Wire closure of intracranial arteriotomy

Technical note

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A technique is described for closure of intracranial arteriotomies in areas of difficult exposure, using wire sutures that can be twisted rather than tied.

Key Words • microvascular surgery • cerebral revascularization • wire suture • arteriotomy

Microvascular techniques now permit intracranial operations for revascularization of the brain. In most cases, the surgical field is flat, corresponds to the plane of focus of the microscope, and lies on the surface of the brain. Microvascular suturing is more difficult when the surgical field is perpendicular to the plane of focus of the microscope, or when the exposed artery is situated in the bottom or along the side of a small hole. This is the situation when one is operating on the proximal portion of the middle cerebral artery.

We have found that tying knots is one of the more difficult aspects of such operations. The ends of the suture and the knot are never in focus at the same time, and the frequent changes in focus and magnification required to tie a knot delay the operation and increase the risk of technical error.

Technique

This problem can be simplified by the use of fine wire on atraumatic needles for suture material. The wire can be twisted rather than tied. After a suture is placed, the ends of the wire are cut to equal lengths of less than 1 cm. Each end of the wire is grasped with a separate instrument and the ends are twisted together tightly enough to approximate the edge of the vessel (Fig. 1). Four to six twists

FIG. 1. Steps in closure of microvascular arteriotomy using wire suture.
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appear sufficient to prevent spontaneous loosening of the wire when arterial pressure is restored. The twisted ends are covered with a pledget of fibrin foam to prevent puncturing adjacent pial vessels. This technique appears preferable to twisting both wires with a single instrument, since with the single instrument the operator has less control and is more likely to tear the wall of the artery.

Winfrew and Foster\(^1\) have demonstrated in laboratory animals that stainless steel wire is an excellent suture material for anastomosis of small arteries. We have used this technique for closure of the middle cerebral artery following embolectomy in two patients, and have demonstrated postoperative patency of the middle cerebral artery by angiography in both.

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Reference


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