

practices, the distal revascularization-interval ligation (DRIL) procedure has become the preferred method to treat steal syndrome. However, this operation requires a new bypass and results in ligation of the brachial artery distal to the fistula. Although plication of an arteriovenous fistula is a known technique for dealing with steal syndrome, it is rarely reported. In this article, the authors describe their technique, in a small number of patients, for plication of arteriovenous fistulas associated with clinically significant steal. Seven patients were treated with plication. Their symptoms included paresthesia, coolness, and pain in the hand and fingers. No one had ulceration. In six of seven patients, a radial artery pulse returned with compression of the fistula.

Plication was performed using a Satinsky clamp as a guide for the degree of plication, with the vein narrowed by a running horizontal mattress suture of 6-0 polypropylene. The length of vein plicated was approximately 1 cm, and the extent of plication was determined by return of a palpable pulse at the wrist or a change from monophasic to a biphasic distal Doppler signal. If the Doppler signal did not improve, the Satinsky clamp was reapplied and the plication repeated, further narrowing the plicated length of the fistula. The radial pulse returned postoperatively in six of seven patients. Mean follow-up was 9 months. At 13 months, symptoms had recurred in only one patient, the patient in whom the radial pulse did not return.

Comment: Many patients with steal syndrome can be managed by observation. The inflow vessel dilates, and symptoms may resolve within a few days to weeks. A basic principle of surgical therapy is to perform simple procedures that are effective in preference to more complex procedures. DRIL procedures are effective for steal, with an 83% to 100% success rate; however, they are major operations, and the brachial artery is ligated. This study serves as a reminder that simple plication may be an effective treatment for steal syndrome and should be considered as an alternative treatment for steal before performance of a DRIL procedure.

Predictors of Prosthetic Graft Infection after Infrainguinal Bypass

Brothers TE, Robison JG, Elliott BM. *J Am Coll Surg* 2009;208:557-61.

Conclusion: Amputation increases the risk of infrainguinal prosthetic graft infection, especially when amputation is performed in the early postoperative period after infrainguinal prosthetic bypass or after failed revascularization.

Summary: Prosthetic bypass is inferior to autogenous vein for infrainguinal arterial reconstructions. Anecdotally, many surgeons have noticed late development of infection in prosthetic bypasses after ipsilateral above or below knee amputation. The authors hypothesized that major amputation of the lower limb would increase susceptibility of the prosthetic graft to infection in the ipsilateral extremity. They reviewed their patients who had undergone prosthetic infrainguinal bypass grafting during a 12-year period. The data were extracted from a vascular surgical registry and included demographics, operative details, and comorbid conditions. Graft infection was the primary outcome.

There were 141 infrainguinal bypasses using prosthetic material during the 12-year study period, and only a small minority were placed for claudication. Prosthetic graft infection occurred in 25 (18%). Infection occurred most frequently after major amputation (41% vs 6%; odds ratio [OR], 12; 95% confidence interval [CI], 4.1-34). The risk of graft infection was also increased if there was an early reoperation after the initial grafting (70% vs 16%; OR, 11; 95% CI, 1.9-63). The highest risk was associated with amputation ≤ 4 weeks of bypass (70% vs 32%; OR, 5.0; 95% CI, 1.1-23). Also increasing the risk of infection were graft thrombosis (84% vs 39%; OR, 8.3; 95% CI, 2.6-26) and the presence of gangrene (52% vs 23%; OR, 3.6; 95% CI, 1.5-8.7).

Stepwise regression analysis showed the independent predictors for graft infection were amputation ($P < .001$), early reoperation ($P = .002$), and absence of renal failure ($P = .038$). Amputations performed < 6 months after the initial bypass were more likely to be associated with graft infection than those performed > 6 months after the original bypass (52% vs 17%; OR, 5.3; 95% CI, 1.3-22).

Comment: These are startling numbers. An overall incidence of 18% for infection of infrainguinal prosthetic grafts is very high. It implies a high-risk patient population; and indeed, very few of the grafts were placed for claudication alone. It can be concluded the risk of prosthetic graft infection after amputation is sufficiently high that if the graft is occluded at the time of the amputation, serious consideration should be given to concomitant graft removal. The other implication of the data is that if the patient has a significant likelihood of amputation with graft failure, the surgeon should consider other forms of revascularization, despite their difficulty, rather than a prosthetic graft, if possible. The best way to prevent an infrainguinal prosthetic graft infection is to never to have placed an infrainguinal prosthetic graft in the first place.

Rehospitalizations among Patients in the Medicare Fee-for-Service Program

Jencks SF, Williams MV, Coleman EA. *N Engl J Med* 2009;360:1418-28.

