Endoscopic versus open saphenous vein harvest for femoral to below the knee arterial bypass using saphenous vein graft

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Background: **Although the use of endoscopic vein harvest (EVH) in coronary artery bypass grafting is accepted, few studies have documented the implementation of EVH in peripheral vascular disease surgery. We hypothesized that EVH improves outcomes compared with open vein harvest (OVH) in patients undergoing femoral to below the knee arterial bypass surgery.**
Methods: **The charts of 144 consecutive patients undergoing infrainguinal bypass surgery over the course of 27 months were reviewed. A femoral to below the knee arterial bypass with saphenous vein was done in 88 patients (29 had EVH, 59 had OVH). The preoperative characteristics evaluated were age, gender, renal function, history of diabetes, hypertension, tobacco use, and previous infrainguinal bypass surgery on the affected side. End points included wound complications, length of hospital stay, operative time, angiographic and operative interventions for graft occlusion, patency rates, limb salvage, acute renal failure, myocardial infarction, and death.**
Results: **Patient characteristics and demographics were similar in the EVH and OVH groups. No operative intervention for occlusion was required in the EVH group (0/29) compared with 13.4% in the OVH group (8/59) ($P = .03$). At the mean follow-up time of 21 months, primary patency rate was 92.8% in the EVH group and 80.6% in the OVH group ($P = .12$). No significant differences were found between the EVH and OVH groups in postoperative complications, length of hospital stay, operative time, patency rates, limb salvage, and death.**
Conclusion: **Despite our initial concerns of damaging the venous conduit with a minimally invasive approach to saphenous vein harvest, EVH in our experience has resulted in a trend toward improved patency rates and decreased infectious wound complications while affording the benefit of improved cosmesis. An endoscopic approach results in smaller incisions, decreased interventions for occlusion, and improved outcomes compared with OVH. EVH is the procedure of choice for harvesting saphenous vein for femoral to below the knee arterial bypass surgery. (J Vasc Surg 2006;44:282-8.)**

Patients undergoing infrainguinal bypass surgery are a select group. The pathophysiology of the disease process leading to surgery, most commonly atherosclerosis and associated diseases such as diabetes mellitus, predispose these patients to many complications. Among the most troublesome and common complications are those of wound healing. Traditional saphenous vein harvest is associated with wound complication rates of 4% to 44% in peripheral vascular surgery, with lower reported rates in the cardiac surgical literature.[1-12]

With the advent of endoscopic vein harvesting in 1994 by Lumsden et al, it appeared as though this new technique would improve surgical management of this difficult patient population.[13] This minimally invasive approach, most commonly applied and studied in patients undergoing coronary artery bypass surgery (CABG), reduced a long leg incision to one to three incisions of 2 to 3 cm in length.[2] Although cardiac surgical literature has documented endoscopic vein harvest as a modality to decrease wound complications and increase patient satisfaction, there has been less widespread support and implementation of this technique in peripheral vascular surgery.[7,9]

Endoscopic vein harvest mirrors a trend in patient demands for less invasive approaches to surgical intervention in general. At the same time, surgeons' preference for the use of autologous conduit for above knee arterial bypasses has decreased as synthetic conduits have improved, and this is especially true when autologous conduits are not available. Subsequently, endoscopic vein harvest for peripheral vascular surgery may have found a niche in femoral to below the knee arterial bypass surgery. This retrospective study compares our experience with endoscopic vein harvest (EVH) with conventional open vein harvest (OVH) in femoral to below the knee arterial bypass surgery. We hypothesized that EVH improves outcomes compared with OVH in patients undergoing femoral to below the knee arterial bypass surgery.

METHODS

This study was reviewed and approved by the Human Investigation Committee of the University of Virginia Health System. A retrospective analysis of 144 consecutive

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nonrandomized patients at a single institution undergoing infrainguinal bypass surgery over a 27-month period was performed. We identified 88 patients undergoing femoral to below the knee arterial bypass surgery, of whom 29 underwent EVH and 59 had OVH. The availability of endoscopic equipment determined if a patient was to receive EVH or OVH.

Preoperative duplex saphenous vein mapping was not performed in either group, and the suitability of the vein was determined intraoperatively. All EVHs were performed by an experienced team of physician assistants who have each completed at least 20 EVHs for CABG surgery. All OVHs were done through skip incisions by the same group of physician assistants.

