

FETAL ASCITES. ILEAL ATRESIA. MECONIUM PERITONITIS. CASE REPORT

I. I. Jeican*, H. Gocan**, Tünde Kovacs****, D. Gheban****, F. Stamatian****

*^{1st} Department of Obstetrics and Gynecology, Iuliu Hațieganu University of Medicine and Pharmacy Cluj-Napoca

**Department of Pediatric Surgery, Iuliu Hațieganu University of Medicine and Pharmacy Cluj-Napoca

***Imogen Research Institute Cluj-Napoca

****Department of Pathology, Iuliu Hațieganu University of Medicine and Pharmacy Cluj-Napoca

Abstract

This article presents a case of fetal ascites diagnosed prenatally by ultrasound (US) in the 22nd week of pregnancy. In the 31 week of pregnancy, a magnetic resonance imaging (MRI) scan is recommended, which evidences dilated fetal bowel. The suspicion of fetal obstructive malformation of the gastro-intestinal tract imposes the decision of pregnancy at a high risk; the termination of pregnancy is decided by cesarean section. The first day after birth the newborn is transferred to the Pediatric Surgery Hospital of Cluj-Napoca. The next day the newborn presents an occlusive syndrome. Surgical operation is performed for a certainty diagnosis and therapeutic purposes. Meconium-containing peritoneal fluid is found intraoperatively, together with atresia of the terminal ileum, three parietal perforating areas on the terminal ileum above the atresia. The atretic and perforating areas are excised in one piece and the terminal ileum is externalized through the wall with ileostomy in the right iliac fossa. The newborn patient has a good evolution.

This case benefited from a multidisciplinary approach, which led to optimal diagnosis and treatment.

Rezumat: Ascită fetală. Atrezie ileală. Peritonită meconială.

Articolul prezintă un caz de ascită fetală diagnosticată prenatal prin ecografie obstetricală în săptămâna 22 de sarcină. Investigarea imagistică prin rezonanță magnetică nucleară efectuată în săptămâna 31 de sarcină a evidențiat dilatarea intestinului fetal. Suspiciunea de malformație fetală obstructivă a tubului digestiv a determinat încadrarea sarcinii la risc obstetrical crescut; terminarea sarcinii s-a realizat prin secțiune cezariană. În prima zi după naștere, nou-născutul a fost transferat în Clinica de Chirurgie Pediatrică Cluj-Napoca. În ziua următoare, nou-născutul prezintă sindrom ocluziv. Se decide intervenția chirurgicală pentru un diagnostic de certitudine și în scop terapeutic. Intraoperator, se constată colecție peritoneală care conține meconiu, atrezie de ileon terminal, trei zone de perforație parietală pe ileonul terminal, supraiacent zonei atretice. Se practică rezecția zonelor perforate în bloc. Ileonul terminal se exteriorizează printr-o ileostomă în fosa iliacă dreaptă. Nou-născutul prezintă evoluție favorabilă.

Acest caz a beneficiat de o conduită multidisciplinară, fapt care a condus la un diagnostic și un tratament optim.

Cuvinte cheie: ecografie obstetricală, ascită, atrezie

INTRODUCTION

Fetal ascites. Ascites is the pathological accumulation of fluid within the peritoneal cavity. After the evidence of ascites by antenatal ultrasound, it is essential to establish whether this is an isolated fetal ascites or associated with hydrops [1-2]. Fetal hydrops is more commonly caused by systemic diseases, whereas isolated fetal ascites is due to local intra-abdominal causes (obstruction of the urinary tract, intestinal obstruction, meconium peritonitis) [3].

A wide range of etiologies were associated with isolated fetal ascites. The diagnosis of idiopathic ascites has become rare due to the progress in prenatal diagnosis [4].

The majority of cases are associated with fetal malformations. Isolated ascites is commonly caused by intra-abdominal disorders due to urinary tract obstruction. Around 20% of cases occur as a result of gastrointestinal tract disorders [1, 5]. Intestinal obstruction resulting in meconium peritonitis is considered to be one of the commonest gastrointestinal disorders associated with isolated ascites [6]. Less commonly associated are intrauterine infections, intestinal perforation, genetic disorders, neoplasm and growth retardation [7].

First, fetal blood sampling for karyotyping, serology and serial ultrasound examinations are necessary in order to determine the etiology [7]. The etiology of ascites was diagnosed by ultrasound scan in only 50% of cases.

