CASE REPORT

Mesoblastic Nephroma: A Case Report of Prenatal Detection by MR Imaging

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We report a case of mesoblastic nephroma detected prenatally by magnetic resonance (MR) imaging. MR imaging could provide valuable information about the origin and nature of a fetal abdominal mass and help define the relationship of the mass to adjacent structures.

Keywords: *MRI, mesoblastic nephroma, prenatal*

Introduction

Mesoblastic nephroma is the most common neonatal renal tumor. Prenatal diagnosis is usually suggested at ultrasonography (US), which has been reported on several occasions. However, to our knowledge, only 4 cases of prenatal detection with magnetic resonance (MR) imaging have been described.¹⁻⁴ We report a case of mesoblastic nephroma detected prenatally by US and MR imaging.

Case Report

A 25-year-old woman, gravida 2 para 1, was referred to our hospital at 34 + 1 weeks' gestation for polyhydramnios and fetal abdominal mass detected on previous transabdominal ultrasound examination. Targeted sonography showed a unilateral, encapsulated, and heterogeneous echogenic solid mass measuring about 6 × 7 × 7.5 cm in the right side of the abdomen (Fig. 1). The amniotic fluid index had measured to 28.5 cm, indicating polyhydramnios. Lack of visualization of the right kidney suggested the renal origin of the tumor, but a large neuroblastoma could not be excluded.

At 34 + 3 weeks' gestation, after obtaining informed consent, MR imaging was performed to obtain further information about the abdominal mass (Fig. 2). Single-shot fast spin-echo (SSFSE)

Fig. 1. Prenatal ultrasonography at 34 + 1 weeks' gestation. Coronal image of the fetal abdomen shows heterogeneous echogenic solid mass (large arrow) in the right side of the abdomen (small arrow indicates urinary bladder).

sequence was performed on a 1.5T system (Signa; GE Medical Systems, Milwaukee, WI, USA) without premedication. Images were obtained in fetal sagittal, coronal, and axial planes. The tumor was arising from the right renal fossa and compressing the renal tissue, a well-defined ovoid mass with homogeneous signal similar to that of normal renal parenchyma. The capsule of the tumor was clear, and the mass showed neither necrosis nor hemorrhage. These image findings provided proba-

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Fig. 2. At 34+3 weeks' gestation. (a) Sagittal and (b) axial T₂-weighted images using single-shot fast spin-echo (SSFSE; repetition time/echo time [TR/TE], 13,000/31) sequence demonstrate well-defined ovoid mass (large arrows). The displaced normal parenchyma of the right kidney is also observed (small arrows). The mass shows homogeneous signal intensity similar to that of normal renal parenchyma.

ble diagnosis of mesoblastic nephroma. Differential diagnosis also included Wilms tumor of the kidney and congenital adrenal neuroblastoma.

At 35+3 weeks' gestation, after spontaneous premature rupture of the membranes, emergency cesarean section was performed as a result of breech presentation, and a male neonate was delivered, weighing 2904 g and with Apgar scores of 8 at 1 min and 9 at 5 min.

At birth, physical examination showed no pathological abnormalities, except a large, non-tender elastic hard mass in the right side of the abdomen. MR imaging performed on the 13th day after birth demonstrated a well-defined homogeneous solid mass arising from the right kidney (Fig. 3). The right renal collecting system was displaced to the median. The liver and left kidney were normal. Enlarged lymph nodes were not detectable. The mass displayed similar signal intensities to those of normal renal parenchyma on both T₁- and T₂-weighted images. The mass had sign of neither necrosis nor hemorrhage. These findings were consistent with those on prenatal MR imaging and provided probable diagnosis of mesoblastic nephroma, although differential diagnosis included Wilms tumor of the kidney and congenital adrenal neuroblastoma.

Twenty days after birth, right nephrectomy revealed a firm round renal mass measuring about

Fig. 3. Coronal T₂-weighted image demonstrates a homogeneous solid mass (large arrow) arising from the right kidney. The mass shows similar signal intensity to that of normal renal parenchyma.

Fig. 4. Histopathology demonstrates fascicles of numerous spindle-shaped mesenchymal cells infiltrating the renal parenchyma. There is neither necrosis nor hemorrhage. The pathological diagnosis is mesoblastic nephroma of fibromatous type. (hematoxylin and eosin, $\times 100$)

6 $\times$ 5 $\times$ 4 cm. The right adrenal gland was intact and conserved. Pathological diagnosis was mesoblastic nephroma of fibromatous type confined within the renal capsule with a clear ureteral resection margin (Fig. 4).

The baby had no complications and was discharged on the ninth postoperative day. Follow-up of the infant 11 months after surgery identified no clinical recurrence.

Discussion

Mesoblastic nephroma (Bolande's tumor) is a benign mesenchymal renal tumor in childhood,⁵ representing only 3 to 6% of renal tumors.⁶ Retrospective clinical studies show that approximately 70% of cases present with polyhydramnios.³ However, it is the most common type of renal tumor in neonates, and prognosis after complete surgical resection is excellent. It is therefore important to differentiate the mesoblastic nephroma from other tumors. Accurate prenatal diagnosis may improve the outcome of affected pregnancies by enabling the planning of strategy of management and delivery.

Recently, prenatal visualization of these tumors without X-ray exposure has been reported on routine high-quality US images.^{1,6} Ultrasonographic findings are polyhydramnios, caused by excessive fetal urine production, and a unilateral, encapsulated, and heterogeneous echogenic solid abdominal mass.¹ However, the field of view in US is narrow, and in our case, the origin of the tumor

was not defined by US alone.

MR imaging has advantages over US in providing better tissue contrast and defining the relationship of tumor to adjacent structures.^{1,2,7} With the recent evolution of faster techniques, MR imaging provides excellent images of the fetal anatomy without maternal or fetal sedation.⁸

When a renal solid tumor is found in a fetus, differential diagnosis includes mesoblastic nephroma, Wilms tumor of the kidney, and congenital adrenal neuroblastoma. Wilms tumor appears unencapsulated or with a clearly defined capsule and characteristically invades the normal renal parenchyma. Hemorrhage and necrosis may be seen within the mass. However, ultrasonographic findings in mesoblastic nephroma may reveal a hypoechogenic tumor with an echogenic rim or a monogeneous or heterogeneous solid mass with no discernible rim.⁹ So, differentiation from Wilms tumor is difficult by US. Congenital adrenal neuroblastoma appears separated from the kidney and has solid and cystic components.^{4,6}

In our case, MR imaging indicated the mass to be arisen from the right kidney, which excluded adrenal tumor, such as neuroblastoma. Although Wilms tumor appears as various signal reflected on necrosis and hemorrhage and rarely in the neonate, such findings were not consistent with our case. Nevertheless, similar imaging findings of mesoblastic nephroma and of Wilms tumor have been reported in several cases.^{7,9,10} Histological examination is the only method of definitive diagnosis and is therefore needed for surgical excision.

In conclusion, although US continues to be the screening modality of choice in the evaluation of the fetus, MR imaging is a valuable complement to US when additional information is needed to make treatment decisions during pregnancy. MR imaging can aid evaluation of the origin and nature of a fetal abdominal mass and definition of the relationship of the mass to adjacent structures.

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