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Major Lower Extremity Amputation after Multiple Revascularizations: Was It Worth It?

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Lower extremity revascularization is often described as excessively lesion-centric, with insufficient focus on the patient. We investigated patients' perspectives of multiple procedures for limb salvage that culminated in major lower extremity amputation. A prospective vascular surgery database was queried from January 2000 to December 2005 for patients who had undergone below-knee (BKA) or above-knee (AKA) amputation after failed lower extremity revascularization. Patients were surveyed via telephone by a vascular nurse regarding thoughts on undergoing multiple procedures for limb salvage, involvement in decision making, functional status (work, meal preparation, shopping, driving), use of prosthesis, and independence. The Social Security Death Index was utilized to verify patient survival. Amputations for infection were excluded. Seventy-eight patients underwent AKA or BKA after failed revascularization. Forty-six patients (59%) were alive at 5 years. Thirteen patients were lost to follow-up, leaving 33 available for survey. A total of 142 lower extremity revascularizations (median = 4/patient) were performed on these patients including 94 surgical bypasses (median = 3/patient) and 48 percutaneous interventions (median = 1/patient). Eighty-five percent (28 of 33 patients) of amputees surveyed would do everything to save the leg if faced with a similar scenario, regardless of the number of procedures. Fifty-four percent (18/33) of patients actively used a prosthesis, and 91% (30/33) resided at home. In retrospect, patients are willing to undergo multiple revascularizations—percutaneous or open—to attempt limb salvage even if the eventual result is major amputation. Independence and functional status appear to be obtainable in a majority of patients. Patient-oriented outcomes are necessary to guide revascularization, whether it is by a percutaneous or open technique.

INTRODUCTION

Modern-day care of patients with critical limb ischemia (CLI) involves a near universal approach at aggressive limb salvage by the vascular specialist. For better or worse, this strategy is typically lesion-centric, with often insufficient focus on the patient. Patient-oriented outcomes have been somewhat sparse compared to those more limb-oriented. Functional outcome reports do exist in the vascular literature regarding patient satisfaction and whether they would recommend the experience after having undergone infrainguinal revascularization.[1-5] Paradoxically, patients with CLI are the most impaired, yet there is the least amount of data in the literature regarding their quality of life and functional status. With the complexity of this patient population, a reasonable outcome for one patient may be unreasonable to another. The patient's perspective on undergoing amputation after multiple revascularizations versus primary amputation has not been explored.

A relatively small subgroup of patients undergo extensive efforts—percutaneous and open—at limb salvage, who some believe might be best suited with primary amputation. This is primarily due to the perception that while surgical revascularization may prevent limb loss, it does not uniformly result in ambulation or functional independence. The advantage of revascularization over primary amputation in patients with CLI is not clear, which is why

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some have suggested that early amputation, with the remainder of the patient's life focused on home and social activities, may be better spent than weeks of hospitalization to repair failed distal bypass procedures or in the clinic attempting to heal distal wounds.[6]

Questions remain as to whether it is reasonable to strive for the longest patency or limb salvage when this patient population has such an abbreviated survival and significant comorbidity. It is reasonable to assume that, given the option, most patients would choose limb salvage versus primary amputation at initial presentation of limb-threatening ischemia. What remains unclear is whether or not patients would make the same choice regarding limb salvage when, after multiple revascularization attempts—percutaneous or open surgical bypass—a major amputation is necessary. We investigated functional status, independence, and patients' perspective of multiple procedures for limb salvage that culminated in major lower extremity amputation specifically to see if the same decision regarding limb salvage would be made had they known multiple procedures might be necessary.

METHODS

The prospective vascular surgery database at the University of Cincinnati was queried from January 1, 2000, to December 31, 2005, for patients who had undergone below-knee (BKA) or above-knee (AKA) amputation after failed multiple lower extremity revascularizations. Patients undergoing one revascularization resulting in amputation and amputations for infection were excluded. Patients were surveyed over the telephone by a vascular nurse (C. D.) to help avoid potential bias that might be incurred if the patient spoke to the surgeon. In addition to internal review board approval, all available patients gave consent for interview and review of their medical record.

Patients were questioned regarding their participation in decision making, understanding of their disease process and treatment plan, ambulatory status and living arrangement, use of a prosthesis, functional status (work, meal preparation, driving, shopping), and, looking back, if they would undergo such extensive measures at limb salvage again if faced with the same scenario (Fig. 1).

Electronic medical records and outpatient charts were reviewed for demographics, comorbidities, and type and number of procedures. The Social Security Death Index (SSDI) was utilized to verify patient survival.

RESULTS

During the period January 1, 2000, to December 31, 2005, 1,718 revascularizations were performed—1,057 open (61%) and 661 (39%) percutaneous. Seventy-eight patients subsequently underwent AKA (65%, 51 patients) or BKA (35%, 27 patients) after multiple revascularizations for CLI which ultimately failed. Forty-seven (60%) were male aged 23-97 years (mean = 59.6) and 31 (40%) were female aged 32-91 years (mean = 56.5), for a male-to-female ratio of 1.5:1. Typical comorbidities in this patient population included hypertension, coronary artery disease, hypercholesterolemia, and past or current tobacco use. Fifty-one (65%) patients were diabetic. Only seven (9%) patients who underwent amputation after multiple lower extremity revascularizations had end-stage renal disease (ESRD).

Thirty-two (41%) of the 78 patients expired during the study period: 15 females (48%) and 17 males (36%). Thirteen patients were confirmed to be living by SSDI but had moved out of state or were unable to be contacted for follow-up, leaving 33 patients (13 females, 20 males) available for survey. Mean follow-up was 22 months.

Of the 33 patients assessed, 64% (21/33) underwent AKA (nine females, 12 males) and 36% (12/33) BKA (four females, eight males). Two patients were revised from BKA to AKA due to inadequate healing. Four males and two females became bilateral amputees—three AKA and three BKA. Four of the six bilateral amputee patients had diabetes; one had ESRD and one had undergone liver and kidney transplant.

All lower extremity revascularizations in this study group were performed for CLI. A total of 142 lower extremity revascularizations (mean = 4.3/patient) were performed in 33 patients, including 94 open surgical procedures (median = 3/patient) and 48 percutaneous interventions (median = 1/patient). Eighteen patients (54%) underwent a combination of open and percutaneous procedures for limb salvage. Three patients underwent multiple percutaneous procedures with no open revascularization options available. Twelve patients had only open surgical procedures.

Open surgical revascularizations included aortobifemoral, aortofemoral, axillofemoral, axillobifemoral, and infrainguinal reconstructions with prosthetic and autogenous materials, graft revisions, thrombectomy, thromboendarterectomy, and open patch angioplasty. Percutaneous interventions included catheter-directed thrombolysis, percutaneous mechanical thrombectomy, iliac and superficial