

Mechanical Extraction of a Refluxed Onyx Piece from the Sigmoid Sinus Using a Solitaire AB Stent for Treating a Dural Arteriovenous Fistula: technical report

Dural Arteriovenöz Fistül Tedavisi Esnasında Sigmoid Sinüse Reflü Olan Onyx Parçasının Solitaire AB Stent ile Çıkarılması: teknik rapor

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Cite this article as: Caylı E, Oguz S, Dinc H. Mechanical Extraction of a Refluxed Onyx Piece from the Sigmoid Sinus Using a Solitaire AB Stent for Treating a Dural Arteriovenous Fistula: technical report. *Eurasian J Med* 2017; 49: 224-5.

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Received: August 15, 2017

Accepted: August 17, 2017

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DOI 10.5152/eurasianjmed.2017.17260

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A 49-year-old woman presented with tinnitus since a long time. Magnetic resonance angiography revealed abnormal vessels located around the left sigmoid sinus. Digital subtraction angiography revealed a left sigmoid sinus dural arteriovenous fistula (DAVF) primarily supplied by the left tentorial marginal artery from the left internal carotid artery, posterior meningeal artery from the left vertebral artery, anterior and posterior branches of the left middle meningeal artery, and posterior auricular artery from the left external carotid artery. There was prominent stenosis in the left sigmoid sinus (Figure 1 a-d). The fistula was classified as type II a+b according to the Merland–Cognard classification. Onyx injection was performed through the posterior auricular artery using the combination of a Marathon microcatheter (ev3, Neurovascular, Inc.,

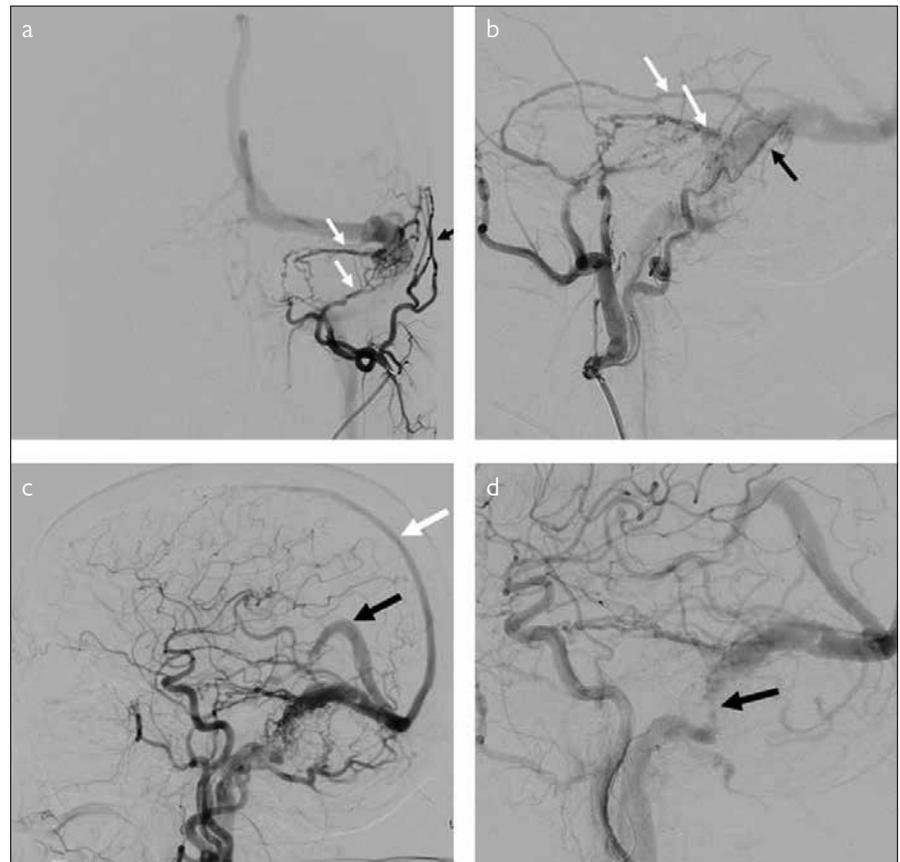


Figure 1. a-d. The left sigmoid sinus DAVF discovered in a 55-year-old woman who presented with headache and tinnitus. Selective the left external carotid artery anteroposterior (a) and lateral (b) injections demonstrates the DAVF fed primarily by anterior and posterior branches of the MMA (white arrows) and posterior auricular artery (black arrow). (c) Late arterial and venous phases of ECA shows retrograde contrast filling of the straight (black arrow) and superior sagittal sinuses (white arrow). (d) There is prominent stenosis in the left sigmoid sinus (arrow). This is a type II a+b, DAVF according to Merland-Cognard classification. 90x86mm (300x300 DPI)

