EDORIUM Journals

Edorium J Surg 2018;5:100032S05AB2018.
www.edoriumjournalofsurgery.com

ORIGINAL ARTICLE PEER REVIEWED | OPEN ACCESS

Standard bridging versus traditional open technique for harvesting great saphenous vein in coronary artery bypass grafting: A comparative study

Aram Baram, Ahmad Mohammad Sherif, Ashur Y. Izac

ABSTRACT

Aims: Great saphenous vein harvesting by traditional open technique (TOT) is associated with several wound complications and delayed patient mobilization. Minimally invasive vein harvesting techniques such as the standard bridging technique (SBT) are developed to decrease postoperative complications. This randomized aims to compare post saphenectomy wound complications between SBT and TOT. Methods: A total of 110 patients who underwent coronary artery bypass grafting were prospectively randomized into two groups. Group A consisted of 68 patients who had TOT, Group B consisted of 42 patients who had SBT. Results: Dermatitis and wound infection occurred in four patients (5.88%) in group A and in two (4.76%) of group B. There was no statistical difference in the prevalence of these complications between the two groups (p> 0.80). Cellulitis most commonly encountered in both groups. Saphenous neuropathy occurred in one (1.5%) patient in group A and in one patient (2.4%) in group B. There was no statistical difference in the prevalence of saphenous neuropathy between the two groups (p>0.72). Conclusion: Harvesting GSV by minimally invasive SBT does not reduce the incidence of complications of saphenous vein harvesting for coronary artery bypass grafting.

Keywords: Bridging technique, Coronary artery bypass grafting, Outcome, Vein harvest

How to cite this article

Baram A, Sherif AM, Izac AY. Standard bridging versus traditional open technique for harvesting great saphenous vein in coronary artery bypass grafting: A comparative study. Edorium J Surg 2018;5:100032S05AB2018.

Article ID: 100032S05AB2018

****

doi: 10.5348/100032S05AB2018OA

Aram Baram[1], Ahmad Mohammad Sherif[2], Ashur Y. Izac[3]

Affiliations: [1]Assistant Professor of Cardiovascular and Thoracic Surgery, Department of Surgery, School of Medicine, Faculty of Medical Sciences, University of Sulaimani, Department of Thoracic and Cardiovascular Surgery Sulaimani Teaching Hospital, Iraq; [2]Kurdistan Board for Medical Specialization/Cardiothoracic and Vascular Surgery Duhok DOH, Azadi Cardiothoracic Center, Iraq; [3]Assistant Professor of Cardiovascular and Thoracic Surgery, University of Duhok/ College of Medicine, Departement of Surgery/Unit of Cardiothoracic Surgery, Duhok DOH, Azadi Cardiothoracic Center, Iraq.

Corresponding Author: Dr. Aram Baram MD, MRCSEd, FACS, Assistant Professor, University of Sulaimani Faculty of Medical Sciences, School of Medicine, Department of Thoracic and Cardiovascular Surgery, François Mitterrand Street, Sulaymaniyah 46001, Iraq; Email: aram.baramm@gmail.com; aram.baram@unvisul.edu.iq

Received: 03 August 2018
Accepted: 24 October 2018
Published: 16 November 2018

INTRODUCTION

Great saphenous vein (GSV) has been widely used as a vascular conduit in vascular surgery due to ease of harvesting, availability and versatility [1]. It has been established as the gold standard conduit for bypass grafting [2].

Saphenous vein conduits are very widely used in coronary artery bypass grafting (CABG) [3, 4]. CABG remains a widely used procedure for the treatment of coronary artery disease (CAD). Therefore, any modification of the operative technique or strategy

will have substantial implications on the postoperative outcome [5].

The majority of CABG operations performed utilize both GSV and arterial conduits in combination, most commonly GSV with the left internal thoracic artery (LITA) [6–9].

Saphenous vein harvest for CABG has several techniques. The traditional open technique involves a large longitudinal incision extending from the medial malleolus along the medial aspect of the knee joint and often to the thigh and inguinal region [8]. Over the past decades, minimally invasive alternatives developed, the standard bridging technique in which the vein harvested through multiple skip incisions alternating with skin bridge along the course of the GSV [8].

After CABG, many patients anecdotally reporting more discomfort from the incisions used to harvest the great saphenous vein than from the incision of sternotomy [10].

