Bleeding Complications in Acute Type A Aortic Dissection

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Background

Acute type A aortic dissection (aTAAD) is serious disease and despite surgical advances, aTAAD still poses a great clinical challenge, carrying high mortality and morbidity. The pathology of aortic dissection is known to cause a dysregulation of the coagulation system further prompted by the use of cardiopulmonary bypass and deep hypothermia. Consequently, massive peri- and postoperative bleeding is a common and feared complication, associated with a considerable increase in morbidity and mortality.

With varying success, transfusion of platelets and fresh frozen plasma together with treatment with prothrombin-complex, fibrinogen concentrate, tranexamic acid and recombinant factor VIIa (rFVIIa) have been used to prevent bleeding complications.

Previous studies have shown rFVIIa to be effective in decreasing blood loss and allogenic blood transfusions, yet questions have been raised whether the pro-thrombotic properties of rFVIIa result in an increased risk of mortality and thromboembolic complications, when used in non-hemophiliac patients.

The aim of this project is to evaluate risk factors and predictors of bleeding and bleeding complications and the functionality of the coagulation system in association with surgery for aTAAD. The purpose is to identify and describe correctable mechanisms of coagulopathy and major bleeding and identify suitable treatment options. The current thesis aims to assess the following:

1. Are there any preoperative predictors of massive bleeding and what effect does massive bleeding have on mortality?
2. Does the use of rFVIIa in surgery for type A aortic dissection effect mortality, rates of postoperative stroke and need for renal replacement therapy?
3. How are the concentrations of fibrinogen, antithrombin III and d-dimer effected by acute type A aortic dissection, cardiopulmonary bypass and hypothermia and is the treatment given, sufficient for depleting deficiencies of the coagulation system?
4. Is there a difference in von Willenbrand factor concentrations in patients undergoing surgery for aTAAD compared to those undergoing elective aortic surgery?

Methods
I: Retrospective study with data from Skane University Hospital with multivariable regression analyses of predictors for major bleeding and mortality.

II: Retrospective, multi center study with data from eight Nordic centers comparing patients who received rFVIIa with propensity score matched control patients.

III and IV: Prospective studies with pre-, peri- and postoperative blood analyses including patients undergoing surgery for type A aortic dissection compared with control patients undergoing elective aortic surgery with or without deep hypothermic arrest.

Results and importance

I: Independent predictors of massive bleeding included symptom duration and DeBakey type I dissection. Mortality was significantly higher for patients with massive bleeding and re-exploration for bleeding was an independent predictor of in-hospital and late mortalities.

II: Despite rFVIIa was given to patients with more serious bleeding, patients receiving rFVIIa did not show a significant increase in early and late mortality and did not suffer more postoperative stroke or renal failure.

III and IV: Pending

Publications:
