

Clinical Outcomes After Endovascular Treatment of 102 Dural Arteriovenous Fistulas Without Cortical Venous Reflux

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Introduction

Although dural arteriovenous fistulas (dAVF)s without cortical venous reflux (CVR) do not pose a risk of venous hypertension/hemorrhage, they can cause debilitating pulsatile tinnitus, ocular symptoms or develop CVR. Clinical outcomes reported across large patient cohorts with these dAVFs are sparse.

Methods

We reviewed our endovascular database from 1995-October 2015 for cranial dAVFs without CVR treated initially endovascularly. We extracted demographic, angiographic, treatment and follow-up data.

Results

Our analysis included 100 patients with 102 distinct dAVFs. Patients presented with either pulsatile tinnitus (61%) and/or ocular symptoms (42%). dAVF location was transverse/sigmoid in 42% of cases, cavernous in 40%, marginal sinus in 10%, torcular in 5%, superior sagittal sinus in 2% and petrosal in 1%. The initial angiographic occlusion rate improved from 63% to 75% following the introduction of Onyx (p = 0.28). The complication rate was 5% with 1% of patients having permanent neurological sequelae. Among patients with dAVFs with pulsatile tinnitus, resolution after treatment was seen in 59% of cases, tolerable improvement in 20% and persistence in 21% over a mean follow-up period of 3 years. Angiographically-occluded fistulas were associated with a greater rate of symptomatic resolution/improvement of tinnitus as compared to partially treated lesions (90% vs 62%, p = 0.04). Among patients with ocular symptoms, resolution after treatment was seen in 48% of cases, tolerable improvement in 30% and persistence/worsening in 22% over a mean follow-up period of 2 years. Angiographically-occluded dAVFs were associated with greater rates of symptomatic resolution/improvement of ocular symptoms than partially treated dAVFs (85% vs 33%, p = 0.02).

Learning Objectives

- 1) Low risk dAVF endovascular treatment is associated with an approximately 80% rate of symptomatic improvement/resolution after initial treatment.
- 2) Onyx has improved angiographic obliteration
- 3) Angiographic obliteration is significantly associated with higher rates of symptomatic improvement

References

1. Djindjian R, Merland JJ: Super-Selective Arteriography of the External Carotid Artery. Berlin: Springer-Verlag, 1978.

2. Halbach VV, Higashida RT, Hieshima GB, Mehringer CM, Hardin CW: Transvenous embolization of dural fistulas involving the transverse and sigmoid sinuses. AJNR Am J Neuroradiol 10: 385-392, 1989.

3. Rodrigues T, Willinsky R, Agid R, TerBrugge K, Krings T: Management of dural carotid cavernous fistulas: a single-centre experience. Eur Radiol 24: 3051-3058, 2014.

4. Satomi J, van Dijk JM, Terbrugge KG, Willinsky RA, Wallace MC: Benign cranial dural arteriovenous fistulas: outcome of conservative management based on the natural history of the lesion. J Neurosurg 97: 767-770, 2002.

5. Shah SB, Lalwani AK, Dowd CF: Transverse/sigmoid sinus dural arteriovenous fistulas presenting as pulsatile tinnitus. Laryngoscope 109: 54-58, 1999.

6. Shah MN, Botros JA, Pilgram TK, Moran CJ, Cross DT, Chicoine MR, et al: Borden-Shucart type I dural arteriovenous fistulas: clinical course including risk of conversion to higher-grade fistulas. J Neurosurg 117: 539-545, 2012.

Conclusions

Endovascular treatment of dAVFs without CVR is associated with a high rate of symptomatic improvement/resolution with low procedural morbidity.