The traditional open technique used for GSV harvesting is associated with significant morbidities including wound infection, skin flap ischemia, fat necrosis, lymphatic leak, increased postoperative pain, and increase hospital stay [2]. In the standard bridging technique, postoperative complications are significantly less frequent due to shorter length incisions [8]. Minimal invasive techniques may reduce leg wound complications such as pain and infection as stated by Rao et al. [8]. These minimal invasive techniques require traction on the vein to maximize surgical visibility and enable side branch ligation [6].

The aim of this study is to compare the postoperative outcomes for two different techniques for harvesting the GSV in CABG.

PATIENTS AND METHODS

From July 2016 to August 2017, 110 patients who underwent CABG were prospectively randomized demographics and characteristics are shown in (Table 1) in to two groups. Institutional review board ethical approval obtained for this randomization.

The 110 patients were randomly allocated to one of two groups: Group A, the traditional open technique group (n = 68), (Figure 1), and group B, the standard bridging technique group (n = 42) (Figure 2). Written, informed consent was obtained from all participants before randomization.

Inclusion criteria was adult patients, admitted for coronary artery bypass grafting (CABG) using the great saphenous vein (GSV) as a vascular conduit for bypass grafting. Exclusion criteria was all adult patients who suffer from bleeding tendency, immune compromise conditions, those who are on steroids for long duration to decrease the chance for higher postoperative complications, harvesting both GSVs, prior saphenectomy

Table 1: Respondent demographics and characteristics

Patients characteristics	Numbers	Percent (%)
Gender		
Male	78	70.9
Female	32	29
Smoking		
Yes	49	44.5
No	53	48.2
Diabetes mellitus type 2		
Yes	65	59.1
No	44	40.9
Chronic renal failure		
Yes	11	10
No	94	85.5
HTN		
Yes	77	70
No	30	30
Hyperlipidemia		
Yes	63	57.3
No	43	39.1
I.T.A		
Yes	105	95.5
No	4	3.6
I.A.B.P		
Yes	3	2.7
No	106	96.4
Techniques		
TOT	68	68.1
SBT	42	38.2

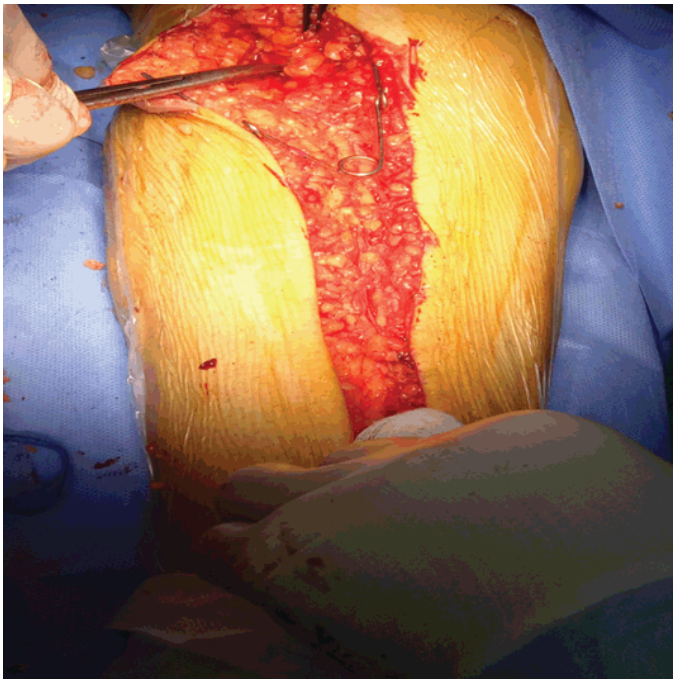

Figure 1: Traditional open technique TOT.

Figure 2: Standard bridging technique SBT.

of the contralateral limb, edema caused by a systemic cause; such as heart, renal, thyroid or hepatic disease, and venous insufficiency of lower limbs as characterised by varicose veins both with and without trophic change. All patients operated by the same surgeon. GSV harvesting performed by two assistants; one of them always performing the harvest by traditional open technique, and the other one always harvesting the vein by standard bridging technique this method implicated to have a less chance for statistical bias and less possibility of changes in the variables.

All patients followed by daily examination in the first week post operatively while still in hospital, then they had been followed after 10 days after discharge from hospital, another examination had been done after one month of the second examination. Any complication found during these three examinations has been registered.

