# Direct carotid-cavernous sinus fistula

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A 40 year old man presents with decreased vision and redness in the left eye.  He had a significant trauma to the left side of his face a year ago but did not seek medical attention

He is healthy and does not have any known medical conditions

Visual acuity is 20/20 OD and NLP OS

There is a > 1.2 log unit left relative afferent pupillary defect

Color vision is 14/14 OD Ishihara color plates OD. The control plate was not seen in the left eye.

Intraocular pressure is 9 OD and 12 OS

**Figure 1.**

External examination of both eyes

**Figure 1.**

External examination shows significant proptosis of the left eye

**Figure 2.**

External examination of the left eye

**Figure 2.**

External examination of the left eye shows major conjunctival chemosis and corkscrew episcleral vessels

**Figure 3.**

Extraocular motility is full in both eyes

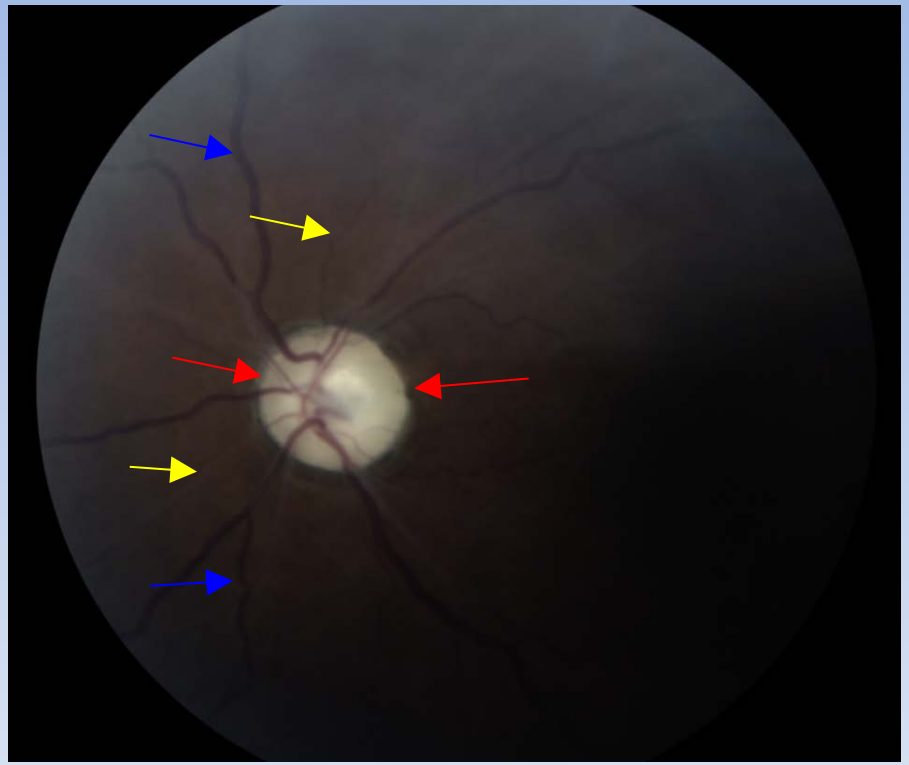
**Figure 4.**

Right eye

Left eye

**Figure 4.**

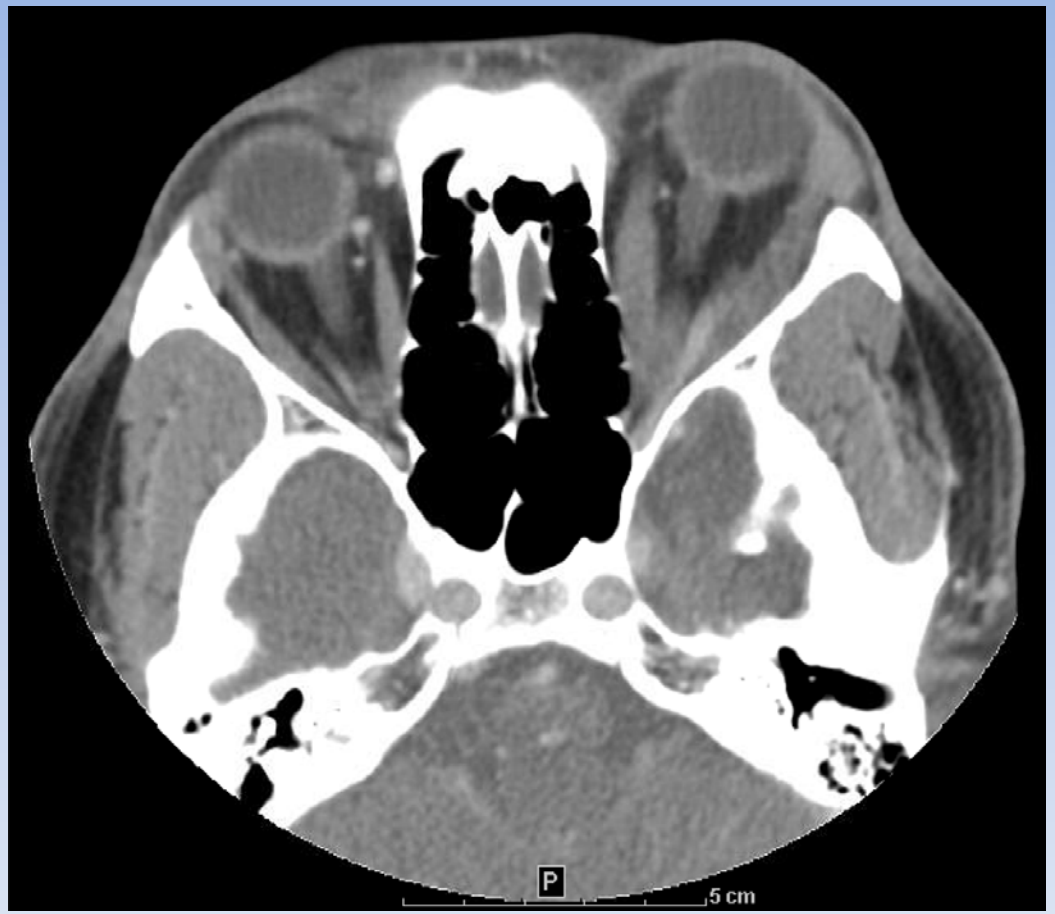
Right eye



Left eye

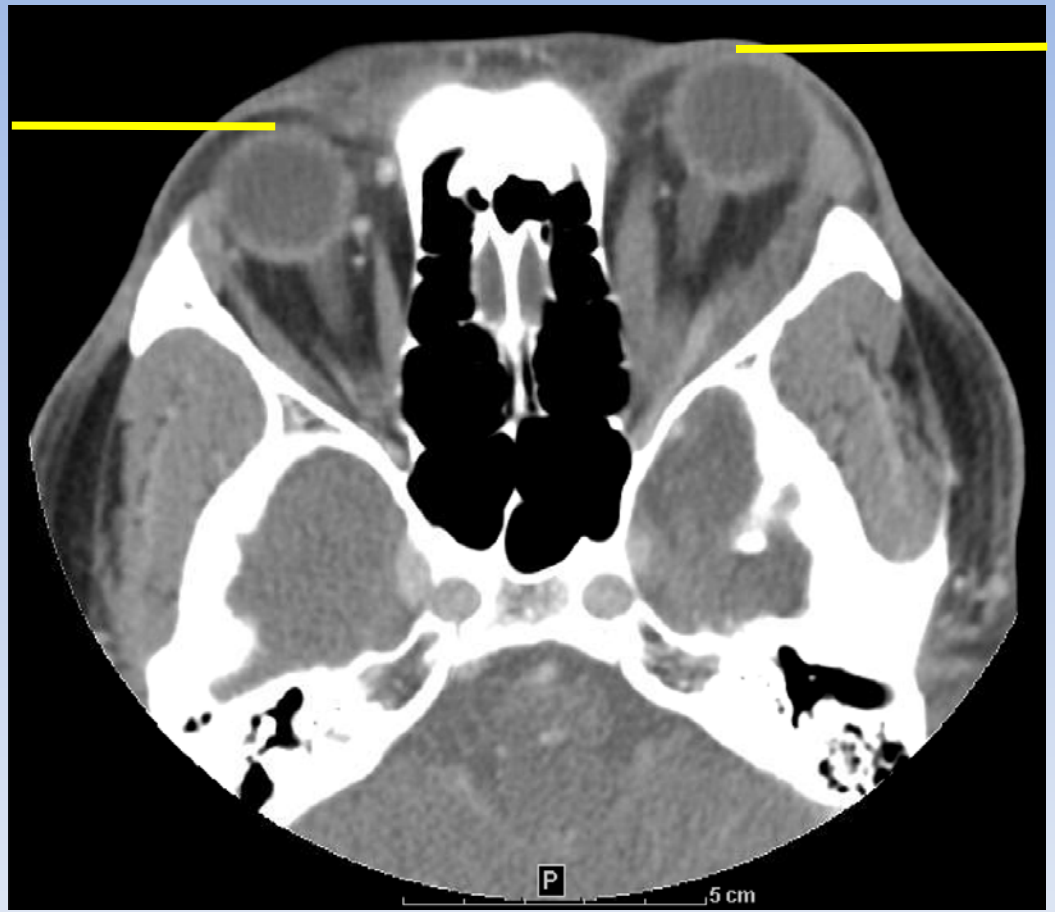
There is diffuse optic disc pallor (red arrows), tortuous retinal venules (blue arrows) and severe retinal arteriolar attenuation (yellow arrows)

