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Video Abstract

Unedited microneurosurgery of a cavernous malformation of the pineal region

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Abstract

Background: Cavernous malformations are low-flow vascular malformations comprised of clusters of dilated sinusoidal channels lined with endothelial cells. The tortuous blood vessels also called vascular caverns lack muscular and elastic layers, and are filled by blood at different stages of thrombosis. Hemosiderin and gliosis often surround cavernomas. However, no neural tissue is present inside the lesion. Magnetic resonance images of cavernomas reveal a pathognomonic popcorn appearance produced by multiple small hemorrhages. Developmental venous anomalies are associated in around 30% of the cases. Cavernomas are very prevalent lesions ranging from 0.4 to 0.8% of the population. However, those located in the pineal region are very rare. Herein, we present the microsurgical treatment of a histologically confirmed cavernous malformation of the pineal region.

Case Description: A 33-year-old patient with a pineal region cavernoma and progressive hydrocephalus underwent right supracerebellar infratentorial paramedian approach in a sitting praying position. The surgical planning did not require neuronavigation, but anatomical landmarks for the proper approach. Under high magnification, the pineal region was accessed over the superior cerebellar surface. After a focused lateral opening of the dorsal membrane of the quadrigeminal cistern, small vessels running in the posterior wall of the third ventricle were carefully dissected. A yellowish hemosiderin staining tissue allowed us to recognize the vicinity of the lesion. A small cottonoid delimitated the posterior border of the malformation, nonetheless, the superior limits underwent microdissection to release some cerebrospinal fluid from the third ventricle. A precise marginal dissection with bipolar forceps, microdissectors, and a thumb-regulated suction tube encircled the lesion. Gently traction of the lesion with ring microforceps associated further detachment of the cavernoma with the suction tube. Cotton dissection and water dissection technique were useful as well. A piecemeal resection, which is indicated in lesions with a deep and eloquent location, allowed us a complete removal of the cavernoma. Accurate hemostasis and continuous saline irrigation

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maintained a clean surgical field along the procedure. The gliotic tissue was left behind to prevent damage of the surrounding structures. Under endoscopic vision, remnants in the lower margins of the operative field were carefully evaluated. Finally, the surgical area was flushed with saline irrigation to detect any bleeding, and a small piece of tachosil was placed over the cavity. The postoperative course was uneventful. The hydrocephalus resolved after surgery and it did not require any further procedure.

Conclusion: This unedited video offers all detailed aspects that a neurosurgeon as the senior author Juha Hernesniemi considers essential when performing an efficient and safe surgery for cavernous malformation of the pineal region.

Videolink: http://surgicalneurologyint.com/videogallery/iii-ventricle-cavernoma/

Key Words: Cavernous malformation, pineal region, sitting position, supracerebellar infratentorial approach, unedited microsurgical video