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## American Journal of Emergency Medicine

journal homepage: [www.elsevier.com/locate/ajem](http://www.elsevier.com/locate/ajem)The  
American Journal of  
Emergency Medicine

## Emergency lumbar puncture in a patient receiving dabigatran after antagonization with idarucizumab – A case report

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## ARTICLE INFO

## Article history:

Received 11 October 2016

Accepted 28 October 2016

Available online xxx

## ABSTRACT

Idarucizumab is an antibody fragment which is used to reverse the anticoagulant effects of dabigatran. We report on the first successful use of idarucizumab before performing an emergency lumbar puncture in a patient on effective anticoagulation with dabigatran thought to have infective cerebral disease (such as temporal encephalitis).

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An 85-year-old male patient was admitted to our emergency department (ED) with fever (38.6 °C/101.5 °F) and new onset of aphasia at night in late February 2016. The patient was on dabigatran 110 mg BID because of non valvular atrial fibrillation (NVAF). In addition, the patient had also been diagnosed with hypertension, hyperlipidemia and chronic renal insufficiency. The patient was last seen without aphasia the day before admission. Time of last dabigatran intake was unknown at the time of presentation in our ED. Neurological status on admission revealed a severe aphasia (NIHSS [National Institutes of Health Stroke Scale] = 4). The Glasgow Coma Scale (GCS) was 13 (patient was confused, disoriented).

Magnetic resonance imaging (MRI) was not available at night. The emergency computer tomography scan showed no signs of acute cerebral ischemia or hemorrhage. The thrombin time (TT) was 55.8 s (normal <13.0 s) and the activated partial thromboplastin time (aPTT) was 45.3 s (normal range: 26.0–40.0 s). The creatinine clearance was 52 ml/min, the C-reactive protein (CRP) was 18.5 mg/l (normal <5.0 mg/l) and the leukocyte count was 7.55/nl (normal range: 3.90–10.50/nl).

Differential diagnoses included stroke with unknown onset with accompanying infective disease and infective cerebral disease such as temporal encephalitis (new aphasia, fever and elevated CRP). We decided to perform an emergency lumbar puncture to narrow down differential diagnosis. Therefore, we first injected the patient with 5 g idarucizumab. Thrombin time (TT) and the activated partial thromboplastin time (aPTT) both rapidly normalized. TT was 10.6 s (normal <13.0 s) and aPTT was 32.7 s (normal range: 26.0–40.0 s) after idarucizumab application. Lumbar puncture was performed without difficulties. We did not notice any bleeding during or following the procedure. Cerebrospinal fluid (CSF) showed very mild pleocytosis

(number of cells: 5/μl; normal range: 0–4/μl). PCR did not show herpes simplex, varicella zoster or Epstein-Barr virus within CSF.

On the next day, magnetic resonance imaging revealed a subacute middle cerebral artery infarction. Duplex sonography revealed a high-grade left-sided proximal internal carotid artery stenosis (90% according to NASCET criteria). Additionally, an acute laryngitis was diagnosed. The patient was given antibiotics because of the laryngitis. Carotid endarterectomy was performed because of the high grade stenosis. Following surgery, we recommended to continue medical therapy with a NOAC because of NVAF.

Idarucizumab is a humanized monoclonal antibody fragment (Fab) indicated in patients treated with dabigatran when reversal of the anticoagulant effects of dabigatran is needed for emergency surgery/urgent procedures or in life-threatening or uncontrolled bleeding [1–3]. For the first time, we report on a patient receiving dabigatran 110 mg BID in whom idarucizumab was successfully used before performing an emergency lumbar puncture. This adds important information to very recent case reports describing the use of idarucizumab before intravenous thrombolysis with recombinant tissue-type plasminogen activator in stroke patients receiving dabigatran [4,5].

In our report, emergency lumbar puncture was indicated because of possible infective cerebral disease (aphasia, fever and elevated CRP). In ED more thorough history taking was not possible due to severe aphasia and lack of relatives to report further details on the onset or dynamics of the disease. Therefore, we could not determine the time of intake of the last dabigatran dose. The results of the coagulation tests (aPTT and TT both increased) suggested effective dabigatran concentration [2]. Application of 5 g idarucizumab resulted in prompt normalization of coagulation tests, indicating a successful antagonization of the anticoagulant effects of dabigatran. Lumbar puncture, which requires normal hemostasis, was performed without difficulties or complications in the ED helping to narrow down differential diagnosis.

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Alternative strategies for this emergency setting included: (1) Performing MRI/MR-Angiography (MRA)/Computed tomography Angiography (CTA), (2) empirical treatment with aciclovir. Because MRI was not available at night we discussed both performing CTA and empirical treatment with aciclovir. In both cases, however, we opted for lumbar puncture because renal insufficiency might have worsened following CTA or aciclovir application. The differential diagnosis of encephalitis was made unlikely in a timely manner.

We demonstrated that idarucizumab can be successfully used before performing an emergency lumbar puncture in a patient on effective anticoagulation with dabigatran.

#### Disclosure

Dr. C.C. Eschenfelder is an employee of Boehringer Ingelheim.

#### Acknowledgment

Dr. T.B. Braemswig is participant in the BIH-Charité Clinical Scientist Program funded by the Charité – Universitätsmedizin Berlin and the Berlin Institute of Health.

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