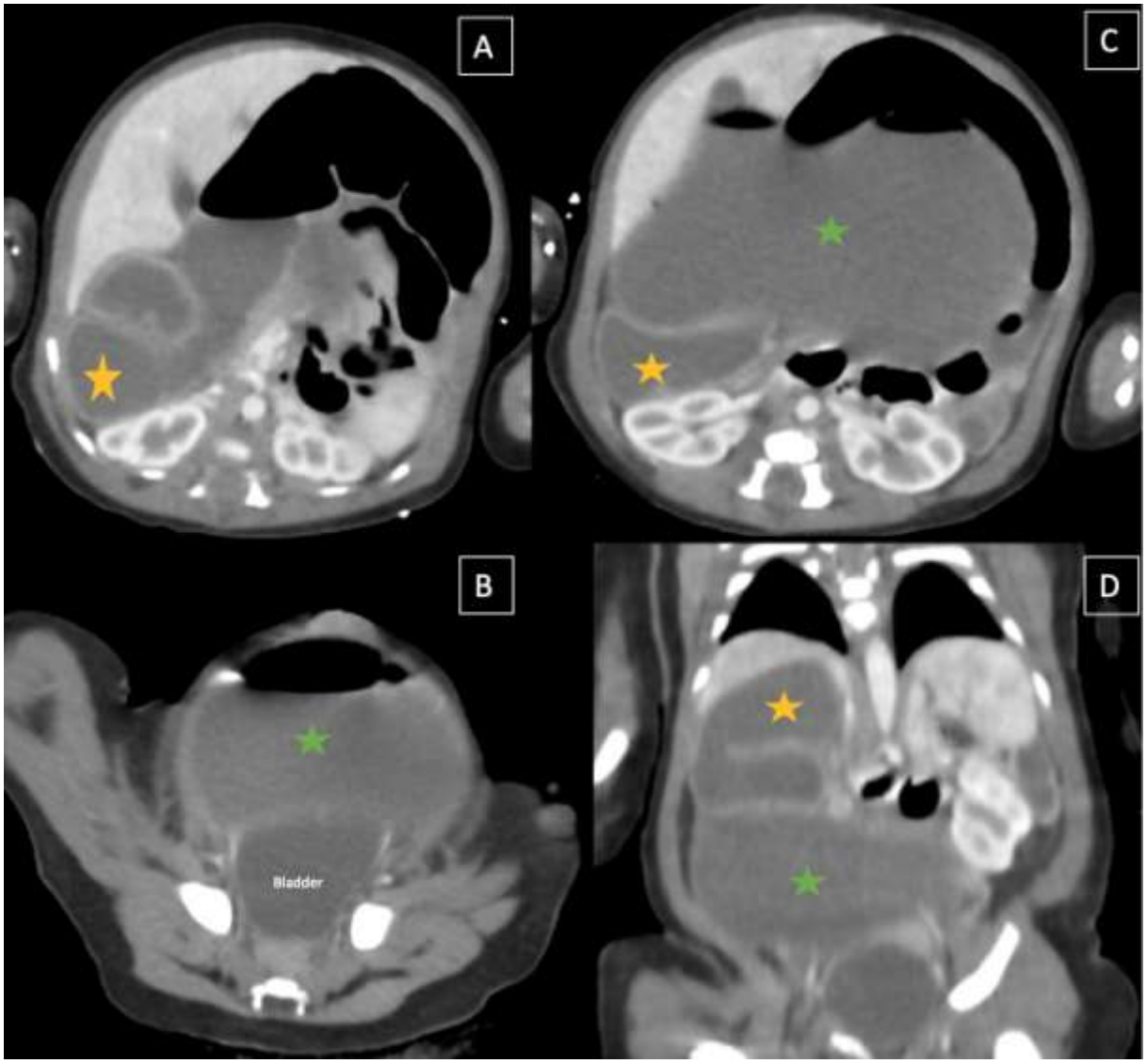

Figure 3: Enhanced abdominal CT scan in axial images (A, B, and C) and coronal images (D), confirming the presence of a dilated proximal bowel loop (yellow star). Its continuous course is difficult to assess, embedded within the encapsulated peritoneal formation containing air and fluid without any calcifications (green star). These findings are consistent with encysted meconium peritonitis due to proximal small bowel atresia.