Second, biochemical and cytological analyses can contribute to the diagnosis: the biochemical analysis of ascites fluid shows low levels of total protein in the ascites of urinary origin, high levels of digestive enzymes in ascites of digestive origin, and high α_2 -microglobulin in infectious ascites. Thus 63% and 96% of etiologies may be identified after the first and second steps, respectively [8].

The prognosis of the newborn in case of prenatally diagnosed ascites depends on the etiology of the ascites [9]. Fetal and neonatal mortality is high, particularly when the ascites develops before 24 weeks of gestation [3].

Possible fatal complications of isolated fetal ascites include the development of lung hypoplasia

(the ascites moving the diaphragm upwards, thereby compressing the lungs) [10-11].

Ileal atresia. Small bowel atresia is one of the most common causes of congenital intestinal obstruction [12]. Jejuno-ileal atresia occurs as a result of an intra-uterine ischemic insult to the midgut [13].

Jejunal and ileal atresia have sonographic patterns allowing specific prenatal diagnoses in most affected fetuses [14]. Prenatal ultrasonography is more reliable in detecting duodenal atresia than distal lesions [15]. The detection rate of non-duodenal small bowel atresia by prenatal ultrasound is highly variable, with values ranging from 10 to 100%; when analyzed separately, the detection rates of jejunal and ileal atresia were 66.3%, and 25.9% respectively [16].

The prenatal sonographic features of ileal atresia include multiple dilated bowel loops, ascites, cysts, and polyhydramnios. Various sonographic findings were reported in about 60% of cases [17].

A study shows that there are differences between patients with jejunal atresia and those with ileal atresia: the mean birth weight and gestational age of patients with jejunal atresia were significantly lower than of those with ileal atresia, antenatal perforation occurred more frequently in ileal atresia, while the postoperative period was prolonged and mortality was higher in jejunal atresia [18].

After surgery, whether short bowel syndrome occurs or not, it is important to begin enteral feeding as soon as possible [13]. Short bowel syndrome is the major impediment in the management of jejunoileal atresia. Although total parenteral nutrition is the main adjunctive treatment, it delays intestinal adaptation and may cause cholestasia and subsequent liver damage [15]. Prolonged ileus and anastomotic dysfunction requiring long-term parenteral nutrition are the major causes of complications leading to death [18].

Meconium peritonitis. In utero intestinal perforation can have various causes and can lead to generalized, fibro-adhesive or cystic forms of meconium peritonitis [19]. Generalized meconium peritonitis develops if the perforation occurs late in the prenatal period [20-21].

Prenatal diagnosis is important in finding the predisposing factors of meconium peritonitis.

Calcification is also a diagnostic feature, which can be seen on a post-natal abdominal x-ray [22].

The pathogenesis of calcification in meconium peritonitis has been linked to the precipitation of calcium salts in the meconium, or the inflammatory response of keratin in the meconium [23].

CASE PRESENTATION

IM, 24-year-old patient in her 22nd week of pregnancy, no previous history of pathological conditions, refers to the outpatient unit for an overall maternal-fetal assessment. Obstetric US evidences monofetal pregnancy in progress, with possible signs of fetal ascites.

US examination performed in week 31 evidences a transonic band of impure fluid at the level of the fetal abdominal cavity and also dilated intestinal loops (fig. 1). The findings raise the suspicion of obstructive malformation of the gastro-intestinal tract and an MRI scan is recommended, which evidences dilated fetal bowel (fig. 2).

Obstetrical US performed in week 33 evidences markedly dilated intestinal loops, but with preserved peristalsis, ascites in remission (fig. 3).

