ABSTRACT

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Frameless robot-assisted stereotactic biopsy: an effective and minimally invasive technique for pediatric diffuse intrinsic pontine gliomas.

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PURPOSE: Diffuse intrinsic pontine gliomas (DIPGs) are prone to high surgical risks, and they could even lead to death due to their specific sites. To determine the value of frameless robot-assisted stereotactic biopsies of DIPGs, when compared it with microsurgical biopsies.

METHODS: We conducted a retrospective study of 71 pediatric patients who underwent biopsies from January 2016 to January 2021. (i) group 1: microsurgical biopsies, and (ii) group 2: frameless robot-assisted stereotactic biopsies. Demographic information, neuroimaging characteristics, pathological diagnoses, operation time, postoperative intensive care unit (ICU) stay time, postoperative hospitalization time, complications, cost, and perioperative mortality rate (POMR) were collected for analyses.

RESULTS: 32 Cases underwent microsurgical biopsies (group 1) and 39 cases underwent frameless robot-assisted stereotactic biopsies (group 2). All cases were accurately diagnosed after surgery. There was no significant difference in gender, age, symptom times and tumor volumes between the two groups ($p > 0.05$); operation time, postoperative ICU, stay time and postoperative hospitalization time were longer in group 1 than in group 2 ($p < 0.001$); the intraoperative bleeding volumes and cost were higher in group 1 than in group 2 ($p < 0.001$). Group 1 patients required more perioperative blood transfusion than group 2 ($p = 0.001$), and the new neurological impairments were more frequent in group 1 than in group 2 ($p = 0.003$). The POMR was 9.38% (3/32) in group 1 and 0 in group 2 ($p = 0.087$).

CONCLUSIONS: Frameless robot-assisted stereotactic biopsy was an effective and minimally invasive technique for pediatric DIPGs.

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