Surgical Neurology International

OPEN ACCESS

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Letter to the Editor

Successful excision of a pontomesencephalic cavernoma through anterior subtemporal route without mapping: Anatomical landmarks as a road map

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Received: 21 August 13 Accepted: 19 September 13 Published: 29 January 14

This article may be cited as:
Salunke P, Sahoo S, Futane S. Successful excision of a pontomesencephalic cavernoma through anterior subtemporal route without mapping: Anatomical landmarks as a road map. Surg Neurol Int 2014;5:15.
Available FREE in open access from: http://www.surgicalneurologyint.com/text.asp?2014/5/1/15/126044

Sir,

Brain stem cavernomas account for 9-35% of the total intracerebral cavernomatous malformations.[2] However, pediatric brain stem cavernomas are uncommon. Pediatric pontomesenchephalic cavernoma are rare and pose a unique surgical challenge.[3] Total excision without damaging the nuclei or long tracts bears a good outcome.[1-3] We describe a large pontomesencephalic cavernoma in a pediatric patient resected successfully through anterior subtemporal transtentorial approach without navigation or mapping.

A 14-year-old male, presented with bilateral ptosis and right hemiparesis. Magnetic resonance imaging (MRI) showed heteregenous nonenhancing lesion with bleed occupying almost the entire left half of the pontomesencephalic area, extending from the upper midbrain to the mid pontine region in the vertical plane [Figure 1a-d]. MR angiogram showed no feeding vessels, suggesting a cavernoma. He was operated due to progressive worsening. The lesion was approached through anterior sub-temporal route. Tent was incised posterior to the trochlear nerve opening the ambient cistern. Posterior cerebral artery (P2-3 segment) and medial posterior choridal artery (MPChA) was seen traversering horizontally. The third nerve could be seen anteriorly with the pyramidal crus seen as a bulge just lateral to it. The brain stem substance was entered through a vertical incision above and below the MPChA, posterior to the bulge, where a yellowish discolored area was noted [Figure 2a]. The blood clot and contents of cavernoma were excised completely by gently stroking the wall of cavernoma with a small sponge [Figure 2b]. The ventral and dorsal limits were reached by sequential turning of table and microscope [Figure 2c]. The histopathology confirmed cavernoma. The ptosis and hemiparesis improved significantly except for minimal hand weakness, over 2 months. MRI, 2 months later, showed no residual lesion [Figure 1e and f].

Brainstem cavernomas are uncommon in pediatric population. These differ from their adult counterpart by the large size and greater chance of rebleed.[1] Surgical extirpation of these lesions, bear a good outcome. Furthermore, pontomesencephalic large cavernoma is rare. Abla *et al.* in their large series on childhood brainstem cavernoma found only 3 such cases out of 40.[1] Steno *et al.* described two pontomesencepahlic childhood similar cases, though smaller, approached through subtemporal route.[3] Because of the proximity to nuclei and long tracts, their excision poses a unique surgical challenge.

Total removal of the tumor without damaging the nuclei and long tract fibers have better prognosis. Common surgical approaches for brain stem cavernomas are lateral supracerebellar infratentorial, retrosigmoid, presigmoid,

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	DOI: 10.4103/2152-7806.126044

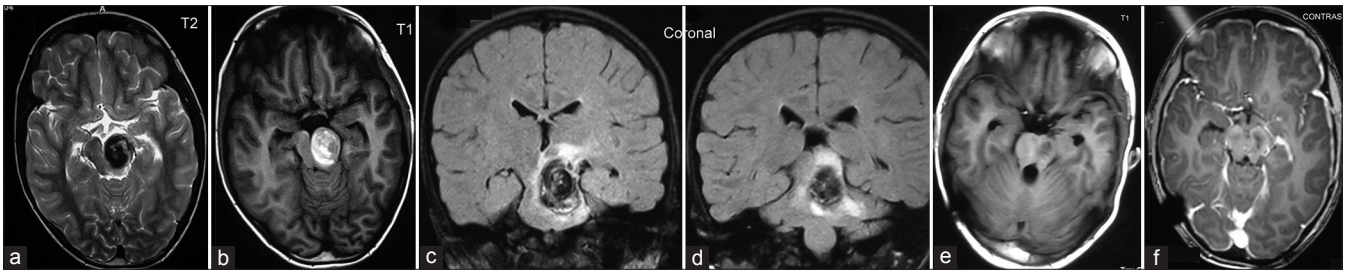

Figure 1: Axial MRI showing lesion heterogeneously hypointense on T2 (a) and hyperintense on T1 (b), occupying almost the entire left half of midbrain, suggestive of bleed. (c and d) show coronal MRI revealing the vertical extent of the vascular lesion (cavernoma) from the upper midbrain to the upper pons. (e and f) CEMRI after 8 weeks of surgery showing complete removal of the lesion