Unless a specific contraindication to antiplatelet therapy existed, patients in both groups received aspirin preoperatively. Antiplatelet therapy was not withheld preoperatively and was restarted on postoperative day 1.

Patient characteristics, operative features, and postoperative outcomes in the two groups were compared. Specifically, age, gender, history of diabetes mellitus, hypertension, tobacco use, renal function, and previous infrainguinal arterial bypass surgery were analyzed. End points included wound complications, length of hospital stay, postoperative myocardial infarction, renal failure, death, operative time, limb salvage rates, primary, primary assisted, and secondary patency, and angiographic and operative interventions for occlusion. Failure of patency in the immediate postoperative hospital course was included in the patency rate calculations.

Patency of the grafts was determined according to the recommendations on reporting outcomes for lower extremity arterial bypass operations set forth by Rutherford et al.[14] Briefly, primarily patent grafts needed no related procedures to restore or assist in maintaining patency. Primary assisted patency was defined as grafts that required prophylactic interventions to maintain patency, such as percutaneous transluminal angioplasty (PTA) of a focal stenosis or a minor surgical revision. Secondary patency was defined as grafts that required angiographic or operative intervention for occlusion and those that required anastomotic revision. Patency was calculated by using the life-table method.

Wound complications were classified by two separate methods. Szilagyi's method, described in 1972, was initially used.[15] Specifically, class I wounds were characterized by erythema requiring antibiotics, class II wounds were those with superficial dehiscence or drainage, or both, and class III wounds were those with exposed or threatened grafts. Additionally, wounds were evaluated according to an infectious vs noninfectious process. Infectious processes included cellulitis requiring antibiotics and any purulent wound drainage or dehiscence. Noninfectious processes included seromas and hematomas and nonpurulent serous or serosanguineous drainage.

The groups were compared for significant differences ($P < .05$) by using the Fisher's exact test. The Wilcoxon statistic was used to compare patency and limb salvage curves. The analysis was performed using SAS statistical software (SAS Institute, Cary, NC) by a licensed statistician.

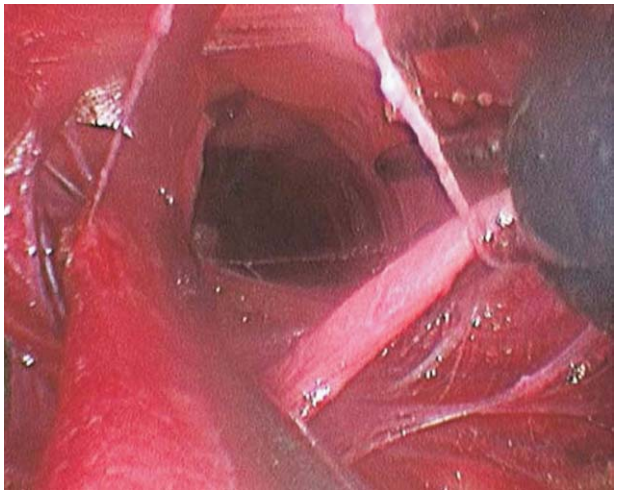

Fig 1. Branch of saphenous vein dissected with the C-ring and bisector.

Endoscopic vein harvest. For endoscopic vein harvest, the patient is placed in the supine position with the legs elevated. A 2-cm transverse linear incision is made at the medial tibial condyle and the saphenous vein is identified and elevated with a vessel loop or silk tie. We use the Vasoview 6 vein harvesting system (Guidant Cardiac and Vascular Surgery, Menlo Park, Calif). A disposable conical tip is attached to a 7-mm extended length endoscope. A blunt tip trocar is placed over the endoscope. The conical tip is placed anterior to the saphenous vein, and the soft tissue is dissected away for approximately 5 cm to make room for the blunt tip trocar port. Once the port has been inserted into the incision, the balloon is inflated with 20 mL of air and the carbon dioxide insufflation is initiated to provide a plane between the vein and surrounding subcutaneous tissue.

