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Correspondence

Severe bleeding after jugular central venous line insertion in a patient under rivaroxaban

Rivaroxaban, a factor Xa inhibitor, is an oral anticoagulant that has been shown to be non-inferior to the vitamin K antagonist warfarin for prevention of stroke or embolism in patients with atrial fibrillation (AF) in the ROCKET-AF trial[1]. Rivaroxaban has a half-life of 9 to 13 hours, and it is recommended that invasive procedures should be only performed after a delay of at least one half-life after the previous administration[2,3]. Whereas recommendations are available about managing rivaroxaban in the perioperative and intensive care setting, including epidural/regional anaesthesia, no recommendations have been published thus far regarding the insertion of central venous lines[3]. With the permission of the patient's next of kin, we report a case of severe bleeding after jugular central venous line insertion in a patient receiving rivaroxaban.

An 81-year-old Caucasian female with a height of 160 cm, a weight of 70 kg and a history of diabetes mellitus, hyperlipidaemia, arterial hypertension and paroxysmal AF was admitted because of dysarthria due to an ischaemic stroke in the territory of the left middle cerebral artery. Blood tests are listed in Table 1. Additionally, hepatic dysfunction of unknown aetiology was detected (aspartate aminotransferase 122 U/l, alanine aminotransferase 62 U/l, cholinesterase 4941 U/l, total protein 56 g/l). Rivaroxaban 20 mg/day was started on day 20 of her admission. The patient's additional medication included diltiazem, nebivolol, simvastatin and trazodone. On day 25, antibiotic therapy with piperacillin and tazobactam was started because of pneumonia. On day 26, 14 hours after the last dose of rivaroxaban, a central venous catheter was inserted via the jugular vein by one of the authors, who has 27 years of experience with intensive care medicine. The puncture was easy, the jugular vein was punctured at the first attempt, there was no accidental puncture of the carotid artery and no technical problems occurred during insertion of the catheter. The correct position of the catheter was confirmed by recording venous pressures and by chest X-ray. On day 27, the patient complained of pain in her neck. Twenty-four hours after insertion of the catheter, a large haematoma was observed in the neck extending to the chest wall. Because of the location on the neck, no local compression was possible. Computed tomography showed the haematoma to extend to the sternoclavicular joint. Due to the resultant anaemia (haemoglobin 75 g/l) she received four units of packed blood cells.

The severity of the complication in this case was possibly related to a failure to appreciate the risk of bleeding in a patient who had recently received rivaroxaban, lack of close monitoring and late diagnosis leading to the large blood loss. Inability to rapidly reverse rivaroxaban may also have been an issue.

Insertion of central venous lines is common, and serious bleeding complications are rare, even in anticoagulated patients[4]. It is not reported whether any bleeding occurred after the insertion of central venous lines in rivaroxaban-treated patients in the ROCKET-AF study, and no instructions are given in the study protocol of that trial about precautions when central venous lines have to be inserted[1]. Our

Table 1
Laboratory findings

Parameter (normal range)	Day 1	Day 25	Day 27	Day 29	Day 31	Day 33
Creatinine (μmol/l) (<97)	88	163	230	323	275	362
Cr clearance* (ml/min) (>90)	48	26	18.7	13.3	15.7	11.9
INR	NM	2.09	1.96	NM	1.24	NM
PT (%) (70–130)	121.0	38.0	31.0	65.0	67.0	90
aPTT (s) (<33)	26.8	35.2	33.1	38.2	34.0	34.1
TT (s) (14–21)	NM	16.6	NM	NM	19.7	NM
Fibrinogen (μmol/l) (44–134)	153	NM	NM	NM	114	NM

*Creatinine clearance was determined according to the Cockcroft–Gault formula. aPTT=activated partial thromboplastin time, Cr=creatinine, INR=International Normalized Ratio, NM=not measured, PT=prothrombin time, TT=thrombin time.