Correspondence

The bloodless field

To the Editor:

The theory and the practice of a bloodless field and tourniquet ischemia were recently reviewed by Lundborg (1991) in a Guest Editorial. The risks of local and peripheral injuries by pressure and ischemia were nicely covered. However, several clinical specifications are required.

It is possible that a tourniquet should not be used as widely in extremity surgery as is the practice today; instead, its use should be limited to specific indications where the advantages clearly outweigh the potential risks.

Both the advantages of a tourniquet-induced bloodless field, i.e., facilitating the operative procedure and reducing blood loss, are relative. Except for sites distal to the mid(upper)arm and midthigh, a tourniquet cannot be used. Operations that require anatomic precision, including microsurgery, are performed without a tourniquet. Meticulously applied hemostasis during any operation reduces blood loss, and the post-ischemic hyperemia merely postpones the hemostatic problem: viz., increasing edema (Silver et al. 1986).

As Lundborg states, tissues already damaged by injury have notably less tolerance to circulatory arrest. Therefore, a tourniquet should be used very restrictively in trauma surgery. In a randomized study on the use of a tourniquet in plate osteosynthesis of tibial fractures in patients under the age of 50 years, Salam and coworkers (1991) found disturbances in wound healing in the tourniquet group as compared with the group operated on without a bloodless field. Prolonged use of a tourniquet may result in rhabdomyolysis, as was shown by the case (a young adult) of Shenton's et al. (1990), with a total tourniquet time less than 4 hours and with a recirculation interval of 13 minutes. Recently, we experienced an arterial thrombotic complication resulting in an above-the-knee amputation in a 70-year-old patient after osteosynthesis of a tibial condylar fracture. Many patients of this age are operated on for fractures distal to the hip.

The use of a tourniquet may be limited by having it in place uninflated for occasional problems. A tourniquet should not be used routinely, and it should not be used in old age. Further, it should be removed as soon as the most demanding part of the operation is completed, and preferably after 1 rather than after 2 hours.

Critical randomized prospective studies are required to establish the pros and cons of a tourniquet-induced bloodless field. To accept the increased risk, which is certainly greater than that of a regional nerve block, definite benefits must be both anticipated and gained.

References

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Antti Alho, M.D., Ph.D.
Professor of Orthopedics, Department of Orthopedics, Ullevål Hospital,
N-0407 Oslo 4, Norway

To the Editor:

I appreciate Professor Alho's comments regarding the pros and cons of the use of a bloodless field. Certainly, there are situations when a bloodless field should not be used because of the high risks of complications. As Alho points out, there may be an increased risk of thrombosis formation in very old patients. In trauma cases, additional ischemia may transform tissues with decreased viability into necrotic tissues.

As regards the use of a tourniquet to produce a bloodless field, Alho states the following: "A tourniquet should not be used routinely, and it should not be used in old age." I feel that this statement has to be questioned, at least regarding the application of a bloodless field in the upper extremity. It is well known that critical atherosclerosis, as well as postoperative thrombosis formation, is much more common in the lower extremity as compared with the upper extremity. Deep thrombosis formation in the arm is extremely rare. On the other hand, the lower extremity contains large muscle volumes when compared with the arm; negative local metabolic postischemic effects may therefore be more pronounced in the lower extremity. It it conceivable that a bloodless field should be used more restrictively in the lower extremity.

As regards the use of bloodlessness in arm and hand surgery, I would rather state that it should be used routinely unless there are very special reasons for not using it. In our department, this has been the rule for several decades. No thrombosis formation or other recognizable complication has been observed. A bloodless field is essential for saving time and carrying out appropriate dissections.

Even with this experience, subclinical negative effects of a bloodless field also in the upper extremity cannot be excluded. For instance, the weakness in the handgrip frequently following hand surgical procedures perhaps may reflect functional or structural changes in neuromuscular structures associated with ischemia.

I agree with Professor Alho that prospective randomized studies are required to clarify these questions.

Göran Lundborg, M.D., Ph.D.
Professor and Head
Lund University Department of Hand Surgery, Malmö General Hospital, S-214 01 Malmö, Sweden