CASE REPORT

Spontaneous Resolution of Direct Carotid Cavernous Fistula
Mazhar Ishaq, Muhammad Aamir Arain, Saadullah Ahmed, Muhammad Khizar Niazi, Muhammad Dawood Khan and Zamir Iqbal

ABSTRACT
Proptosis due to carotid cavernous fistula is rare sequelae of head injury. We report a case of post-traumatic, direct high flow carotid cavernous fistula that resolved spontaneously 06 weeks after carotid angiography. It however, resulted in loss of vision due to delay in early treatment. In the cases of post-traumatic proptosis, carotid cavernous fistula should be kept in mind.

Key words: Carotid cavernous fistula. Head injury. Spontaneous closure. Proptosis.

INTRODUCTION
Carotid–cavernous sinus fistulas (CCF) can result from head injury or may arise spontaneously. Post-traumatic cases account for about 75% of direct fistulas between the internal carotid artery and the cavernous sinus. These are often associated with fracture base of skull.1-3 Spontaneous closure of CCF by thrombosis of the cavernous sinus is uncommon, especially in the traumatic high flow type.4 Cases of spontaneous occlusion of a traumatic CCF after orbital angiography have been reported.5

We present the case of a patient who sustained a blunt head injury resulting in direct type carotid–cavernous sinus fistula which closes spontaneously without any intervention.

CASE REPORT
A young female presented with 3 weeks history of head injury, followed by bulging of her left eye, whooshing noises in her head and double vision. There was also history of left sided ptosis, swelling of both upper and lower lids, temporal headache and ear bleed. There was no previous history of any ocular and systemic diseases.

Her general physical examination and systemic examination was unremarkable. Ophthalmic examination on presentation revealed corrected visual acuity of 20/30 in right and 20/40 in left. Her pupils were round but unequal in reaction in left eye as compared to right eye; rest of the optic nerve functions were unremarkable. There was severe ptosis in left eye. Adnexa showed swelling of both upper and lower lids with resistance to retropulsion. Conjunctiva showed chemosis and dilated episcleral blood vessels.

The ocular movements were painful and limited in all directions of gaze. Forced duction test revealed restriction of all extra ocular muscles. She was having significant proptosis of 24 mm with difference of 6 mm from other eye. Fundus showed dilated veins with no haemorrhages or disc edema. Intraocular pressure was 38 mm of Hg with pulsating mires. Gonioscopy revealed open angle with no neovascularization. Ocular and cephalic bruits were audible. There was no increase in proptosis after Valsalva maneuver excluding the venous anomalies in orbit.

On X-ray of skull lateral view, there was a fracture of the petrous part of temporal bone. CT scan of orbit in axial view showed prominent superior ophthalmic vein and engorged extra ocular muscles on left side. Her trans-orbital colour Doppler ultrasound also revealed dilated superior ophthalmic vein. Carotid angiography revealed dilated cavernous sinus and arterIALIZATION OF superior ophthalmic vein with retrograde flow. The contrast medium from internal carotid artery was seen filling the cavernous sinus through fistula and then flowing retrograde into the superior ophthalmic vein. Her CT angiography also revealed dilated superior ophthalmic vein and enlarged cavernous sinus on left side (Figure 1, A-C).

On the basis of history, clinical examination and investigations, a diagnosis of left traumatic direct high flow carotid cavernous fistula was made. She was treated with intraocular pressure lowering eye drops artificial tears and painkillers.

