A Comparison of Antegrade and Retrograde Mesenteric Bypass

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Mesenteric artery bypass originating from the suprarenal aorta (antegrade bypass) has been the standard orientation of visceral artery bypass grafts. Retrograde bypass, in which the bypass originates from the iliac arteries, has not been as widely accepted. The purpose of our study was to compare the results of these two types of bypass in a similar population. We retrospectively reviewed the records of patients undergoing mesenteric artery bypass at two tertiary care medical centers (UCLA Medical Center, Beth Israel Deaconess Medical Center). Between February 1992 and January 2001, 37 patients underwent 39 mesenteric bypass procedures. The choice of bypass orientation (antegrade versus retrograde) was determined by the individual surgeon. Chart review, duplex ultrasonography, and/or telephone interviews were used to assess symptom-free survival. Actuarial analysis was completed using Kaplan-Meier survival estimates. From this assessment we were able to determine that symptom-free survival of patients undergoing retrograde mesenteric bypass is similar to that seen in antegrade bypass. Primary retrograde bypass is a valid option for patients undergoing mesenteric bypass.

INTRODUCTION

Mesenteric bypass of the visceral vessels in the treatment of mesenteric ischemia is an established and durable procedure. Since Mikkelson1 proposed the first successful treatment for mesenteric ischemia in 1957, the technique of revascularization has been undergoing constant revision. In the intervening time period, various authors have advocated a number of different methods by which to successfully restore splanchnic perfusion.2-11 These methods include transaortic endarterectomy, visceral reimplantation, antegrade bypass from either the suprarenal aorta or, more recently, the thoracic aorta,4 retrograde bypass from either the infrarenal aorta or iliac arteries, or balloon angioplasty and stenting. In addition to the various techniques of bypass, the decision of whether to use autogenous conduit (vein) versus a prosthetic conduit (Dacron or polytetrafluorethene [PTFE]) is still determined by individual surgeon preference.

We combined the experience of two tertiary-referral academic medical centers to determine whether there was a difference in outcome between antegrade and retrograde bypass orientation. Specifically, our objective was to compare antegrade and retrograde mesenteric bypass with regards to symptom-free survival, periprocedural morbidity, and overall mortality.
PATIENTS AND METHODS

A chart review and database query were used to identify patients who had undergone mesenteric artery bypass between February 1992 and June 2001 at Beth Israel Deaconess Medical Center in Boston, MA and UCLA Medical Center in Los Angeles, CA. During that interval, 37 patients were identified as having undergone a total of 39 mesenteric artery bypass procedures. A retrospective chart review was employed to determine the preoperative indication for bypass, patient comorbidities, type of procedure performed (antegrade versus retrograde), and perioperative complications. Assessment of symptom-free survival was determined by review of office charts and, when possible, phone interview. We attempted to provide objective assessment of bypass graft patency using color-flow duplex, however, we were only successful in obtaining this type of follow-up in four patients. Overall patient survival was assessed using the Social Security Death Index (SSDI). Each patient’s Social Security number was used to query the SSDI database via the internet, which lists, by Social Security number, anyone who is deceased. If a patient had died, the date of death was retrieved from the SSDI and was then used to calculate the overall survival time. Symptom-free survival and overall patient survival were calculated using Kaplan-Meier life-table analysis. This analysis was performed using the JMP statistical software package (version 4.0.2) (SAS Institute Inc., Cary, NC).

Both the orientation of the mesenteric bypass that was performed and the type of conduit used were determined by individual surgeon preference. As a general practice, patients with evidence of infrarenal aortic or iliac disease were not considered candidates for retrograde bypass and these patients underwent antegrade bypass. This aside, there were no standardized criteria for selection of bypass direction or conduit type. The indication for mesenteric bypass was chronic ischemia manifest in most cases by weight loss and post-prandial abdominal pain. These elective procedures accounted for 35 (89.7%) of the total number of bypasses. Acute mesenteric ischemia was the indication in 4 (10.3%) patients (Table I).

Patient follow-up was subjective in 35 (89.7%) patients. Objective duplex-based evidence of patency was only possible in 4 (10.3%) patients. The mean follow-up was 25 months, (range 0-95 months).

RESULTS

The mean age of patients was 65.8 years, with 25 females and 12 males (Table II). The most common patient comorbidities or risk factors were hypertension (64.9%), smoking (45.9%), coronary artery disease (35.1%), and a history of prior myocardial infarction (24.3%) (Table II). Diabetes, renal insufficiency (creatinine > 2), congestive heart failure, and dialysis-dependent renal failure were less common (Table II). Patient demographics between the two groups were similar.

As described earlier, selection of graft orientation was determined by surgeon preference, as a result, there were no uniform criteria by which the type of bypass was selected. In our series, the graft orientation was distributed almost evenly, with 21 (53.9%) grafts being placed in the antegrade direction and 18 (46.1%) in a retrograde fashion (Table III). As can be seen in Table III, most of the antegrade bypass grafts originated from the supraceliac aorta, whereas in retrograde bypasses the infrarenal aorta and iliac arteries were used comparably. The