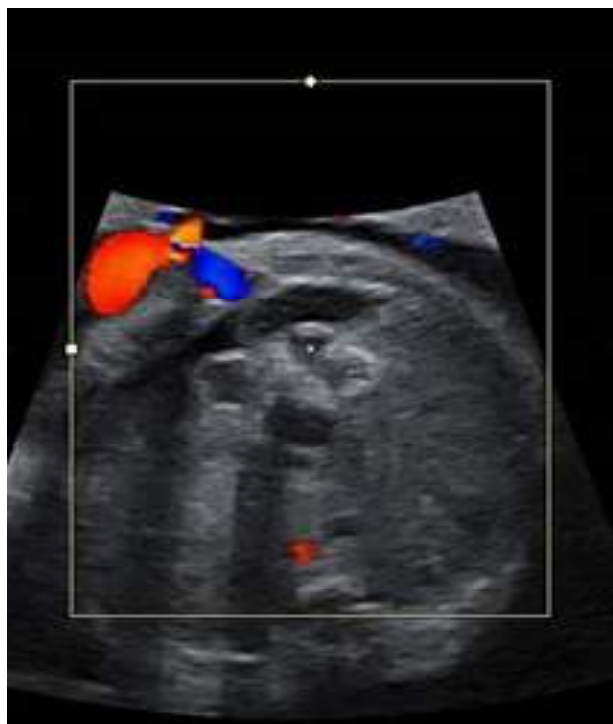


Fig. 1 Obstetric ultrasound scan (31 weeks): fetal ascites



Fig. 2 Maternal-fetal MRI (31 weeks): dilated fetal bowel



Fig. 3 Obstetric ultrasound scan (33 weeks): dilated loops, ascites in remission

On 19 July 2013 the patient is admitted to the obstetric unit of our hospital for diagnostic assessment and therapeutic management. The objective examination does not evidence pathological signs, normal fetal heart rate, about 140/min; valve exam and vaginal tract are normal, fetal head mobile.

Considering the diagnosis 2 Gesta 1 Para, pregnancy in evolution 36 weeks with single live fetus in longitudinal lie, cranial presentation, no signs of labor, intact membranes, negative Rh without antibody Ig,

suspicion of fetal malformation – distal intestinal obstruction – the termination of pregnancy is decided by cesarean section.

On 21 July 2013 the patient delivered by cesarean section, a live male baby, 2490 g weight, Apgar score 8/9. The mother is administered antiD immunoglobulin. The postpartum evolution is normal.

The same day the newborn ID is transferred to the Pediatric Surgery Hospital of Cluj-Napoca. On admission the abdominal X-ray does not evidence hydro-gaseous levels or pneumoperitoneum. At the neonatologist's indication the surgical operation is postponed.

The X-ray performed the next day evidences water-gas levels and bowel gas, without gassy images in the small pelvis; an area of possible peritoneal calcification is evidenced (fig. 4)



Fig. 4 Abdominal X-ray of the newborn: hydro-gaseous levels, bowel gas, area of possible peritoneal calcification

Taking into account the occlusive syndrome, surgery is decided for a certainty diagnosis and for therapeutic purposes.

Surgery is performed: laparotomy by median xypho-umbilical incision. The adherent small bowel is evidenced in the form of a bundle and meconium-containing peritoneal fluid. The lysis of the adherent mass is performed. Atresia of the terminal ileum is found; loop integrity is checked, evidencing three parietal perforating areas on the terminal ileum above

the atretic zone (fig. 5). The atretic and perforating areas are excised in one piece (about 6 cm) (fig. 6). The terminal ileum is externalized through the wall with ileostomy in the right iliac fossa. The abdominal cavity is abundantly washed with saline, the pouch of Douglas is drained through a tube pulled out into the left iliac fossa; then the planes are reconstructed, hemostasis is controlled and wound is sutured.

The operation did not entail intraoperative or immediate postoperative complications.

The newborn patient is followed up in the intensive care unit and has a good evolution.



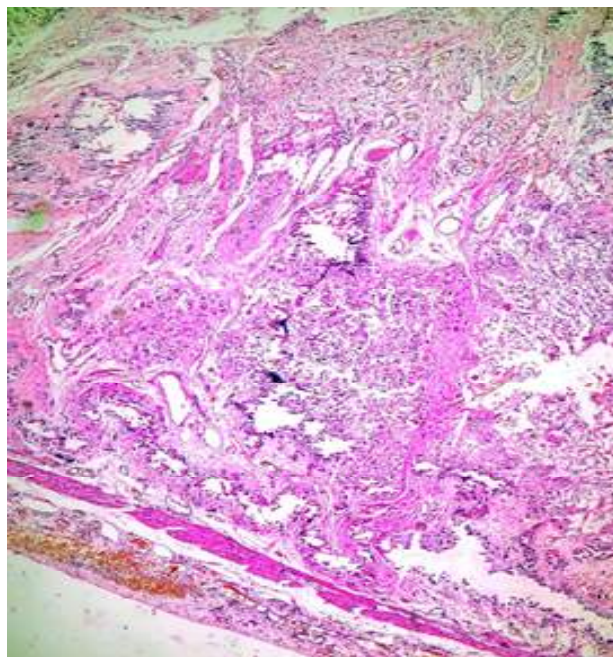
Fig. 5 Intraoperative aspect: dilation and perforation of the intestinal segment



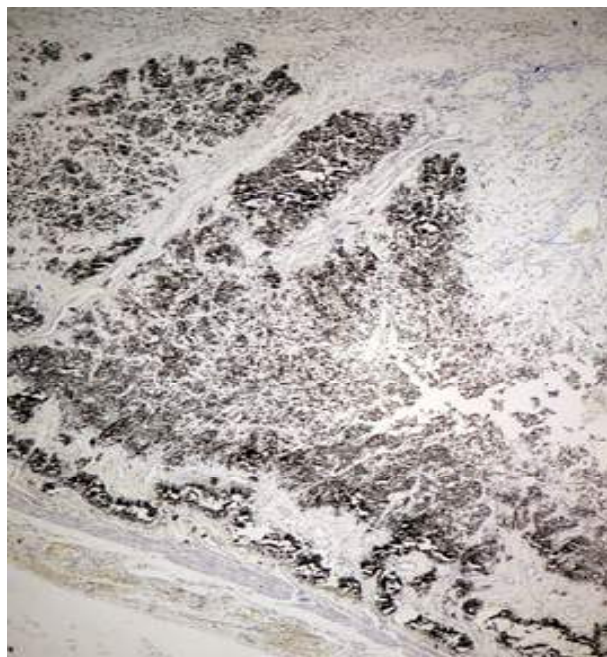
Fig. 6 The excised fragment of the terminal ileum

The histopathological examination of the resected fragment evidences the intestinal muscular wall with its lumen attached to the mucosa, full of amorphous matter that contains also bile. The surface of the muscular wall is scattered with granulation tissue and calcium deposits (figs. 7-8)

The newborn patient is discharged 12 days after admission.

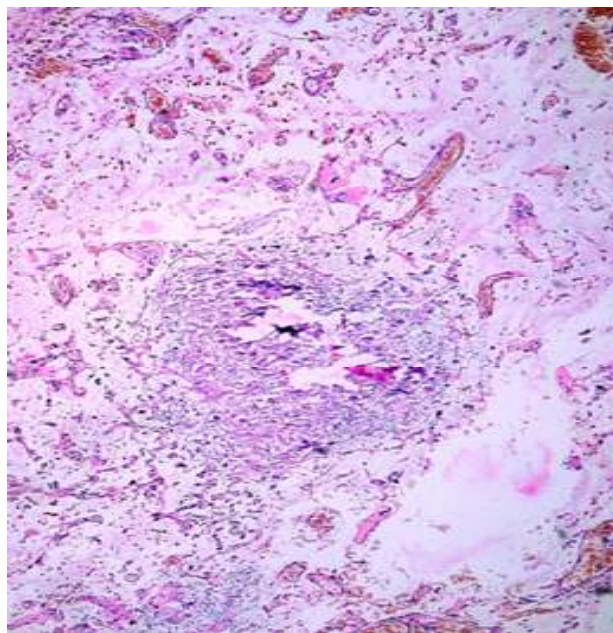


A



B

Fig. 7 Massive calcifications in the intestinal wall (A – HE, B – vonKossa)



A



B

Fig. 8 The calcification outbreak in granulation tissue (A – HE, B – vonKossa)

DISCUSSION

In our case the first ultrasound evidence of fetal ascites was found in the 22nd week of pregnancy. Taking into account the increased pregnancy risk, its termination was by cesarean section. The newborn did not present severe respiratory distress or pulmonary malformation secondary to ascites.

At abdominal laparotomy the local intra-abdominal defense response was found to be similar to the appendicular block.

In such cases the prognosis and postoperative evolution depend on the length and location of atresia. The higher the stoma needs to be placed, the higher the risk of onset of malabsorption syndrome. Thus, jejunostomy corresponds to a more severe prognosis as compared to ileostomy. Bowel transit is restored when the baby reaches 10 kg bodyweight.

There are a few similar reports in literature

– meconium peritonitis diagnosed by ultrasound in the last trimester of pregnancy, in which laparotomy confirmed perforation of the terminal ileum [24], ileal atresia confirmed by laparotomy [25].

Another case report shows a 2-day-old female neonate with a near-total jejuno-ileal atresia. The baby had a total small bowel length of less than 10 cm. She survived for 3 months on enteral feeding after end-to-back duodeno-ileal anastomosis and thereafter succumbed to septicemia [26].

CONCLUSIONS

The cases of fetal ascites diagnosed prenatally require multidisciplinary approach, with a team including a fetal-maternal expert, obstetrician, neonatologist and pediatric surgeon. The close pregnant patient follow-up, including periodical US examinations, neonatal support and prompt surgical treatment ensure the therapeutic success in such cases.

The certainty diagnosis and therapy are established by surgery.

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