SCIE DOI: 10.14744/scie.2019.18189
South. Clin. Ist. Euras. 2019;30(2):184-186

Case Report

Fetal Neuroblastoma: Prenatal Ultrasonography and Magnetic Resonance Imaging Findings

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Submitted: 29.10.2018
Accepted: 20.02.2019

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Keywords: Fetus; magnetic resonance imaging; neuroblastoma; prenatal diagnosis; ultrasonography.

ABSTRACT

Neuroblastomas are the second most common type of neonatal tumor originating from embryonic nerve cells. It constitutes 20% of all fetal tumors and is incidentally detected on routine ultrasonography (US). Magnetic resonance imaging (MRI) plays a complementary role to US when diagnosis is difficult. In the absence of poor prognostic factors, treatment is not recommended during the prenatal and neonatal periods, and follow-up imaging is considered sufficient. In this case report, we present the US and MRI findings of a fetal neuroblastoma detected in the 25th week of pregnancy in the left fetal adrenal gland.

INTRODUCTION

Neuroblastomas are poorly differentiated tumors originating from embryonic nerve cells. Although most commonly observed in the adrenal gland (90%), they may be observed in the posterior mediastinum or sympathetic nerve chain.[1] Fetal neuroblastomas are the second most common neonatal tumors, accounting for 20% of all fetal tumors.[2] Their incidence ranges from 0.01% to 0.001% live births.[3] Neuroblastoma cases diagnosed in the prenatal period are often asymptomatic and detected incidentally during routine ultrasonography (US), but they can metastasize in utero.[4] US can evaluate the localization, size, and sonographic characteristics of lesions and the presence of metastasis. Fetal magnetic resonance imaging (MRI) can be used to determine the anatomical location of detected lesions and to characterize the lesions more accurately. In addition, MRI is superior to US in terms of metastasis detection.[5] We aimed to present the US and MRI findings of a fetal neuroblastoma, which was incidentally detected in the left fetal adrenal gland in the 25th week of pregnancy. We also aimed to highlight the importance of imaging in determining disease management.

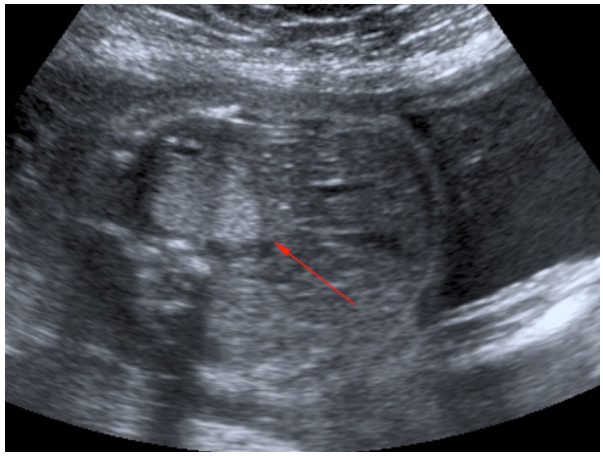

Figure 1. Transabdominal US image shows a 25- × 19-mm hyperechoic nodule in the left adrenal gland localization (red arrow).

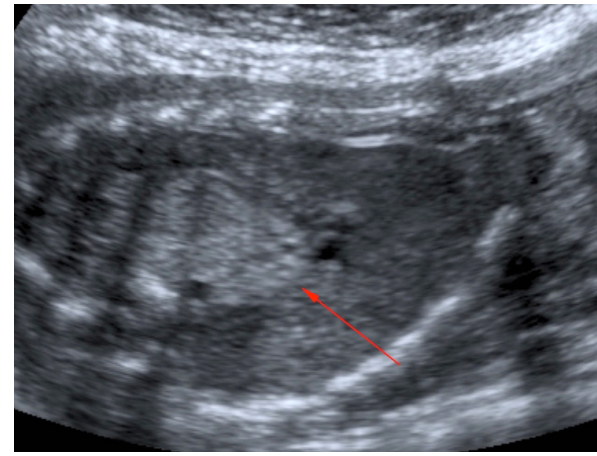

Figure 3. Control transabdominal US image shows that the size and appearance of the lesion is similar to that observed on the previous US (red arrow).