An anterior and posterior pass is made on the entire length of the vein. The conical tip is removed, and a harvesting cannula is placed over the endoscope after the saphenous vein and its branches have been dissected. The semi-circular C ring (vein cradle) is advanced around the vein to retract and direct the vein (Fig 1). The cautery scissors are then used to coagulate and transect the branches. After the branches have been transected, the vein cradle is used to run the entire length of the vein to ensure that the vein is free from tissue or branches. The vein is then removed and prepared for bypass (Fig 2).

No special attention is given to the management of the harvest tunnel, and no drains are placed. At the end of the entire operation, the leg is lightly wrapped with a compressive dressing.

RESULTS

Preoperative patient characteristics were well matched between the EVH and OVH groups (Table I). Specifically,

Fig 2. Saphenous vein removed endoscopically from the contralateral leg. The most distal two harvest incisions are seen.

Table I. Patient characteristics*

	OVH (n = 59)	*EVH (n = 29)*	P
Age (years)	62.4 ± 11.9	64.9 ± 13.0	0.38
Gender (male)	83.5	82.3	1.00
Diabetes	50.9	44.8	0.65
Hypertension	83.1	93.1	0.32
Tobacco	50.9	44.8	0.65
Redo operation	20.3	20.7	1.00
Serum creatinine (mg/dL)	1.4 ± 1.1	1.2 ± 0.7	0.39

OVH, Open vein harvest; *EVH*, endoscopic vein harvest.
*Values are in percentages or SD.

Table II. Indications for surgery

	OVH (n = 59) n *(%)*	*EVH (n = 29)* n *(%)*	P
Claudication	18 (30)	8 (28)	1.00
Rest Pain	8 (14)	4 (14)	1.00
Limb Salvage	29 (49)	14 (48)	1.00
Aneurysm	3 (5)	3 (10)	.39
Trauma	1 (1.7)	0 (0)	1.00

OVH, Open vein harvest; *EVH*, endoscopic vein harvest.

they were similar in gender, age, baseline renal function, tobacco use, previous lower extremity vascular surgery on the affected side, diabetes mellitus, and hypertension. There was no statistically significant difference in indications (Table II) for operation or site of the distal arterial anastomosis (Table III).

Operative time and length of hospital stay. The mean operative time was 241.5 ± 75.9 minutes in the EVH group and 222.5 ± 69.3 minutes in the OVH group (P = .11). Length of hospital stay was similar, with a mean hospital stay of 6.35 ± 3.93 days for EVH and 6.51 ± 4.93 days for OVH (P = .87).

Acute renal failure, myocardial infarction, and death. No statistically significant difference was found between the two groups in the incidence of postoperative acute renal failure, myocardial infarction, and death. One (3.45%) of 29 patients in the EVH group and two (3.39%) of 59 of the OVH group died during the study period (Table IV). The EVH patient died of a presumed pulmonary embolus on postoperative day 5, the day after his discharge. Both patients in the OVH group died of presumed sepsis unrelated to their operation. No patients died intraoperatively.

Table III. Distal anastomosis

	OVH (n = 59) n *(%)*	*EVH (n = 29)* n *(%)*	P
Popliteal	27 (46)	9 (31)	.25
Tibioperoneal trunk	2 (3)	1 (3)	1.00
Anterior tibial	6 (10)	2 (7)	1.00
Posterior tibial	18 (31)	11 (38)	.63
Peroneal	6 (10)	6 (21)	.20

OVH, Open vein harvest; *EVH*, endoscopic vein harvest.

Table IV. Postoperative outcomes and operative time*

	OVH (n = 59)	*EVH (n = 29)*	P
Acute renal failure	1.7	3.5	1.00
Myocardial infarction	5.1	0	0.55
Death	3.4	3.5	1.00
Length of stay (days)	6.5 ± 4.9	6.3 ± 3.9	0.87
Total operative time (min)	224 ± 69	248 ± 79	0.11

OVH, Open vein harvest; *EVH*, endoscopic vein harvest.
*Values are in percentages or SD.

Wound complications. Irrespective of the classification method, the total incidence of wound complications was 13.8% (4/29) in the EVH group and 16.9% (10/59) in the OVH group (P = 1.00) (Table V). There was no statistically significant difference between the two groups in regard to class I to III wound complications. The incidence of wound infections in the EVH group was 3.4% (1/29) vs 15.3% in the OVH group (9/59) (P = .15). Three of the eight patients in the OVH group with cellulitis treated with antibiotics also had hematomas. Only one patient (OVH group) in the entire study required readmission for intravenous antibiotics for management of an incisional wound infection.

