Management of Iatrogenic Internal Carotid Artery Injury During Medial Sphenoid Wing Meningioma Resection: 2-Dimensional Operative Video

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Medial sphenoid wing meningiomas constitute up to 10% of all intracranial meningiomas.¹ These meningiomas have a tendency to engulf the internal carotid artery (ICA), its termination, and the middle cerebral artery. These arteries and the optic apparatus are at a particularly high risk of injury during the microsurgical resection of these tumors. ICA injuries are potentially devastating and challenging to manage. In this technical video, we demonstrate the management of inadvertent ICA terminus injury during the microsurgical resection of the medial sphenoid. Rapid vascular control was obtained with temporary clips on the ICA and anterior cerebral artery (ACA). Tamponade with a felt and primary repair of the arterial tear were attempted without success. We then created a tamponade around the tear with the help of a Hemashield strip (Meadox

Medicals, Oakland, New Jersey), which was secured with a 90-degree-angled clip. Temporary clips were removed, and microsurgical dissection was completed. The Hemashield strip was removed at the end of the procedure. This maneuver resulted in complete hemostasis. Vascular patency was confirmed using Doppler imaging and intraoperative indocyanine green angiography. Postoperatively, the patient had transient right-sided weakness, which resolved 2 d later. The patient was discharged without any neurological deficit.

The patient gave informed consent for surgery and video recording. Institutional review board approval was deemed unnecessary.

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KEY WORDS: Iatrogenic vascular injury, Internal carotid artery, Medial sphenoid wing meningioma

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COMMENT

The authors present a video of intracranial carotid artery injury during medial sphenoid wing meningioma resection. These menin-

giomas tend to involve the intracranial carotid artery and its branches, occasionally causing progressive stenosis and risk of further ischemic or hemorrhagic complications during surgery. The authors demonstrate the immediate actions that should be undertaken during an event like this. Tamponade, proximal and distal control—basic tenets of vascular surgery. Among the techniques available for repair after control, the surgeon can consider direct suture repair (needs adequate vessel wall integrity), partial clipping of the ruptured arterial wall (resulting in residual stenosis of the parent vessel), encircling the artery with a piece of muscle, strip of cotton fibers or Hemashield™ patch graft tourniquet as depicted. Prevention of such complications is paramount in these cases. Medial sphenoid wing or clinoidal meningioma cases that involve the carotid artery and its major efferent branches may benefit from preoperative cerebral angiogram with or without balloon test occlusion. The latter in order to assess the cerebrovascular reserve in case the patient requires prolonged temporary occlusion or carotid sacrifice. In addition, this can also provide information on the need of possible revascularization depending on the aggressiveness of the planned resection.

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