**Figure 5.**




Axial CT scan of the orbits with contrast

**Figure 5.**




There is severe left proptosis

Axial CT scan of the orbits with contrast

**Figure 6.**

Axial CT scan of the orbits with contrast

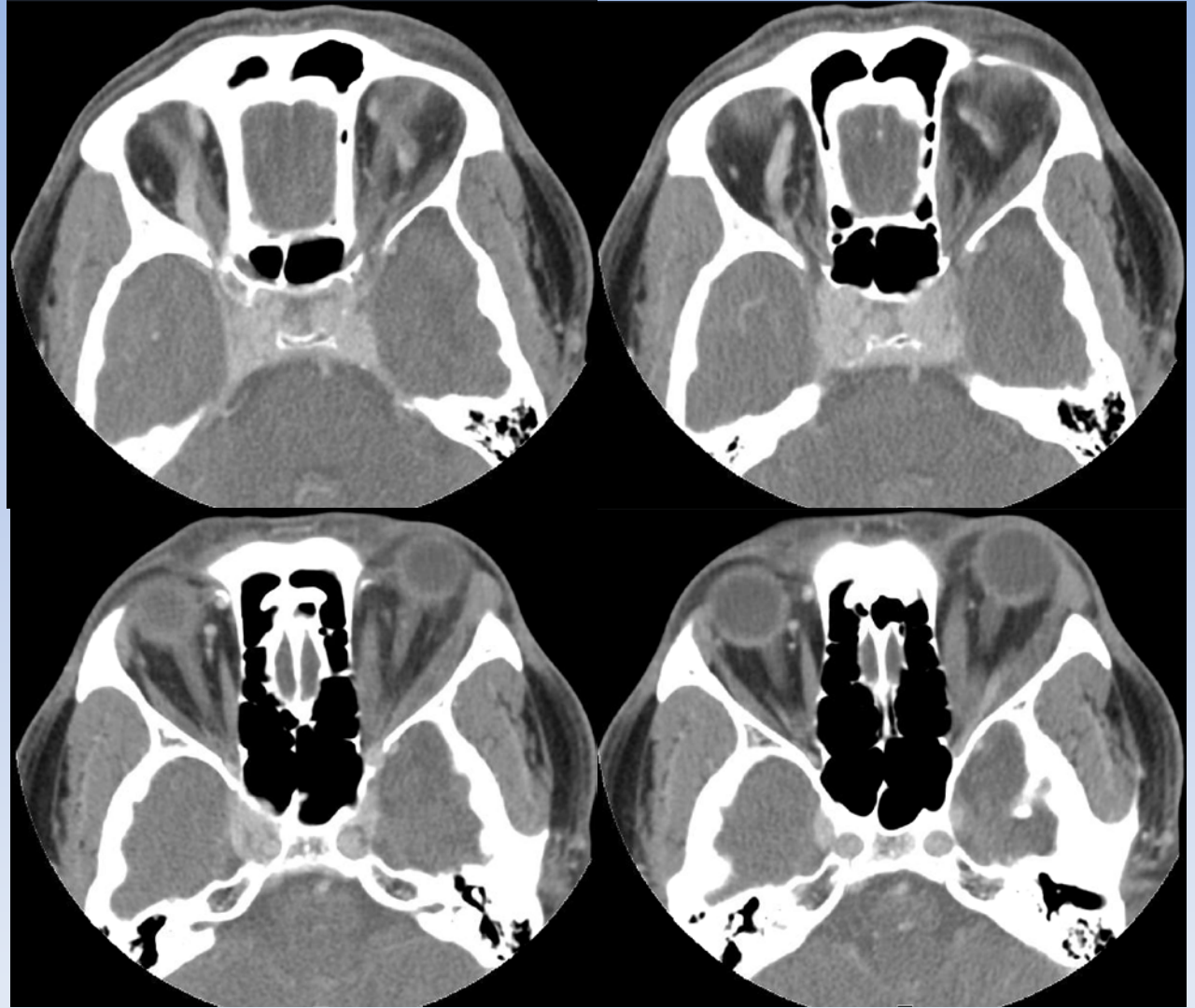
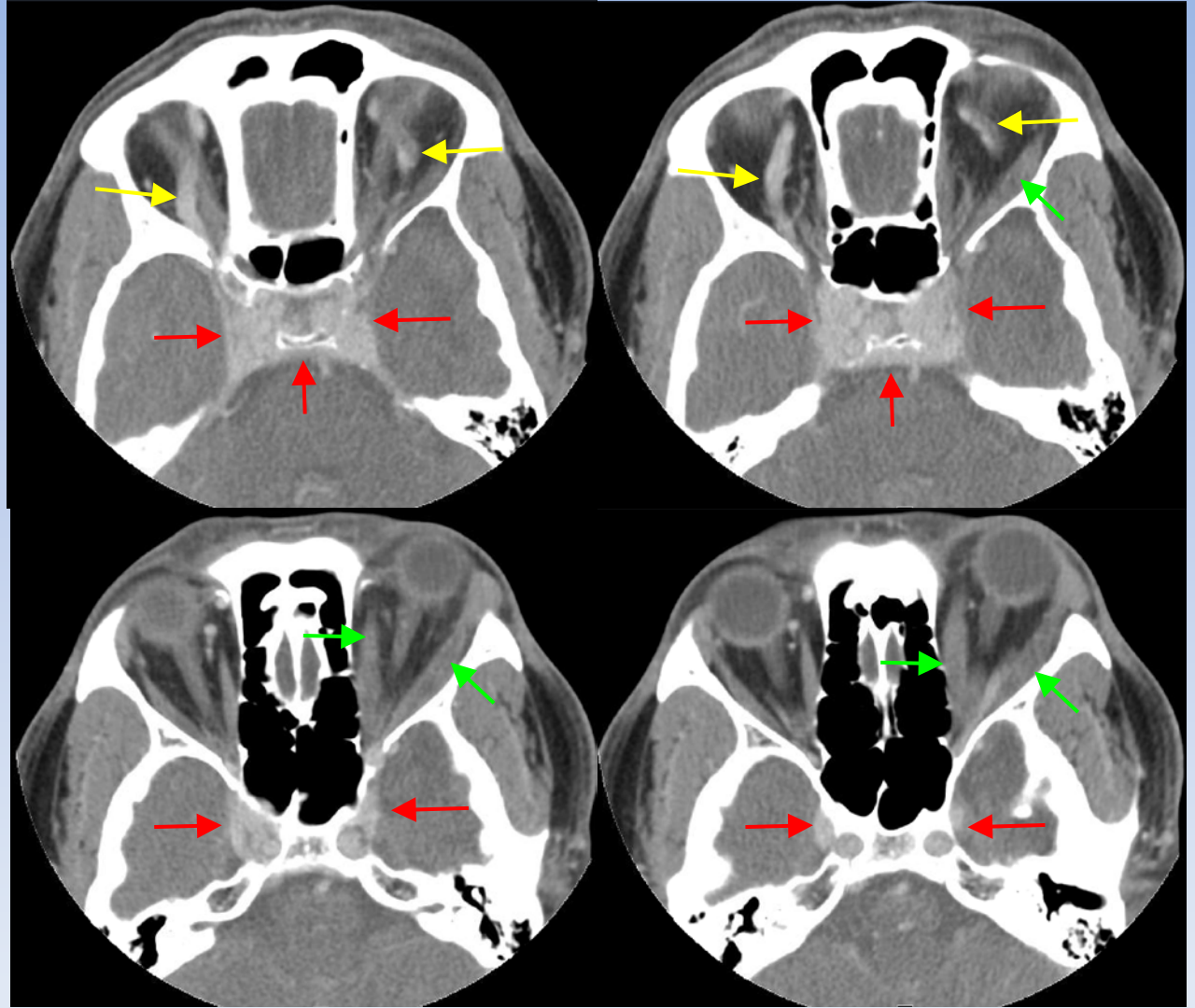


**Figure 6.**

Axial CT scan of the orbits with contrast shows enlarged cavernous sinuses (red arrows) and dilated superior ophthalmic veins (yellow arrows)



There are enlarged extraocular muscles on the left side (green arrows)

