



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com



Original Article

Dual-lumen balloon to increase onyx venous penetration in the treatment of spinal dural arteriovenous fistulas

1 Felipe Padovani Trivelato^{a,*}, Marco Túlio Salles Rezende^a, Alexandre Cordeiro Ulhoa^a,
2 Guilherme Seizem Nakiri^b, Daniel Giansante Abud^b

3 ^a Division of Interventional Neuroradiology, Felício Rocho Hospital, Rua Timbiras 3616, Barro Preto, 30320-670 Belo Horizonte, Minas Gerais, Brazil
4 ^b Division of Interventional Neuroradiology, Hospital das Clínicas da Faculdade de Medicina, Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil

ARTICLE INFO

Article history:
Available online xxx

Keywords:
Embolization
Endovascular
Spinal dural arteriovenous fistula

ABSTRACT

Purpose. – Spinal dural arteriovenous fistulas (sDAVF) are the most common spinal vascular lesions. The arterialization of the recipient vein results in venous hypertension and chronic ischemia. Intravascular injection of acrylic glue in order to occlude the draining vein is the principle of endovascular treatment, but a significant portion of embolization procedures do not succeed. We present our initial experience of endovascular balloon augmented embolization of sDAVF using a dual-lumen balloon.

Clinical presentation. – Three patients harboring sDAVF were submitted to endovascular treatment by onyx injection assisted by a double-lumen balloon as the sole therapy. Control angiography demonstrated complete obliteration of the fistula in all cases with clinical improvement.

Conclusion. – Dual-lumen balloon onyx embolization of spinal dural arteriovenous fistulas appears to be an acceptable and feasible alternative.

© 2017 Elsevier Masson SAS. All rights reserved.

Introduction

Spinal dural arteriovenous fistula (sDAVF) accounts for more than 70% of all spinal arteriovenous lesions. It is a presumably acquired vascular malformation that is primarily found in elderly men and classically in the thoracolumbar region [1–6,8]. sDAVF are fed by radiculomeningeal arteries along the dural root sleeve that lead to retrograde draining into radicular veins toward the perimedullary veins. The arterialization of the recipient vein results in venous hypertension and chronic ischemia [1–5,7–10].

sDAVFs usually have a small diameter long tortuous feeder where the emissary bridging (transdural) veins pierce the dura. Due to rich collateral dural arterial network, closure of the most distal part of the artery and the proximal part of the draining radicular vein is the goal of the treatment [1,5,6,9]. In previous case series, the success rate of endovascular therapy had varied between 25% and 75%, whereas a meta-analysis suggested a rate of 98% complete occlusion after surgery [1,3,6,8].

Acrylic glue is the main embolic material to treat sDAVFs. However, a significant portion of the NBCA (Codman Neuro, Raynham, Massachusetts, USA) embolization procedures do not succeed

[1,5,7,9]. In the last few years, Onyx has been used in order to improve cure rates. However, if onyx (Covidien, Irvine, USA) has shown to greatly improve the results of cranial dural fistula embolization, for now, it has failed to demonstrate the same good results in sDAVF, specially because of poor venous penetration [2,6,7].

We present our initial experience of endovascular balloon augmented embolization of sDAVF using a dual-lumen balloon. Additionally, a literature review was performed in order to determine whether the use of a double lumen balloon could really increase onyx venous penetration and cure rates.

Technical case reports

Case 1

A 53-year-old male presented with two-year history of slowly progressive lower extremity weakness. Over the past two months, he developed urinary incontinence. He was evaluated with a magnetic resonance imaging (MRI) of the spine. It demonstrated thoracic spine scoliosis, flow-voids on the thoracic and cervical spinal cord surface and diffuse multilevel intramedullary hyperintensity on T2-weighted sequence, representing edema. A spinal angiography was performed and revealed a dural arteriovenous fistula at the level of left T4 nerve root dural sleeve (Fig. 1).

* Corresponding author.
E-mail address: felipepadovani@yahoo.com.br (F.P. Trivelato).

