Intraprocedural aneurysm rupture

Intra- or peri-procedural aneurysm rupture is one of the most feared adverse effects associated with embolization.

Delgado Acosta et al. aimed to report the characteristics of patients suffering intra- or peri-procedural ruptures during embolization of cerebral aneurysms.

Between March 1994 and October 2021, 648 consecutive cerebral aneurysms were treated by the endovascular procedure. Medical records were reviewed retrospectively with emphasis on procedure description, potential risk factors, and clinical outcomes related to intra- or peri-procedural rupture.

Of the 648 patients, 17 (2.6%) suffered an intra- or peri-procedural hemorrhagic event. The most common location was the anterior communicating artery. There was no significant difference between previously ruptured and unruptured aneurysms in the incidence of bleeding. In four patients, bleeding was evident within 24 h after the procedure. The clinical evolution at three months was poor and only four patients presented a positive evolution. There were 11 deaths (64.71%). Balloon remodeling was associated with an increased frequency of ruptures, while stenting was a safer treatment.

Aneurysm rupture during endovascular therapy is unpredictable, and its occurrence can be devastating. The incidence is quite low although the outcome is frequently poor. Early detection and proper management, including prompt occlusion of the aneurysm, are important to achieve a positive outcome. Anterior communicating artery aneurysms and those treated with balloon catheters have a higher incidence of rupture. A small number of ruptures of uncertain origin occur that go unnoticed in digital subtraction angiograms [1].

The aim of a study was to identify predisposing factors for IPR, as well as to define patient groups with worse clinical outcome following IPR.

From February 2008 to March 2015, 273 consecutive patients were treated at our institution via endovascular coil embolization. Patient medical records were reviewed with emphasis on procedure description, potential risk factors and clinical outcomes related to IPR. The IPR occurred in 14 (5.13%) cases. Multivariate logistic regression models were used to determine independent predictors of IPR. Clinical outcome was analyzed using the Glasgow Outcome Scale (GOS).

Multivariate analysis showed that aneurysm location at posterior communicating artery is an independent risk factor for IPR ($p = 0.035$; OR 3.5; 95%CI 1.09-11.26). The frequencies of favorable disability (GOS 4-5), severe disability (GOS 2-3), and mortality (GOS 1) between patients with IPR and without IPR were significantly different in the general study population ($p < 0.001$, $p < 0.001$ and $p = 0.023$, respectively) and in patients with previously unruptured aneurysms ($p < 0.001$, $p = 0.006$ and $p = 0.003$, respectively) but not in patients with previously ruptured aneurysms ($p = 0.187$, $p = 0.089$ and $p = 1.0$, respectively).

Posterior communicating artery aneurysm location is an independent predictor for IPR. IPR is associated with a significant clinical deterioration in a subgroup of patients with previously unruptured aneurysms, but not in patients with ruptured aneurysms [2].

A retrospective study in 322 consecutive patients with ruptured cerebral aneurysms who were treated with coil embolization over an 8-year period from January 2005 to December 2012, were classified by morphology according to multilobulation, presence of a daughter sac, and presence of a small basal outpouching (SBO).

The incidence of IPR was 4.8% (16 of 332). In terms of aneurysm configuration, the presence of multilobulation (100.0% [16 of 16] in the IPR group vs 89.2% [282 of 316] in the non-IPR group, p = 0.388) and daughter sac (75.0% [12 of 16] in the IPR group vs 59.2% [187 of 316] in the non-IPR group, p = 0.208) were not significantly associated with IPR. However, SBO, found in 9% (30 of 332) of the study population, was significantly associated with IPR (56.3% [9 of 16] in the IPR group vs 6.7% [21 of 316] in the non-IPR group, OR 18.06, p < 0.0001).

The more general groups of multilobulation and daughter sac were not significantly associated with IPR, although the more specific subgroup with an SBO was. More confirmation studies on these results are required, but they point to the possibility that SBO (with its possible connection to basal rupture) is an important morphological risk factor for IPR during coiling. In addition, future comparison of coiling and clipping treatment for ruptured aneurysms associated with an SBO seems necessary [3].

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