**Figure 7.**

Coronal CT scan of the orbits with contrast

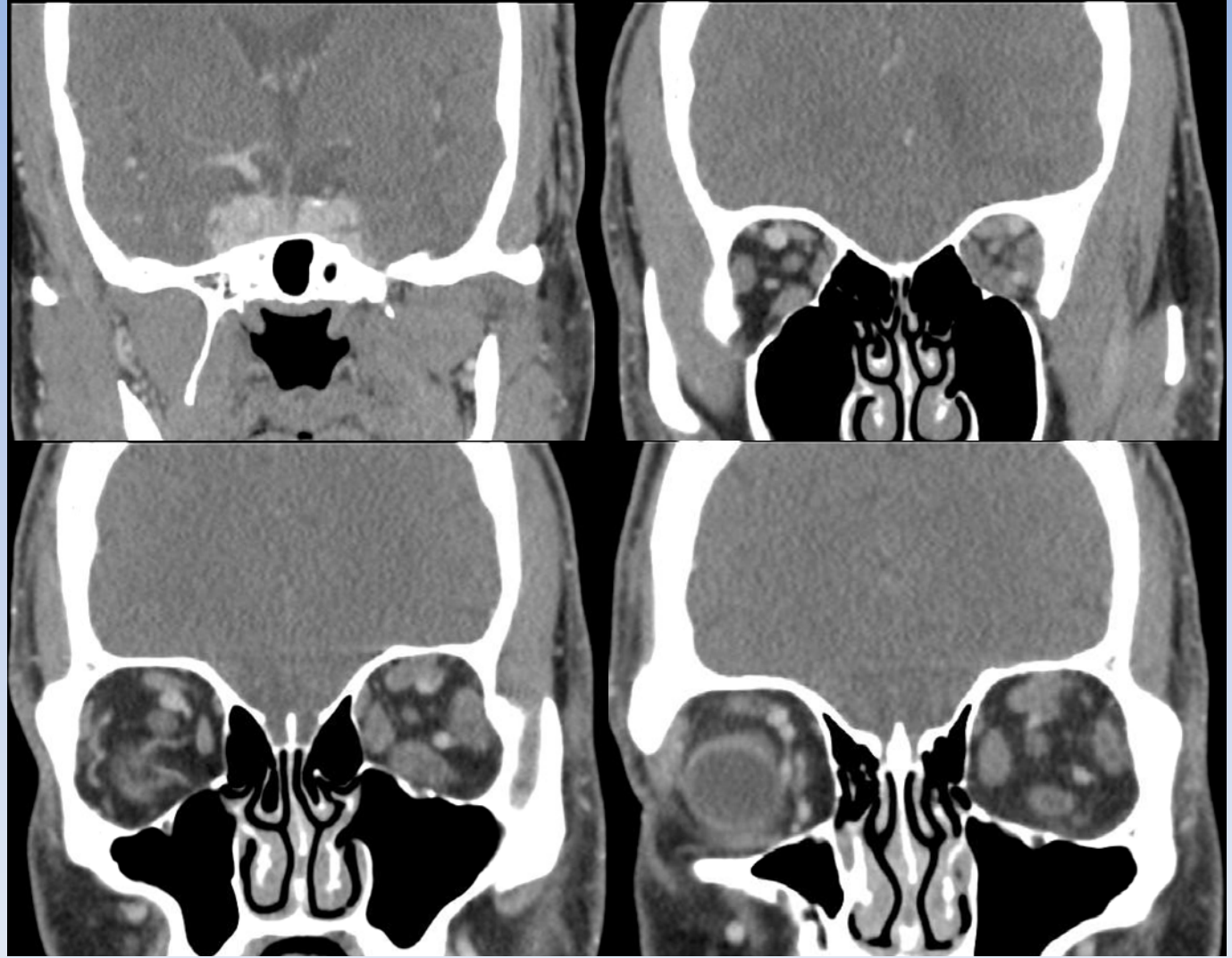
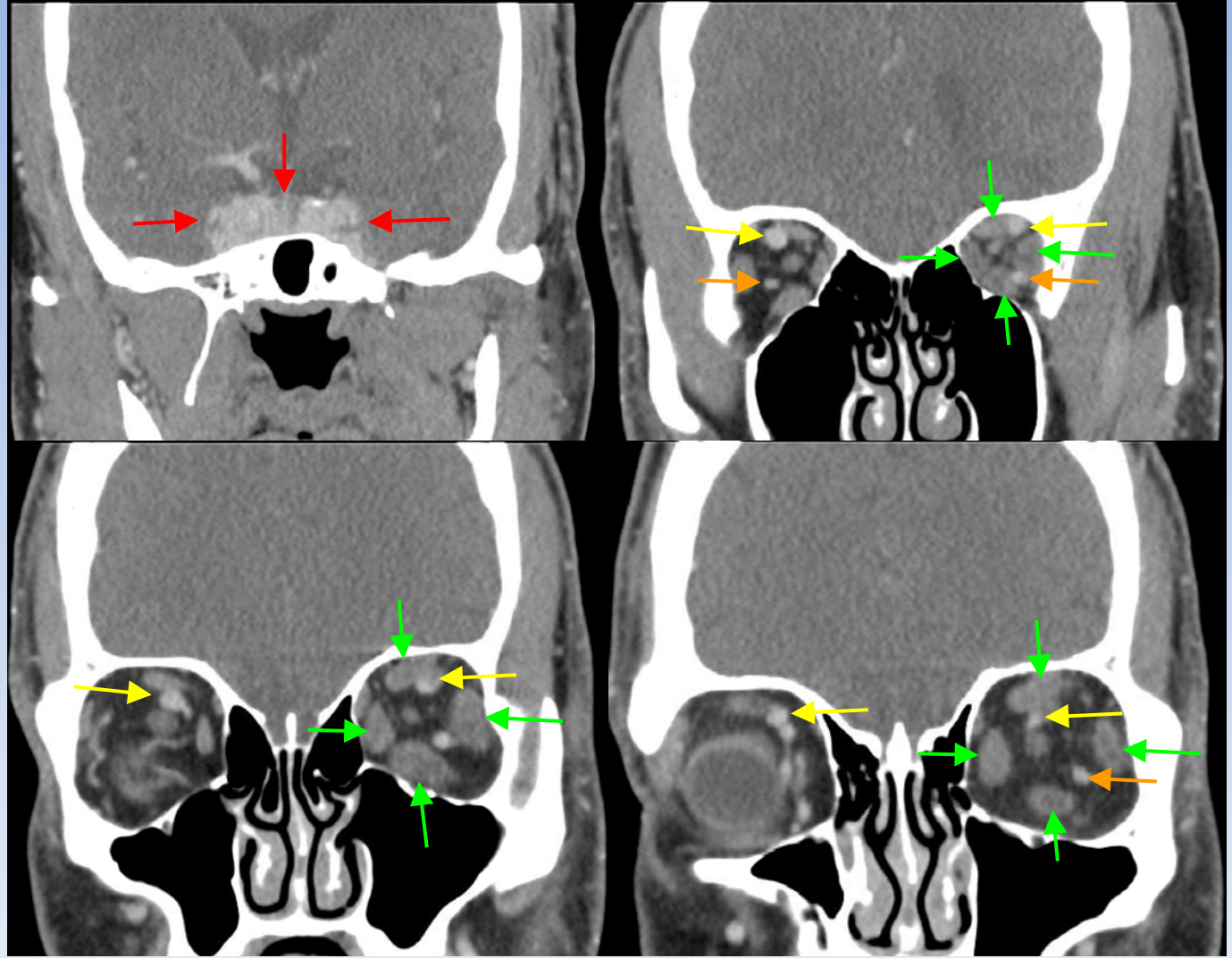


