Embolization of a deep orbital varix through endovascular route

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We report a case of the primary deep orbital venous varix treated by endovascular coil embolization procedure by transfemoral catheterization. This method of treatment has the advantage of image-guided localization of the pathology, real-time management and confirmation of the success of the procedure in the sitting.

Key words: Deep orbital varix, endovascular coil embolization, transfemoral route

Orbital varix is an intraorbital mass composed of abnormally large veins. It may be a single vessel with saccular or segmental dilatations or a tangled plexus of venous channels. Lloyd et al. differentiated them into primary and secondary varices.

Treatment of patients with orbital varix remains controversial. This congenital venous malformation usually has a benign course. The number of patients undergoing radical surgery is relatively small, and many are managed conservatively. However, some patients have pain, recurrent orbital hemorrhage and may even become blind. Active treatment of orbital varix may, therefore, be important, and development of a suitable form of treatment is desirable.

We report a case of the primary deep orbital venous varix treated by endovascular coil embolization procedure by transfemoral catheterization with a successful outcome.

Case Report

A 23-year-old housewife, married for 3 years and mother of 2-year-old son reported with headache for 3 years which increased in intensity over last 2 years. Since last 6 months, she developed nausea during episodes of headache. Over the last 2 years, she noticed a deeper regression of right eyeball as compared to the left. She also had gradual descent and protrusion of right eyeball while forward bending and straining for last 1 year [Fig. 1]. At examination, visual field, ocular mobility, and visual acuity were normal; the fundi were unremarkable; and no bruit or pulsation was noted. With the patient in sitting position, the right eye showed enophthalmos of 2 mm as compared to left but on forward bending for 1 min the right eye showed a proptosis of 12 mm (right eye 34 mm and left eye 22 mm at 110 cm on Hertle exophthalmometer). Magnetic resonance imaging (MRI) of the orbit in the prone position revealed a right side large cystic retrobulbar extraconal intraorbital mass of 34 mm × 30 mm × 29 mm. The mass was producing significant proptosis of 12 mm as compared to the left side. T1-weighted MRI showed hypo to intermediate signal intensity of the mass. T2-weighted MRI showed hyperintense signal thus confirming a diagnosis of deep Orbital venous varix [Fig. 2]. It was decided to treat the varix as it was causing severe headache, nausea and cosmetic disfigurement.

Patient was again taken up under general anesthesia with 5000 units of heparin for an elective coiling procedure by the transfemoral venous route. The jugular bulb of the right internal jugular vein was accessed with a 6F multipurpose...
guide catheter. The right superior ophthalmic venous varix sac was reached using a Prowler14, Codman neurovascular 2.3/1.9 F microcatheter over 0.014” and 0.010” steerable agility neuromicrowire via the right cavernous sinus. On achieving good microcatheter positioning, the varix sac was obliterated with 05 long neurocoils [Fig. 3] (Codman - Trufill orbit coils −7 mm × 21 cm, 6 mm × 15 cm, deltapaque 5 mm × 10 cm, 4 mm × 8 cm and 4 mm × 6 cm). Check venograms showed controlled complete coiling of varix of the right superior ophthalmic vein with preserved flow in the cavernous sinus concluding the procedure. Postprocedural skull skiagram showed deposited right intra orbital coils [Fig. 4].

Postoperative period was uneventful with no headache, vomiting or any visual defects. Patient was discharged. On the review after 2 and 6 months, she clinically had no evidence of descending right sided postural proptosis at forward bending and performing Valsalva [Fig. 5]. Patient underwent a prone orbital MRI at 6 months which showed near complete obliteration of the deep orbital varix noticed earlier with susceptibility artefacts from the packed coils in the retrobulbar extraconal space of the right orbit [Fig. 6].

Discussion

A primary orbital varix or more simply orbital varix is a congenital venous malformation. It is manifested in infancy, but its appearance may be delayed until the early part of the second decade.[1] A secondary varix is acquired and may be caused by orbital trauma or related to a change in hemodynamics of the orbit induced by extraorbital lesions, such as carotid-cavernous fistula, dural fistula, brain arteriovenous malformation, or intracranial dural venous sinus occlusion. A transient and evanescent proptosis-induces by Valsalva maneuver are the principal clinical sign, as orbital varices are usually in direct communication with the native venous system.[3] There are only two indications for intervention: Extreme orbital pressure with a functional deficit or intractable pain and cosmetic disfigurement.[4] A varix rarely leads to visual loss or extreme pain unless there is spontaneous intraorbital hemorrhage or unexpected thrombosis.

Methods of treatment of orbital varix are essentially limited to endovascular intervention and surgical excision. Sclerosis of vascular lesions can be extremely effective, especially
when performed under direct fluoroscopic or ultrasound guidance, however, the orbital compartment poses limitations and risks not seen in other regions such as the subcutaneous planes of the head and neck. Alcohol, tetracyclines, and other irritants (sodium tetradecyl sulfate) if injected directly and not contained within the varix can produce drastic irritation, swelling, pain, and congestion in the orbit and significantly threaten vision. Multiple treatments may be required. Surgical resection of varix can be challenging as these lesions are sometimes poorly defined with extensive projections. It is generally difficult because the wall of the varix is thin and tears easily during surgery and bleeding may be massive and uncontrollable. The venous channels partially collapse and may become undetectable at surgery in the supine position. Surgery may damage the surrounding nerves, muscles and vessels.\textsuperscript{[5]}

Endovascular surgery is an effective therapeutic tool for orbital varix.\textsuperscript{[5]} As shown, in this case, report a detailed road mapping of venous channels and orbital anatomy was achieved by MRI evaluation and by a preprocedural diagnostic orbital venography from the cavernous sinus route. Hence, we approached the cavernous sinus with a microcatheter via the transvenous route and coil embolized the varicoal superior ophthalmic vein. There were no complications of retrobulbar hemorrhage and orbital compartment syndrome. Thus, endovascular treatment causes less damage than surgery and is a practical approach to a deep orbital varix by transfemoral route. We thus recommend transcavernous endovascular embolization approach as the first and definitive approach in symptomatic deep orbital varix instead of surgery which may be too demanding in a limited field of view.\textsuperscript{[5]}

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