Tranexamic acid and acute myocardial infarction

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Introduction

The plasminogen activator inhibitors have an important therapeutic role in controlling bleeding in patients with congenital and acquired coagulation disorders. They are being increasingly used in patients with blood loss and to prevent bleeding. However, these antifibrinolytic agents can also facilitate the development of thrombosis. We report a patient with severe gastrointestinal bleeding who developed acute myocardial infarction following the administration of the antifibrinolytic agent, tranexamic acid.

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Case report

A 60-year-old man presented to the emergency room of our hospital with a two-day history of generalised abdominal pain and a several-hour history of profuse fresh rectal bleeding. Two weeks previously he had been admitted to hospital with an uncomplicated non-Q-wave inferior myocardial infarction. He was a smoker of 45 pack years and he drank 25 units of alcohol at weekends.

On examination, he was pale, cold and clammy. The resting heart rate was 102 beats per minute and blood pressure was 92/47 mmHg. There was general abdominal tenderness but no signs of peritonitis were elicited.

The haemoglobin was 5.7 g/dL with an MCV of 88 fL. The platelet count was 286 x10^9/L. The clotting indices were within normal limits (international normalised ratio [INR] 1.1, fibrinogen level 3.2 g/L). The serum urea and creatinine were 8.9 mmol/L and 75 mmol/L, respectively. The random serum cholesterol was 3.6 mmol/L with the patient taking simvastatin 40 mg once daily.

The resting 12-lead ECG was within normal limits, with no ischaemic features. The chest and abdominal radiographs were unremarkable. An abdominal ultrasound showed normal appearances with no masses or ascites. Emergency upper gastrointestinal endoscopy was normal.

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The presumptive diagnosis was angiodysplasia and the patient was resuscitated with intravenous fluids and blood. He was also treated with an intravenous proton pump inhibitor. Over the next 24 hours the rectal bleeding worsened and the patient required a transfusion of 11 units of blood in total. He was also prescribed 1 gram of oral tranexamic acid prior to undergoing emergency laparotomy.

One hour after the administration of tranexamic acid, the patient developed severe retrosternal chest pain with profuse sweating. The electrocardiogram demonstrated ST elevation in chest leads V1 to V4, consistent with acute anteroseptal myocardial infarction. The cardiac enzymes were also raised (total creatine phosphokinase 1,754 IU/L, CK myocardial band [MB] isoenzyme 221 IU/L, lactate dehydrogenase 396 IU/L, troponin I > 180 ng/mL). Transthoracic echocardiography confirmed septal hypokinesia.

Emergency coronary angiography was performed and this revealed an occluded right coronary artery. The left anterior descending coronary artery was patent with minimal atheromatous disease, suggesting resolution of the acute thrombosis in the above artery. The patient's symptoms resolved on medical therapy and coronary intervention was not required. The rectal bleeding also resolved with conservative management.

Discussion

Tranexamic acid (marketed in the UK under the trade name of Cyklokapron) is an antifibrinolytic agent which competitively inhibits the activation of plasminogen to plasmin. The drug has affinity for the five lysine-binding sites of plasminogen and thus promotes clot stability. It is particularly valuable in controlling bleeding in haemophilia and von Willebrand's disease, and may obviate the need for replacement therapy with concentrate or plasma in the above patients. It is also now being widely used in multiple settings of blood loss and coagulopathy, including cardiac surgery and upper gastrointestinal bleeding, resulting in a decrease in the requirement for blood transfusion.

It is now well recognised, however, that disruption of the inhibition of the activation of plasminogen to plasmin may also cause thrombosis.[1-4] The World Health Organization's international drug monitoring database holds 528 reports of suspected reactions to tranexamic acid. There are 56 reports of deep vein thrombosis, pulmonary embolism, or both. Additionally, there are 22 reports of cerebral embolism and nine of arterial thrombosis. The Medicines and Healthcare products Regulatory Agency has received three reports of myocardial infarction, one of them fatal, associated with tranexamic acid. Thus far we

Key messages

- Antifibrinolytic agents such as tranexamic acid are increasingly used to stem or prevent blood loss
- The WHO database has 500 reports of thrombosis and embolism that may be related to tranexamic acid use
- This case report suggests that administration of this agent to patients with coronary artery disease may precipitate thrombosis and myocardial infarction (MI)
- Antifibrinolytic agents should be avoided in patients with recent MI, unstable angina and recent percutaneous coronary intervention (PCI)

have been unable to find a published report of acute myocardial infarction in patients treated with tranexamic acid.

Our case report suggests that the administration of tranexamic acid to patients with coronary artery disease may precipitate coronary artery thrombosis, leading to acute myocardial infarction. Prescribers should be aware of this association and seek cardiological consultation promptly for patients who develop chest pain following the administration of tranexamic acid. Furthermore, we recommend that treatment with tranexamic acid and other antifibrinolytic agents should be avoided in patients with recent myocardial infarction or unstable angina. This also holds true for patients who have had recent percutaneous coronary intervention.

Conflict of interest

None declared.

References

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