Prenatal Diagnosis of an Inguinoscrotal Hernia

Sonographic and Magnetic Resonance Imaging Findings

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The formation of inguinal scrotal hernias is usually aided by factors that act to increase the intra-abdominal pressure, such as vigorous crying, prematurity, chronic lung disease, ascites, and bowel disease in neonates and children.[1] The diagnosis is made by physical examination without difficulty in most cases. However, in the fetus, because physical examination is not possible, and the frequency is probably much less frequent than after birth, the diagnosis of a hernia is more difficult than in the neonate or infant. The clues to diagnosis of an inguinoscrotal hernia in the fetus have been reported as peristaltic movement of herniated bowel and paucity of blood flow on prenatal sonography.[1]

We report a case of a fetal inguinoscrotal hernia that appeared as a solid mass by sonographic examination. Contrary to previous reports, the mass had blood vessels in it, and no peristaltic movement was seen during the sonographic examination. The fetal magnetic resonance imaging (MRI) features and outcome of the fetus are also presented.

Case Report

The patient was a 30-year-old woman in her first pregnancy. The clinical history was unremarkable. Routine obstetric sonographic examinations at 10 and 24 weeks' gestation did not reveal any abnormality. At 36 weeks' gestation, the patient was scheduled for a routine sonographic examination. The estimated fetal weight was 3100 g; biometric data of the head, femur, and abdomen were compatible with the age of gestation, and there had been appropriate interval growth. The amniotic fluid index was 25. At this examination, a 4.2 × 5.0 × 3.8-cm mass was noted in the scrotum (Figure 1). The mass was predominantly on the left side of the midline scrotal raphe. The left testis was not identified, but the right testis was seen, displaced laterally. The mass was solid and predominantly echogenic without a cyst. Power Doppler assessment of the mass showed blood flow (Figure 2). During the 30-minute examination, no peristaltic movement was seen in the mass. There was no sonographic

Abbreviations
MRI, magnetic resonance imaging

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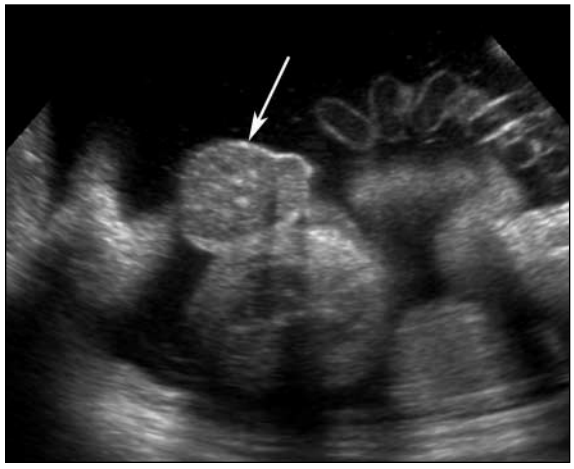
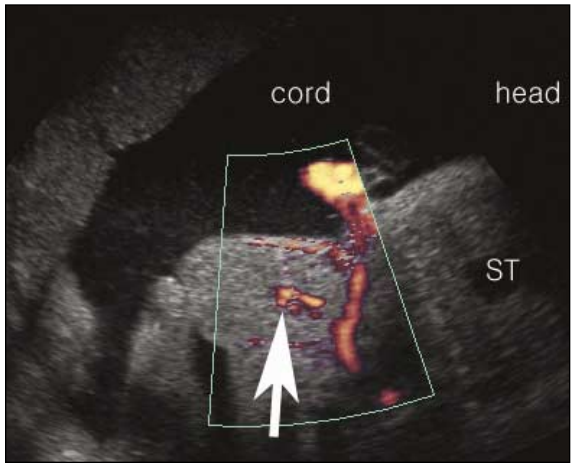


Figure 1. Transverse sonogram shows an enlarged scrotum that is filled with heterogeneous echoes (arrow).

evidence to indicate an associated bowel obstruction, ascites, or intra-abdominal mass lesion. The left foot showed varus deformity, but no other fetal anomaly was noted. With the diagnosis of a scrotal hernia versus a scrotal tumor, an MRI assessment was undertaken 2 days later. On MRI, the mass was identified as bowel that extended from the abdominal cavity into the scrotum. The material in the scrotum had a signal intensity similar to that of small bowel on both longitudinal relaxation time– and transverse relaxation time–weighted imaging (Figure 3). The diagnosis of a fetal inguinoscrotal hernia was made.

Figure 2. Sagittal sonogram of the abdomen and scrotal area. On power Doppler sonography, a few vessels are shown in the mass (arrow). ST indicates stomach.

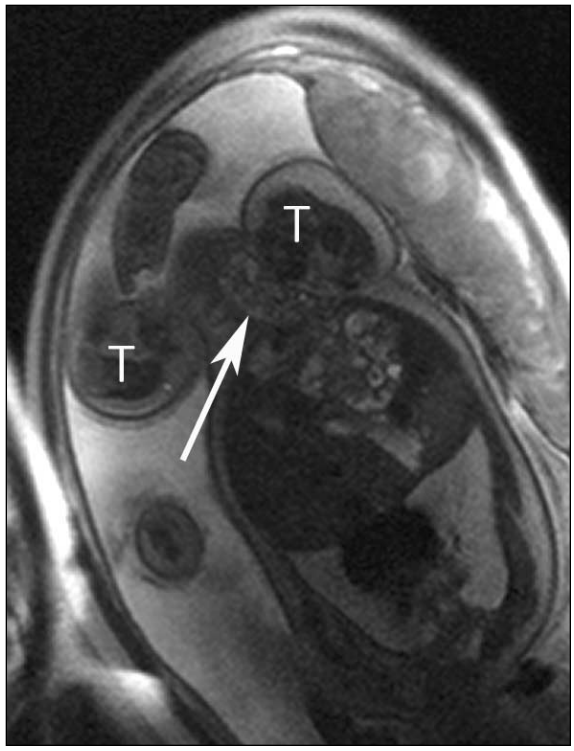


The patient had an uncomplicated cesarean section delivery a week later. The male neonate was 3200 g. Neonatal examination and plain radiographic examination confirmed a left-sided inguinoscrotal hernia that was reducible (Figure 4). He had multiple joint contractures, including both knees, the right first carpometacarpal, and the left foot (clubfoot). There was no evidence of bowel obstruction. The neonate failed to thrive and died after 5 days in the neonatal intensive care unit. No etiology for the failure to thrive was identified. The parents refused pathologic examination.