**Figure 7.**

Coronal CT scan of the orbits with contrast shows enlarged cavernous sinuses (red arrows) and superior ophthalmic veins (yellow arrows) and inferior ophthalmic veins (orange arrows)



There are enlarged extraocular muscles on the left side (green arrows)

**Figure 8.**

Sagittal CT scan of the orbits with contrast

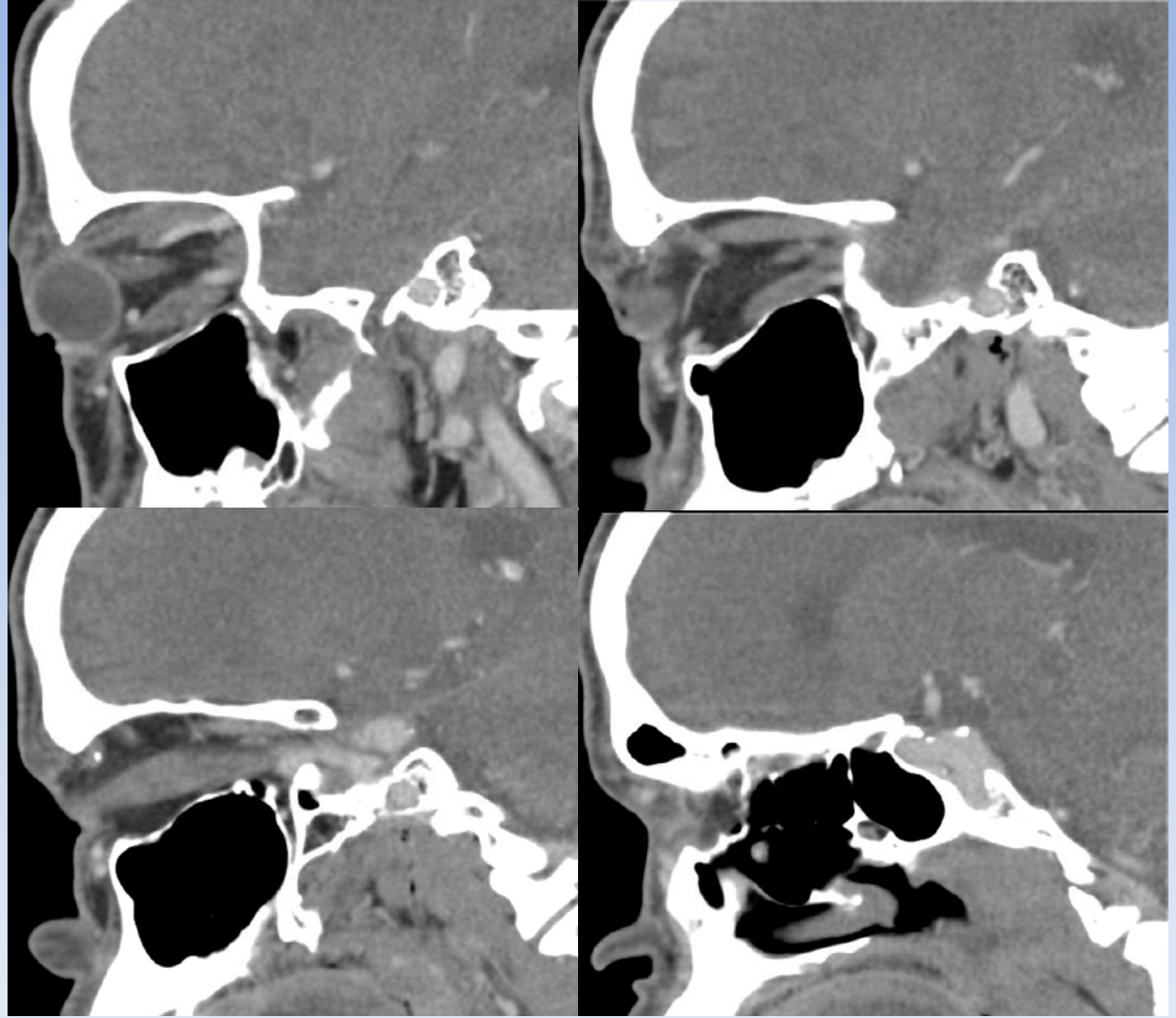
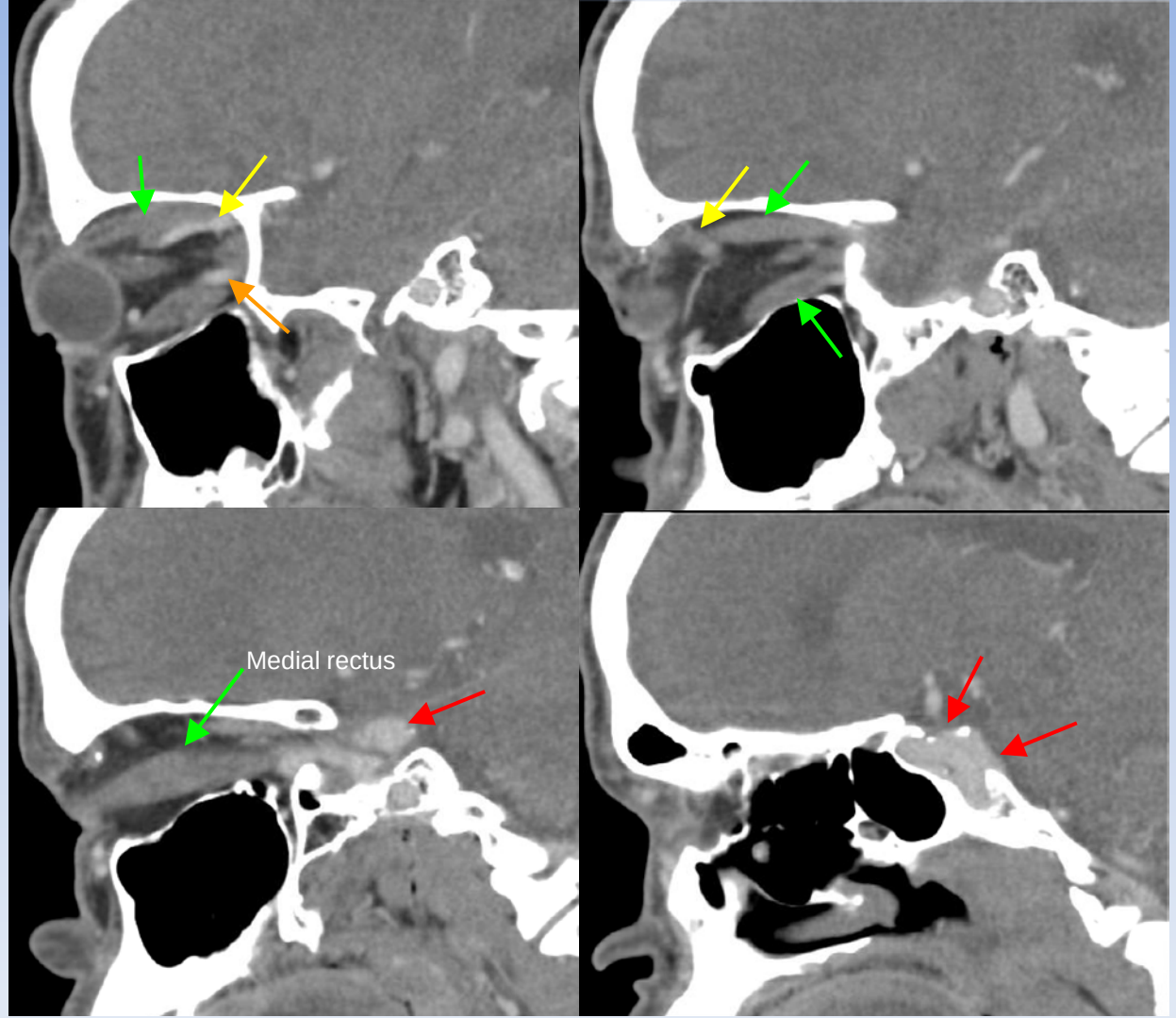


