Proximal anterior cerebral artery aneurysm

The proximal segment of the anterior cerebral artery (A1) is amongst the most uncommon locations for occurrence of an intracranial aneurysm. These aneurysms may be missed if small or misinterpreted when they are in the vicinity of Internal Carotid Artery (ICA) bifurcation or Anterior Communicating Artery (ACOM) region. The association with congenital vascular anomalies and multiplicity makes them unique.

Outcome

A distinguishing characteristic of A1 segment aneurysms is that they tend to rupture when they are small, which may be related to their distinctive morphology and hemodynamics

Case series

Xu et al. retrospectively enrolled 49 (23 ruptured, 26 unruptured) consecutive patients presenting to the Daping Hospital, with A1 segment aneurysms between January 2010 and March 2020. Independent risk factors associated with the rupture of A1 segment aneurysms were analyzed by multivariate regression analysis in the ruptured group and unruptured group.

Clinical risk factors, including age, sex, hypertension, smoking history, and SAH family history revealed no difference between the ruptured and unruptured groups. The ruptured group presented a significantly larger size (Size, P = 0.007), aspect ratio (AR, P = 0.002), size ratio (SR, P = 0.001), bottleneck index (BN, P = 0.016), dome-to-neck ratio (DN, P = 0.001), and oscillatory shear index (OSI) (P = 0.001) than the unruptured group. The normalized wall shear stress (NWSS) of the ruptured aneurysms was lower than the unruptured group (P = 0.001). In the multivariate regression analysis, only SR (OR = 3.672, P = 0.003) and NWSS (OR = 0.474, P = 0.01) were independent risk factors in the A1 segment aneurysm rupture.

A higher size ratio and lower normalized wall shear stress revealed a close connection with the rupture of A1 segment aneurysms in the study, thus providing a reference for clinical decision-making in treating A1 segment unruptured aneurysms [1)].

Sixteen patients with seventeen A1 aneurysms were diagnosed between January 2000 and October 2014. A retrospective review of the clinical, radiological and management (microsurgical and endovascular) details of these patients was conducted.

The incidence of A1 aneurysm was 1.71% of all patients harboring aneurysms and 1.19% of all aneurysms. Half of these patients presented with subarachnoid hemorrhage. A total of fourteen aneurysms underwent microsurgical or endovascular intervention. All of them recovered well except one patient, who expired in post-operative period [2)].

1)
Xu M, Lv N, Sun K, Hong R, Wang H, Wang X, Xu L, Chen L, Xu M. Morphological and Hemodynamic

Risk Factors for the Rupture of Proximal Anterior Cerebral Artery Aneurysms (A1 Segment). Front Aging Neurosci. 2022 Feb 18;14:835373. doi: 10.3389/fnagi.2022.835373. PMID: 35250548; PMCID: PMC8895198.

2)

Maiti TK, Bir S, Konar S, Bollam P, Cuellar-Saenz HH, Nanda A. Management of Proximal Anterior Cerebral Artery Aneurysms: Anatomical Variations and Technical Nuances. World Neurosurg. 2015 Jul 14. pii: S1878-8750(15)00888-8. doi: 10.1016/j.wneu.2015.07.022. [Epub ahead of print] PubMed PMID: 26187109.