RESULTS

Patient demographics: The mean age of group A and group B patients was comparable (60.38 vs. 61.04). In group A, 22 out of 68 patients (32%) were females, while in group B 10 out of 42 patients (23%) were females. Other factors influencing wound healing (as anemia, malnutrition) were collected for risk stratification. There was no significant difference between the two groups in regard to the incidence of hypertension, diabetes, body mass index (BMI), hemoglobin level, smoking, chronic renal failure, hyperlipidemia, use of intra-aortic balloon pump, cardiopulmonary bypass machine time and aortic cross clamp time (Table 2). All patients included in the study had been followed-up and all of them attended scheduled periodic postoperative examination. Dermatitis, cellulitis, skin necrosis, non-healing wound and saphenous nerve injury were the complications that occurred in both groups. Wound debridement was necessary in 2 of 68 (2.95) in group A patients and 2 of 42 (4.76%) of group B patients (Table 3).

Dermatitis occurred in four patients (5.88%) in group A and in two patients (4.76%) in group B. There was no statistical difference in the prevalence of this complication between the two groups (P> 0.80). The mean age of patients who had dermatitis was 61.67 (Age (mean ±SD) is 60.63±9.27 for the respondent). Dermatitis occurred in five of the male patients 78 (6.4%) and in 1 of the 32 female patients (3.1%), their mean BMI was 32.30 (BMI (mean±SD) is 28.95±4.66 for the respondent). Dermatitis occurred in 2 of 49 smoker patients (4.1%), in 5 of 65 diabetic patients (7.7%), in 4 of 77 (5.2%) patients who had hypertension and in 1 of 11 (9.1%) patients having chronic renal failure. Dermatitis occurred in 3 of 63 (4.8%) patients with hyperlipidaemia. The mean level of haemoglobin in those patients in which dermatitis had occurred was 12.21. None of the 3 patients (0.0%) in which IABP had been used had dermatitis. For the patients who had dermatitis, the mean cardiopulmonary bypass time was 135.50 minutes (CBP time (mean ± SD) is 117.10±46.99) and the mean time for aortic cross clamping time was 90.83 minutes ((mean ± SD) is 68.91±31.83).

Cellulitis was the complication most commonly encountered in both groups. It occurred in seven (10.30%) patients in group A and in four (9.52%) patients in group B. There was no statistical difference in the prevalence of this complication between the two groups (P> 0.89). The mean age of patients who had cellulitis was 64.40. Cellulitis occurred in 5 of the 78 male patients (6.4%) and in 6 of the 32 female patients (18.8%), their mean BMI was 30.94. It occurred in 2 of 49 (4.1%) smokers, in 8 of 65 diabetic patients(12.3%), in 10 of 77 patients (13.0%) who had hypertension and in 5 of 63 patients (7.9%) having CRF. Cellulitis had occurred in 5 of 63 patients (7.9%) with hyperlipidaemia. The mean level of haemoglobin in those patients in which cellulitis had occurred was 11.96 gm/dl. Regarding intra operative data, cellulitis occurred in 10 of 105 patients (9.5%) in which the ITA used as conduit. None of the 3 patients in which IABP used had cellulitis. For the patients who had cellulitis, the mean cardiopulmonary bypass machine time was 143.09 minutes and the mean cross clamping time was 86.8 minutes.

Necrosis was the only complication in which there was a significant statistical difference in the prevalence of the complication between the two groups. It occurred in none of the patients in group A, but in 3 patients (7.3%) in group B (p> 0.025). The mean age of patients who had necrosis was 90.83. Necrosis occurred in 1 of the 78 (1.3%) male patients and in 2 of the 32 female patients (6.3%), their mean BMI was 31.63. It occurred in none of 49 smokers, in 3 of 65 diabetic patients (4.6%), in 3 of 77 patients (3.9%) who had hypertension and in none of 11 patients having end stage renal disease. Necrosis occurred

Table 2: Patient demographics in the TOT and SBT groups

Variables	TOS (n=68)	SBT (n=42)	P.value
Age (mean±SD)	60.38±8.74	61.04±10.19	0.718
Gender			0.338
Male	46	32	
Female	22	10	
HTN			0.144
Yes	52	25	
No	15	15	
DM			
Yes	42	23	
No	25	19	0.522
BMI(mean±SD)	28.87±4.79	29.08±4.5	0.825
Level of Hb(mean±SD)	12.79±2.20	13.23±1.92	0.282
Smoking			0.382
Yes	27	22	
No	35	18	
CRF			0.060
Yes	5	6	
No	62	32	
Hyperlipidiamia			0.197
Yes	36	27	
No	28	25	
I.T.A			0.652
Yes	65	40	
No	2	2	
CPB time (mean±SD)	112.14±50.86	125.14±39.20	0.160
Cross clamp time (mean±SD)	67.42±32.01	71.33±31.75	0.534
I.A.B.P Usage			0.437
Yes	1	2	
No	66	40	