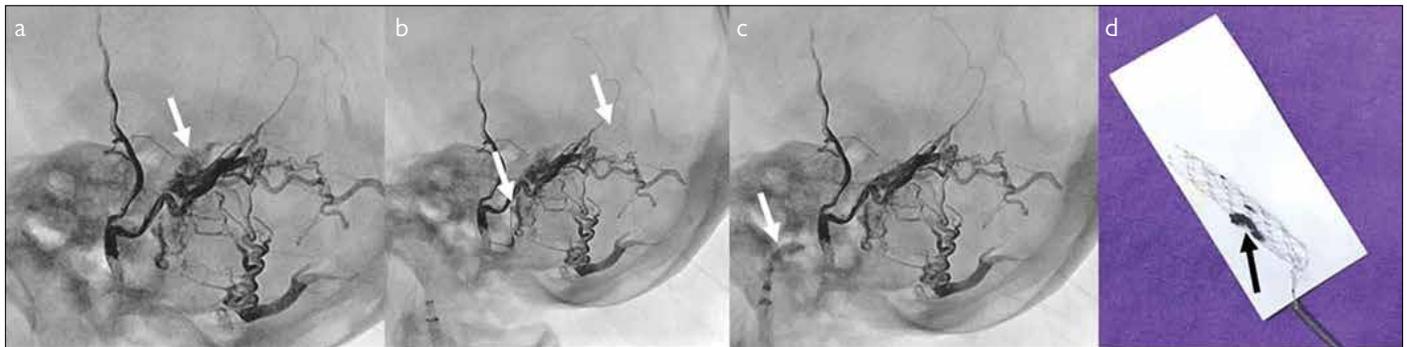


Figure 2. a-d. (a) Fluoroscopic image, after Onyx injection through the microcatheter using posterior auricular artery, shows onyx cast in posterior auricular artery branches and retrograde filling of the meningeal branches which supplies the fistula. During microcatheter injection, a small amount of Onyx cast was refluxed (arrow) within the left sigmoid sinus. (b) A Solitaire AB stent was opened into the left sigmoid sinus for retrieving the refluxed Onyx (arrows). (c) The Solitaire AB stent with the Onyx cast (arrow) were together pulled back into the guiding catheter. (d) Removed Onyx piece (arrow) and the Solitaire AB stent were seen on aseptic paper. 90x22mm (300 x 300 DPI)

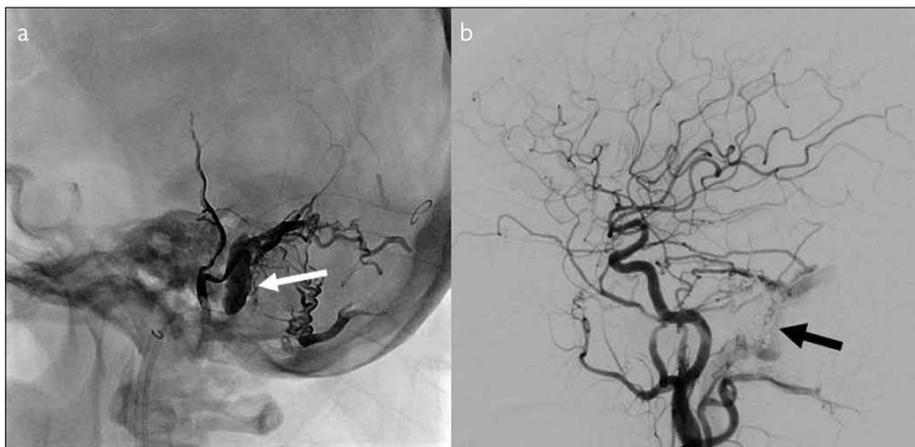


Figure 3. a, b. (a) Following mechanical removal of the Onyx piece, balloon dilatation was performed to open the stenotic segment of the sigmoid sinus using a 6 x 20 mm standard angioplasty balloon (white arrow). (b) After balloon angioplasty, the stenotic segment was resolved (black arrow) and the retrograde flow pattern within the sigmoid sinus changed into the antegrade one. The fistula was downgraded from Type II a+b to Type I according to Merland-Cognard classification. 90x43mm (300x300 DPI)

Irvine, CA, USA) and Mirage 0.008 microwire (ev3 Neurovascular, Inc., Irvine, CA, USA). During the injection, a small amount of the Onyx piece was refluxed within the left sigmoid sinus. A Solitaire AB stent (Covidien, Irvine, CA, USA) was opened into the left sigmoid sinus for retrieving the refluxed Onyx piece (Figure 2 a-d). Balloon dilatation was performed to open the stenotic segment of the sigmoid sinus (Figure 3 a-b). The fistula was downgraded from type II a+b to type I.

Endovascular embolization is an important therapeutic option for treating cerebral vascular malformations such as aneurysms, arteriovenous malformations, and DAVFs [1]. Onyx is a non-adhesive polymer that uses as a liquid embolic agent for brain arteriovenous malformations (AVMs) and dural arteriovenous fistulas (DAVFs). One of the serious complications of Onyx embolization is the risk of reflux into parent vessels, and techniques to cope with this complication have not yet been established [2].

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Farabi Hospital School of Medicine.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - EC.; Design - EC., SO., HD.; Supervision - EC., SO., HD.; Resources - EC., SO., HD.; Materials - EC., SO., HD.; Data Collection and/or Processing EC., SO., HD.; Analysis and/or Interpretation - EC., SO., HD.; Literature Search - EC.; Writing Manuscript - EC., HD.; Critical Review - EC., SO., HD.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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