Emergent interventions, patency, and limb salvage. No EVH patients and four OVH patients (6.8%) required operative intervention within the early postoperative period (<30 days) (P = .29). Two OVH patients needed operative intervention for an expanding hematoma and two required thrombectomy and subsequent anastomotic revision for graft thrombosis. All late graft occlusions (>30 days) during the study period had percutaneous or operative intervention, or both. Only one late occlusion occurred in the EVH group at five months. Overall, no EVH patient required operative intervention to restore graft patency compared with 13.4% (8/59) of OVH patients (P = .03). Percutaneous intervention for graft occlusion was attempted in seven of the eight OVH patients with graft occlusion but was successful in only three (42.8%). The

Table V. Wound complications

Complication	*OVH (n=59)* n *(%)*	*EVH (n=29)* n *(%)*	P	*Intervention*
Overall	10 (16.9)	4 (13.8)	1.00	
Class I	8 (13.5)	1 (3.4)	0.26	Antibiotics
Class II	1 (1.7)	1 (3.4)	1.00	Local wound care, antibiotics in OVH group only
Class III	0 (0)	0 (0)	1.00	N/A
Hematoma	3 (5)	1 (3.4)	1.00	Antibiotics for all OVH, exploration for 1/3 of OVH group
Seroma	1 (1.7)	1 (3.4)	1.00	None
Infection	9 (15.3)	1 (3.4)	0.15	Antibiotics
No Infection	1 (1.7)	3 (10.3)	0.11	None

OVH, Open vein harvest; *EVH,* endoscopic vein harvest.
Wounds complications were organized by different methodologies. Overall, 10 OVH patients had wound complications compared with 4 EVH patients. Three of the eight Szilagyi class I complications in the OVH group also had hematomas. The two groups were also evaluated for infectious wound complications versus noninfectious wound complications.

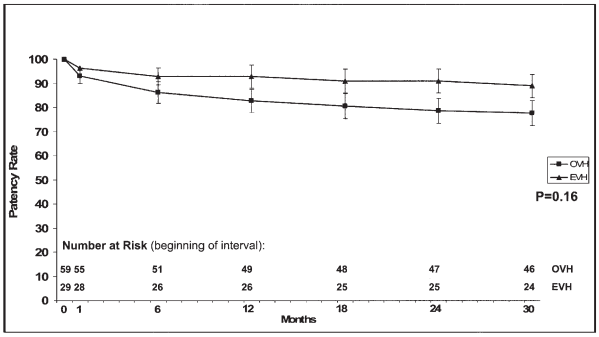

Fig 3. Comparison of primary patency between endoscopic vein harvest (*EVH*) and open vein harvest *(OVH)* by Wilcoxon statistic.

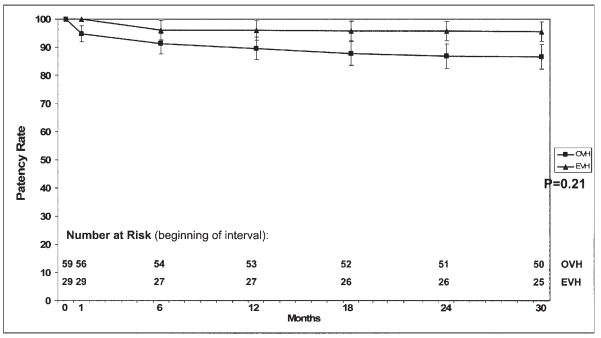

Fig 4. Comparison of primary assisted patency between endoscopic vein harvest (*EVH*) and open vein harvest *(OVH)* by Wilcoxon statistic.

four patients in the OVH group who failed percutaneous treatment needed an operation to restore patency and were included in the group of eight OVH patients overall requiring operative management for occlusion. The one late occlusion in an EVH patient was likely secondary to inadequate runoff and presented as a persistent nonhealing foot ulcer. The late graft interventions in the OVH group were performed because of persistent rest pain in two patients, nonhealing foot ulcers in three, and a significant stenosis found on ultrasound imaging and angiogram in two.

