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Block 12

**Novel oral anticoagulants and trauma: The results of a prospective American Association for the Surgery of Trauma Multi-Institutional Trial**

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**Clinical Question:**

Is there greater incidence of intracranial hemorrhage (ICH), ICH progression, and death in trauma patients on Novel Oral Anticoagulants (NOAs)?

**Introduction:**

Patients on warfarin or anti-platelet agents have been proven to have increased mortality after trauma, especially with intracranial hemorrhage. Rapid reversal of anticoagulation improves outcomes in warfarin, and some data suggest that platelets may be helpful in the appropriate setting. There is concern from case reports that morbidity and mortality in trauma with NOA use may be high, and this is further complicated by a paucity of evidence based methods for anti-coagulation reversal in these settings. Dabigatran is an exception where an antidote-antibody is available.

**Methods:**

A prospective observational study looking at trauma patients >18 yo and non-pregnant, who were on any of the following: dabigatran, rivaroxaban, apixaban, warfarin, aspirin, or clopidogrel. Subcutaneous and IV heparin analogues were excluded. Patients were treated based on local protocols and per attending discretion with no study interference. Data was collected on age, sex, race, blood products given, vitals, injury severity, mechanism, laboratory coagulation parameters, and outcomes which included mortality, intracranial hemorrhage and ICH progression. Multivariate logistic regression analysis was used to identify how the anti-coagulants were associated with these outcomes, while adjusting for the mentioned covariates. A power analysis was performed before the study.

**Results:**

Of 1,847 patients included in the study, 10% were on NOAs. There were no differences between groups with regard to demographics and injury severity, or mechanism of injury. Patients on NOAs were more likely non-Hispanic. Shock (SBP<90) was more common in NOA users but requirement of transfusion was not different. NOA patients were significantly less likely to receive anti-coagulation reversal (OR = 0.48). There was a reduced risk of ICH in patients on NOAs (IRR = 0.78, p = 0.05). Looking at predictors of death among patients with ICH, the respective ORs were 8.14 for ASA, 5.54 for Clopidogrel, 8.44 for Warfarin, and 5.25 for NOAs—with only NOAs not being statistically significant (at p = 0.111, CI = 0.69-40.23)

**Main limitations:**

The evaluation of the association of death in ICH and progression of ICH with NOAs was underpowered, as discovered in a *post-hoc* analysis. The observational nature of the study has inherent limitations but this is the best option given that trauma is unpredictable and cannot be randomized.

**The take-away:**

The risk of ICH in trauma is less in the NOA group when competed to anti-platelets or Warfarin. The progression of ICH or mortality associated with NOAs, in comparison, is not yet definitively established.

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