Idarucizumab for dabigatran reversal in cardiac tamponade complicating percutaneous intervention in ST elevation myocardial infarction

Marta Kurdziel, Bartosz Hudzik, Anna Kazik, Jacek Piegza, Janusz Szkodziński, Mariusz Gąsior

3rd Department of Cardiology, Faculty of Medical Sciences in Zabrze, Medical University of Silesia in Katowice, Silesian Center for Heart Disease in Zabrze, Poland

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An 83-year-old man with a history of permanent atrial fibrillation (AF) anticoagulated by dabigatran 150 b.i.d., type 2 diabetes mellitus, and hypertension was admitted to the hospital with a diagnosis of ST-elevation myocardial infarction (STEMI). The patient was loaded with 300 mg of aspirin *p.o.*, 5000 IU of unfractionated heparin *i.v.* and 600 mg of clopidogrel and was transferred to the catheterization laboratory. Coronary angiography demonstrated left anterior descending artery (LAD) occlusion. During the LAD angioplasty a dissection of a distal part of the LAD and the blood extravasation to the pericardium occurred (Figure 1 A). Idarucizumab 2 × 2.5 g *i.v.* was administered and the inflated balloon maintained at the site of coronary perforation. About 10 min after the end of idarucizumab infusion, the balloon was deflated and the patient presented with clinical symptoms of cardiac tamponade such as blood pressure decrease and tachycardia. The echocardiographic assessment revealed up to 16 mm accumulation of pericardial fluid (Figure 2 A). Immediately the covered stent was implanted (Papyrus, Biotronik) and the pericardiocentesis was carried out. 320 ml of blood was finally drained. Control contrast injection revealed a covered perforating zone with no contrast extravasation (Figure 1 B). The echocardiographic control revealed pericardial effusion less than 5 mm (Figure 2 B). The patient was stable with a blood pressure of 130/80 mm Hg, a heart rate of 100–130/min (AF), and without chest pain. No significant reduction in the red blood cell count was observed. Antiplatelet therapy was given consisting of aspirin and clopidogrel. In the following days enoxaparin was introduced and finally changed to dabigatran 110 mg b.i.d.

Long term oral anticoagulation is used in various conditions such as atrial fibrillation, mechanical heart valves, and venous thromboembolism in approximately 6–8% of patients undergoing percutaneous (PCI) interventions [1]. Coronary artery perforation may occur with an incidence of 0.48% [2]. The risk of complications during coronary angiography increases with patient age, sex, renal impairment, and urgency of the procedure [2]. The first line treatment in cardiac tamponade is pericardiocentesis with drainage. Additional use of idarucizumab to reverse dabigatran might be necessary in such cases to maintain hemostasis in the perforated coronary artery and improve patient recovery. The antidote for dabigatran does not bind known thrombin substrates and has no activity in coagulation tests or platelet aggregation [3]. The analysis of 503 patients from the RE-VERSE AD (Reversal Effects of Idarucizumab on Active Dabigatran) trial found that idarucizumab rapidly normalized hemostasis and reduced levels of circulating dabigatran in subjects on dabigatran who had serious bleeding or required an urgent procedure [4]. Heparin reversal with protamine can be associated with increased risk of device (guiding catheter, guide wire, covered stent) immediate thrombosis.

The lesson to be learnt based on the presented case is that idarucizumab might help in the treatment of major bleeding complications which may occur during interventional STEMI treatment in patients on dabigatran. The antidote should be easily accessible in every catheterization laboratory for emergency use due to the increasing number of patients who will receive dabigatran and more complicated procedures which interventional cardiologists are faced with.

Conflict of interest

Mariusz Gąsior and Bartosz Hudzik received lecture fees from Boehringer Ingelheim.

