Editorial

Balloon remodeling

GIUSEPPE LANZINO, M.D.

Mayo Clinic, Rochester, Minnesota

Since Moret’s original description of the balloon remodeling technique, indications and safety of this adjunct to endovascular coiling have been heavily debated.1,7 The availability of compliant and supercompliant over-the-wire balloons has definitely improved our ability to reach distal locations and increased the safety of balloon-assisted coiling. Some authors have reported higher complications rates with balloon remodeling when compared to simple coil embolization.8 However, in these series, quite often balloon remodeling was used in more challenging cases (large aneurysms with wide necks) so it is not surprising that complications rates were higher. With increasing experience, the potentially higher risk associated with balloon remodeling has been questioned.3,5,6 In a subgroup analysis of the ATENA (Analysis of Treatment by Endovascular Approach of Nonruptured Aneurysms) study, a large multicenter perspective study of untreated aneurysms treated with coil embolization, the use of an intravascular balloon to assist the coiling procedure was not associated with any difference in the incidence of peri-procedural complications. In this issue, Cekirge and coworkers from Ankara, Turkey, retrospectively reviewed a formidable series of 800 patients with anterior circulation aneurysms treated with balloon assistance.2 The majority of the aneurysms (647/800) were ruptured, and over half had a broad neck (defined as a neck diameter ≥ 4 mm). Procedural complications occurred in 3.6% of patients. More specifically, intraprocedural rupture was observed in 1.7% of patients and thromboembolic complications in 1.9%.

As indicated by the authors of this study, there are several advantages to the use of a balloon-assisted technique that are worth stressing. The highly compliant balloon, because of its compliance, “adapts” to the bifurcation and, therefore, it is a great aid in the embolization of middle cerebral artery aneurysms or anterior communicating artery aneurysms with partial involvement of the parent vessel. In some cases, having an intravascular balloon inflated across the aneurysm neck during coiling can also indirectly clarify complex bifurcation geometry. Moreover, especially in small or difficult-to-catheterize aneurysms, the balloon can “stabilize the microcatheter” so that the microcatheter can be placed at the entrance of the aneurysm without the need for placement well within the aneurysm. This prevents dislodgement of the microcatheter, obviating the need for microcatheter repositioning in this challenging situation. The endovascular balloon placed across the neck of the aneurysm comes in particularly “handy” in case of periprocedural rupture. If the aneurysm ruptures, the balloon can be left inflated across the neck while the aneurysm is rapidly obliterated with additional coils. Increased operator familiarity with the remodeling technique has undoubtedly widened the indications for endovascular coiling. As eloquently illustrated in this manuscript, aneurysms that previously were considered not amenable to endovascular treatment can now be effectively embolized.

Despite the favorable experiences of these authors and others, there are shortcomings to this technique. These are related to the need for multiple balloon inflations with resultant transient flow arrest during coiling of the aneurysm. Notwithstanding the navigability and compliance of these balloons, one wonders about the safety of this approach in elderly patients who often have atherosclerotic plaques in the proximity of the aneurysm. In theory, balloon remodeling allows for tighter coil packing, but there is not good evidence that the incidence of recurrences is reduced with balloon-assisted coiling. Despite the incredible balloon-remodeling experience of Cekirge et al.,2 a significant proportion of aneurysms (9%), required retreatment at follow-up because of a clinically important recurrence.

With improved experience and better devices, the balloon remodeling technique is now an accepted and widely utilized adjunct to endovascular treatment. Nevertheless, it is important to realize that the majority of small aneurysms can be safely and effectively coiled without this adjunct. Although “practice makes it perfect” and newer compliant balloons are very safe, I still favor a minimalist approach, trying to keep the endoluminal manipulations to a minimum and use balloon assistance only in selected cases.

References

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Response

H. SARUHAN CEKIRGE, M.D., KIVILCEM YAVUZ, M.D., SERDAR GEYIK, M.D., AND ISIL SAATCI, M.D.

Hacettepe University Hospitals, Ankara, Turkey

In our experience, balloon-assisted coiling is the primary method of choice in the treatment of ruptured aneurysms, and the underlying reasons, including additional safety in the event of a periprocedural rupture, microcatheter stabilization during coil placement, and the ability to better pack the aneurysm neck, have been thoroughly discussed in our paper. Moreover, the balloon remodeling technique has definitely increased the indications for endovascular coil placement as stated by Dr. Lanzino in his commentary. Aneurysms that were considered untreatable by endovascular means can be coiled using balloon assistance. Therefore, it is not fair to compare the results of simple coiling and balloon-assisted coiling. Despite the increased percentage of broad-necked aneurysms in our group (61%), the recanalization rate of 12% and the final (at follow-up from 6 months to 5 years) incomplete occlusion rate of 14% in our group are favorable. In addition, the safety of the balloon remodeling technique has been demonstrated not only in our series but also in other series as well.1,2

In conclusion, we strongly believe that balloon remodeling not only extends the indications for endovascular treatment but also increases the safety and the ease of the procedure against all myths, especially in ruptured aneurysm.

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