SBT, standard bridging technique; TOT, traditional open technique

Table 3: Relationship between SBT and TOT with complications occurred

	SBT (n=42)		TOT (n=68)		
Complications	Yes	No	Yes	No	P value
Dermatitis	2(4.76%)	40(95.4%)	4 (5.88)	64(94.22%)	0.802
Cellulites	4 (9.52%)	38 (90.48%)	7 (10.3%)	61(89.7%)	0.896
Necrosis	3 (7.2%)	39 (92.8%)	0 (0.0%)	68(100%)	0.025
Non-healing wound	1 (2.4%)	41 (97.6%)	1 (1.5%)	67(98.5%)	0.728
Great saphenous neuropathy	1 (2.4%)	41 (97.6%)	1 (1.5%)	67(98.5%)	0.728
Debridement	2 (4.76%)	40 (95.4%)	2 (2.95%)	66(97.05%)	0.620

in 1 of 63 patients (1.6%) with hyperlipidaemia. The mean level of haemoglobin in those patients in which necrosis occurred was 10.76 gm./dl. Skin necrosis occurred in 2 of 105 patients (1.9%) in which the internal thoracic artery used. None of the 3 patients in which IABP used had necrosis.

Non-healing wound occurred in 1 patient (1.5%) in group A and in 1 patient (2.4%) in group B. There was no statistical difference in the prevalence of this complication between the two groups (p > 0.72). The mean age of patients who had non-healing wound was 68.5 years. Non-healing wound occurred in 1 of the 78 male patients (1.3%) and in 1 of the 32 female patients(3.1%), their mean BMI was 29.24.

Non-healing wound had occurred in none of patients with hyperlipidaemia(n=63). The mean level of haemoglobin in those patients in which non-healing wound had occurred was 12.3gm/dl.

Similar to non-healing wound, saphenous neuropathy occurred in 1 patient (1.5%) in group A and in 1 patient (2.4%) in group B. There was no statistical difference in the prevalence of this complication between the two groups (p> 0.72). The mean age of patients who had saphenous neuropathy was 62.5 years. Saphenous

neuropathy occurred in 1 of the 78 male patients (1.3%) and in 1 of the 32 female (3.1%) patients, their mean BMI was 33.2. It occurred in none of 49 smokers, in 2 of 65 diabetic patients(3.1%), in 1 of 77 patients (1.3%) who had hypertension and in none of 11 patients having chronic renal failure. Saphenous neuropathy had occurred in none of 63 patients with hyperlipidaemia. The mean level of haemoglobin in those patients in which great saphenous neuropathy had occurred was 12.3gm/dl.

During follow up, 4 patients needed wound debridement, 2 patients (2.95%) in group A and 2 patients (4.74%) in group B. There was no statistical difference in the prevalence of this complication between these two groups (p> 0.62). The mean age of patients who needed wound debridement was 64.5. There was need for wound debridement in 2 of the 78 male (2.6%) patients and in 2 of the 32 female (6.3%) patients, their mean BMI was 33.9. Wound debridement needed in none of 49 smokers, but in 3 of 65 diabetic patients (4.6%), in 4 of 77 patients (5.2%) who had hypertension and in none of 11 patients having chronic renal failure. Wound debridement was needed in 1 of 63 patients (1.6%) with hyperlipidaemia. The mean level of haemoglobin in those patients in which wound debridement had been needed was 11.5gm/dl. Regarding intra operative data, wound debridement had been needed in 3 of 105 (2.9%) patients in which the internal thoracic artery had been used. None of the 3 patients in which intra-aortic balloon pump had been used needed wound debridement. For the patients who needed wound debridement, the mean cardiopulmonary bypass machine time was 172.5 minutes and the mean cross clamp time was 113.75 minutes (Table 3).

DISCUSSION

The technology and character of CABG surgery is changing rapidly with the transition to a higher risk patient population. CABG remains a mainstay in the treatment of ischemic heart disease even in the era of the major advances in interventional cardiology and cardiac pharmacology [9]. CABG remains one of the most common operations in adult cardiac surgery. It frequently uses the great saphenous vein as a vascular conduit. The traditional open technique is frequently associated with wound related complications including wound infection, sepsis and saphenous nerve neuropathy. Complications of the limb undergoing great saphenous vein harvesting by the TOT are the main drive behind the development of minimally invasive vein harvesting techniques (standard bridging technique and the endoscopic vein harvesting procedure) aiming to decrease the wound related post harvesting limb complications [11].

