LETTERS TO THE EDITOR

Regarding "Heparin-bonded Dacron or polytetrafluoroethylene for femoro-popliteal bypass grafting: A multicenter trial"

We have read with interest the article by Devine and McCollum (J Vasc Surg 2001;33:533-9) on femoropopliteal arterial reconstructions comparing heparin-bonded Dacron grafts versus non–heparin-treated PTFE control grafts. The title of this important study suggests that the improved outcome demonstrated for the heparin-bonded Dacron grafts is related somehow to the antithrombotic properties of the bonded heparin that is exposed on the inner graft surface to the circulating blood stream. This assumption is well in line with previous work demonstrating improved thrombo-resistance for heparin surface coated devices exposed to the blood stream under various conditions.[1-3]

Unfortunately, clot production has been demonstrated clinically for patients perfused with heparin-coated devices, after infusion of protamine during the perfusion period.[4] It was also demonstrated for the experimental set-up that heparin-coated devices exposed to circulating protamine produced more clots than both uncoated controls perfused sequentially under the same conditions and heparin surface coated devices perfused without systemic heparinization.[5] Hence, it has to be accepted that circulating protamine neutralizes the antithrombotic properties of heparin surface treatments.

Devine and McCollum have not reported the detailed periprocedural anticoagulation regimens used for the study group receiving heparin-bonded grafts and the control patients included in their report (only aspirin 300 mg/d is mentioned). However, if some systemic heparin was given before cross-clamping, and eventually protamine was used at the end of the procedure, it can be expected, based on the experiences mentioned above, that the heparin on the inner graft surface, which was exposed to circulating protamine, was neutralized, and therefore the antithrombotic properties of the inner graft surface were lost. Hence, under such circumstances it seems to be unrealistic to attribute the superior patency rates of the study group to bonded heparin.

On the other hand, if the authors have avoided protamine in the patients of the study group, this should be clearly stated, and a caveat mentioning the downsides of protamine application in the presence of heparin-bonded synthetic grafts seems to be appropriate for the readers of the Journal.

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Reply

Dr Von Segesser and colleagues read more into our title than was intended. This was a clinical trial comparing two types of grafts. Our discussion points out that we have no convincing evidence to attribute the improved results with heparin-bonded Dacron to the heparin bonding. Rather, we suggest that the results with PTFE are poor, particularly with respect to subsequent amputation.

It is normal practice in the UK to give heparin systemically prior to applying cross clamps. However, some surgeons give regional heparin only and heparin saline was infused into the distal tree after making the arteriotomy in 16 of the 209 reconstructions. It is not normal practice in the UK to give protamine and none of our patients received protamine.

We agree that it would be illogical to give protamine to any patient in whom a heparin bonded device was being implanted. We know that protamine reversal of heparin may be disastrous in carotid surgery (Fearn SJ, Parry AD, Picton AJ, Mortimer AJ, McCollum CN. Eur J Vasc Endovasc Surg 1997;13:394-7), but I suspect there is little evidence of an effect on distal arterial reconstruction.

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Regarding "The 50th anniversary of abdominal aortic reconstruction"

Landmark events in medicine are usually grounded in the thought and research of many people. Without taking credit from Dubost, Oudot, and their colleagues for their audacity and ingenuity in performing the first aneurysm repair, one should also give credit to the mentor who likely guided them. Given the state of surgical technology and anesthesia in 1950, it took incredible courage to apply what was only a minimal laboratory experience with aortic homografts to a new clinical application. Was there someone who provided inspiration to perform that surgery?