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Risk of intracranial hemorrhage with direct oral anticoagulation versus low molecular weight heparin in the treatment of brain tumor-associated venous thromboembolism: A meta-analysis

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Abstract

Objectives: Direct oral anticoagulants (DOACs) are effective in treating cancer-related thrombosis and are superior to low molecular weight heparin (LMWH) in terms of efficacy. The effects of DOACs or LMWH on intracranial hemorrhage (ICH) remain uncertain in individuals with brain tumors. We conducted a meta-analysis to compare the frequency of ICH in individuals with brain tumors treated with DOACs or LMWH.

Methods: Two independent investigators reviewed all studies that compared the frequency of ICH in patients with brain tumors who received DOACs or LMWH. The primary outcome was the incidence of ICH. We used the Mantel-Haenszel method to estimate the combined effect and calculated 95% confidence intervals (CI).

Results: This study encompassed six articles. The results indicated that cohorts treated with DOAC experienced much fewer instances of ICH compared to the LMWH cohorts (relative risk [RR] 0.39; 95% CI 0.23-0.65; P = 0.0003; I² = 0%). The same effect was observed for the prevalence of major ICH (RR 0.34; 95% CI 0.12-0.97; P = 0.04; I² = 0%), but there was no difference for fatal ICH. Subgroup analysis indicated that DOACs had a substantially reduced incidence of ICH in primary brain tumors (RR 0.18; 95% CI 0.06-0.50; P = 0.001; I² = 0%), but had no impact on ICH with secondary brain tumors.

Conclusions: This meta-analysis showed that DOACs are associated with a lower risk of ICH than LMWH therapy in treating venous thromboembolism associated with brain tumors, especially in patients with primary brain tumors.

Keywords: Anticoagulation; Direct oral anticoagulant; Intracranial hemorrhage; Low molecular weight heparin; Meta-analysis.

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