Minimally invasive vein harvesting techniques for CABG are expected to be associated with fewer wound related post harvesting limb complications compared with the traditional open technique. However, its efficacy with regard to vein conduit damage and the long term patency rates has recently been in question. Trauma to the vein which occurs during vein harvesting via the minimally invasive techniques has a major impact on the quality of the vein, short term patency rates [12].

The extend of scar formation and the time of recovery after vein retrieval are important factors in patient satisfaction and success of the procedure. Although immediate satisfaction is an important issue during assessment of vein retrieval techniques; the quality of the vascular conduit and the long term patency rates with its prognostic implications must be the primary outcome, keeping in mind the SBT is associated with more minor vein repairs than the TOT, though studies showed equivalent long-term outcomes [13]. The standard bridging technique of GSV harvesting through multiple small incisions along the course of the vein with the aid of retractors permits shorter overall incision length but it remains a blind procedure and it is somewhat technically demanding [14].

Although, in comparison to the conventional open technique of GSV harvesting, endoscopic GSV retrieval has resulted in decreased lower limb wound complications in both randomized and non-randomized studies, whether the standard bridging technique of GSV harvesting is as efficacious as the minimally invasive endoscopic vein retrieval regarding post harvesting limb complications has yet to be determined [15].

In a prospective randomized trial of endoscopic versus conventional harvesting of the saphenous vein in coronary artery bypass surgery, the main result of the trial was that endoscopic harvesting of the saphenous vein results in a significant decrease in the rate of wound infections from 24.6% to 4.3% (conventional vs. endoscopic groups; p = 0.0006). Randomization to endoscopic harvesting was the only independent variable associated with reduced wound infection [16]. They concluded in their trial that endoscopic harvesting of the saphenous vein significantly reduced postoperative leg wound complications, and improved patient satisfaction as compared with the traditional open technique [16].

In another prospective randomized trial comparing in situ lower extremity bypass via SBT versus the TOT post harvesting limb complication rates were similar [15]. Another comparative analysis of saphenous vein conduit harvesting techniques for coronary artery bypass grafting comparing SBT with TOT demonstrated that SBT reduces post-operative limb morbidity and increases patient satisfaction when compared to TOT, it also showed SBT to be cost effective [11].

Our findings demonstrated that none of the limb complications that occurred after GSV harvesting was lower in the SBT compared to TOT. In contrast, necrosis appeared to be more frequent in the SBT group (p> 0.025).

This study mainly focused on the leg wound morbidity in relation to the techniques of GSV harvesting TOT versus SBT only, because minimal invasive technique

(Endoscopic GSV harvesting) facility currently lacking at our centre, we thought it is wise to conduct a study on safety and effectiveness of both techniques of GSV harvesting that routinely we perform during coronary artery bypass surgery. While most of the research in the literature comparing minimal invasive versus conventional GSV harvesting with regards of leg morbidities and quality of the veins, there is few on relation of the techniques to leg morbidities.

A comparative analysis done by U.A. Khan et al. to compare the SBT with TOT in reducing leg morbidity and increasing patient satisfaction, found that SBT associated with better wound development [11]. Although their study mainly focused on pain evaluation, patient satisfaction, early wound assessment (hematoma) and saphenous neuropathy, in accordance with their results patients demographic (age, gender, DM and BMI) does not increase leg wound morbidity, but inconsistent with those finding we found no significant difference between both group with regard of leg morbidities (Dermatitis p> 0.80, Cellulites p 0.896, non-healing wound p > 0.72, saphenous nerve neuropathy p > 0.728 versus p <0.001 and re-intervention), in contrast we found that skin necrosis to be more frequent in the SBT (p > 0.025) this might be related to excessive handling of the skin and subcutaneous tissue to have a better vision of the vein and side branches.

Richard Feyrer and colleagues from Germany, conducted a randomized comparison between minimal invasive (SBT and Saph LITE system) versus conventional vein harvesting [17]. Although they have not seen any major complication with any of those methods, but inconsistent with our finding skin edge necrosis and localized infection were recorded with conventional vein harvesting then in conclusion found that both methods of harvesting have similar complication rates, and the only advantage of minimal invasive method was cosmetic and patient satisfaction.