Corresponding author:
Marta Kurdziel MD, PhD, 3rd Department of Cardiology, Faculty of Medical Sciences, Medical University of Silesia, Silesian Center for Heart Disease, Zabrze, Poland, e-mail: mkurdziel@sccs.pl
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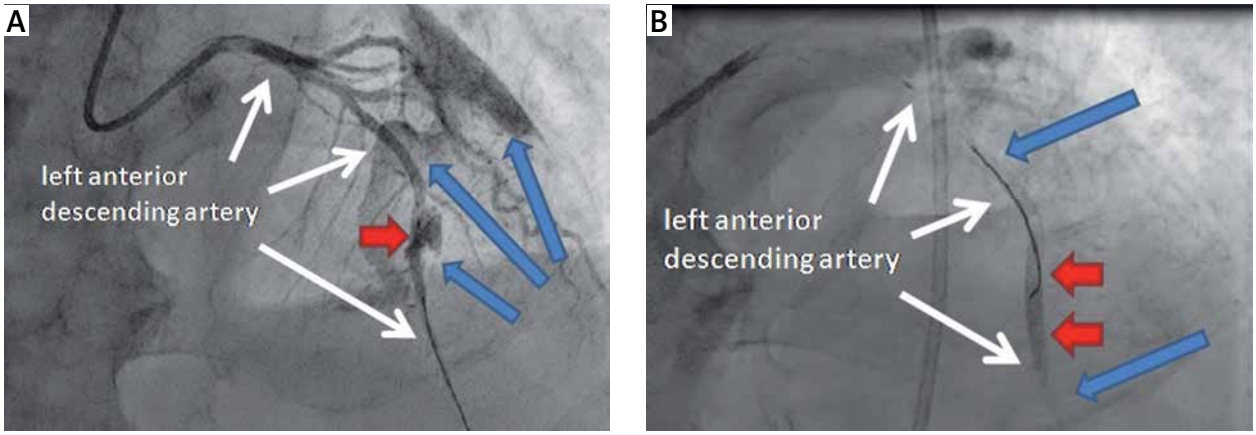

Figure 1. Angiography. **A** – Blood extravasation to the pericardium after angioplasty on dabigatran (wide arrow indicates perforating zone, narrow arrows indicate contrast extravasation). **B –** Control contrast injection after idarucizumab use, pericardiocentesis with drainage and covered stent placement (wide arrows). No blood extravasation is seen (narrow arrows)

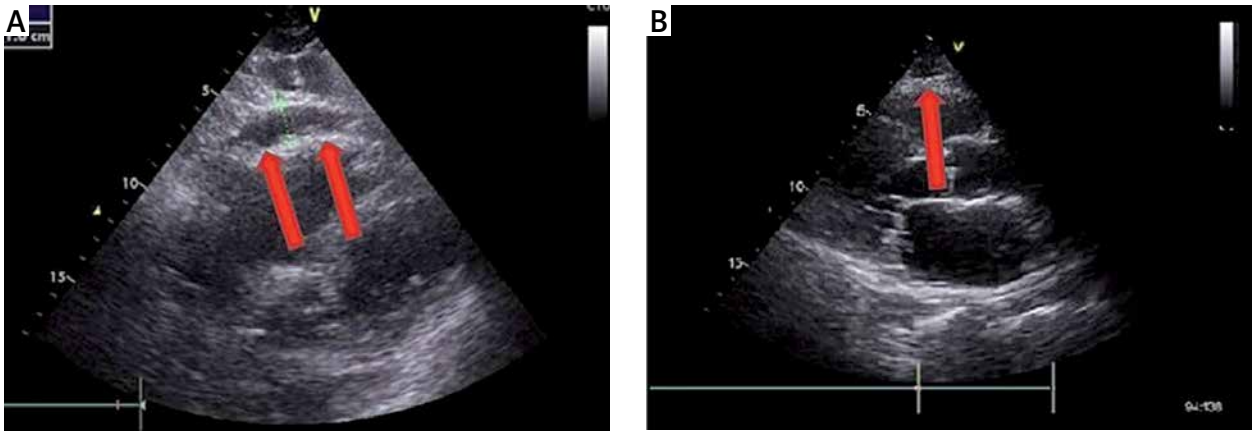

Figure 2. Transthoracic echocardiography. **A** – Subcostal view, fluid accumulation in pericardium after extravasation. **B** – Parasternal long axis view, assessment after the procedure, less than 5 mm of fluid in pericardium is seen

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