Editorial

Stent-assisted coil embolization

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Stent-assisted coil embolization (SAC) is a widely accepted endovascular method for treating wide-necked cerebral aneurysms. This can be a very effective treatment for some patients, but does have drawbacks. The placement of a stent necessitates the use of long-term acetylsalicylic acid (ASA) therapy and an antiplatelet agent to lessen the incidence of thromboembolic complications. The drug regimen varies among surgeons and institutions, but often comprises ASA daily for life and clopidogrel for 3–6 months. As SAC has increased in popularity as a treatment method, especially with improvement in stent designs for the cerebral vasculature, some surgeons have treated patients with acutely ruptured aneurysms by using this method. This presents a challenge, albeit self-inflicted, because of the increased risk of hemorrhage created by using ASA and antiplatelet drugs in patients with acutely ruptured aneurysms. The bleeding risk is compounded when CSF diversion is required for acute hydrocephalus, which occurs in approximately 20% of patients with subarachnoid hemorrhage (SAH). It has been shown that hemorrhage can occur after external ventricular drain placement in as many as 32% of patients receiving ASA and clopidogrel, and the associated morbidity can be devastating. If the patient requires permanent CSF diversion, this was performed without discontinuing clopidogrel.

The authors report periprocedural complications in nearly 20% of patients. Statistically, the study showed that external ventricular drain placement was the only significant independent risk factor for these complications. Fifty percent of the patients in this study required CSF diversion and approximately 10% needed a permanent shunt. Five patients experienced hemorrhagic complications: 2 were external ventricular drain–related, 2 were from aneurysm rebleeding, and 1 was a remote “unrelated” intraparenchymal hemorrhage. Two of these patients died. Interestingly, all other complications were attributed to thrombotic or embolic complications. This highlights the importance of monitoring laboratory tests such as an activated clotting time and antiplatelet assays to be sure drug therapy is adequate prior to placing a stent. It is quite possible that the incidence of hemorrhagic complications in this study would have been higher if all patients had been on a therapeutic regimen of heparin, ASA, and an antiplatelet drug.

Multiple studies have previously shown that the treatment of ruptured aneurysms with SAC in patients using ASA and antiplatelet agents significantly increases the risk of hemorrhage and poor outcomes. A strategy aimed at protecting the dome of the aneurysm with coil placement in the acute phase, then bringing the patient back electively for definitive treatment, is a safe and effective option. If SAC must be used to treat a ruptured aneurysm, extreme caution should be applied. A nice discussion of these strategies and others has recently been published in an editorial in this journal. These approaches provide an effective solution that is also safe.

Disclosure

Dr. Hoh received an honorarium from Edge Therapeutics for participating in the steering committee for a clinical trial.
Response

JOONHO CHUNG, M.D., PH.D.1 AND YONG SAM SHIN, M.D., PH.D.2

We appreciate the thoughtful commentary on our findings regarding SAC in patients with ruptured wide-necked aneurysms. For those patients, we consider microsurgical clipping as the first treatment option. We have tried to perform SAC in those who are poor candidates for microsurgical clipping—patients with conditions such as old age, medical comorbidities, poor initial clinical grade, poor brain condition, and complex aneurysm characteristics or difficult lesion locations. Our complication rates for SAC (19.4%) in patients with ruptured aneurysms, which include asymptomatic complications, are similar to or a little higher than previously reported rates (14%–21%).1,6 Putting aside asymptomatic complications, we regard 13.8% for the symptomatic complication rate in our study as still high enough to consider other treatment options (balloon-assisted or multiple-microcatheter techniques) in the setting of acutely ruptured wide-necked aneurysms. On the other hand, 70.8% of the patients achieved favorable outcomes (Glasgow Outcome Scale Score 4 or 5) at the time of discharge, which is the best clinical outcome among the previously reported studies.1,2,6

While performing SAC, we had been afraid of peri-procedural hemorrhagic complications rather than thromboembolic complications due to a few terrible experiences, so that we performed external ventricular drainage (EVD) before SAC because antplatelet agents could be safely loaded in our patients after the drain had been inserted. Also, we did not use bolus injection of anticoagulation, and we mixed 4000 U of heparin in 1 L of flushing saline during endovascular treatment. These might have caused a high incidence of thromboembolic complications in our study.

We found that EVD was an independent risk factor for periprocedural complications. As mentioned in the Discussion section of our paper, patients with ruptured aneurysms might demonstrate an increased thromboembolic rate after coil placement,4 and thrombin production was significantly increased in patients undergoing surgical procedures,1 confirming a hypercoagulable postoperative state. Thus, EVD could be related not only to hemorrhagic complications, but also to thromboembolic complications. We suggested that microsurgical clipping might be a more appropriate first-line treatment option in patients requiring EVD. For permanent CSF diversion, such as ventriculoperitoneal shunt placement, we used a new soft ventricular catheter without the stylet, and inserted it through the same tract immediately after removal of a preexisting external ventricular drain.5

We agree with Billingsley and Hoh about a strategy aimed at protecting the dome of the aneurysm with coil embolization in the acute phase, then bringing the patient back electively for definitive treatment.5,7 Even though SAC is a highly risky procedure when performed in patients with ruptured wide-necked aneurysms, this method must be used to treat a ruptured aneurysm in a certain type of patient. Therefore, proper indications for SAC in those patients should be refined by further evaluation.

References


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Response

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References

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