Editorial

Excimer laser–assisted nonocclusive anastomosis

ROBERTO C. HEROS, M.D.

Department of Neurosurgery, University of Miami, Florida

THE authors present us with a comprehensive, clearly written, and beautifully illustrated review of the technique and the experience to date using excimer laser–assisted nonocclusive anastomosis (ELANA). It is of course well known that this technique was developed over many years of arduous laboratory work and clinical experience by Professor Tulleken at the University of Utrecht. It appears that all the authors of this manuscript have learned the technique directly from its inventor.

The article is truly an excellent one and does not require any significant editorializing. I will simply emphasize a few points that the authors have either made directly in the manuscript or have indirectly alluded to.

First and most important, it should be abundantly clear from a careful reading of the description of the technique that this is not “easy” surgery. For example, just one of the steps of the operation, the suturing of the donor conduit with the ring to the recipient vessel, demands a very high level of technical proficiency. Placing 8 microsutures, as the authors recommend, in a deep major arterial branch at the base of the brain is easy to describe but difficult to do. Just consider the difficulty of doing this in the basilar artery as this group has done. It should be clear to the readership that only neurovascular surgeons with considerable experience in performing conventional high-flow bypass grafts should attempt this technique, whenever it becomes more generally available. It is obvious from reading the description of the authors’ experience that on many occasions a conventional anastomosis needs to be performed; for example, when the recipient vessel is < 2.6 mm, the size of the “ring” used for the ELANA. Additionally, the authors emphasize the significant amount of laboratory experience that is necessary before undertaking this type of bypass.

Along the same lines, it should be understood, as I think is clear from a careful reading of this review, that the major advantage of this technique is the avoidance of a significant period of temporary occlusion of the recipient vessel and not necessarily the “ease” of the procedure, which, at least during the early experience, may actually be more technically demanding than the standard form of anastomosis.

Some technical improvements, such as retrieval of the arteriotomy flap, probably need to be resolved before the technique becomes widely applicable. I have no doubt that with increased experience, in the laboratory as well as clinically in selected centers, as is currently planned by the authors, these improvements will take place.

Even a superficial reading of the updated clinical results attained with this technique gives the clear impression that the technical learning curve is rather steep. Of course, as the technique becomes more and more refined through clinical experience in selected centers, much of the learning curve will have been eliminated for those surgeons who will eventually adopt the technique when it becomes more generally available, as I am sure it will.

It is interesting that in the patients who were surgically treated for ischemia, the authors encountered no complications related to hyperperfusion. As they suggest, it is very likely that this is due to the fact that there was no superimposed acute ischemia (as a result of temporary occlusion) in the territory to be revascularized. This may make this technique particularly valuable in the revascularization of ischemic cerebral vascular territories.

In summary, ELANA is a beautiful and creative technical innovation, which, I have no doubt, will eventually be widely adopted by cerebrovascular surgeons. It is becoming obvious that in spite of the terrific advances in endovascular techniques, the need for bypasses in cases of aneurysms that are unsuitable for clip ligation and in which arterial occlusion would not be tolerated will remain into the foreseeable future, and undoubtedly this technique will find a major role in the treatment of these patients. I also have no doubt that ongoing studies will finally show that there is a group of patients who can be selected based on physiological characteristics, and who suffer from ongoing cerebral ischemia and that this technique, once fully refined, would seem to be ideal for these patients.

RESPONSE: We have read the editorial by Dr. Heros and we appreciate his insight and comments. We agree with his conclusions regarding the ELANA technique and believe that he has emphasized a number of essential points related to the technique itself, its acceptance as a useful surgical tool, and its application in neurovascular surgery.

There is no question that ELANA does not make the surgery technically easier. It may, however, make the surgery emotionally easier given the elimination of temporary occlusion; this allows the surgeon to perform the distal microvascular anastomosis without any time pressure. Training is a must and there certainly is a significant learning curve supplemented by laboratory and clinical training. The ELANA technique at this point is only applicable to a subset of all bypasses, namely higher-flow replacement bypasses performed using transplanted conduits to the large proximal vessels of the circle of Willis. It does not supplant the conventional technique and its application requires the user to be familiar and facile with conventional bypasses as well.

The ELANA is simply a new and exciting surgical tool that will become available for experienced neurovascular surgeons for certain high-risk bypass indications. It is not a surgical tool to create new bypass surgeons. We thank Dr. Heros for his review and thoughtful comments and look forward to continuing to report on the progress of the ELANA technique in the future.

DAVID J. LANGER, M.D., NEW YORK, NEW YORK
 PETER VAJKOCZY, M.D., BERLIN, GERMANY
 LEENA KIVIPELTO, M.D., HELSINKI, FINLAND
 ALBERT VAN DER ZWAN, M.D.,
 TRISTAN P. VAN DOORMAAL, M.D.,
 AND CORNELIS A. F. TULLEKEN, M.D.,
 UTRECHT, THE NETHERLANDS