There was an overall trend toward improved patency and limb salvage in the EVH group. The primary patency rate was 92.8% in the EVH group and 80.6% in the OVH group at the mean follow-up of 21 months ($P = .12$) (Fig 3). At 21 months, the primary assisted patency was 96.4% in the EVH group and 87.9% in the OVH group ($P = .25$) (Fig 4), and secondary patency rates were identical at 96.5% ($P = .00$) (Fig 5). EVH patients had a trend towards a higher limb salvage rate at 96.5% vs 86.0% in the OVH patients at 21 months ($P = .26$) (Fig 6).

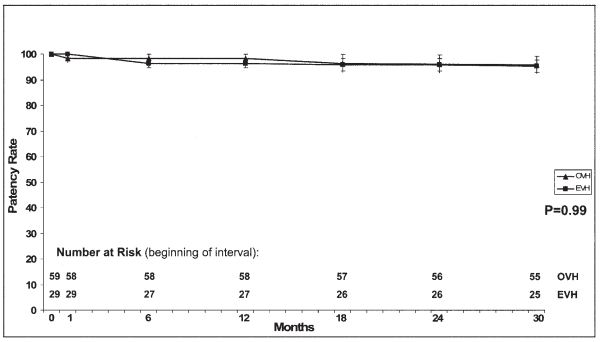

Fig 5. Comparison of secondary patency between endoscopic vein harvest (*EVH*) and open vein harvest *(OVH)* by Wilcoxon statistic.

DISCUSSION

The transition from conventional operative procedures to those that are less invasive is often met with resistance. OVH is not a technically difficult procedure and has long been considered the standard of care when harvesting the greater saphenous vein. For decades, surgeons have been able to reliably and consistently remove the greater saphenous vein through either a single long leg incision or multiple smaller "skip" incisions. Unfortunately, these conventional techniques are associated with wound complication rates as high as 44%. The technique of endoscopic vein

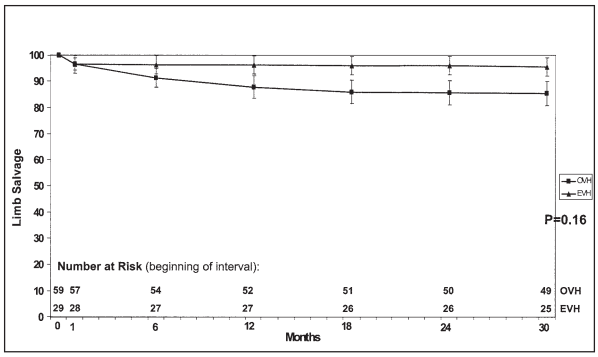

Fig 6. Comparison of limb salvage between endoscopic vein harvest (*EVH*) and open vein harvest *(OVH)* by Wilcoxon statistic.

harvesting offers a procedure that may decrease wound complications by virtue of decreasing the length of the incision, decreased tissue trauma, and possibly decreasing the propensity for skin flaps.

Although the difference in wound complication rates between EVH and OVH in the present study failed to reach statistical significance, perhaps secondary to sample size, there was a trend toward decreased wound infections in the EVH group. The cardiac surgical literature has consistently reported decreased wound complication rates with EVH compared with OVH. One recent study comparing wound healing between EVH and OVH in cardiac surgery patients was done by using the ASEPSIS (Serous discharge, Erythema, Purulent exudate, and Separation of the deep tissues, the Isolation of bacteria, and the duration of inpatient Stay) scoring system.[2,16] This scoring system has been validated as a method to categorize wounds for clinical studies and to describe wounds in a reproducible fashion for the purpose of wound surveillance.[16]

A prospective, randomized controlled trial of 110 patients found significantly impaired wound healing in patients undergoing OVH compared with those undergoing EVH.[2] Another prospective, randomized controlled trial of 100 patients in the cardiac literature reported wound complication rates of 8% with EVH and 34% with OVH ($P = .001$).[4] The improvement in wound complication rates with EVH in the cardiac literature, which we did not see in the present study, to some extent may reflect study design and different patient populations. Most of the cardiac studies have been prospective, randomized controlled trials. In addition, patients with infrainguinal arterial occlusive disease have an inherently increased risk of wound complications with saphenous vein harvest due to the ischemic nature of their disease, unlike most cardiac patients undergoing saphenous vein harvest.