« [insert Figure 4.] »

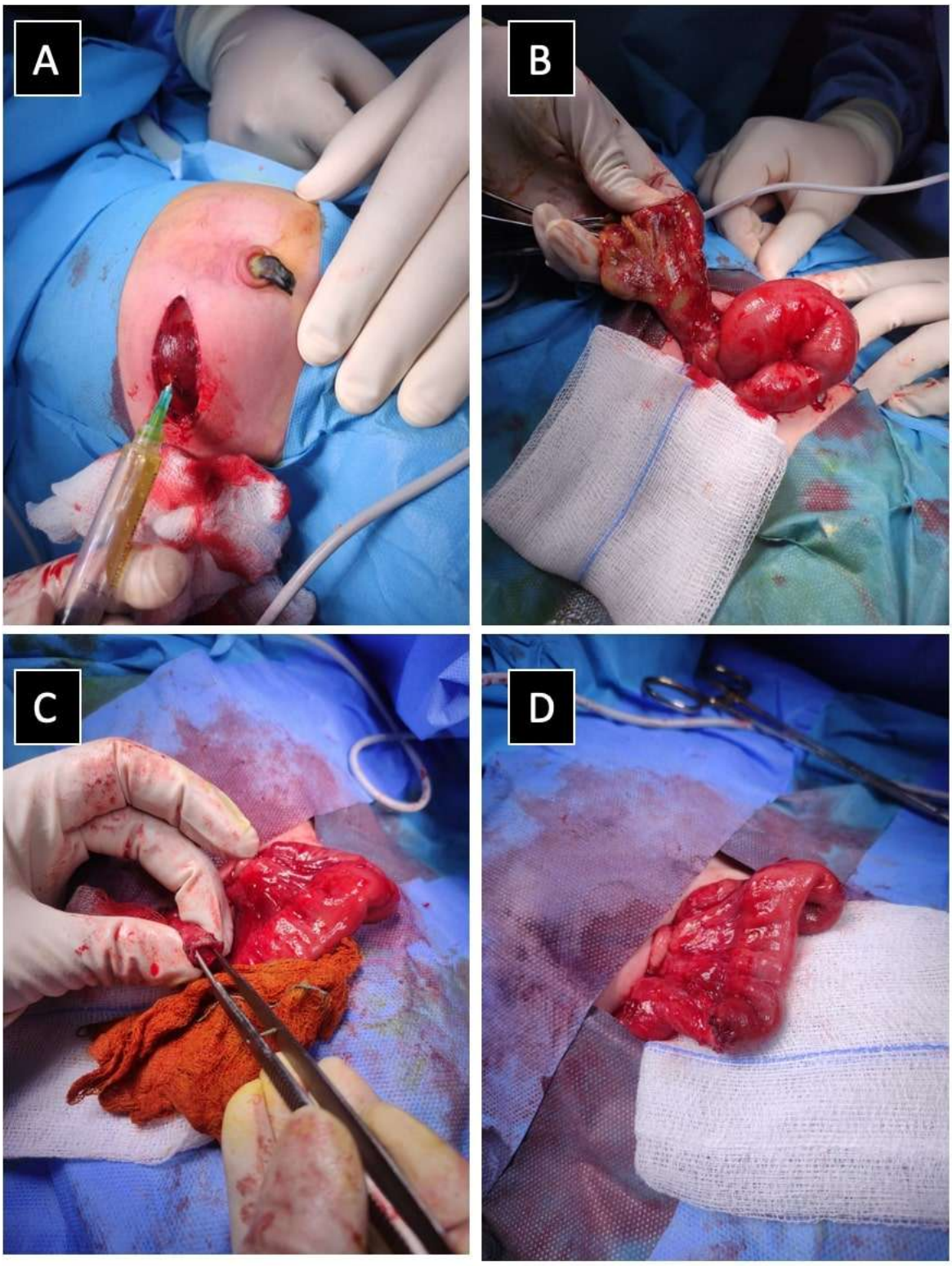

Figure 4: Surgical procedure revealed: Image A showing a meconium-stained fluid after puncture of the cyst. Image B shows the resection of the meconium cyst. Image C shows an atretic jejunal loop opened surgically. Image D shows a termino-terminal small bowel anastomosis.

Discussion:-

Cystic meconium peritonitis is a rare condition that occurs after an intrauterine bowel perforation causing peritoneal sterile inflammation. (Gudi Shobha N. et al, 2011)

Its pathogenesis remains unclear however, some mechanisms can be proposed including:

- Bowel ischemia due to decreased mesenteric blood flow.
- Bowel obstruction due to atresia, volvulus etc.
- Meconium ileus, especially if meconium is thick, it can lead to obstruction andperforation.
- Congenital bowel wall defects due to dysplasia or other anomalies.

When bowel perforation happens, sterile meconium leaks inside the peritoneal cavity, causing a fibrotic reaction leading to a pseudo-cyst formation. The pseudocyst constitutes fibrous adhesions encapsulating the meconium, usually associated with calcifications later on detected by imaging. (Gudi Shobha N. et al, 2011) Meconium peritonitis can be detected in fetuses through antenatal ultrasounds, diagnosis may unfortunately be delayed in some cases, especially in underdeveloped countries, where pregnancies aren't followed or monitored. Neonates will present after birth abdominal distension, vomiting and signs of peritonitis, and complications may arise such as respiratory distress, sepsis and hemodynamic instability, requiring an urgent surgical intervention. (Fengping Fu et al., 2022) Antenatal diagnosis is easily accessible though fetal ultrasound, which is the first choice imaging method, allowing early detection.

Ultrasound findings include:

- Polyhydramnios.
- Peritoneal calcifications.
- Fetal ascites.
- Dilated bowel loops (sign of obstruction).
