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Clinical Research

Comparison of Bypass with Endoscopically Harvested Internal Saphenous Vein versus Bypass with Surgically Harvested Internal Saphenous Vein for Lower Limb Arterial Disease

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Background: Patients with lower limb arterial disease have a high risk for complications related with surgical wounds. The endoscopic extraction of the great saphenous vein (GSV) is a less invasive alternative to the conventional surgical extraction.

Methods: A clinical and ultrasonographic follow-up was carried out on the lower limb bypass with GSV performed in our institution between years 2007 and 2012. Patients were selected for open or endoscopic harvesting depending on the surgeon assigned (endoscopic or open surgeon). Follow-up was performed at 1, 3, 6, and 12 months after surgery and annually thereafter. All the GSV endoscopic harvestings (GSVEH) were performed by the same surgeon. Data for primary, assisted, and secondary patency and amputation-free survival were analyzed. Anatomopathalogic analysis were performed on pares of samples of the same vein dissected surgically and endoscopically from the same patient.

Results: Sixty bypass surgery has been performed on 60 patients (54 men and 6 women), 30 with GSVEH (50%), and 30 with GSV open harvesting (GSVOH). All patients were intervened for critical limb ischemia (Rutherford cathegory 4, 5, and 6). Significant differences were found between both groups for suture dehiscence (GSVEH 0%, GSVOH 20%, $P = 0.01$) and infection (GSVEH 3%, GSVOH 30% P, 0.006). No significant differences were found between both groups regarding to primary patency, assisted primary patency, or amputation-free survival. An anatomopathologic comparison of segments of veins extracted surgically and endoscopically of the same patients did not show any significant differences.

Conclusions: Although no statistically significant differences were found between GSVOH and GSVEH bypass for lower limb revascularization, there is a trend toward poorer patency rates for the endoscopic technique. GSVEH lowers the risks for infection and dehiscence of surgical wounds.

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INTRODUCTION

The lower limb revascularization using the bypass technique with autologous great saphenous vein (GSV) was originally described by Kunlin in 1948.[1] Since this first experience, the method has shown high patency rates on a long and midterm basis, and it has become the first choice for revascularization in a wide group of patients with lower limb arterial pathology.[2] However, there is a high morbidity rate associated with the long incisions required for the extraction of the GSV. In an attempt to reduce this morbidity, some minimally invasive techniques have been developed. One example is the incorporation of the GSV endoscopic harvesting (GSVEH), initially described for coronary bypass surgery, where it has proved to decrease the rate of surgical wound complications and postoperative pain.[3–5] However, there is a wide discrepancy in the literature regarding the comparability in terms of patency of the coronary bypass performed with endoscopically extracted GSV, against those with the open-harvested GSV (GSVOH).[6,7]

The application of the GSVEH in the lower limb revascularization vascular surgery has also proved to reduce the morbidity related to surgical wounds and to reduce the costs of surgery compared with those of the conventional dissection.[8] However, there is a lack of evidence regarding the results of the endoscopic technique for lower limb revascularization in critical ischemia.

We have performed a nonrandomized prospective study comparing the results of this technique against open GSV harvesting in terms of wound-related complication rates (infection, dehiscence of suture, hemorrhage, hematoma). We have compared too patency rates and amputation-free survival between both techniques, as well as postoperative hospital stay. An anatomopathologic evaluation of the veins harvested either endoscopically and surgically has been performed to detect differences in tissue damage between the GSV harvesting procedures.

PATIENTS AND METHODS

Patients

All patients undergoing surgical lower limb revascularization with contralateral GSV bypass for critical lower limb ischemia (Rutherford stages 4, 5, and 6), intervened in our center between July 2007 and January 2011 where included for the analysis. Given that in case of available ipsilateral GSV the elective technique in our institution is the in situ configuration, only contralateral GSV grafts were considered for enrollment. The indication for lower limb revascularization surgery with contralateral GSV graft bypass was established in all patients based on the current clinical guidelines (Trans-AtlanticInter-Society Consensus II).[2] The adequacy of the contralateral GSV to be used as a graft was established by preoperative ultrasonographic study. The ultrasound criteria for the exclusion of GSV were: diameter less than 3 mm in standing position, venous incompetence and/or signs of thrombophlebitis. All the GSVEH bypass were performed by the same senior surgeon, who was the only operator during endoscopic vein harvesting and who performed exclusively GSVEH during the study period. The patients who underwent GSVOH bypass were intervened by the remaining 3 senior surgeons from our service. All the open harvesting of GSV was performed by senior surgeons. Of 87 patients undergoing bypass revascularization with contralateral GSV in our center during the recruitment period, 60 were included for analysis. The remaining patients were excluded because of their negative to participate in the study. After signing an informed consent, a sequential sampling was conducted, assigning the first 30 patients to endoscopic technique, and the subsequent 30 patients to GSVOH.

The study protocol was reviewed and approved by the investigation and ethical committee from the institution.

Operative Method

Open extraction of the GSV. After ultrasonographic location of the GSV and its branches, surgical dissection of the GSV was performed at the groin to control the saphenofemoral junction. Skip—skin incisions were performed, when needed, to ligate the collateral branches. Long skin incisions were avoided when possible, trying not to make long-continuous incisions. All the veins harvested with open technique were inserted as a bypass graft in an inverted disposition. Tunneling was performed anatomically and using a tunneler in all cases.

Endoscopic extraction of GSV. The Maquet Vasoview Hemopro endoscopic Vessel Harvesting System (Maquet Cardiovascular, LLC, Wayne, NJ) was used for endoscopic harvesting of the GSV in all cases. After ultrasonographic identification of the GSV in its immediately suprapopliteal portion, dissection proceeded through a 2-cm long skin incision. Through this incision a blunt dissection endoscopic device was introduced in a cephalad direction, followed by the inflation of the sealing balloon and the low pressure injection of CO_2 in the tissue surrounding