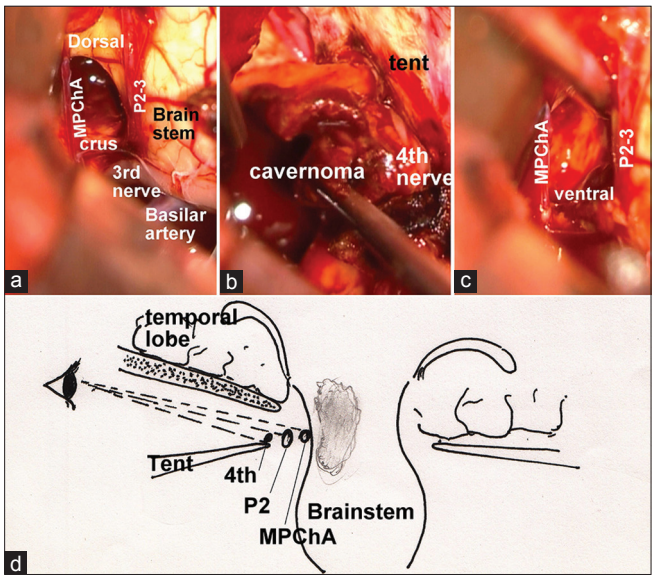

Figure 2: Intraoperative images (a) shows entry into the cavernoma through a vertical incision on either side of MPChA, posterior to the third nerve and bulge of pyramidal tract. Also the dorsal potion of lesion can be seen (b) shows removal of cavernoma (c) shows visualization of ventral portion of lesion by turning the table. (d) Schematic diagram to show the relationship of 4th nerve, P2-3 and MPChA in the same axial plane and the parallax effect in subtemporal approach

subtemporal-occipital, and transpetrosal.[2] Pechstein in 1997 first reported the sub temporal transtentorial approach for brainstem cavernoma.[2] The major advantage of this approach is direct visualization of the lesion area. Surgery at ponto-mesencephalic junction have potential risk of injuring III, IV, V cranial nerve nuclei, their emerging fibers and pyramidal tract. So a safe entry zone is important taking care not to damage any of these vital structures and can be decided by mapping of pyramidal tract fibers. Mapping or navigation was used in all the cases described previously.[1-3] However, when these facilities are not available, as in our case, entry point can be made on the basis of important anatomical landmarks.

The entry is at the site of obvious thinning and yellowish discoloration where the hematoma is likely to surface. The Trochlear nerve, P2-3 and MPChA lie in the same axial plane from lateral to medial respectively. However, in the subtemporal approach, MPChA, which is the closest to the brain stem appears to be caudal as compared with P2-3 and trochlear nerve. Thus MPChA forms the horizontal landmark [Figure 2d]. The vertical incision, parallel to the long tracts, can be given above and below MPChA. After evacuation of hematoma fluid, the solid component can be easily removed by gently stroking the hematoma wall with a small sponge.[4] The cavernoma fragments and feeding vessels cling to the sponge and can be easily dissected out.[4] The ventral and the dorsal portion can be safely reached through this approach by turning the table position. Complete removal of the lesion is essential as any residual lesion will increase the chance of rebleed.

Subtemporal transtentorial approach gives an excellent panoramic view of such large ponto-mesencephalic cavernomas. The understanding of anatomical landmarks in varied planes is essential to prevent injury to vital structures especially in nonavailability of navigation facilities. The MPChA, third nerve and bulge of pyramidal tracts forms a good landmark in such cases.

REFERENCES

1. Abla AA, Lekovic GP, Garrett M, Wilson DA, Nakaji P, Bristol R, *et al.* Cavernous malformations of the brainstem presenting in childhood: Surgical experience in 40 patients. Neurosurgery 2010;67:1589-98.
2. Sabatino G, Rigante L, Marchese E, Albanese A, Esposito G, Capone G, *et al.* Anterior subtemporal approach for posterolateral brainstem cavernomas: Report of ten cases. Acta Neurochir (Wien) 2012;154:2009-16.
3. Steňo J, Bízik I, Steňová J, Timárová G. Subtemporal transtentorial resection of cavernous malformations involving the pyramidal tract in the upper pons and mesencephalon. Acta Neurochir (Wien) 2011;153:1955-62.
4. Yasargil MG, Curcic M, Kis M, Tedy PJ, Valavanis A. Venous, Cavernous and Occult Angiomas. Clinical features and surgical results In: Yasragil MG, editor. AVM of the brain, clinical considerations, general and special operative techniques, surgical results, nonoperated cases, cavernous and venous angiomas, neuroanesthesia. Microneurosurgery, 1st ed., Vol. 3B, New York: Thieme; 1996. p. 429.