Correspondence

Operations, total hospital stay and costs of critical leg ischemia

Sir—I have read with interest the paper by Eneroth et al., "Operations, total hospital stay and costs in critical limb ischemia", *Acta Orthop Scand* 1996; 67 (5): 459–465.

This paper suffers several shortcomings, primarily due to a separation of the patient material into a "restorative" group, as opposed to to a "reconstructive" group. Such a classification was discussed by an Ad Hoc Committee on Reporting Standards in vascular disease (J Vasc Surg 1986; 4: 80-94) which, however, never intended to pool data from acute operations (thrombo-embolectomies) and elective ones (PTA) as the authors of the present paper have done. A more correct classification would be into "acute" and "elective" procedures, considering less than 14 days' history as an acute case, in accordance with present recommendations.

Secondly, the costs have been calculated on the sole basis of hospital stay, excluding costs for preoperative investigations and implants, but also all outpatient rehabilitation-costs, and even the cost of the amputee's prosthesis training. These facts imply a bias that must be considered.

The authors conclude that patients with critical limb ischemia give rise to a cost, which "by far exceeds the cost of other orthopedic disorders, such as total hip prosthesis", which seems a less relevant comparison and a not unexpected message. It is not new information that vascular disorders involve very high costs, whatever the key symptom—i.e., critical limb ischemia, stroke or coronary disease.

The conclusion that "The total in-hospital cost we described is probably an underestimate of the true costs, especially among those with a reconstructive key procedure, since the mortality in that group is lower than in the two others with a higher risk of further surgical procedures and hospitalizations", is astonishing as the authors claim that they have been able to find a large majority of all inhospital stays during the follow-up period. Most importantly, whatever the message intended, the interpretation can only be that it is cheaper not to reconstruct. This is based on the fact that patients not undergoing a reconstruction, have a higher mortality rate, especially after amputation.

Although costs are of the utmost importance these days, the aim of treating individual patients with critical limb ischemia should be to keep them alive, with two usable legs. Non-beneficial surgery shall be avoided and it must be accepted that reoperations and redo surgery should be kept at a minimum. Sometimes, though rarely, a primary amputation is the best alternative, but most patients should be offered a fair chance to keep the leg.

Finally, the patient material described goes back to 1987, but is now published almost 10 years later. Therefore, the results can be taken only for what they are worth. Today's policy, including thrombolysis in patients with acute ischemia, more directed and less invasive procedures (PTA, etc), but also a high proportion of very distal reconstructions in elective cases have most certainly changed the scene. This must be verified in correctly defined and performed prospective studies.

To conclude, the authors' intention may have been the best, but using an invalid classification of patients, and avoiding the calculation of some costs and presenting 9-year-old data in a field which has progressed and advanced tremendously during the last 10-year period, they do not present a valid but, I would say, a rather dangerous message.

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Sir—Our study is the first to report a long-term analysis of all vascular procedures, as well as all major amputations, total hospital stay and the vast majority of hospital and surgical costs among patients undergoing surgery for critical leg ischemia (CLI) in a defined population. Many previous studies describing outcome after surgical intervention for CLI, focus on some specific surgical procedure in a selected patient group (Taylor et al. 1991, Shah et al. 1992, Pomposelli et al. 1995). Results of treatment analyzed in a population-based material, including all vascular procedures and major amputations, as in our study, better reflect the actual conditions.

Our aim was not to compare amputation and revascularization, and to conclude by recommending amputation, as Lars Norgren seems to believe. On the

contrary, we wanted to show (and we found) that a comparison of outcome or costs between revascularization and major amputation, especially with a short follow-up, are not adequate, as these probably reflect differences in the severity of leg ischemia, patient characteristics, patient selection and treatment strategy, rather than the type of treatment that proved efficacious.

All classifications regarding CLI have shortcomings and there is no optimal classification at present. Since our intention was to report the overall long-term outcome among all patients who have had surgery for CLI rather than to analyze the outcome after specific procedures, we found that, after comparison, the classification we used was more applicable than a classification based on acute and chronic ischemia. However, as we mentioned in the discussion, regardless of classification, when evaluating the results, the heterogeneity of patients and the mixture of acute and chronic CLI and type of interventions within groups must be considered.

Lars Norgren further states that the calculated costs have been based "only" on hospital stay. We have performed the most thorough long-term cost analysis of patients undergoing surgery for CLI, published until this date—including for the first time the costs of all surgical procedures in a defined population, and the costs of all hospital stays, not only in surgical departments but also in all other acute care departments, as well as rehabilitation wards and nursing homes. Although inclusion of the costs of angiography, implants, out-patient care, orthopedic appliances and indirect costs obviously would have been valuable, duration of hospital stay has repeatedly been shown to be the major determinant of hospital as well as overall costs in lower limb ischemia (Mackey et al. 1986, Cheshire et al. 1992, Gibbons et al. 1993, Apelqvist et al. 1994, Solomon et al. 1994, Johnson et al. 1995).

Although the patients were included in 1987, they were followed until 1994.

Today's policy, including improved foot care for diabetics, thrombolysis in patients with acute ischemia, more frequent use of PTAs, a high proportion of distal reconstructions in elective cases and more distal amputation levels, *may* have changed the long-term outcome and resource utilization in patients with CLI. Moreover, changes in demographics may have changed the outcome. We therefore agree with Lars Norgren's opinion that the outcome among patients undergoing surgery for CLI, using today's policy, has to be verified in prospective studies. Hopefully, such future studies, which consider the influence of patient selection, will find an improved long-term outcome among patients with CLI.

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