CASE REPORT

An 18-year-old female (gravidity: 1, parity: 0) was referred to our clinic for the preliminary diagnosis of fetal adrenal hemorrhage because a hyperechoic lesion was seen in the left paravertebral area during routine US in the 25th week of pregnancy. Her medical history was uneventful. US revealed a well-defined hyperechoic nodule (25×19 mm in diameter) superior to the left kidney at the adrenal gland localization (Fig. 1). Doppler US did not show any vascularization within the lesion. Amniotic fluid volume and fetal development were consistent with the gestational age. Fetal MRI was performed on the same day to exclude adrenal hemorrhage, and it showed a well-defined nodular lesion sized 27×9×23 mm at the left adrenal gland localization. The lesion was found to be hyperintense on the T2-weighted series, and no diffusion restriction was observed on diffusion-weighted images (Fig. 2a and b). No evidence of metastasis was observed. A fetal neuroblastoma was considered based on the present imaging findings. Follow-up US was performed in the 29th week of pregnancy, and the lesion at the left adrenal gland localization was found to have similar size and imaging properties (Fig. 3). Follow-up examination did not revealed metastasis, and diagnosis of a fetal neuroblastoma was confirmed based on the follow-up imaging findings. Due to the stable appearance of the lesion, it was decided to follow-up the patient in the prenatal and postnatal periods and to construct the treatment plan according to the follow-up imaging results. Informed consent was acquired from the patient to publish this case report.

DISCUSSION

Neuroblastomas are fairly common in the neonatal period, but their diagnosis is extremely difficult in the prenatal period because they are rarely observed in this period.[6]

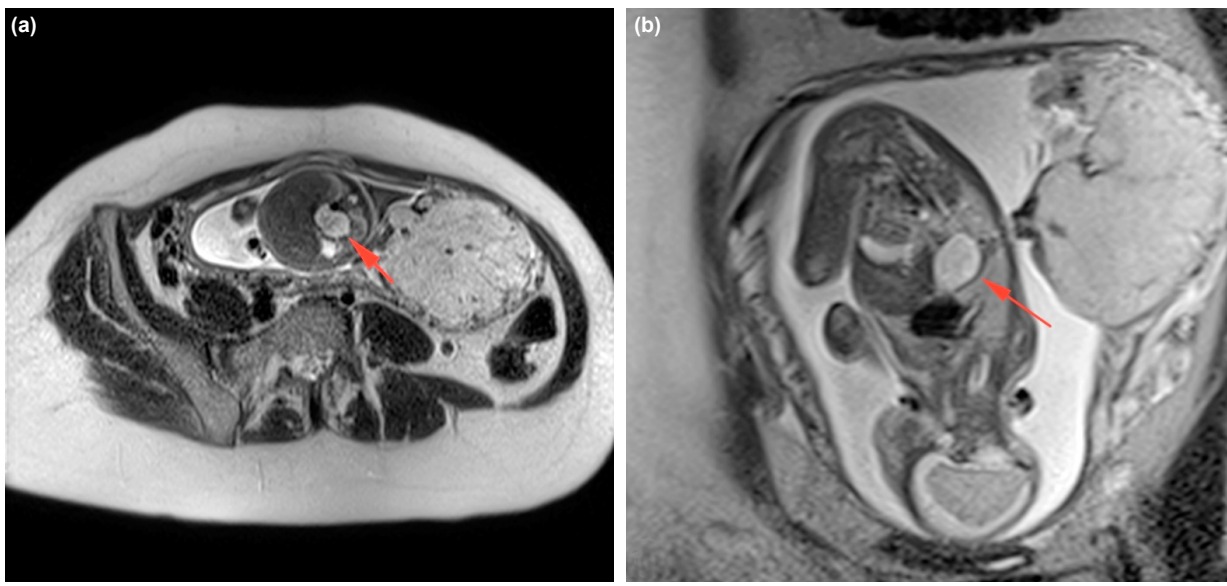

Figure 2. Axial **(a)** and coronal **(b)** T2-weighted MRI images shows a 27- × 9- × 23-mm well-defined nodular lesion in the left adrenal gland localization (red arrows)

