AANS/CNS Joint Cerebrovascular Annual Meeting
Los Angeles, California
February 15-16, 2016

Vision Outcomes for Paraclinoid Aneurysms Treated with Flow Diversion

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Introduction

Aneurysms of the paraclinoid region of the internal carotid artery (ICA) and the interventions used to treat them often result in visual impairment. Because of the proximity of these aneurysms to the optic nerve and the ophthalmic artery, between 16% and 53% of patients present with visual deficits.1, 2, 7 Iatrogenic vision impairment has been reported with both clipping and coiling.1-4 While flow diversion is increasingly used throughout endovascular neurosurgery, few studies have reported the visual outcomes of treating paraclinoid aneurysms with this technique5 or compared it to coiling or clipping.4, 6 In order to satisfy demand for data on the visual outcomes for this new endovascular treatment modality and inform the contemporary management of paraclinoid aneurysms, we performed a retrospective analysis of patients with paraclinoid aneurysms treated at our site with a Pipeline embolization device (PED).

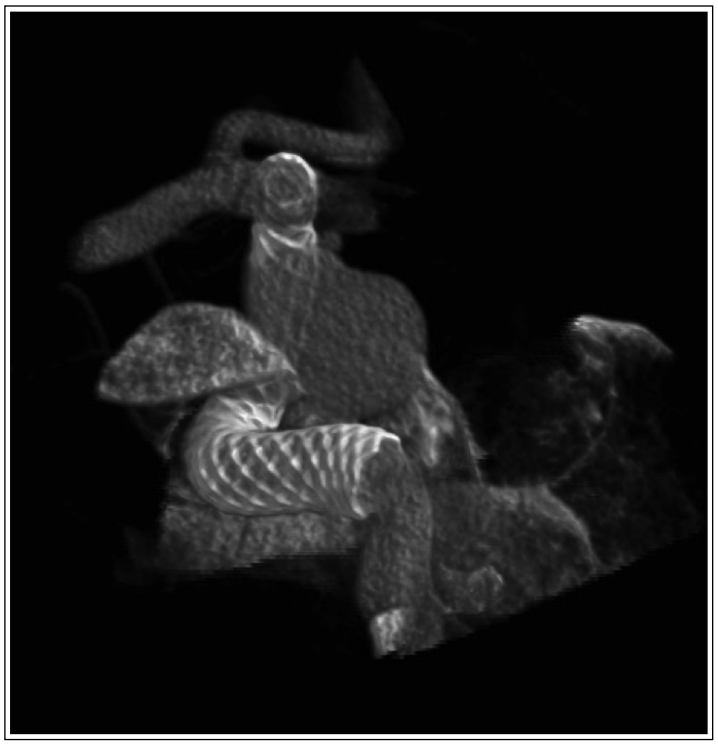
Methods

We compiled visual outcome data for 20 patients presenting with 26 paraclinoid aneurysms and treated at our site with flow diversion, 10 of whom (totaling 13 aneurysms) presented with visual impairment. We then reviewed vision outcomes in these patients at discharge and at 6 months, noting improved, unchanged, deteriorated, or newly impaired vision. We also performed an extensive literature review to compile data (1447 cases from 21 sites) on vision outcomes for paraclinoid aneurysms treated with clips (534 cases), coils (638), or flow diverters (275).

Table 1: Vision outcomes for patients with paraclinoid aneurysms presenting with visual deficits.

Results

Twenty patients with 26 paraclinoid aneurysms were treated at our site with a PED between December 2013 and October 2015. Ten of these patients (totaling 13 aneurysms) presented with preoperative visual impairment. Of these 13 aneurysms, 6 were superior hypophyseal artery, 4 were ophthalmic artery, and 3 were cavernous ICA aneurysms. Six were small (<6mm), 4 were large (6-10mm), and 3 were giant (>10mm), with an average size of 7.1mm. Visual deficits were improved in 8 patients (80%) and unchanged in 2 (20%) following treatment. All patients with ophthalmic and cavernous aneurysms saw improved vision, while 33% of patients with superior hypophyseal aneurysms (n=6) improved. No patients experienced sustained worsening of their existing visual impairment, however one patient acquired postoperative iatrogenic vision impairment (5%). A literature review of paraclinoid aneurysm treatment revealed visual improvement rates of approximately 41% for clipping, 54% for coiling, and 73% for flow diversion, visual deterioration rates of approximately 14% for clipping, 23% for coiling, and 2% for flow diversion, and newly impaired vision rates of 9% for clipping, 3% for coiling, and 4% for flow diversion (Table 1).



Conclusions

Compared to clipping and coiling, flow diversion demonstrates a higher rate of visual improvement and a lower rate of visual decline in patients with visually symptomatic paraclinoid aneurysms, with comparable risk of iatrogenic vision impairment. Few studies have reported primary data on visual outcomes following flow diversion in patients with paraclinoid aneurysms presenting with visual deficits. We report strong visual outcomes in patients treated at our site for paraclinoid aneurysms with a PED. Our data also demonstrate that visual improvement can be achieved when treating small paraclinoid aneurysms with a PED, unlike the mostly large and giant aneurysms that have previously been described.8 Our results suggest that this new treatment modality yields improved vision outcomes in patients with paraclinoid aneurysms compared to clipping and coiling.

References

1. Day AL. Journal of neurosurgery. May 1990;72(5):677-691. 2. Heros RC et al. Neurosurgery. Feb 1983;12(2):153-163. 3. Lai LT, Morgan MK. Journal of clinical neuroscience. Aug 2013;20(8):1127-1133. 4. Kanagalingam S et al. Journal of neuro-ophthalmology. Mar 2012;32(1):27-32. 5. Zhu Y et al. World neurosurgery. Jul 22 2015. 6. Patel S et al. BMJ case reports. 2014;2014. 7. Aboukais R et al. Clinical neurology and neurosurgery. Oct 2014;125:155-159. 8. Sahlein DH et al. Journal of neurosurgery. Oct 2015;123(4):897-905.