- An encapsulated well-defined anechoic mass sometimes associated to a calcified wallcorrespondingto the pseudocyst.

If neonatal ultrasound is doubtful, a complementary fetal MRI can be requested to confirm diagnosis, showing dilated bowel loops, communicating with the meconium pseudocyst, however, fetal MRI may not be available, or routinely performed in all centers. (Gunadi et al., 2023)

Post-natal diagnosis requires additional imaging technique:

- First of all, X-Rays may show peritoneal calcifications, or bowel obstruction.
- An ultrasound may reveal peritoneal fluid, or a cystic mass and calcifications.
- A CT scan can be beneficial when both the X-Ray and ultrasound are inconclusive due to its radiation exposure concern. (Hee Girl Park et al., 2014)

Treatment of meconium peritonitis requires surgery, and it is its definitive treatment. Surgical approach depends on the extent of bowel involvement. The most used technique is a primary resection with end-to-end anastomosis, however, when patients have low birth weight or a need for an extensive bowel resection an enterostomy is chosen. Sometimes, when the cyst is too fragile for surgical resection, a drainage can be done. (Rudolph Ascherl et al., 2020) Prognosis depends essentially on: the gestational age and birth weight, timeline between diagnosis and surgical intervention, the extent of bowel damage and co-existing comorbidities especially other congenital malformations. (Chetna Rathi et al., 2023)

Conclusion:-

Cystic meconium peritonitis is a rare neonatal condition that can be severe requiring immediate surgical treatment after birth. Fetal ultrasound plays an important role in diagnostic suspicion or confirmation. Improving antenatal diagnosis and management protocols after birth are essential for reduced morbidity and mortality.

Abbreviations:

CT= Computed Tomography
US= Ultrasound
MRI= Magnetic Resonance Imaging

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