They are mostly seen as hyperechoic nodules on US and in cystic forms in 22%–34% of cases.[7] Solid lesions may sometimes be seen as heterogeneous mass due to bleeding and necrotic areas. Calcifications are reported less frequently in fetal tumors than in postnatally diagnosed tumors.[8] Neuroblastomas should be considered when any suprarenal mass is observed on prenatal US.[4] In our case, a hyperechoic mass was seen in left fetal adrenal gland localization on US. MRI was performed to make differential diagnosis and possible metastasis evaluation. Further, the neuroblastoma was confirmed with MRI, and metastasis was not found. Subdiaphragmatic cystic adenomatoid malformation, subdiaphragmatic extralobar pulmonary sequestration, exophytic renal tumors, or adrenal hemorrhage may mimic neuroblastomas on US, making it inadequate for differential diagnosis.[3,9] In these cases, MRI plays a complementary role to US. MRI can confirm the localization of lesions more clearly than US, and it may be possible to make differential diagnosis of suprarenal lesions, including adrenal hemorrhage and subdiaphragmatic extralobar sequestration.[10] In addition to determining the localization of lesions, MRI allows better evaluation of the liver and other solid organs, which facilitates the detection of metastatic lesions that are not easily visible on US.[7] The signal features of neuroblastomas on MRI vary depending on their cystic or solid composition. On T2-weighted images, cystic areas are hyperintense and solid areas are isointense. Intratumoral bleeding sites typically have high signal intensities on T1-weighted images.[5] Prenatal neuroblastomas have excellent prognosis, and survival rates range from 88% to 94%. When a fetal neuroblastoma is prenatally detected with US and/or fetal MRI, the pregnancy course does not typically change. For cases without poor prognostic factors, follow-up is recommended without any treatment.[3]

In the literature, fetal neuroblastomas are reported to be spontaneous regressive in nature.[7] Lactic acidosis and consumption coagulopathy due to intratumoral necrosis or extensive metastasis are considered poor prognostic indicators. Prenatal and neonatal deaths have been reported in these cases.[7,11] In our case, metastasis was not detected and the lesion size was found to be similar on the control imaging performed 4 weeks after the first examination. Due to the absence of poor prognostic factors, follow-up was decided.

In conclusion, US is the first choice for the evaluation of the lesions detected in the adrenal region during the fetal period. MRI is a highly effective complementary method for characterizing lesions and detecting possible metastases. The information provided by both imaging methods enables more accurate diagnosis and is crucial in determining the appropriate treatment method in the prenatal and postnatal periods.

Informed Consent

Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: S.A., M.O., M.C.B., H.C.; Design: S.A., D.S., A.D.; Data collection &/or processing: S.A., M.O., M.C.B., A.D.; Analysis and/or interpretation: S.A., M.O.; Literature search: S.A., M.O., M.C.B.; Writing: S.A.; Critical review: S.A., M.O., M.C.B.

Conflict of Interest

None declared.

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Fetal Nöroblastom; Prenatal Ultrasonografi ve Manyetik Rezonans Görüntüleme Bulguları

Nöroblastom embriyonik sinir hücresi kaynaklı neonatal dönemin ikinci en sık görülen tümörüdür. Fetal tümörlerin %20'sini oluşturur ve rutin ultrasonografilerde (US) tesadüfen saptanır. US ile tanıda güçlük yaşanması durumunda manyetik rezonans görüntüleme (MRG), US'yi tamamlayıcı rol oynamaktadır. Kötü prognostik faktörlerin olmadığı durumda prenatal ve neonatal dönemde tedavi önerilmez, görüntülemeler ile takip yeterli olmaktadır. Biz bu olgu sunumunda sol fetal adrenal bezde gebeliğin 25. haftasında saptanan fetal nöroblastomun US ve MRG bulgularını sunduk.

Anahtar Sözcükler: Fetüs; manyetik rezonans görüntüleme; nöroblastom; prenatal tanı; ultrasonografi.