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Risk factors of intraoperative blood transfusion in pediatric craniotomy for intracranial tumor resection: a 10-year analysis

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Abstract

Objective: A pediatric craniotomy for intracranial tumor removal brings both high bleeding and blood transfusion risks. The aim of this study was to identify the risk factors for intraoperative blood transfusion in this procedure. The secondary outcome was to investigate postoperative complications and clinical outcomes related to blood transfusion.

Methods: A retrospective analysis was performed among children who underwent a craniotomy for brain tumor resection at a tertiary hospital over a 10-year period. The pre- and intraoperative variables were examined and compared between the transfusion and nontransfusion groups.

Results: One hundred seventy-two patients (58%) received intraoperative blood transfusions among a total of 295 craniotomies in 284 children. Factors associated with blood transfusion were body weight ≤ 20 kg (adjusted odds ratio [AOR] 5.286, 95% confidence interval [CI] 2.892-9.661; $p < 0.001$), American Society of Anesthesiologists (ASA) physical status III-IV (AOR 6.860, 95% CI 1.434-32.811; $p = 0.016$), preoperative hemoglobin ≤ 11 g/dl (AOR 3.610, 95% CI 1.406-9.265; $p = 0.008$), tumor size ≥ 45 mm (AOR 2.117, 95% CI 1.214-3.693; $p = 0.008$), and duration of operation ≥ 6 hours (AOR 3.816, 95% CI 1.736-8.385; $p = 0.001$). Postoperative infection of other systems, other complications, duration of mechanical ventilation, and intensive care unit and hospital length of stay were found to be significantly higher in the transfusion group.

Conclusions: Lower body weight, higher ASA physical status, preoperative anemia, large tumor size, and prolonged duration of surgery were found to be significant factors for predicting intraoperative blood transfusion in pediatric craniotomy. The identification and modification of risks from intraoperative blood transfusion can be beneficial in reducing the probability of transfusion and improving allocation efficiency of limited blood component resources.

Keywords: blood transfusion; complication; craniotomy; intracranial tumor; intraoperative.