

ABSTRACT

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Intraoperative MRI versus intraoperative ultrasound in pediatric brain tumor surgery: is expensive better than cheap? A review of the literature.

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PURPOSE: The extent of brain tumor resection (EOR) is a fundamental prognostic factor in pediatric neuro-oncology in association with the histology. In general, resection aims at gross total resection (GTR). Intraoperative imaging like intraoperative US (iOUS) and MRI have been developed in order to find any tumoral remnant but with different costs. Aim of our work is to review the current literature in order to better understand the differences between costs and efficacy of MRI and iOUS to evaluate tumor remnants intraoperatively.

METHODS: We reviewed the existing literature on PubMed until 31st December 2021 including the sequential keywords "intraoperative ultrasound and pediatric brain tumors", "iUS and pediatric brain tumors", "intraoperative magnetic resonance AND pediatric brain tumors", and "intraoperative MRI AND pediatric brain tumors.

RESULTS: A total of 300 papers were screened through analysis of title and abstract; 254 were excluded. After selection, a total of 23 articles were used for this systematic review. Among the 929 patients described, a total of 349(38%) of the cases required an additional resection after an iMRI scan. GTR was measured on 794 patients (data of 69 patients lost), and it was achieved in 552(70%) patients. In case of iOUS, GTR was estimated in 291 out of 379 (77%) cases. This finding was confirmed at the post-operative MRI in 256(68%) cases.

CONCLUSIONS: The analysis of the available literature demonstrates that expensive equipment does not always mean better. In fact, for the majority of pediatric brain tumors, iOUS is comparable to iMRI in estimating the EOR.

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