Despite the lack of prospective, randomized controlled studies in the vascular surgery literature, all but one has reported decreased wound complication rates in EVH patients. The largest series to date evaluating EVH for infrainguinal bypass surgery reported a wound complication rate of 7.5%, well below most reported wound complication rates for OVH.[6]

Patients have also favored EVH over OVH. EVH has been associated with decreased postoperative pain and earlier time to ambulation.[1,2] In addition, patients who have undergone EVH have reported decreased leg edema, improved range of motion at the knee and ankle, and fewer related visits to their general practitioner compared with OVH patients.[1,2] Although often overlooked, cosmesis and patient satisfaction are improved in EVH patients compared with OVH patients.[1]

Drawbacks to EVH include increased operative time associated with the learning curve, cost, and potential vein trauma. Several studies have reported a learning curve to EVH that has led to increased operative times and wound complications during the initial implementation period.[2,5] Proficiency is quickly attainable, however, and has generally been achieved after only 20 procedures. Our physician assistants, who have had previous EVH experience with cardiac surgery, felt comfortable after approximately 10 harvests for lower extremity bypass.

The greatest difficulty in making the transition from EVH for cardiac surgery vs for lower extremity bypass surgery is the need for a longer intact segment of vein. The dissection is more difficult in the lower leg, because there is less room for the scope.

When solely looking at harvest time, however, there has been little difference between EVH and OVH, and the smaller total length of the incision has translated to an overall decease in total procedure time with EVH.[2] Initial concerns about increased cost associated with EVH were addressed by a financial analysis performed by Illig et al.[7] EVH for infrainguinal arterial bypass surgery demonstrated a cost benefit of approximately $2200.[7] The cost benefit reflects the costs of the operation and the overall mean inpatient costs, including readmissions for wound infections.

Another commonly held critique of EVH is the need to directly manipulate and place traction on the vein. Early trepidation that this would translate to worsened patency has not been supported[17]; moreover, the use of skip incisions in OVH places similar and more significant forces on the vein because visualization can be difficult.

One interesting and encouraging finding in our study was a trend toward improved patency and limb salvage rates in the EVH patients. This finding is similar to previously reported results in the vascular and cardiac surgical literature.[6,9,18,19] In general, patency rates with EVH have been comparable to accepted standards after OVH.[20] Jordan et al[9] studied the long-term patency of EVH for lower extremity revascularization and found a 5-year patency rate of 51%. In another study of 164 endoscopically harvested saphenous veins for lower extremity bypass, the primary patency at the mean follow up time at 18 months was 71.5%.[6] Previous reports of decreased leg edema and pain, and a quicker time to ambulation could conceivably account for a trend towards improved patency and limb salvage associated with EVH. The significant amount of traction placed on the saphenous vein harvested with skip incisions could also account for worsened patency in the

open group. Several histologic studies looking at cross sections of harvested vein have failed to show a significant difference in the quality of the venous conduit between EVH and OVH.[1,3,17]

CONCLUSION

Despite the inherent shortcomings of a retrospective analysis, such as recall bias and selection bias, and the relatively small patient population, this study supports the use of EVH for femoral to below the knee arterial bypass surgery. No study to date has shown poorer overall outcomes in patients undergoing EVH compared with OVH, and the existing body of literature generally endorses the use of EVH.

The implementation of EVH in peripheral vascular disease surgery has been slow compared with cardiac surgery. Although decreased wound complication rates have not been as dramatic in the vascular surgery literature as in the cardiac surgical literature, EVH has been shown to improve patient satisfaction and cosmesis in a cost-effective manner without negatively impacting graft patency. Ultimately, this retrospective study supports the current use of EVH; however, further evaluation of EVH harvest for femoral to below the knee arterial bypass surgery in a prospective randomized controlled trial is warranted.

