

Below-knee physiologic cryoanesthesia in the critically ill patient

Mark R. Brinker, M.D., Gregory A. Timberlake, M.D., James M. Goff, B.S.E., Janet C. Rice, Ph.D., and Morris D. Kerstein, M.D.,
New Orleans, La., and San Diego, Calif.

Controversy has surrounded the role of local hypothermia as a preoperative treatment in amputations of the lower extremity. A study was undertaken to determine the effectiveness of amputation under cryoanesthesia in decreasing postoperative morbidity and mortality in below-knee (BK) amputations. Of 154 BK amputations, only 91 with unreconstructable vascular disease, gangrene, or both, were included in this study. Group I consisted of 48 patients (mean age 63.9 years) who had undergone a routine BK amputation; group II consisted of 43 patients (mean age 65.7 years) who were acutely ill and too unstable to undergo a major surgical procedure. Group II patients were treated by amputation while under cryoanesthesia before any definitive operative intervention. The patients in group II were significantly ($p < 0.05$) more ill preoperatively than those in group I. Group II patients had a higher prevalence of previous myocardial infarction, previous stroke, diabetes mellitus, osteomyelitis, and wet gangrene. Seventy percent of the patients in group II had three or more risk factors vs. 46% in group I. Early postoperative mortality rates did not differ significantly between groups (group I, 8%; group II, 9%); the average length of hospital stay for group I patients was 24.2 days compared with 17.7 days in group II. Group II patients sustained slightly more postoperative complications. Amputation under cryoanesthesia appears to be of value in reducing postoperative morbidity and mortality and length of hospital stay in the acutely ill patient with unreconstructable vascular disease, gangrene, or both. (J VASC SURG 1988;7:433-8.)

Controversy has surrounded the role of local hypothermia as a preoperative treatment in amputations of the lower extremity. Although several investigators have shown that cryoamputation with a tourniquet significantly decreases the risk of postoperative morbidity and death in the seriously ill patient,¹⁻⁵ the procedure has not gained widespread popularity. Much of the resistance to the technique stems from improper association of amputation under cryoanesthesia with local cooling as a surgical anesthetic.

This report is an analysis of 91 patients who underwent below-knee (BK) amputation at Charity Hospital of Louisiana at New Orleans (CHNO) between 1980 and 1985. The study was undertaken to

determine the effectiveness of amputation under cryoanesthesia in decreasing postoperative morbidity and death in BK amputations. To our knowledge, a well-controlled study of this type has not been published in the literature.

PATIENTS AND METHODS

A series of 154 BK amputations performed by Tulane University School of Medicine housestaff at CHNO between 1980 and 1985 was reviewed. The data were obtained through a retrospective review of the medical records. To be included in the study, patient charts had to contain indication for surgical amputation, associated risk factors of vascular disease, physical findings (proximal extent of disease, Doppler studies, and x-ray films of the affected limb), surgical procedure performed, and postoperative complications. Unreconstructable vascular disease was defined clinically after review of Doppler studies, angiograms, and the patients' clinical and psychosocial status. A total of 104 patient charts met these strict criteria, of which 13 were eliminated because the primary indication for BK amputation was major trauma. The remaining 91 patients for whom the

From the Department of Surgery, Tulane University School of Medicine (Drs. Brinker and Kerstein and Mr. Goff), and the Department of Biostatistics and Epidemiology, Tulane University School of Public Health and Tropical Medicine, New Orleans (Dr. Rice) and the U.S. Naval Hospital, San Diego (Dr. Timberlake).

Reprint requests: Morris D. Kerstein, M.D., Tulane University School of Medicine, Department of Surgery, 1430 Tulane Ave., New Orleans, LA 70112.