

## Wrap-clipping with a Dacron mesh Silastic sheet

### Technical note

KAZUHIKO FUJITSU, M.D., YUUSUKE ISHIWATA, M.D., GAKUJI GONDO, M.D.,  
SATOSHI FUJII, M.D., AND DENG DONG FENG, M.D.

*Department of Neurosurgery, Yokohama City University School of Medicine, Yokohama, Japan*

✓ A technique combining wrapping and clipping using a Silastic sheet coated with Dacron mesh is described for treatment of fusiform or broad-based cerebral aneurysms. This sheet is easily tailored to wrapping the aneurysm base while avoiding involvement of the cranial nerves or branching vessels. The sheet is semi-transparent so that the caliber of the newly constructed parent artery is easily adjusted during wrap-clipping. After the aneurysm and the parent artery have been circumferentially wrapped with the sheet, aneurysm clips are applied on the sheet so that the base of the aneurysm is clipped between the two leaves of the sheet. This wrap-clipping technique avoids the risks involved in extracting the aneurysm from the parent artery. The Dacron mesh coating the outer surface and sufficient clip closing pressure are both helpful in preventing the clip blades from sliding. Similar previously reported techniques are reviewed and discussed in detail.

**KEY WORDS** • wrapping • clipping • silicone sheet • fusiform aneurysm • broad-based aneurysm

**W**E describe a technique that combines wrapping and clipping for fusiform or broad-based aneurysms using a Dacron mesh Silastic sheet. The properties of the sheet and usefulness of the wrap-clipping technique are discussed and clinical applications are presented.

### Operative Technique

The wrapping sheet is composed of a 0.175-mm thick Silastic sheet coated with Dacron mesh.\* The mesh coating the outer surface of the sheet helps to prevent the clip blades from sliding (Fig. 1). The sheet is flexible enough to be inserted between the cranial nerves and the aneurysm. After the aneurysm and the parent artery are circumferentially wrapped, with the Dacron mesh outside, clips with sufficient closing pressure are applied on the sheet so that the base of the aneurysm is clipped between the two leaves of the sheet. The sheet is transparent enough that the outer caliber of the reconstructed parent artery may be observed during wrap-clipping (Fig. 2).

We used this sheet for wrap-clipping of fusiform or

broad-based aneurysms in five cases: two on the vertebral artery, one in the vertebral-posterior inferior cerebellar artery region, one on the internal carotid artery, and one on the middle cerebral artery. A satisfactory result was obtained in each case during a follow-up period of 1 to 3 years. There was no sign of the clips sliding either on follow-up imaging or postoperative clinical examination.

### Discussion

Fusiform or broad-based aneurysms are often difficult to treat by the conventional neck-clipping method. Although several workers have designed various clips for reconstructing the parent artery,<sup>2,4,5</sup> the treatment of choice for most of these aneurysms was either wrapping or proximal clipping until Sugita, *et al.*,<sup>4</sup> reported successful reconstruction of the parent artery using multiple fenestrated clips.

There are, however, some problems in reconstructing the parent artery if circumferential wrapping of the parent artery and the aneurysm base is not utilized. When the aneurysm base is thin-walled, clip application without wrapping may cause the aneurysm to separate from the parent artery. Conversely, if the aneurysm base and the parent artery are circumferentially wrapped, hemostasis and reconstruction of the parent artery can be

\* Dacron mesh Silastic sheet manufactured by Dow Corning, Tokyo, Japan.

## Wrap-clipping of aneurysms with a mesh sheet



FIG. 1. The 0.175-mm thick Silastic sheet coated with Dacron mesh. The sheet is transparent enough that the wrapped forceps can be seen through it.

achieved even when clip application causes a tear in the aneurysm base. We actually had this experience in the wrap-clipping of a broad-based thin-walled aneurysm on the dorsal surface of the internal carotid artery. Another problem is that the toughness of the wall of a fusiform aneurysm often causes the clips to slide. In the wrap-clipping techniques, clips with a closing pressure sufficient to prevent sliding can be applied without fear of tearing the aneurysm from the parent artery. The Dacron mesh on the outer surface of the sheet helps to stabilize the clips.

We formerly used fascia of the temporal muscle for wrap-clipping of these aneurysms. However, atrophy and absorption always caused a problem when a free flap of the muscle fascia was used. Moreover, the caliber of the reconstructed parent artery was difficult to adjust because of the opaqueness of the muscle fascia.

Recently, circumferential wrapping with clip reinforcement was reported by Bederson, *et al.*<sup>1</sup> Their method is quite similar to ours except that they use a cotton sling to squeeze rather than to clip the aneurysm dome. The caliber of the reconstructed artery is more easily regulated with a Dacron mesh Silastic sheet because this sheet is transparent, enabling the surgeon to observe the aneurysm and the parent artery. We have previously reported the use of the Silastic encircling clip,<sup>3</sup> and the safety and durability of perivas-

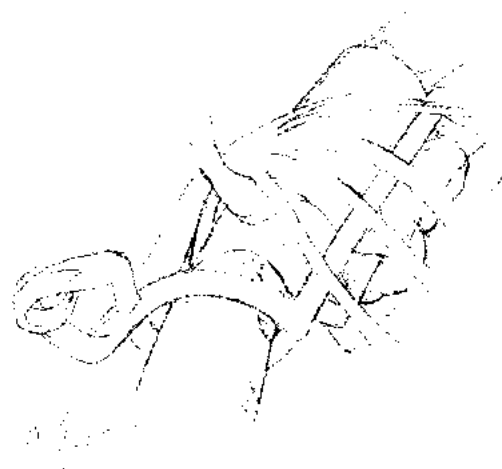


FIG. 2. Drawing of a fusiform aneurysm in the region of the vertebral-posterior inferior cerebellar artery treated with wrap-clipping as described.

placement of Silastic materials were well demonstrated.

### References

1. Bederson JB, Zabramski JM, Spetzler RF: Treatment of fusiform intracranial aneurysms by circumferential wrapping with clip reinforcement. Technical note. *J Neurosurg* **77**:478-480, 1992
2. Heifetz MD: A new intracranial aneurysm clip. *J Neurosurg* **30**:753, 1969
3. Ishiwata Y, Inomori S, Fujitsu K, et al: A new intracranial Silastic encircling clip for hemostasis. Technical note. *J Neurosurg* **73**:638-639, 1990
4. Sugita K, Kobayashi S, Inoue T, et al: New angled fenestrated clips for fusiform vertebral artery aneurysms. *J Neurosurg* **54**:346-350, 1981
5. Sundt TM Jr, Nofzinger JD: Clip-grafts for aneurysm and small vessel surgery. Part 1: Repair of segmental defects with clip-grafts; laboratory studies and clinical correlations. Part 2: Clinical application of clip-grafts to aneurysms; technical considerations. *J Neurosurg* **27**:477-489, 1967

Manuscript received May 5, 1993.

Address reprint requests to: Kazuhiko Fujitsu, M.D., Department of Neurosurgery, National Hospital of Yokohama, 252 Harajuku-cho, Totsuka-ku, Yokohama 245, Japan.