**Figure 8.**

Sagittal CT scan of the orbits with contrast shows enlarged cavernous sinuses (red arrows) and superior ophthalmic veins (yellow arrows) and inferior ophthalmic veins (orange arrows)




There are enlarged extraocular muscles on the left side (green arrows)

**Figure 9.**

Catheter angiogram shows evidence of Borden type II direct left carotid-cavernous sinus arteriovenous fistula shunting into bilateral cavernous sinuses (red arrows)

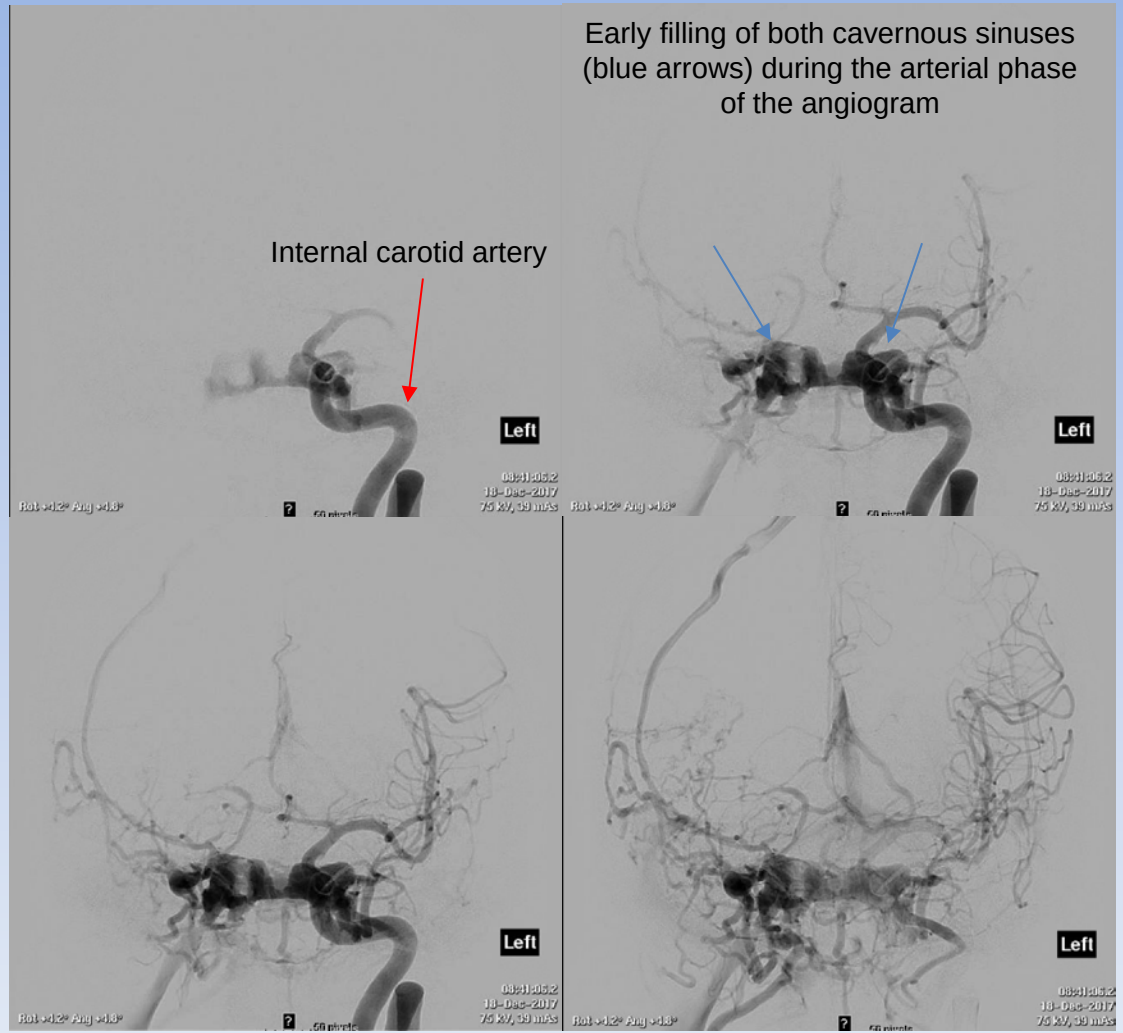