Discussion

The differential diagnosis of scrotal masses in fetal life includes hydrocele, testicular torsion, tumors, meconium peritonitis, and hernias. Hydrocele is common[2] because the tunica vaginalis is patent throughout gestation, and a small amount of peritoneal fluid can fill the scrotal sac. However, the other causes are rare in the prenatal period. The diagnosis of hydrocele is not difficult because of its characteristic appearance of

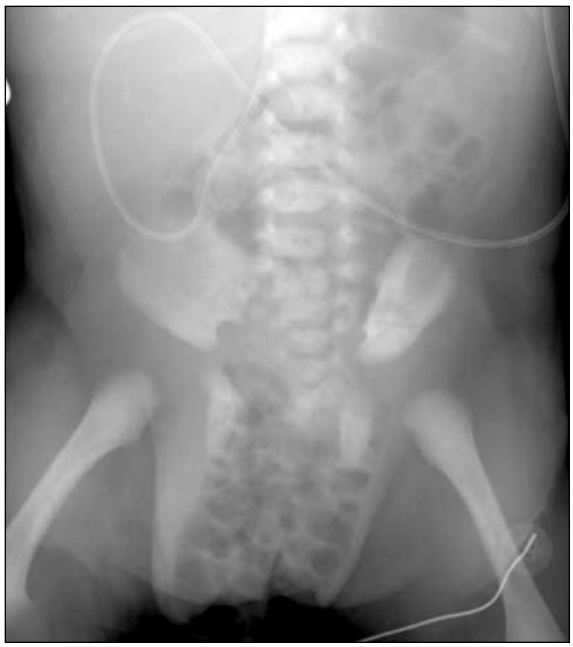
Figure 3. Coronal transverse relaxation time–weighted MRI image shows the mass in the fetal scrotum continuing from the bowel (arrow). T indicates thigh.



fluid surrounding the testis.[3] Excluding hydrocele, the other diagnoses of scrotal masses are rare and not easy to make. Among the neoplastic lesions in the scrotum, the sacrococcygeal tumor is usually large and extends into the scrotum with a characteristic complex echo structure.[3] It may be purely cystic, complex, or a hypervascular solid mass. The other reported tumor of the scrotum in the fetus is hemangioma[4]; however, the diagnosis was not made with sonography but was identified at pathologic examination. According to the reports about adult testicular hemangioma,[5] it appears as a well-defined solid mass with blood flow on sonography. Prenatally diagnosed testicular torsion shows enlarged testis with or without fluid collection[6,7] or small testis with a peripheral echogenic ring.[8] Meconium peritonitis causes fluid collections with calcifications in the scrotal sac and could mimic a scrotal mass.[9] However, diagnosis of meconium peritonitis may be facilitated by other sonographic findings in the abdomen.

The intra-abdominal pressure in the fetus is similar to the pressure in the amniotic cavity. This is probably why inguinoscrotal hernias are rare in fetal life.[1] We found only 5 reports of antenatal diagnosis of inguinoscrotal hernias in the English literature.[1,3,10–12] In previous reports, inguinoscrotal hernias appeared as heterogeneous masses in the scrotal sac with peristaltic movements. However, in our case, the inguinoscrotal hernia mimicked a testicular tumor because of the lack of peristaltic movement and blood flow in it. It is difficult to differentiate a testicular tumor from a hernia by sonographic examination. The echo texture and vascularity of the mass were not classic for a hernia. In addition, it was difficult to determine the extent of the mass on sonographic examination.

Figure 4. Plain abdominal radiograph after birth shows air-filled bowel loops in the left scrotal sac.



An MRI examination was performed for further evaluation. Magnetic resonance imaging is useful for prenatal evaluation of sacrococcygeal teratoma.[13] It can also be used to differentiate several types of hernias in adults.[14] In the fetus, detailed anatomic characteristics of the abdominal wall often cannot be evaluated on MRI if the fetus lies adjacent to the uterine wall or the placenta. In our case, nevertheless, MRI showed continuation of the mass from the bowel into the scrotal sac. The signal intensity of the mass was identical to that of the bowel. These findings suggested the diagnosis of a hernia rather than a tumor. The cause of blood flow in the mass was thought to be due to a mesenteric vessel that was associated with the herniated bowel.

We were unable to make a final diagnosis, which included the inguinoscrotal hernia, failure to thrive, and joint contractures in this case because the neonate died, and no autopsy was performed. The neonate may have had an unidentified syndrome. Paladini et al[3] reported a case of an inguinoscrotal hernia in trisomy 18 with omphalocele. They suggested that the intra-abdominal pressure in that fetus was likely to be below the normal value because the cause of the hernia was a primary defect of the abdominal wall tissue.

In conclusion, we report a case of an inguinoscrotal hernia in the fetus with sonographic findings of a solid mass with blood flow without peristalsis. Magnetic resonance imaging was helpful in differentiating herniated bowel from a tumor. Certainly, when peristalsis is identified within the scrotum, the diagnosis of a hernia would be possible.

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