Conclusion: Rehospitalization among Medicare beneficiaries occurs frequently.

Summary: Under current law, payment is available from Medicare for most rehospitalizations. An exception is for patients rehospitalized for the same condition ≤ 24 hours after discharge from which they had initially been hospitalized. Policy changes are being considered that would create payment incentives to reduce rates of rehospitalization. Reducing rehospitalization is an important component of President Obama's health care reform proposals (*Washington Post*, Feb 26, 2009).

The Medicare Payment Advisory Commission (MEDPAC) has suggested that hospitals receive from Centers for Medicare and Medicaid Services a confidential report of risk-adjusted rehospitalization rates and that these rates be published after 2 years. It has also been suggested that hospitals with high-risk adjusted rates of rehospitalization should receive lower average per case payments. Although reducing rehospitalizations is clearly a potential means of reducing costs, there is actually little information on the frequency and patterns of rehospitalization. The authors therefore analyzed Medicare claims from 2003 and 2004 in an attempt to describe patterns of rehospitalization and relationships of rehospitalization to demographic characteristics of the patients and the characteristics of the hospitals.

During the period analyzed, 1,855,702 Medicare beneficiaries were hospitalized, of which 19.6% were rehospitalized ≤ 30 days; at 90 days, 34% had been rehospitalized. Within the first year after discharge, 68.9% of patients who had been discharged with a medical condition and 53% who had been discharged after surgical procedures were rehospitalized or had died. Of patients discharged with a medical condition and who were rehospitalized ≤ 30 days after discharge, 52.2% had no bill for a visit to a physician's office between the time of discharge and rehospitalization. After surgical discharge, 70.5% of rehospitalizations ≤ 30 days were for a medical condition. The average stay of rehospitalized patients was 0.6 days longer than that of patients in the same diagnostic-related group whose most recent hospitalization had been ≥ 6 months previously. The estimated cost to Medicare of unplanned rehospitalizations in 2004 was \$17.4 billion.

Vascular surgical patients had a 23.9% rate of rehospitalization ≤ 30 days. This comprised 1.4% of all rehospitalizations of Medicare patients. Rehospitalization was for additional vascular surgery in 14.8% and amputation in 5.8%. In comparison, rehospitalizations ≤ 30 days occurred in 13.5% of patients undergoing cardiac stent procedures, 15.6% of patients undergoing major bowel surgery, and 17.9% of those undergoing hip or femur surgeries. Overall rates of rehospitalization were region-dependent. The lowest rates were in the Pacific Northwest and the Intermountain West.

Comment: Rehospitalization is a huge problem. The data indicated that the risk of rehospitalization persists over time. Additional studies will be required to understand the relative contributions of inadequate discharge planning, insufficient outpatient and community care, and progression of illness to rates of rehospitalization. Vascular surgeons should note that among the surgical groups analyzed, vascular surgery had the highest rates of rehospitalization. This has significant implications for the relationship between vascular surgeons and their hospital administrators should there eventually be instituted a financial penalty for rehospitalization of surgical patients.

Treadmill Exercise and Resistance Training in Patients With Peripheral Arterial Disease With and Without Intermittent Claudication: A Randomized Controlled Trial

McDermott MM, Ades P, Guralnik JM, et al. *JAMA* 2009;301:165-74.

Conclusions: Supervised treadmill walking training improves quality of life, brachial artery flow-mediated dilatation, and 6-minute walk performance as well as treadmill walking performance in patients with peripheral arterial disease (PAD) with and without intermittent claudication. Treadmill training did not improve short physical performance battery scores. Lower extremity resistance training improves quality of life, stair climbing ability, and treadmill walking in patients with PAD with and without intermittent claudication.

Summary: Treadmill exercise training under supervised conditions improves walking performance in patients with PAD and intermittent claudication (*JAMA* 1995;274:975-80). The effect of treadmill training on patients with PAD, but who do not have symptoms of claudication, is unknown. Also unknown is whether lower extremity resistance (strength) training in patients with PAD provides additional benefits. Adults with PAD have a smaller calf muscle area and diminished strength of their legs than patients without PAD, and these muscle characteristics are associated with greater functional impairment (*J Am Geriatr Soc* 2008;56:224-30).

This randomized trial was designed to address two questions. The first was to determine whether supervised exercise training on a treadmill improved functional performance in patients with PAD with and without classic symptoms of claudication. The second was to determine whether lower extremity strength training improved functional performance in patients with PAD with and without symptoms of claudication. Each intervention group was compared with a control group. The study was performed at