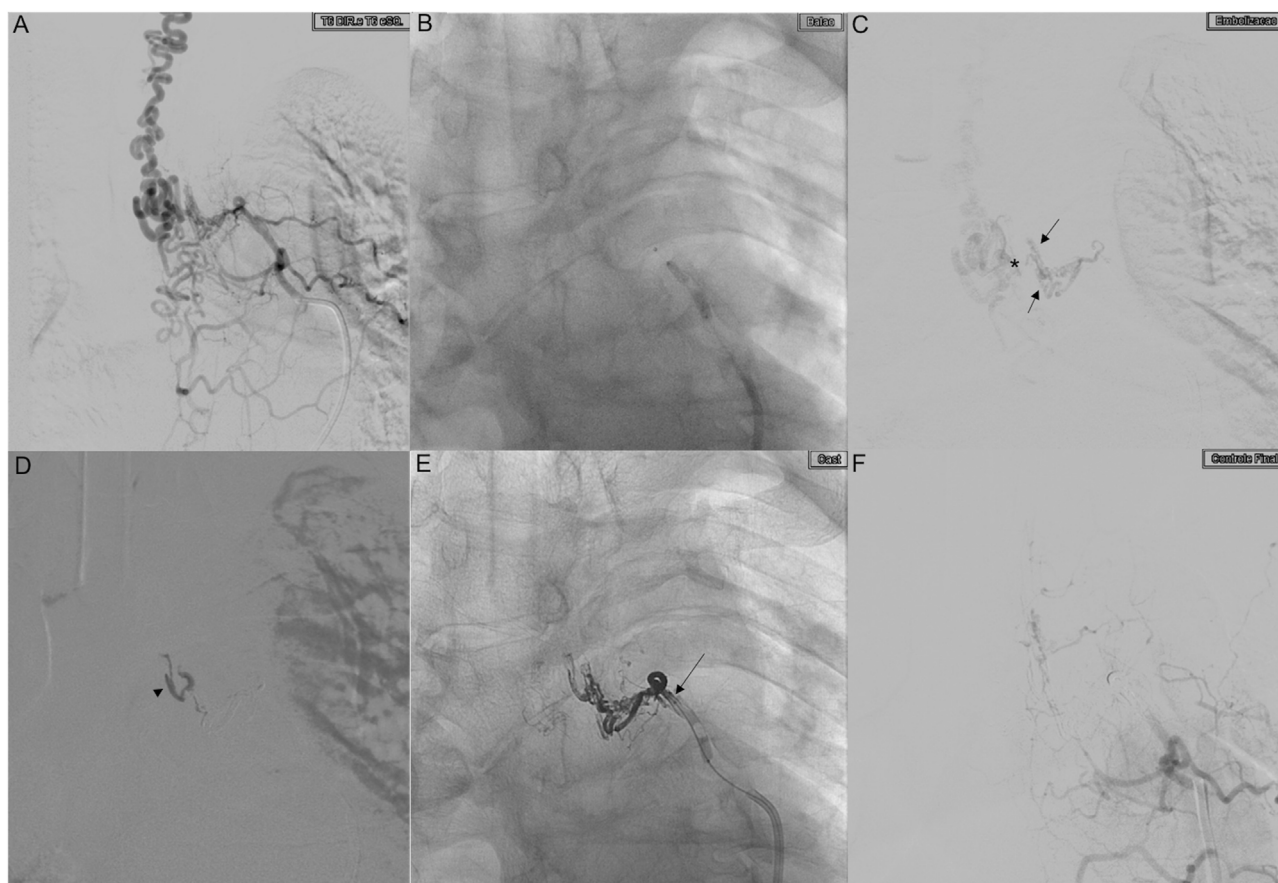


Fig. 1. A. Spinal angiography demonstrates a DAVF at left T9 level. B. Dual-lumen balloon inflated inside radiculomeningeal branch. C. Superselective injection with the balloon inflated shows the fistulous zone (arrows) and the draining vein (asterisks). D. Onyx penetrating inside the vein (arrow head). E. Onyx cast – note the balloon minimizing the reflux (arrow). F. Angiographic control demonstrates total occlusion of the sDAVF.

Endovascular treatment was chosen. A guiding catheter was placed into the left T4 intercostal artery. A 4 × 10 mm Scepter C balloon (Microvention, Tustin, USA) was advanced over a 0.014-inch Transend microguidewire (Stryker, Fremont, EUA) through the intercostal artery and then through the radiculomeningeal branch. Superselective injection showed the dural fistula and no radiculomedullary arteries. The tip of the balloon was relatively far from the fistulous point. With the balloon inflated, Onyx (Covidien, Irvine, USA) injection was performed continuously during 45 seconds, filling the proximal portion of the draining vein (0.8 mL).

Final control angiography showed complete occlusion of the sDAVF. The patient had an uneventful recovery. After one year he has completely recovered sphincter function and has mild paraparesis. After seven months, control angiography showed persistent occlusion.

Case 2

A 52-year-old man presented with a seven-month history of progressive paraparesis. MRI showed spinal cord enlargement, with signal change involving the thoracic region. It was also observed flow-voids on the cord surface. Spinal angiogram demonstrated a dural fistula at the right T9 level. The draining perimedullary veins were tortuous and dilated (Fig. 2).

It was decided to perform endovascular treatment. A 5F guiding catheter was placed into the intercostal artery. A 4 × 10 mm Scepter C balloon was advanced into the radiculomeningeal branch. Superselective injection confirmed the fistulous point. The balloon was inflated and onyx injection was performed. During injection, no

reflux occurred but migration of onyx toward the distal portion of the intercostal artery via an anastomosis with the radicular branch was observed. After 29 minutes, with very slow intermittent injections, the embolic agent (1.7 mL) reached the fistulous zone and the foot of the draining vein.

The control angiogram revealed complete occlusion of the fistula. The patient was discharged after 2 days with partial improvement of lower limb paresis. After 6 months, he is asymptomatic and angiographic control demonstrated complete obliteration of the sDAVF.

Case 3

A previously healthy 22-year-old man presented to the emergency department with a two-month history of paraparesis. Whole spine MRI showed intramedullary T2-weighted hyperintensity and prominent perimedullary flow voids surrounding the spinal cord, specially the conus medullaris. A catheter-based spinal angiogram confirmed the presence of a sacral dural arteriovenous fistula with extensive perimedullary venous engorgement supplied from both lateral sacral arteries (Fig. 3).

Endovascular treatment was performed via the right internal iliac artery. A 4 × 10 mm Scepter C balloon was advanced into the lateral sacral artery close to the fistulous point. With the balloon inflated, onyx (Covidien, Irvine, USA) injection was performed continuously during 7 minutes, filling the proximal portion of the draining vein (1.1 mL).

The angiogram demonstrated complete occlusion of the sDAVF. The patient had an uneventful recovery. After a week, he had

Download English Version:

<https://daneshyari.com/en/article/8823733>

Download Persian Version:

<https://daneshyari.com/article/8823733>

[Daneshyari.com](https://daneshyari.com)