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Case of the week 34/2020

Ticagrelor and Rivaroxaban Elimination With CytoSorb Adsorber Before Urgent Off-Pump Coronary Bypass

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This case reports on a 58-year-old male patient who was admitted to the South Munich Surgical Clinic for urgent coronary artery bypass surgery.

Case presentation:

- The day before he had undergone a percutaneous coronary intervention (PCI) with implantation of a drug-eluting stent into the right coronary artery for treatment of coronary artery disease at a peripheral cardiology department. During the PCI, the left anterior descending artery (LAD) had dissected with an extravasation injury. Stabilization of the lumen with PCI was not possible while there was still flow in the LAD. He was in a stable condition with no impairment of pump function or any symptoms. After the PCI, the patient refused any additional interventions and so was treated with dual antiplatelet therapy - DAPT (ticagrelor, 180 mg/day, in combination with acetylsalicylic acid, 100 mg/day) and rivaroxaban (15 mg/day) because of his history of paroxysmal atrial fibrillation (first diagnosed in 2018)
- Further medical history included arterial hypertension and obesity as well as 2 pharmacological cardioversions in 2018
- The next day the patient presented with an increase in troponin plasma levels (troponin T 100 pg/dL; normal range 0 to 14 pg/dL) accompanied by intermittent chest pain
- Finally, the patient accepted the recommended Off-Pump Coronary Bypass (OPCAB) procedure but no further surgical treatment (e.g. ablation or left atrial appendage amputation), so he was immediately transferred to the Department of Cardiac Surgery of South Munich Surgical Clinic
- Anticoagulant medication and dual antiplatelet therapy were stopped on admission
- Because of the urgent indication for surgery, waiting for physiological clearance of the anticoagulant substances (rivaroxaban and ticagrelor) was not an option and therefore CytoSorb adsorption was initiated to eliminate these medications

Treatment

- CytoSorb adsorption was initiated 1 hour before the operation and was continued for 1.5 hours during the operation, for a total treatment time of approximately 2.5 hours
- The CytoSorb adsorber was integrated with standard dialysis connectors into an extracorporeal circuit in hemoperfusion mode (multiFiltrate, Fresenius Medical Care). Tubes were connected to a large 12-F, 3-lumen catheter and were implanted into the right femoral vein
- Blood flow rate: 130-150 ml/min
- Anticoagulation: citrate
- CytoSorb adsorber position: pre-hemofilter

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Measurements

- Hemodynamics and need for vasopressors
- Postoperative drainage volume
- Requirement for transfusion of blood products
- Creatinine levels

Results

- Urgent myocardial revascularization using the OPCAB technique could be performed without any difficulties
- Postoperatively, his hemodynamic condition was stable with only low doses of catecholamines required. Norepinephrine could be tapered off on the first postoperative day
- The chest tubes drained 570 mL in 24 hours and were removed on the second postoperative day
- Hemoglobin initially dropped from 14.0 g/dL preoperatively to 8.5 g/dL post-operatively, which was treated with 1 unit of red blood cells
- Postoperatively, maximum creatine kinase levels were 380 U/L (normal range, 40 to 310 U/L), with the creatine kinase (CK) MB isoenzyme in the normal range

Patient Follow-Up

- The patient was transferred to the intensive care unit and was extubated the same day
- The further postoperative course was uneventful, with good recovery of the patient
- The patient was discharged with a renewed prescription for DAPT and rivaroxaban
- At 6-month follow-up, the patient had good pump function, sinus rhythm, and no cardiac symptoms

Conclusions

- This case highlights an approach for managing antiplatelet drugs and anticoagulant agents such as ticagrelor and rivaroxaban before and during emergent off-pump coronary artery bypass surgery, an indication, which is currently not covered by the intended use (no integration into CPB given) and therefore has to be seen as off-label use
- Treatment of this patient demonstrated the safe elimination of both rivaroxaban and ticagrelor with CytoSorb adsorption, which was started shortly before the OPCAB operation and resulted in rapid hemodynamic stabilization, only little intra- and postoperative bleeding and an uneventful postoperative course
- In conclusion, CytoSorb hemoadsorption before urgent OPCAB operations appears to be safe and effective for aiding bleeding control in patients at high risk of bleeding as a result of ticagrelor or rivaroxaban therapy

Comment by CytoSorbents Europe GmbH:
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