Regarding “Adjuvant arteriovenous fistula as a means of rescue for infrapopliteal venous bypass with poor runoff”

Laurila et al. have noted the lack of impact of creating an adjuvant distal arteriovenous fistula (dAVF) on patency and limb salvage rates despite improved graft flow. In their study, the graft material was autologous saphenous vein (ASV) and was anastomosed to crural outflow sites in 19 patients (25%) and pedal arteries in 58 (75%). In a prior publication, these authors presented similar conclusions where adjuvant fistulas were constructed with polytetrafluoroethylene (PTFE) bypasses.

The theoretic basis for using distal arteriovenous fistulas as adjuncts to crural reconstruction to maintain graft patency and distal perfusion is based on the need to reduce the vascular overload being presented to the distal circuit and, at the same time, to keep graft flow above the critical thrombotic threshold level. Establishing such a vent results in increased flow in the graft, much of which is directed into the high capacitance venous circulation. The amount of blood that can be accepted by the arterial runoff, albeit limited, will perfuse distally and reverse the ischemic state.

We have been impressed by the minimal increment of blood required to effect this change. Intraoperative flow studies have demonstrated a trebling of graft flow with an adequate dAVF. The predominant flow is through the fistula, but arterial flows of <60 mL/min have been maintained and have resulted in limb salvage.

The differences in outcomes between our cases and those of Laurila et al. are based on a number of parameters, some obvious and others speculative. There is a major difference to be expected in outcomes based on the use of PTFE, ASV, or umbilical vein graft (UV) as the conduit material. We have repetitively emphasized the negative impact of PTFE in that this noncompliant material is generally unable to provide sufficient incremental distal flow, unless hemodynamic revisions are initiated as described by Ascer et al.

Use of ASV, on the other hand, can maintain continuous flow even with a low thrombotic threshold velocity, enabling improved likelihood for patency in adverse circumstances even in the absence of an adjunctive fistula. We have deployed adjunctive fistulas with ASV in 47 cases and concur with the findings of Laurila et al. Nonetheless, we were able in several instances to clearly document the conversion of certain failure to durable patency and success. Perhaps there are other factors at work, and these include the documentation of venous outflow quality, surgical technique for creating the dAVF, and the requirement for at least some arterial runoff. We have previously addressed all these factors.

In our view, an adjunctive fistula does enable improved patency in addition to increased graft flow under conditions where a prosthetic is required that is compliant (UV in our experience), where the outflow tract is strictly at the crural level, and where there is strict adherence to specific surgical technique including four-quadrant interrupted sutures and tourniquet control. We continue to believe that the creation of a dAVF as an adjunct to prosthetic bypass at the crural level has validity and the potential for significantly improving crural limb salvage rates and return to a functional and pain-free existence.

It is unlikely that randomized prospective studies will ever be performed to define the “truth”; we therefore bear the responsibility of defining the parameters in which we perform our operations. Superficial similarities fade under scrutiny that discloses differences in methods and materials. Clearly a UV-peroneal by-pass plus dAVF cannot be equated with an ASV-dorsalis pedis bypass plus dAVF.

I congratulate the authors for their work and inciteful findings and hope that they continue to expand their observations.

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Reply

We thank Dr Dardik for his continued interest in our work and for his letter highlighting the differences in the feasibility of adjuvant arteriovenous fistulas in combination with different types of graft materials. It is true that vein grafts may stay patent despite very low flow, and therefore, indeed, there may also be other factors affecting patency.

We were happy with our results until we compared our results with matched controls. In our previous study of polytetrafluoroethylene (PTFE) bypass, vein cuff, and adjuvant arteriovenous fistula, there was no benefit in patency from the fistula in a prosthetic bypass either. Because our studies focus on bypasses with PTFE and vein grafts, we cannot comment the use of an adjuvant arteriovenous fistula with umbilical vein grafts.

Dr Dardik has large experience with these grafts, and certainly, different graft materials differ in compliance and therefore also in patency. Our results have, however, affected our clinical practice, and currently, an arteriovenous fistula combined with a bypass is used only in exceptional situations.

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REFERENCES

Error in Charing Cross Venous Ulcer Questionnaire (CXVUQ)

We have encountered an unexpected problem with the Charing Cross Venous Ulcer Questionnaire (CXVUQ), an ulcer-specific quality-of-life instrument previously reported in this journal.1 When designing the Honey as Adjuvant Leg ulcer Therapy (HALT) Trial (ISRCTN06161544), the CXVUQ appeared to be a promising tool that would complement the more generic Short Form-36 (SF-36). When we analyzed the data, however, two domains (cosmesis and emotional status) scored considerably higher than the other domains (Table), which seemed incongruent with the scoring of CXVUQ. Low scores on the CXVUQ indicate better quality-of-life outcomes. We therefore investigated the scores of all those participants with healed and unhealed ulcers at end point. The CXVUQ should have discriminated between those that did heal and those that did not, irrespective of treatment. Participants with healed ulcers should have scored lower (ie, better) than those with unhealed ulcers at end point. However, the opposite was true for cosmesis and emotional status.

This problem seems to have been created by an error in the original publication. Questions three and seven were incorrectly scaled and thus the best answers score highest instead of lowest. When we recoded the data so that the best answers gave the lowest scores, the data were more congruent and participants with healed ulcers did indeed score lower than those with unhealed ulcers. Another research group using the CXVUQ has independently arrived at the same solution (Irene Wong and David Thompson, personal communication),2 and we have since been able to confirm the error from a second publication by the instrument’s authors.3 This publication is not listed in Medline or CINAHL, and will only come to user’s attention if they search EMBASE or SCOPUS.

The CXVUQ is a disease-specific instrument that has excellent potential for use in clinical trials. It appears to have discriminant characteristics,4 unlike the Hyland scale.5 However, future users should be aware of the problem we have outlined and its solution.

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Table. Mean domain scores for healed and unhealed cohorts using uncorrected and corrected variables

<table>
<thead>
<tr>
<th>Domain</th>
<th>Uncorrected results*</th>
<th>Corrected results*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Healed</td>
<td>Unhealed</td>
</tr>
<tr>
<td>Social interaction</td>
<td>25.7 ± 11.1</td>
<td>37.6 ± 16.1</td>
</tr>
<tr>
<td>Domestic activities</td>
<td>24.9 ± 11.6</td>
<td>33.9 ± 18.0</td>
</tr>
<tr>
<td>Cosmesis</td>
<td>83.6 ± 11.5</td>
<td>72.7 ± 14.8</td>
</tr>
<tr>
<td>Emotional status</td>
<td>78.2 ± 15.5</td>
<td>65.4 ± 18.7</td>
</tr>
</tbody>
</table>

*Data presented as mean ± standard deviation.