



Dural Venous Sinus Stenting in Pseudotumor Cerebri: A Retrospective Chart Review to Measure Objective Outcomes Using Optical Coherence Tomography.

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Introduction

Idiopathic intracranial hypertension (IIH) is a difficult neurologic problem to manage with medical and surgical management due to side effects and complications. A subset of patients with dural sinus stenosis has shown benefit with endovascular dural venous sinus stenting (DVSS). It is hypothesized that stenting relieves the stenosis, thereby normalizing the venous pressure gradient, promoting cerebrospinal fluid drainage, ultimately leading to normal intracranial pressure.

Methods

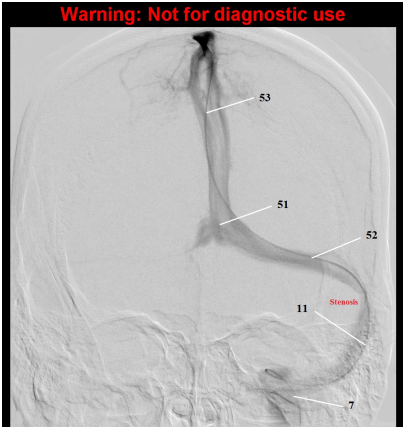
A retrospective study was performed to identify IIH patients with dural sinus stenosis on noninvasive neuroimaging who were treated with DVSS. Outcome measurements included pre- and post-intervention dural venous sinus pressure gradients; optical coherence tomography (OCT) at ophthalmologic examinations; and improvement in clinical symptoms including visual disturbances, headaches, and tinnitus.

Table I. Patient Symptoms.

Patient	Pre-Intervention Symptoms		
	Headache	Vision	Tinnitus
1	X	O	X
2	O	X	
3	O	X	X
4	O	X	X
5	X	X	O
6	O	X	X
7	X	O	
8	X	O	X
9	X	O	
10	O	X	X
11	X	O	
12	O	X	
13	X	O	
14	O	X	
15	O	X	
16	X	O	X
17	O	X	

X = symptom present on history
O = denotes main patient symptom/complaint
Gray Shading = improvement of symptom, post-intervention

Figure 1. Angiographic Manometry.

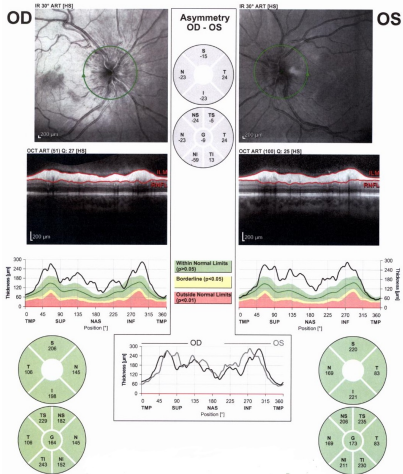


Measurements (mmHg) at superior sagittal sinus, torcula, transverse sinus, sigmoid sinus, jugular bulb. Stenosis with MPG of 41 mmHg at transverse-sigmoid sinus junction.

Results

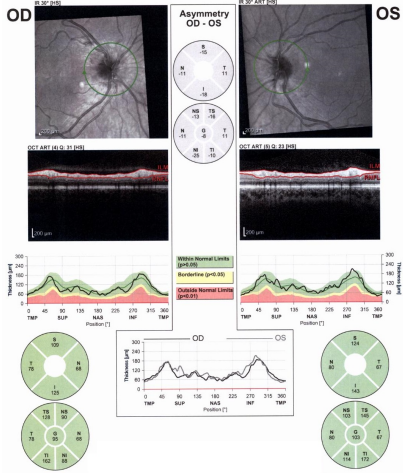
Seventeen patients (15 female) were identified who underwent endovascular DVSS. Mean age was 29.47 years. All patients had pre-procedural lumbar punctures with an average opening pressure of 38.1 cmH2O (26-55). Average pre- and post-intervention pressure gradients were 23.06 mmHg and 1.18 mmHg, respectively. Pressure gradient change was found to be statistically significant with unpaired t test ($p < 0.0001$). Fifteen (88%) noted improvement in headache and fourteen (82%) had visual improvement. All patients had improvement in their main symptom related to IIH. Follow-up lumbar punctures in patients in which they were obtained were 15-23, with average 19 cmH2O ($p < 0.0038$, unpaired t test). Of eleven patients who had follow up OCT, eight improved and three remained stable. Six patients were awaiting return appointments or were lost to follow-up. Overall, OCT improvement correlated with improved visual acuity. One patient underwent repeat stenting due to intimal hyperplasia.

Figure 2. Pre-Stent OCT.



OCT demonstrates retinal thickening bilaterally.

Figure 3. Post-Stent OCT.



OCT demonstrates decrease in pre-operative retinal thickening approximating the normogram for retinal thickness without edematous thickening or atrophic thinning.

Conclusions

Our series of patients with dural sinus stenosis treated with endovascular DVSS demonstrated improvement in vision and OCT. Use of OCT in outcomes in IIH is an effective method to objectively assess efficacy of stenting at the retinal level. Our treatment MPG threshold of 10 mmHg is higher than many other studies, which we believe will increase specificity for patients who might benefit most from stenting. Endovascular DVSS is a safe, effective treatment for patients with IIH and dural sinus stenosis.