ORIGINAL ARTICLE

Tranexamic Acid in Patients Undergoing Noncardiac Surgery

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ABSTRACT

BACKGROUND

Perioperative bleeding is common in patients undergoing noncardiac surgery. Tranexamic acid is an antifibrinolytic drug that may safely decrease such bleeding.

METHODS

We conducted a trial involving patients undergoing noncardiac surgery. Patients were randomly assigned to receive tranexamic acid (1-g intravenous bolus) or placebo at the start and end of surgery (reported here) and, with the use of a partial factorial design, a hypotension-avoidance or hypertension-avoidance strategy (not reported here). The primary efficacy outcome was life-threatening bleeding, major bleeding, or bleeding into a critical organ (composite bleeding outcome) at 30 days. The primary safety outcome was myocardial injury after noncardiac surgery, nonhemorrhagic stroke, peripheral arterial thrombosis, or symptomatic proximal venous thromboembolism (composite cardiovascular outcome) at 30 days. To establish the noninferiority of tranexamic acid to placebo for the composite cardiovascular outcome, the upper boundary of the one-sided 97.5% confidence interval for the hazard ratio had to be below 1.125, and the one-sided P value had to be less than 0.025.

RESULTS

A total of 9535 patients underwent randomization. A composite bleeding outcome event occurred in 433 of 4757 patients (9.1%) in the tranexamic acid group and in 561 of 4778 patients (11.7%) in the placebo group (hazard ratio, 0.76; 95% confidence interval [CI], 0.67 to 0.87; absolute difference, –2.6 percentage points; 95% CI, –3.8 to –1.4; two-sided P<0.001 for superiority). A composite cardiovascular outcome event occurred in 649 of 4581 patients (14.2%) in the tranexamic acid group and in 639 of 4601 patients (13.9%) in the placebo group (hazard ratio, 1.02; 95% CI, 0.92 to 1.14; upper boundary of the one-sided 97.5% CI, 1.14; absolute difference, 0.3 percentage points; 95% CI, –1.1 to 1.7; one-sided P=0.04 for noninferiority).

CONCLUSIONS

Among patients undergoing noncardiac surgery, the incidence of the composite bleeding outcome was significantly lower with tranexamic acid than with placebo. Although the between-group difference in the composite cardiovascular outcome was small, the noninferiority of tranexamic acid was not established. (Funded by the Canadian Institutes of Health Research and others; POISE-3 ClinicalTrials.gov number, NCT03505723.)

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*A complete list of the POISE-3 Investigators is provided in the Supplementary Appendix, available at NEJM.org.

This article was published on April 2, 2022, at NEJM.org.

DOI: 10.1056/NEJMoa2201171