Carotid compression: An anesthesiologist's maneuver to salvage carotid injury during transphenoidal hypophysectomy

Sir,

Transphenoidal surgeries (TSS) are commonly performed by the neurosurgeons for removing pituitary or sellar tumors. Surgical maneuvers inside the sella can cause injury to the carotid artery, results of which can result in catastrophic hemorrhage, false aneurysm or carotid cavernous fistula (CCF).[1] In face of such hemorrhage, packing is virtually the only means of control before further definitive measures like balloon occlusion, endovascular stenting or coiling can be attempted. We encountered such a scenario where an inadvertent injury to the right internal carotid artery (ICA) occurred and the heavy bleeding prevented the identification and packing of the bleeding point. Carotid compression assisted the surgeon to pack the injury site and avert a fatality.

A 50-year-old male patient was undergoing TSS for non-functioning pituitary tumor. While breaking the sellar floor, heavy bleeding started due to carotid injury. Immediate packing was attempted, but the bloody field made visualization of bleeding point difficult. Repeated attempts at packing resulted in failure and bleeding continued. At this stage, we manually compressed the carotid artery on the right side of neck and kept the pressure on for around 1 min. Gradually, the bleeding reduced and the bleeding point became evident. Packing was done with muscle, fat and gel foam to control the hemorrhage and the procedure was abandoned. After stabilization, the patient underwent digital subtraction angiography where the rent in the right ICA causing CCF was demonstrated [Figure 1]. He underwent endovascular stenting the next day [Figure 2] along with anticoagulant drug therapy and was later safely discharged.

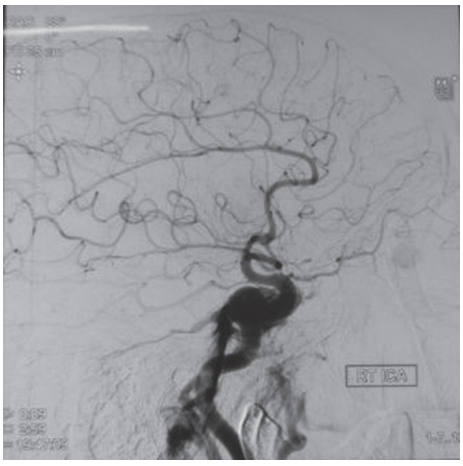

Figure 1: Digital subtraction angiography following injury showing carotid cavernous fistula with venous filling in arterial phase

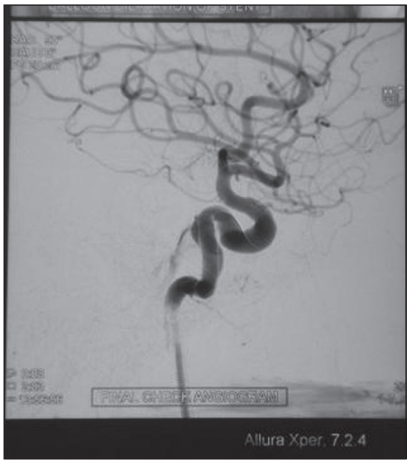

Figure 2: Digital subtraction angiography following stenting showing absence of venous filling

A pre-operative magnetic resonance angiography or an intraoperative Doppler is indispensable to avoid accidental injuries to the ICA during TSS as they indicate the potential vascular anomalies.[2] Hemorrhagic complications are also anticipated in patients with previous surgery, radiation therapy, bromocriptine therapy, tumor adhesion, invasive adenomas and sphenoidal sinus abnormalities.[1] A strict midline and vertical approach under televised fluoroscopy[3] and a careful dissection of the sphenoidal floor (when sellar floor erosion exists by tumor invasion or anatomical variations)[2] are essential surgical considerations in these cases. In spite of the precautions, injury to the ICA can occur rarely where immediate packing and tamponade insertion becomes imperative. If the carotid compression is effective then the bleeding reduces immediately. In our case, temporary manual carotid compression provided the benefits of reduced bleeding and also allowed the surgeon a clearer field to visualize the source for effective packing. Packing in a pool of blood without visualization of the rent has the hazard of the blood dissecting into the intracranial space, widening the rent of the cavernous carotid or damage deeper structures like hypothalamus. Brief occlusion of common carotid artery provokes a reduction in perfusion pressure in the ipsilateral circle of Willis wherein the magnitude of perfusion pressure drop is dictated by the adequacy of collateral circulation. Although the concerns regarding its adverse effects like reduced cerebral perfusion, atheromatous diseases and unruptured aneurysm existed and heterogeneity of the anatomy of circle of Willis is high[4] nevertheless, this exercise helped us to bail out of an exigent situation. Thus carotid compression for brief period can be a useful non-invasive maneuver in such situations which confers the advantages of buying time, reduced blood loss and improved view of the surgical field outweighing its drawbacks.

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