A treatment plan of endovascular approach for embolization of carotid cavernous fistula with balloon and coil was made. Due to financial constrains the patient managed the amount needed for intervention in about 06 weeks time. The condition of patient rapidly deteriorated before surgical intervention was made and she started losing vision in the left eye. Her proptosis

Department of Ophthalmology, Armed Forces Institute of Ophthalmology, Rawalpindi.
Correspondence: Dr. Muhammad Aamir Arain, House No. 204, Lane No. 5, Near Quba Market, Peshawar Road, Rawalpindi. E-mail: doctorarain@yahoo.com
Received October 10, 2009; accepted July 06, 2010.
had markedly increased. The conjunctival congestion worsened and the fundus with dilated veins developed marked haemorrhages and edema (Figure 2, A and C). A few days before the planned surgery it was noted that her chemosis started decreasing, proptosis reduced (Figure 2, B), intraocular pressure decreased, and ocular bruit stopped; whooshing noises were no more audible to her. The ocular movements started to regain and it was concluded that the fistula was closed spontaneously. A repeat CT angiogram also confirmed spontaneous closure (Figure 1, D). But she failed to regain the vision in left eye due to optic atrophy and vascular occlusion (Figure 2, D). She was advised by the cardiologist, not to take aspirin, warfarin, heparin or any other thrombolytic therapy throughout life.

**DISCUSSION**

CCF is the most common arterio-venous malformation affecting the orbit. A CCF are classified according to several criteria; pathogenetically into spontaneous or traumatic; haemodynamically into high-flow and low-flow and angiographically into four types. The type A are direct shunts between the internal carotid artery and the cavernous sinus, including most traumatic carotid-cavernous fistulas. Type B are dural shunts between meningeal branches of the internal carotid artery and cavernous sinus. Type C are dural shunts between meningeal branches of the external carotid artery and cavernous sinus. Type D are dural shunts between meningeal branches of both internal and external carotid arteries and cavernous sinus.

Instances of direct CCF following surgical procedures (such as endoscopic sinus surgery, vascular, neuro surgery) or spontaneously from aneurysm ruptures have also been reported. Spontaneous CCF can be associated with cavernous sinus pathology such as arteriosclerotic changes of the arterial wall, fibromuscular dysplasia or Ehler-Danlos syndrome. Traumatic CCF may occur after either blunt or penetrating head trauma. Spontaneous thrombosis of the cavernous sinus does occur especially in low flow CCF within a period of 3-6 months but spontaneous closure in high flow CCF is very rare but miraculous closure can occur as sited in this case. As a mechanism of spontaneous occlusion, it is suggested that stasis of the blood flow may have caused the formation of a thrombosis inside the cavernous sinus, which induced closure of the fistula.

As spontaneous thrombosis is a possibility in CCF, conservative management can be rewarding but intervention becomes mandatory if the eye is at risk due to secondary glaucoma, rapidly progressive proptosis, exposure keratopathy, rubeosis or ischemic retinopathy. Diplopia, intolerable bruit and headache are also indications for intervention. Untreated cases may be life threatening.

Endovascular approaches have been tried to correct high-flow post-traumatic CCF which include intravascular closure using detachable balloon microcatheterization techniques or embolization with isobutyl-2-cyanoacrylate or polyvinyl alcohol particles. However, the detachable balloon embolization is the first choice in the treatment of traumatic CCF.

In this case we have reported, the patient developed post-traumatic proptosis after a road traffic accident. Her clinical examination and investigations confirmed the diagnosis of direct CCF. Since the facilities of endovascular approach for treating CCF were not available in our setup, she was referred to an interventional neuroradiologist for further evaluation. He had planned for balloon embolization of CCF. It took about 06 weeks for procurement of funds for treatment. Meanwhile her condition rapidly deteriorated, but few days before the surgery, her CCF was closed spontaneously without any intervention. This must have been due to spontaneous...
thrombosis of the fistula. Her proptosis had rapidly reduced along with her other signs and symptoms but unfortunately till then she had lost her vision in her left eye due to optic atrophy. Her extra ocular movements, however, recovered gradually over next 3 months. Her condition was stable till her last follow-up.

It is thus concluded that though direct CCF is a rare complication of head injury, it must be kept in mind in all cases of post-traumatic proptosis. Early diagnosis and prompt intervention is the only key to success in saving the lives and eyes of such patients.

REFERENCES


