J Thromb Haemost. 2023 Oct 20:S1538-7836(23)00779-1. doi: 10.1016/j.jtha.2023.10.011.
Online ahead of print.

Comparison of Direct Oral Anticoagulants versus Low Molecular Weight Heparin in Primary and Metastatic Brain Cancers: A Meta-Analysis and Systematic Review

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PMID: 37866517 DOI: 10.1016/j.jtha.2023.10.011

Abstract

Background: The safety and efficacy of direct-acting oral anticoagulants (DOACs) for therapeutic anticoagulation in the setting of primary or metastatic brain cancer is not known.

Objective: To conduct a meta-analysis and systematic review of studies that compare the risk of intracranial hemorrhage (ICH) in patients with brain cancer treated with DOACs vs. LMWH.

Methods: A literature search was conducted using PubMed, EMBASE, and Cochrane databases. Summary statistics were obtained by calculating the risk ratio (RR), and heterogeneity across studies was estimated using the I^2 statistic. A total of 10 retrospective studies (n=1,638) met criteria for inclusion. The primary endpoint was the pooled RR for ICH in patients with brain tumors receiving anticoagulation with DOACs compared with those receiving LMWH. Secondary analyses included the risk of fatal ICH in each subgroup.

Results: The pooled RR for ICH in patients receiving DOACs vs. those receiving LMWH was 0.65 (95% confidence interval [CI], 0.36-1.17; P = 0.15; I^2 = 50%). In studies evaluating primary brain cancer, there was a reduction in risk of ICH with DOACs (RR, 0.35; 95% CI, 0.18-0.69; P = 0.003; I^2 = 0%). In patients with metastatic brain cancer, there was no difference in the risk of ICH with type of anticoagulation (RR, 1.05; 95% CI, 0.71-1.56; P = 0.80; I^2 = 0%). The overall risk of fatal ICH was not different between anticoagulants.

Discussion: The risk of ICH in patients with brain cancer receiving therapeutic anticoagulation varies by anticoagulation agent and diagnosis of primary or metastatic disease.

Keywords: Anticoagulation; Brain Cancer; Direct-Acting Oral Anticoagulants; Intracranial Hemorrhage; Venous Thromboembolism.