

Congress Abstract

Fetal Magnetic Resonance Imaging in Neuro-Oncology

Alexandra Korostyshevskaya¹

¹Medical Diagnostics Department, International Tomography Center, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia

Proceedings of International Scientific and Practical Conference "ONCO FUTURE KAZAKHSTAN 2026: Precision Oncology Theranostics, Artificial Intelligence," September 24-26, 2026, Astana, Kazakhstan

Corresponding author's email:
koro@tomo.nsc.ru

Copyright: By the author(s).

License: A non-exclusive license by the publisher. Published by Australasia Publishing Group LLP (Astana, Kazakhstan) on behalf National Research Oncology Center.

Open Access: This article is an open access article distributed under the terms and conditions of the CC-BY Creative Commons Attribution license
<https://creativecommons.org/licenses/by/4.0>



Introduction: Fetal brain tumors account for 2% of pediatric tumors and 10% of all congenital tumors. At the same time, prenatal diagnosis of neuro-oncological pathology by ultrasound reaches 68% accuracy, with a relatively high number of false-positive results — about 9.2%. Fetal MRI increases the diagnostic accuracy of fetal tumors to 93%, which makes it possible to timely determine the management strategy regarding pregnancy and early postnatal treatment; to increase the chances of a favorable outcome; and to reduce the rates of intrauterine and early neonatal mortality and childhood disability.

Objective: To consider the current capabilities of fetal MRI in neuro-oncology using a broad spectrum of congenital CNS tumors as an example.

Materials and Methods: The paper presents a systematic review of the capabilities of MRI in the differential diagnosis of the most common malignant and benign brain tumors, as well as tumor-like malformations. The issues of the methodology of fetal brain MRI, specific features of MRI semiotics, localization, morphology, postnatal verification, management strategies, and prognosis for various tumor lesions were considered.

Results: Despite the rare occurrence of fetal tumors, the spectrum of diagnostic features for the differential diagnosis of malignant and benign lesions from brain malformations has been well studied. Unlike pediatric neuro-oncology, congenital tumors have a supratentorial localization in 70% of cases. Among malignant tumors, teratomas, gliomas, and choroid plexus tumors are the most common. Among benign tumors, subependymal giant cell astrocytoma, hamartoma, lipoma, and choroid plexus papilloma are the most common. Vascular malformations and thromboses, hematomas, arachnoid cysts, and cerebral manifestations of tuberous sclerosis should be differentiated from tumor lesions. Compliance with the methodology of performing MRI and the use of modern MRI techniques significantly increase the accuracy of prenatal diagnosis of brain tumors.

Conclusions: Fetal MRI provides the necessary information for the differential diagnosis of a broad spectrum of brain tumors and non-neoplastic changes; allows clarification of the morphology and extent of the lesion, determination of the prognosis, and timely prenatal and early postnatal management.

Keywords: Fetal MRI; Congenital Brain Tumors; Fetal Neuro-Oncology