CNS 2017 ANNUAL MEETING
BOSTON, MASSACHUSETTS OCTOBER 7–11, 2017

Management of Novel Oral Anticoagulant-Associated Intracranial Hemorrhage

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Introduction

Intracranial hemorrhage (ICH) is the most devastating complication of anticoagulant therapy. Randomized controlled trials have shown novel-oral anticoagulants (NOACs) to reduce the risk of ICH and ICH-related mortalities as compared to Vitamin K Antagonists. NOACs also act quickly and are not affected by diet. Nevertheless, there are no universally accepted recommendations for reversal, and no laboratory test that can reliably quantify the degree of anticoagulation on NOAC therapy exists.

Methods

A systematic review of the literature was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Studies that reported strategies and/or outcomes regarding the management of NOAC-associated ICH were selected. Information was extracted on NOAC reversal strategies, anticoagulation resumption, ICH expansion, and ICH recurrence.

Results

Our search yielded 4148 articles that discussed oral anticoagulation and intracranial hemorrhage. After screening articles, we identified 23 articles that discussed the management or outcomes of NOAC-associated ICH. Studies showed that the risk of recurrence and/or re-expansion was non-inferior to warfarin-associated ICH. Reversal strategies varied among institutions, and mostly included 4-factor prothrombin complex concentrate (PCC), 8-factor PCC, fresh frozen plasma (FFP), hemodialysis, packed red blood cells, and Idarucizimab. Only one study discussed strategies for resuming NOAC anticoagulation after ICH and found that 40% of patients resumed dabigatran at time of discharge.

Conclusions

There are no standardized reversal and treatment regimens for NOAC-associated ICH. Several reversal strategies have been proposed in the literature. Nevertheless, the literature showed that outcomes after NOAC-associated ICH were non-inferior than outcomes after warfarin-associated ICH. Future studies are warranted to assess the efficacy of reversal strategies in improving outcomes for NOAC-associated ICH. Additionally, further research should focus on balancing continued risk of thromboembolism with the risk of recurrent hemorrhage to better guide decisions regarding the resumption of NOAC anticoagulation therapy following ICH.

Learning Objectives

1. Review literature on risks and benefits associated with restarting NOACs after ICH

2. Understand relative effectiveness and associated risks of reversal strategies for NOAC-associated ICH

3. Understand how management strategies apply to different patient groups

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