**Figure 10.**

He was treated with transarterial coil embolization

The coil (blue arrow) is being placed into the area of the fistula via the internal carotid artery (red arrows)

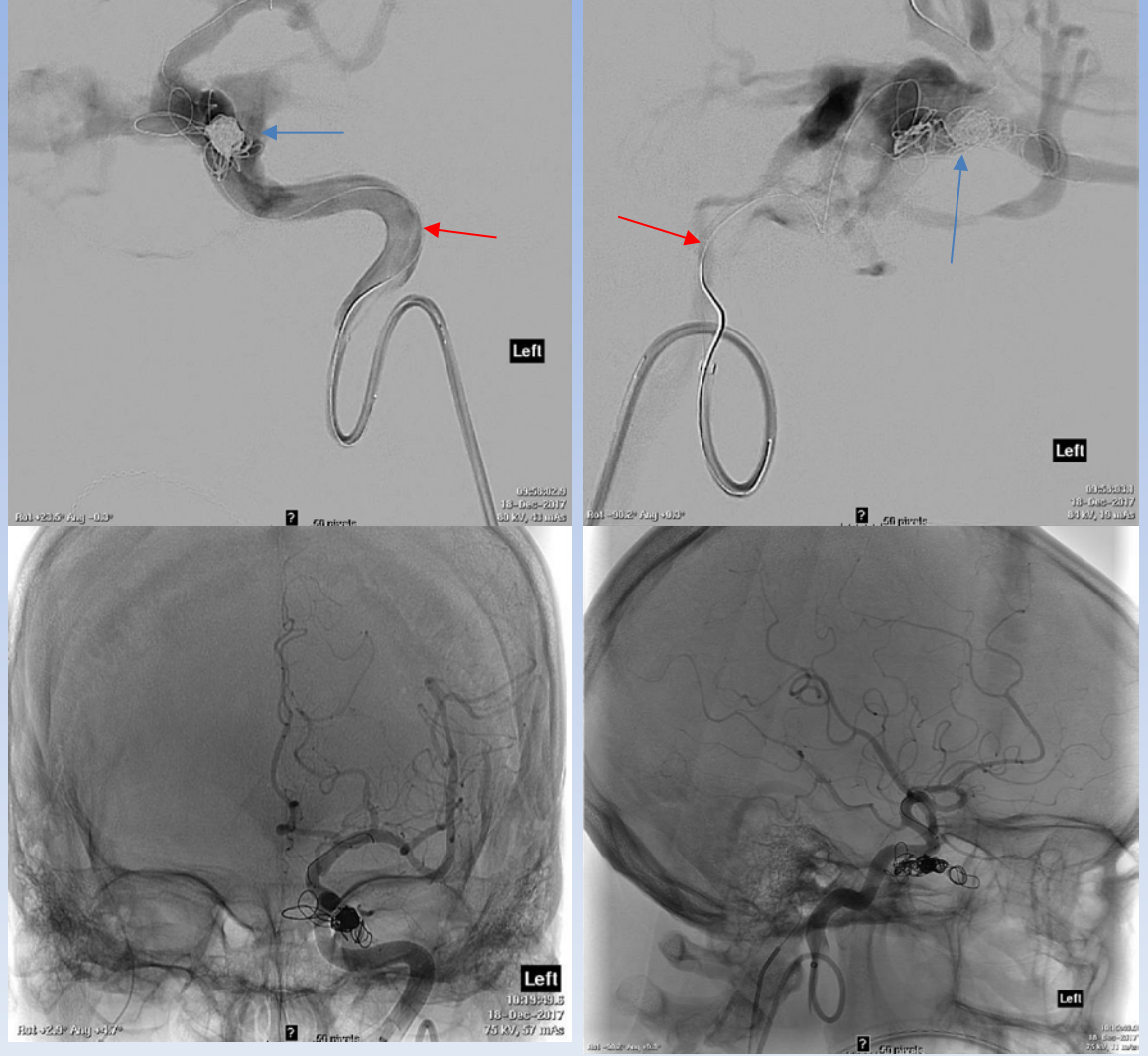


**Figure 11.**

Post-coiling there was complete obliteration of the carotid-cavernous sinus fistula without residual arteriovenous shunting

The internal carotid artery (red) and middle cerebral artery (blue) are indicated by the arrows.

