Thromboembolism During Aneurysm Coiling

The most uncontrollable complication during coil embolization of a ruptured intracranial aneurysm is thromboembolism.

Management includes a series of escalating strategies, including medical therapy and intra-arterial thrombolysis.

Additional strategies include mechanical thrombectomy with suction aspiration and stent retrievers.

Intracranial stenting can be used as a last resource, especially in ruptured cases given the need for dual antiplatelet therapy to prevent stent thrombosis.

A 42-yr-old man with a ruptured left internal carotid artery aneurysm with associated intracranial and intraventricular hemorrhage. The patient was initially presented to an outside facility after he was found in bed unable to speak and with right hemiparesis. The patient consented to surgery and underwent external ventricular drain (EVD) placement for the treatment of obstructive hydrocephalus, followed by diagnostic cerebral angiogram and aneurysm coiling. After the deployment of the last coil, control angiogram showed a small filling defect at the interface between the aneurysm neck and the distal vessel. The patient received intravenous heparin for therapeutic ACT and aspirin load. After the progressive enlargement of the thrombus, the patient received intra-arterial glycoprotein (GP) IIB/IIIA inhibitors with a microcatheter positioned proximal to the thrombus. As the thrombus mass continued to enlarge, mechanical thrombectomy with an aspiration catheter was performed twice. Follow-up angiogram 20 min after the second aspiration demonstrated near-complete resolution of the thrombus. The patient recovered from his right hemiparesis, and he was discharged to rehabilitation [1)].

Shimamura et al. analyzed whether thromboembolism could be reduced by using preoperative antiplatelet medications for acute subarachnoid hemorrhage in multicenter fashion.

Thy selected antiplatelet medicines according to an official protocol: a combination of 200 mg aspirin, 150 or 300 mg clopidogrel, and 200 mg cilostazol. Systemic heparinization was done after sheath insertion in all cases. One hundred and ten consecutive, ruptured cerebral saccular aneurysms that underwent coiling were analyzed. Procedure-related thrombus formation on DSA and clinical evidence of ischemia and procedure-related stroke on CT were reviewed.

Eighty cases (73%) were medicated with multiple antiplatelet medications, 22 cases (20%) were treated with a single medication and 8 cases (7%) were treated without antiplatelet medication. Thromboembolic complications were reduced in an inverse relationship with the number of antiplatelet medications. Hemorrhagic complications due to antiplatelet medications did not occur. Post-operative symptomatic vasospasm tended to decrease, and outcome also tended to improve in the multiple medications groups. Reduction of thromboembolic complication significantly improved clinical outcome in logistic regression analysis.

Preoperative multiple antiplatelet medication reduced thromboembolic events in coiling during acute stage SAH and improved clinical outcomes [2)].

1)
Domingo RA, Martinez Santos JL, Ravindran K, Tawk RG; We thank the ENRG Research Group. Management of Thromboembolic Complications During Aneurysm Coiling: 2-Dimensional Operative Video. Oper Neurosurg (Hagerstown). 2021 Feb 11:opaa480. doi: 10.1093/ons/opaa480. Epub ahead of print. PMID: 33571364.
2)
Shimamura N, Naraoka M, Matsuda N, Katayama K, Kakuta K, Katagai T, Fujiwara N, Hasegawa S, Ohkuma H. Use of preprocedural, multiple antiplatelet medications for coil embolization of ruptured cerebral aneurysm in the acute stage improved clinical outcome and reduced thromboembolic complications without hemorrhagic complications. World Neurosurg. 2019 Oct 8. pii: S1878-8750(19)32593-8. doi: 10.1016/j.wneu.2019.09.149. [Epub ahead of print] PubMed PMID: 31604135.