Dual Microcatheter Coil Embolization of Intracranial Aneurysms: Technique, Long Term Follow–up, and Angiographic Outcomes

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Introduction

Wide-necked and large aneurysms have been shown in multiple reports to have significant recanalization rates, even with increased usage of balloon remodeling and stents. The use of two simultaneous microcatheters within the aneurysmal fundus, one for stabilizing the framing coil, and the second for deploying additional "filler" coils, provides a safe and efficacious alternative to stents, balloon remodeling, and microsurgical obliteration. We report the largest experience to date with dual microcatheter coil embolization and present the technique and both early and long term follow–up for ruptured and unruptured cerebral aneurysms.

Methods

We retrospectively reviewed (single institution, 2004-2011) all endovascular embolizations of cerebral aneurysms. 413 cases were identified with 1–3 yr follow-up. Aneurysm dimensions were quantified. We assessed both initial and long-term saccular occlusion rates with the Raymond–Roy classification (RROC) to evaluate angiographic outcomes. Additionally, we analyzed our adverse events and re-treatment rates.

Results

Dual microcatheter technique was used for 113 (27.4%) large (> 10mm) and small (> 4mm) aneurysms with neck widths from 3–12 mm. Our cohort was predominantly female 82/111 (73.9%) and consisted of both ruptured 64/113 (57%) and unruptured 49/113 (43%) cases. Aneurysms occurred in the anterior circulation 80/113 (70.8%) [pcomm (33.8%)] and in the posterior circulation 33/113 (29.2%) [basilar tip (63.6%)]. Dual microcatheter cases demonstrated RROC 1 in 88/113 (77.9%) cases, RROC 2 in 20/113 (17.7%), and RROC 3 in 5/113 (4.4%) cases. Six cases (5%) were identified with intraprocedural complications (rupture or clot formation). No mortalities were encountered. Five cases (4.4%) required re-treatment (4/5 [80%] RROC 2) versus non-dual microcatheter embolization re-treatments 23/300 (7.7%).

Conclusions

Dual microcatheter technique is a viable endovascular treatment with high occlusion rates, low re-treatment rates, and limited adverse events. This paradigm is particularly useful for early treatment of ruptured, wide necked aneurysms when stent use is limited, and obviates temporary flow arrest when using balloon remodeling.

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Learning Objectives

1. Principles of dual microcatheter technique

2. Indications as an alternative treatment modality to ballon remodeling and stents.

3. Dual microcatheter technique is safe and efficacious