

Video Abstract

Double-clip technique: An effective clipping technique for small and very small aneurysms

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Received: 25 June 18 Accepted: 09 August 18 Published: 11 October 18

Abstract

Background: In this video abstract, we present a double-clip technique for the management of small (≤ 5 mm) and very small (≤ 3 mm) aneurysms with a suitable configuration to apply two clips. This is a parallel duplication clipping technique of booster clipping which uses mini-clips that have a smaller closing force compared to standard clips. This technique prevents the slippage of the applied clips, was developed along the career of the senior author (Juha Hernesniemi), and has been previously proved to be safe and effective for aneurysm clipping.

Technique: The patient with a familial left small (4×3 mm) unruptured paraclinoid aneurysm is placed in the supine position. A left lateral supraorbital approach is performed. After opening the carotid cistern, the aneurysm is discovered under a careful microsurgical dissection. With an exposed aneurysm, cardiac arrest and hypotension produced by adenosine intravenous administration reduces the intravascular and intra-aneurysmatic pressure, and allow us a proximal control of the aneurysm without the use of the conventional temporary clipping (TC). In this regard, quick adenosine cardiac arrest is performed instead of an anterior clinoidectomy and proximal TC, whether the neck of the small paraclinoid aneurysm remains visible, but the space for placing TC is too reduced that may difficult the definitive clipping. According to our experience, the use of adenosine (0.2–0.4 mg/kg/dose) in multiple doses up to 87 mg/patient/surgery did not have any effect on the patient outcome. However, a very close collaboration between the surgeon and the anesthesiologist is required. After vascular control is ensured, an initial definitive mini-clip is applied, and a small residual neck sufficient for application of the second mini-clip is left. A second mini-clip with similar morphology to the first one is applied on the residual neck parallel and running in the same direction to the initial clip. With this, the slippage of the proximal mini-clip is prevented. Moreover, the synergic force of both clips ensures a proper occlusion of the aneurysm. Postoperative computed tomography angiography demonstrated absence of complications.

Conclusion: The double-clip technique, a variation of booster clipping is an effective procedure to ensure a proper occlusion of small and very small aneurysms.

Videolink: <http://surgicalneurologyint.com/videogallery/double-clipping-technique/>

Key words: Booster clipping, double-clip, small aneurysm, very small aneurysms

Access this article online

Website:www.surgicalneurologyint.com**DOI:**

10.4103/sni.sni_206_18

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How to cite this article: Choque-Velasquez J, Hernesniemi J. Double-clip technique: An effective clipping technique for small and very small aneurysms. Surg Neurol Int 2018;9:207. <http://surgicalneurologyint.com/Double-clip-technique:-An-effective-clipping-technique-for-small-and-very-small-aneurysms/>