CASE REPORT

The Use of Recombinant Activated Factor VII to Control Bleeding during Repair of a Suprarenal Abdominal Aortic Aneurysm

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Recombinant activated factor VII (rFVIIa) was first used to control bleeding in haemophilia patients. More recently, it has been used to prevent severe bleeding in patients without pre-existing coagulopathy. We report a case where rFVIIa was used to successfully control postoperative bleeding in a patient undergoing suprarenal abdominal aortic aneurysm (AAA) repair.

Introduction

Recombinant activated factor VII (rFVIIa) is mainly used to control bleeding in haemophilia and other haemostatic disorders, such as thrombocytopenia, Glanzman’s thrombasthenia, and disseminated intravascular coagulation. More recently, rFVIIa has been used in patients without pre-existing coagulopathy to control peri-operative bleeding in trauma, heart valve, liver and neurosurgery. The use of rFVIIa has not so far been reported in patients undergoing vascular surgery. Here, we report a case of a patient undergoing reconstruction of a suprarenal AAA where rFVIIa was used to successfully control postoperative bleeding.

Case Report

A 62-year-old previously healthy man presented with a 11 cm AAA originating above the celiac axis. On admission, he was stable and laboratory indices, including coagulation and liver function tests, were normal. Through a thoraco-abdominal incision the aorta was clamped above the celiac axis and an oblique anastomosis fashioned with inclusion of the celiac, superior mesenteric and right renal arteries. The left renal artery was re-implanted into the graft and the distal anastomosis was constructed end-to-end to the distal aorta. Visceral arteries were perfused with cold saline and the aortic clamp time was approximately 60 min. Although adequate haemostasis had been initially achieved, upon reperfusion diffuse “non-surgical” bleeding developed which improved slightly after administration of tranexamic acid, protamine sulfate and platelets. The incision was then closed. A total of 22 units of fresh frozen plasma (FFP) and 16 units of red blood cell concentrate (RBC) had also been given.

The patient was unstable and was given more FFP, RBC and platelets in the intensive care unit. The aPTT time was prolonged and fibrinogen, platelets and antithrombin levels were low. Following a single dose (80 μg/kg) of intravenous rFVIIa (NovoSeven, Novo Nordisk, Denmark) the patient became haemodynamically stable and mounted an adequate diuresis. On the first postoperative day the patient was taken back to theatre and the retroperitoneal haematoma evacuated without further bleeding. Liver enzymes were considerably elevated but gradually normalised. Renal and respiratory failure required intermittent dialysis and continued ventilatory support after tracheotomy. The patient’s condition gradually improved and he was later discharged for rehabilitation.

Discussion

Suprarenal and thoraco-abdominal aneurysm repair is associated with increased bleeding due to impaired haemostasis and possibly increased fibrinolysis.
secondary to hepatic and mesenteric ischaemia. At the site of vascular injury, tissue factor (TF) forms a complex with rFVIIa to initiate the generation of thrombin. rFVIIa also binds to activated platelets and by activating factor X induces thrombin formation independent of TF. In this patient, preoperative haemostasis was normal and bleeding multifactorial: blood transfusions, hypothermia, extensive surgical dissection, hepatic and mesenteric ischaemia and reperfusion. rFVIIa was given as a last resort after conventional therapy had failed. In haemophilia patients undergoing surgery, 90–110 μg/kg may be given every 2 h for the first 24 post-operative hours. During heart valve surgery and liver transplantation 90 μg/kg is effective and safe and in trauma patients the use of 120–212 μg/kg boluses have been reported. In children 40 μg/kg has been used as single or repeated doses at intervals of 6–7 h. Factor VII is produced in the liver and has a plasma half-life of 4–6 h, which is shorter than most other coagulation factors produced in the liver. There was laboratory evidence of postoperative hepatic dysfunction probably due to ischaemia, which may well have led to reduced FVIIa levels. There is a theoretical risk of rFVIIa inducing thrombosis but this seems rare in practice. In conclusion, recombinant FVIIa appears to be a safe and effective treatment for bleeding during vascular surgery when conventional therapies have failed.

References