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# Capillary Hemangioma of the Neck: Prenatal MR Findings

Larry A. Kramer, Jude P. Crino, John Slopis, Linda Hankins, and Joel Yeakley

**Summary:** Prenatal MR findings of a case of extracranial capillary hemangioma simulating an encephalocele at sonography are reported. MR imaging had an adjunctive diagnostic role in excluding the possibility of an encephalocele. The capillary hemangioma had diffuse T2 hypointensity prenatally, which is atypical of postnatal imaging findings.

**Index terms:** Hemangioma; Fetus, magnetic resonance; Neck, ultrasound

Soft-tissue masses, including cystic hygroma, hemangioma, teratoma, and goiter, are the most common prenatal sonographic abnormalities of the neck (1). Additional imaging of these masses is usually not warranted. We report a case of hemangioma evaluated with fetal magnetic resonance (MR) imaging after an equivocal sonogram suggested the possibility of an encephalocele.

## Case Report

A fetal suboccipital mass measuring approximately  $5 \times 3$  cm was detected at 24 weeks' gestation by routine transabdominal sonography in a 32-year-old woman. Amniocentesis revealed normal 46,XX karyotype and normal  $\alpha$ -fetoprotein. Amniotic fluid acetylcholinesterase was negative. Doppler sonography showed no flow within the mass, and the mass appeared solid with no sulcal pattern. The fetal skull underlying the mass was difficult to see completely at sonographic examination, but there was a suggestion of a possible defect (Fig 1A). An MR study was requested to exclude the possibility of an encephalocele.

After obtaining informed consent from the mother, the fetus was paralyzed by means of a sonographically guided intramuscular injection of pancuronium, 0.4 mg/kg estimated fetal weight, into the fetal thigh. MR imaging was performed on a 1.5-T whole-body imager equipped with a body coil. Fast spin-echo T2-weighted (3750/172/1 [repetition time/echo time/excitations]; echo train length, 32)

and conventional spin-echo T1-weighted (550/17/1) images were obtained in orthogonal planes relative to the fetal skull. Sections were 5-mm thick with a 2.5-mm intersection gap. All T2-weighted fast spin-echo sequences were acquired during maternal breath holding. The prenatal MR examination revealed a well-defined homogeneous mass arising in the posterior soft tissues of the neck immediately below the subcutaneous tissue (Fig 1B and C). The skull underlying the mass was indented but otherwise intact. There was no evidence of an encephalocele. The brain stem and cerebellum were normal. The mass had diffuse low signal intensity on the T2-weighted fast spin-echo images.

After delivery, an MR examination of the newborn brain was obtained at 1 day of age with the use of the head coil. Conventional spin-echo T1-weighted (800/16/1) sagittal sections and fast spin-echo T2-weighted axial and sagittal (3500/102/1, echo train length of 8) sections were obtained. The postnatal MR study showed a posterior neck mass without evidence of an encephalocele. The mass had an intermediate signal intensity on the T1-weighted images and inhomogeneous but relatively high signal intensity on the fast spin-echo T2-weighted sequences (Fig 1D).

Pathologic analysis of the mass after surgical removal revealed compactly arranged blood vessels of capillary caliber, consistent with a capillary hemangioma. There were aggregates of extramedullary hematopoiesis, focal necrosis, and accumulation of amorphous calcium with foreign body reaction.

## Discussion

Sonography is the imaging method of choice for diagnosing fetal abnormalities of the central nervous system; however, because of artifacts arising from the fetal skull, sonographic findings may be equivocal or misleading. In these cases, we have used MR imaging as an adjunctive examination.

Hemangiomas are benign neoplasms composed of proliferative and hyperplastic vascular

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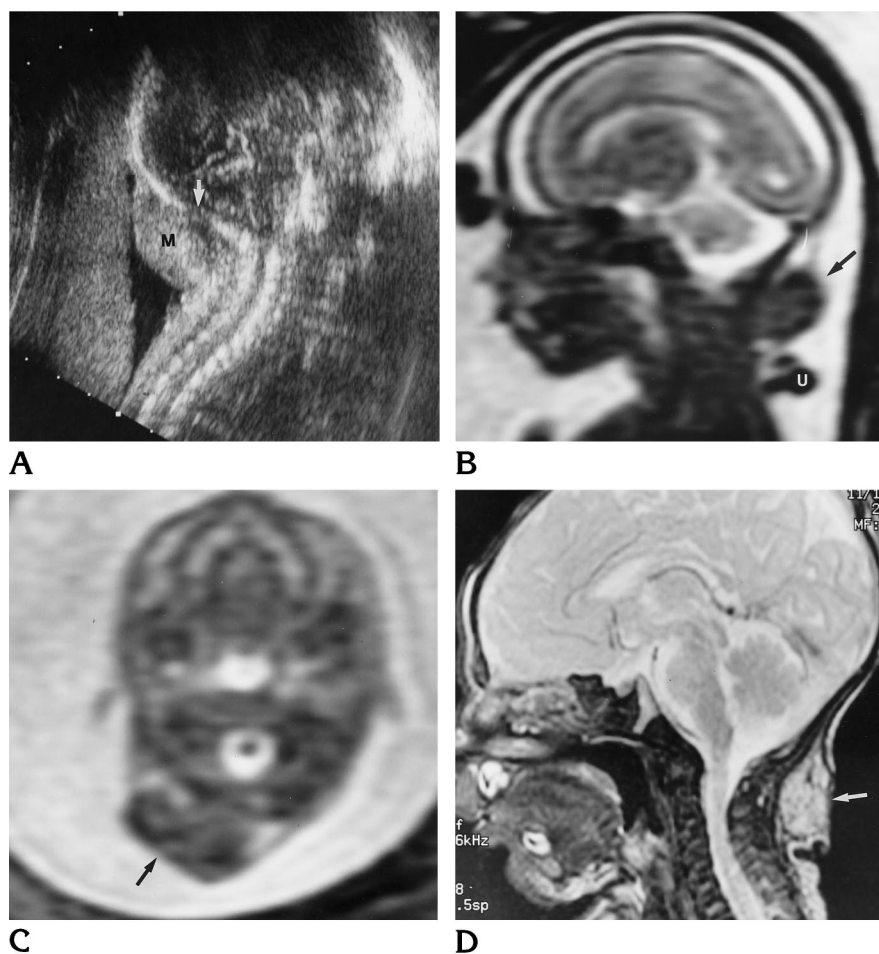


Fig 1. Fetus at 24 weeks' gestation with extracranial mass.

A, Sagittal transabdominal sonogram near midline of fetus. Note echogenic mass (*M*) posterior to fetal skull in occipital region, and echolucent defect in occipital skull (*arrow*) at the level of the mass.

B, Prenatal sagittal T2-weighted fast spin-echo MR image near midline. Hypointense mass is noted in suboccipital region (*arrow*). Note intact hypointense skull and umbilicus (*U*).

C, Prenatal axial T2-weighted fast spin-echo MR image (3500/102/1) near skull base. Note hypointense mass (*arrow*). The right suboccipital bone is indented but intact.

D, Postnatal sagittal T2-weighted fast spin-echo MR image (3500/102/1) near midline obtained at 1 day of age. Mass is now hyperintense (*arrow*). Note intact skull.

endothelium (2). At sonography, hemangiomas appear as solid or cystic masses (1). Those occurring in the occipital region have been known to simulate encephaloceles (3, 4). Although encephaloceles generally show a sulcal pattern or are cystic in appearance at sonography, a review of 26 fetal encephaloceles (5) revealed five that were solid with no sulcal pattern.

The MR findings of hemangiomas of infancy have been well described (6); they have an intermediate signal intensity on T1-weighted images and increased signal on T2-weighted images. The increased T2 signal is thought to be due to the increased fluid volume of slowly flowing blood in vascular cystic spaces (7). Although the hemangioma in our case showed hyperintensity on the T2-weighted images postnatally, it was hypointense prenatally. The prenatal appearance may be explained by the normal evolution of hemangiomas from densely packed vascular channels to more cavernous

spaces (2). The compact vascular spaces and low free water content in a developing fetal hemangioma could account for the low T2 signal intensity noted in our case.

The role of fetal MR imaging is evolving; it is used at our institution when sonographic studies are equivocal. In the case presented, it proved useful in excluding a possible encephalocele suggested by sonographic examination. In addition, although hemangiomas are characteristically hyperintense on T2-weighted images, the presence of diffuse T2 hypointensity, as was found in our case, should not exclude this diagnosis in a fetus.

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