AUTHOR CONTRIBUTIONS

Conception and design: LMG, JAK
Analysis and interpretation: LMG, RLC, NLH, KJC, CGT, ILK, JAK
Data collection: LMG, RLC, JAS
Writing the article: LMG, JAS, JAK
Critical revision of the article: LMG, RLC, JAS, KJC, NLH, CGT, ILK, JAK
Final approval of the article: LMG, RLC, JAS, KJC, NLH, CGT, ILK, JAK
Statistical analysis: LMG
Obtained funding: JAK
Overall responsibility: LMG

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DISCUSSION

Dr. Jordan: Dr Gazoni has nicely summarized a comparison of 29 endovascularly harvested saphenous vein grafts compared to 59 openly harvested vein grafts. I was quite impressed that, while the infectious complications were severely reduced in the endoscopic group, the overall complications and length-of-stay were similar between the two groups. However, patency was improved with endoscopic harvest and the authors seemed to have embraced endoscopic harvest technique for their practice. As a matter of fact, they don't even advocate a randomized prospective clinical trial - quite an anomaly in today's world of evidenced-based medicine

I have some questions to direct to you regarding your manuscript that was timely delivered prior to the meeting. First, I would

like some information about who actually performed this portion of the operation? You have remarked that the Physician Assistants did the endoscopic harvest, but who did the open harvest? You may recall a certain Scottish Texan remarked at this meeting 5 years ago that this technique was just hard—"it was just difficult". You made some references to the learning curve but please provide this audience with some indication on the extent of the learning curve that was utilized here. Were the Physician Assistants, who were undertaking this technique, already familiar with it because of their coronary bypass experience? Was there really a difference in these techniques that is reflected in the lower patency with open harvest? Do you really think that patency has improved with endoscopic vein harvest because of the technique of vein harvest? Second, you notice that there was no difference in the hospital stay despite a much higher rate of infectious complications, 15% in the open group. Even considering that there were similar lymphatic complications between the two groups, your hospital stays were no different. Were there any grafts or limbs lost because of these infectious complications? Additionally, this nonrandomized series was rather well matched with regards to patient-characteristic, indications for surgery, and the distal anastomotic site which was all done below the knee. So give this audience some additional insight. How the cases were selected—one vs. the other—for open or endoscopic repair? Do you have some patients that you would direct and prefer endoscopic approach—which was driving the selection process?

Lastly, you seem to endorse this technique for all of your practice. If that is the case, only one third of you cases are done with the endoscopic technique. Has your practice pattern changed since you have analyzed these results?

Dr. Gazoni: In response to the first question in regards to who performs the open vein harvests, the physician assistants at the University of Virginia also perform the open vein harvests.

In regards to the learning curve, although we specifically did not look at it, there have been a couple studies that have shown there is a learning curve of approximately 20 procedures in learning how to use endoscopic vein harvest. Now our physician assistants who perform the endoscopic vein harvest for fem-distals obviously were familiar with the equipment but I think the most difficult thing from what my understanding and their report of performing a more lengthy saphenous vein harvest was actually getting down into the distal part of the leg and harvesting the vein through that manner. I think there still is a learning curve when we started using endoscopic vein harvest for fem-distals which was probably—and requires many patients but definitely was there. In regards to patency rates, I mentioned that there is an issue with potential traction when we harvest veins and get skip incisions in the open methodology. You did mention that in the slide that I had how you could see the C-ring pushing against the vein but at the same time—in all honesty, I have never done an endoscopic vein harvest, the amount of traction that at least appears to be placed is more in a horizontal direction, not along the actual length of the vein and it does not seem to be as significant as opposed to when you are actually performing an open vein harvest and you get skip incisions. From what I have seen you are really tugging hard on the vein in order to visualize in order not to have to make another skip incision.

In regards to the hospital stay, despite the fact that we had increased infectious complications with open vein harvest, that hospital stay was essentially the same between both groups. I think part of that has to do with the fact that we really did not see any serious wound complications throughout this entire study. There are basically wound complications characterized by some erythema or cellulitis or minimal drainage or superficial separation, and so I do not think there was any wound complication that would really make the patient stay longer in the hospital. It was more just related to the actual bypass procedure.

As far as how the cases were selected, now at the University of Virginia we almost exclusively do endoscopic vein harvest for fem-distals and while—when we looked at this patient population where there were obviously more open vein harvests, it was also the reflection of resource availability. Depending on how many PAs were available and how much equipment was available, the resources were sometimes taken into the cardiac patients undergoing coronary artery bypass. Now e have more PAs and more equipment, so we don't really find that crunch so that we can actually have all our patients who are undergoing fem-distals that require saphenous to have an endoscopic vein harvest.