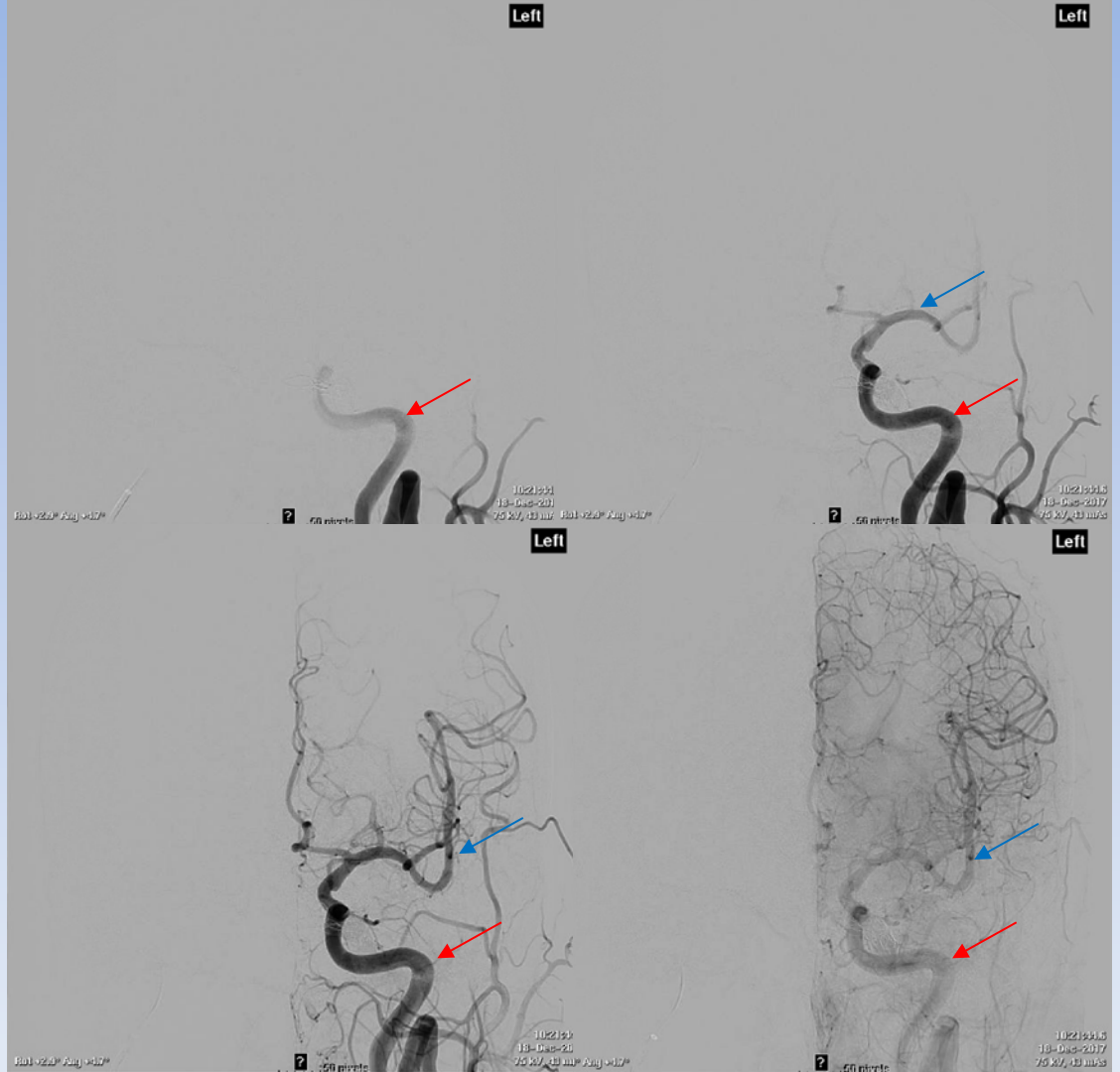
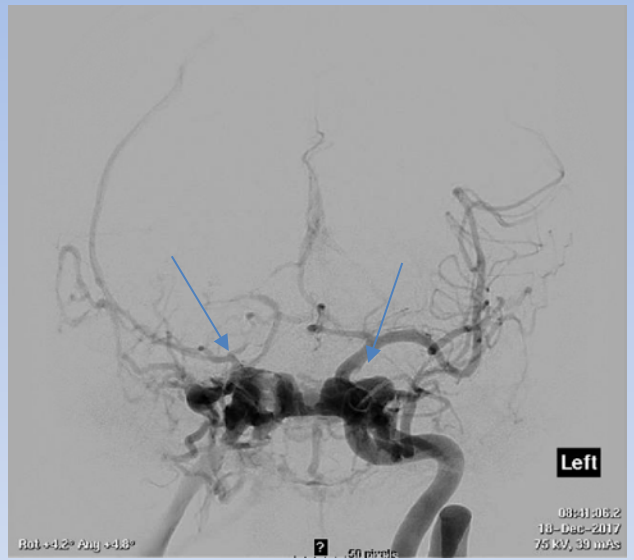


**Figure 12.**

Before




After


Filling of the cavernous sinuses (blue arrows) during the arterial phase was no longer seen in the post-coiling angiogram on the right

**Case summary:**

- Direct carotid-cavernous sinus fistulas from trauma may present with a red eye, proptosis, corkscrew episcleral vessels, and elevated intraocular pressure from raised episcleral venous pressure

- Vision loss from carotid-cavernous fistulas may be due to retinal vein occlusions, retinal artery occlusions, ischemic optic neuropathy, traumatic optic neuropathy or glaucoma

- The mainstay of treatment of carotid-cavernous sinus fistulas is transarterial coil embolization, although sacrifice of the internal carotid artery is sometimes necessary