

Posterior Fossa Arteriovenous Malformation

Epidemiology

Posterior fossa arteriovenous malformations (pAVMs) are rare representing 7-15% of all intracranial arteriovenous malformations,

In patients with posterior fossa arteriovenous malformations (AVMs) who present with hemorrhage, feeding artery aneurysms are often the source of bleeding. Posterior fossa AVM hemorrhages are frequently associated with prenidial arterial aneurysms ¹⁾.

Classification

Posterior Fossa Arteriovenous Malformation Classification.

Clinical Features

Unlike their supratentorial counterparts, infratentorial AVM are likely to present with hemorrhage rather than with seizures ^{2) 3) 4) 5)}.

Progressive neurological deficit is the next most common presentation seen in up to 28% of the patients ⁶⁾

Patients with a ruptured pfAVM are often comatose upon admission, requiring emergency live-saving surgical treatment.

Treatment

Posterior Fossa Arteriovenous Malformation Treatment.

Outcome

Presence of feeding artery aneurysm

An associated aneurysm is often the source of bleeding which if dealt with immediately, offers time to plan the most appropriate strategies to eliminate the AVM. Nevertheless, early re-bleeding is frequent, and a cause of concern as it often leads to death.

Despite the gravity of the clinical condition upon admission in ruptured pfAVM, outcome is favorable for those amenable to treatment ⁷⁾.

Gamma knife radiosurgery

The long-term outcomes of Gamma knife radiosurgery (GKS) in patients with posterior fossa arteriovenous malformations (AVMs) were retrospectively analyzed in 82 patients followed up for more than 5 years to evaluate the efficacy and safety. The median AVM volume at GKS was 0.95 cm³. The prescribed dose to the AVM margin was median 18 Gy with 1-18 isocenters. The actual complete AVM obliteration rate was 58.5% at 3 years and 78.0% at 5 years. The significant factors for higher complete obliteration rate were younger patient age and smaller maximum/minimum nidus diameter ratio. Two patients experienced hemorrhage caused by residual AVM rupture at 4 and 49 months. Twenty patients developed peri-nidal edema as an adverse radiation-induced reaction at median 13 months. One patient developed radiation-induced necrosis at 6.8 years. Neurological complication was observed in 12 patients and 6 patients remained with neurological dysfunction permanently. Larger nidus volume and location adjacent to an eloquent area significantly increased the risk of neurological complication. Pittsburgh radiosurgery-based AVM grading scale was significantly correlated with the outcome of neurological symptoms after GKS. GKS achieved acceptable and complete obliteration rate for posterior fossa AVM with relatively low risk of morbidity on neuroimaging and neurological symptoms for the long-term period after treatment. We recommend conformable and selective treatment planning to achieve both obliteration of the AVM nidus and preservation of neurological function ⁸⁾.

Complications

[Posterior Fossa Arteriovenous Malformation Complications.](#)

Case series

Lefevre et al. performed a retrospective analysis of all consecutive cases of PFAVM managed at the Fondation Rothschild Hospital between 1995 and 2018. Clinical, imaging, and treatment data were prospectively gathered; these data were analyzed with respect to long-term outcomes.

Among the 1311 patients with brain AVMs, 114 (8.7%) had a PFAVM, and 88 (77.2%) of these patients had a history of bleeding. Of the 114 PFAVMs, 101 (88.6%) were treated (83 ruptured and 18 unruptured). The mean duration of follow-up was 47.6 months (range 0-240 months). Good neurological outcome at last follow-up was achieved in 79 cases (78.2%). Follow-up angiography showed obliteration of the PFAVM in 68.3% of treated cases. The presence of direct vertebrobasilar perforator feeders was associated with neurological deterioration (OR 5.63, 95% CI 11.15-30.76) and a lower obliteration rate (OR 15.69, 95% CI 2.52-304.03) after endovascular treatment. Other predictors of neurological deterioration and obliteration rate were consistent with the Spetzler-Martin grading system.

Advances in endovascular techniques have enabled higher obliteration rates in the treatment of PFAVMs, but complication rates are still high. Subgroups of patients who might benefit from treatment must be carefully selected and the presence of direct vertebrobasilar perforator feeders must call into question the indication for endovascular treatment ⁹⁾.

Case reports

2017

Khayat et al. describe an unusual case of an arteriovenous malformation (AVM) supplied by the AICA with a “proximal” AA. This unique combination of vascular lesions has been reported in only four cases so far, limiting the available experience that can safely guide the therapeutic intervention.

This study describes a 59-year-old female presented with a subarachnoid hemorrhage, Hunt and Hess grade 4. Angiography demonstrated an AVM fed mainly by the right AICA and draining superficially into the transverse sinus (Spetzler-Martin grade II). In addition, there was a ruptured proximal AICA aneurysm. An endovascular approach was chosen to coil the aneurysm and obliterate the AVM using ONYX in a multi-staged process. The patient recovered well without residual deficit at 6-month follow-up.

To the best of Khayat et al. knowledge, this is the first report describing a proximal AICA aneurysm and AVM treated by endovascular means. The outcome was very good, considering the technically demanding location. All previously reported cases with exactly similar lesions were managed surgically, with inconclusive outcomes. The data presented in this study are meant to help in decision-making process for similar cases till more data are available ¹⁰⁾.

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