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Case Report

Definitive management of ruptured cavernous internal carotid artery aneurysm

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Introduction

Ruptured cavernous internal carotid artery (ICA) aneurysm with non-traumatic etiology presenting with epistaxis is rare.[1,2] Multiple treatment modalities such as endovascular balloon/stent-assisted coiling, flow diverter deployment, and parent artery occlusion (PAO) are tried in such cases in the past with variable results. Despite the available management protocols, there is always a debate to choose the best option to reduce the risk of rebleed and cause minimal residual patient disability. We discuss the definitive role of PAO in the management of such difficult aneurysms.

Case report

A 48-year-old female patient presented with a single episode of sudden onset of massive epistaxis (1.5 L of blood) from left nostril. The bleeding stopped spontaneously as abruptly as it started for which she underwent nasal packing and was referred to ENT surgeon of the referral hospital for further management. In our center she was hemodynamically stabilized by administration of IV fluids and two units of packed red blood cells. The patient was on regular medication for allergic rhinitis in the past. There was no history of diabetes, hypertension, local trauma or surgery.

The neurological examination was normal. Nasal endoscopy was essentially normal but a streak of clotted blood was seen from the left sphenoid sinus ostium to the choana. Non-contrast CT scan was suggestive of blood filling the left sphenoid sinus with small collection in the left maxillary sinus and a bony defect of the left superolateral wall of sphenoid sinus. CT angiography demonstrated a focal irregularity at the medial wall of anterior genu of cavernous segment of left ICA (Fig. 1a). MR angiography revealed a small partially thrombosed aneurysm from the cavernous segment of left ICA projecting medially into the sphenoid sinus (Fig. 1b).

Cerebral angiography (digital subtraction angiography) was performed and the size and geometry of the aneurysm was accurately evaluated (Fig. 1c). Left ophthalmic artery was seen arising approximately 4 mm distal to the neck of the aneurysm. A left ICA occlusion test showed adequate

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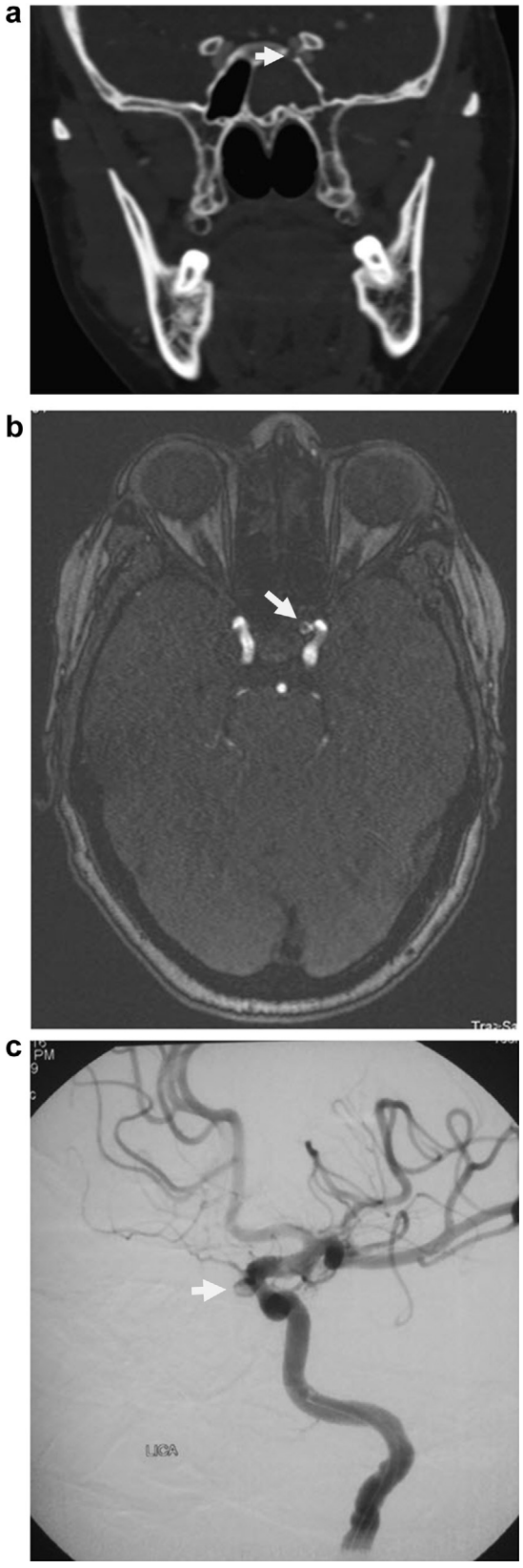

Fig. 1 – (a) CT angiography coronal section bone window shows bony defect in the left superolateral wall of the sphenoid sinus with small nibbing on the medial wall of left cavernous ICA. (b) TOF MR angiography base image showing left cavernous ICA aneurysm projecting into sphenoid sinus. (c) Cerebral angiogram oblique view reveals small aneurysm arising from anterior genu of left cavernous ICA projecting medially.

cross-flow from the right ICA through anterior communicating aneurysm (ACOM) with an arterial delay of <1 s.

A multidisciplinary team including the otolaryngologist, neurologist, neurosurgeon, and interventional neuroradiologist was involved in evaluating the various treatment options. PAO was considered as the definitive treatment option subject to the patient's response to balloon test occlusion (BTO) and the same was communicated to the patient's relatives. In the scenario of failed BTO, the neurosurgical team was requested to be on standby for ECA-MCA bypass prior to PAO. After obtaining informed written consent, patient was subjected to BTO. Under close neurological observation a 4 mm × 20 mm balloon was placed in left cervical ICA at C2–3 level and was inflated for 30 min followed by hypotensive challenge (blood pressure fall of 2/3rd of baseline BP) for 15 min. The patient tolerated BTO well with no neurodefecit. In view of negative BTO, it was decided to proceed for PAO of left ICA. Under general anesthesia 6F guiding catheter (Neuron, Penumbra) was placed in left cervical ICA. Two microcatheters (Echelon 14, Covidien) were navigated into left ICA, one proximal to the neck and the other distal to the neck of aneurysm. First coil was placed distally and left undetached till the end of procedure. Further coiling of the parent artery was performed through the proximal micro catheter using 7 platinum coils (Target 360, Stryker) (Fig. 2a).

Check angiogram revealed complete occlusion of left ICA with non-opacification of the aneurysm. Left common carotid artery run revealed reformation of left ophthalmic artery via left external carotid artery branches. Right ICA angiogram showed good cross flow into left anterior and middle cerebral artery through anterior communicating artery with no significant arterial and venous perfusion delay (Fig. 2b).

Post-procedure, mean arterial pressure of the patient was kept >100 mmHg for 48 h with the help of ionotropic drugs. However, patient still developed mild right upper limb and ipsilateral facial weakness with transcortical motor aphasia on day 1. MRI brain revealed few left side deep and superficial watershed infarcts with corresponding diffusion–perfusion mismatch. Gradually, the patient improved over 1 week with minimal residual neurological deficit. No further episodes of epistaxis occurred. Repeat MRI after 1 week did not show any progression of infarcts. MR perfusion study revealed normal rCBV and rCBF with mild increase in rMTT in left cerebral hemisphere (Fig. 2c). MR angiography revealed exclusion of the left cavernous ICA with adequate flow related enhancement across ACOM into left MCA and ACA. Patient was advised physiotherapy and was discharged on 9th day. Complete recovery of right-sided weakness noted at 1 month.

Discussion

Cavernous ICA aneurysms eroding into sphenoid sinus are relatively rare and always remain a challenge to treat. The nature of such aneurysms is still debatable and various

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