Margaret Olsen and colleagues retrospectively analyzed data from 1980 post CABG patient [18]. They found that in addition to female gender and obesity as independent risk factor for leg harvest site wound infection, previous cerebrovascular accident, postoperative blood transfusion and older age are newly described risk factors for leg harvest site wound infection, in contrast we found no statistically significant value for those patient demographic and leg harvest site wound infection [18].

Study limitations

Our small sample size is possibly a weak point. Our work was by necessity unblended which could possibly lead to bias for soft outcomes specially during evaluating great saphenous neuropathy. This a single centre experience with one surgeon and assistants familial with the procedures so that results may not be generalized to other centres. Only two surgeons performed the two different techniques

CONCLUSION

We concluded that harvesting the GSV by minimally invasive SBT does not reduce the incidence of complications of the limb undergoing GSV harvesting for coronary artery bypass grafting. There was no significant difference favouring SBT over TOT.

REFERENCES

1. Kalra S, Aiyer P, Bhardwaj M, Grover V, Gupta VK. A prospective randomized trial of endoscopic versus open saphenous vein harvesting technique for coronary artery bypass graft surgery. Indian Journal of Thoracic and Cardiovascular Surgery 2016;32(2):113–9.
2. Eid RE, Wang L, Kuzman M, et al. Endoscopic versus open saphenous vein graft harvest for lower extremity bypass in critical limb ischemia. J Vasc Surg 2014 Jan;59(1):136–44.
3. Ouzounian M, Hassan A, Buth KJ, et al. Impact of endoscopic versus open saphenous vein harvest techniques on outcomes after coronary artery bypass grafting. Ann Thorac Surg 2010 Feb;89(2):403–8.
4. Crouch JD, O'Hair DP, Keuler JP, Barragry TP, Werner PH, Kleinman LH. Open versus endoscopic saphenous vein harvesting: Wound complications and vein quality. Ann Thorac Surg 1999 Oct;68(4):1513–6.
5. Hayward TZ 3rd, Hey LA, Newman LL, et al. Endoscopic versus open saphenous vein harvest: The effect on postoperative outcomes. Ann Thorac Surg 1999 Dec;68(6):2107–10.
6. Black EA, Guzik TJ, West NE, et al. Minimally invasive saphenous vein harvesting: Effects on endothelial and smooth muscle function. Ann Thorac Surg 2001 May;71(5):1503–7.
7. Allen KB, Griffith GL, Heimansohn DA, et al. Endoscopic versus traditional saphenous vein harvesting: A prospective, randomized trial. Ann Thorac Surg 1998 Jul;66(1):26–31.
8. Rao C, Aziz O, Deeba S, et al. Is minimally invasive harvesting of the great saphenous vein for coronary artery bypass surgery a cost-effective technique? J Thorac Cardiovasc Surg 2008 Apr;135(4):809–15.
9. Felisky CD, Paull DL, Hill ME, et al. Endoscopic greater saphenous vein harvesting reduces the morbidity of coronary artery bypass surgery. Am J Surg 2002 May;183(5):576–9.
10. Bitondo JM, Daggett WM, Torchiana DF, et al. Endoscopic versus open saphenous vein harvest: A comparison of postoperative wound complications. Ann Thorac Surg 2002 Feb;73(2):523–8.
11. Khan UA, Krishnamoorthy B, Najam O, Waterworth P, Fildes JE, Yonan N. A comparative analysis of saphenous vein conduit harvesting techniques for coronary artery bypass grafting – standard bridging versus the open technique. Interact Cardiovasc Thorac Surg 2010 Jan;10(1):27–31.

12. Krishnamoorthy B, Critchley WR, Bhinda P, et al. Does the introduction of a comprehensive structured training programme for endoscopic vein harvesting improve conduit quality? A multicentre pilot study. Interact Cardiovasc Thorac Surg 2015 Feb;20(2):186–93.
13. Krishnamoorthy B, Critchley WR, Glover AT, et al. A randomized study comparing three groups of vein harvesting methods for coronary artery bypass grafting: Endoscopic harvest versus standard bridging and open techniques. Interact Cardiovasc Thorac Surg 2012 Aug;15(2):224–8.
14. Perrault LP, Jeanmart H, Bilodeau L, et al. Early quantitative coronary angiography of saphenous vein grafts for coronary artery bypass grafting harvested by means of open versus endoscopic saphenectomy: A prospective randomized trial. J Thorac Cardiovasc Surg 2004 May;127(5):1402–7.
15. Allen KB, Heimansohn DA, Robison RJ, et al. Risk factors for leg wound complications following endoscopic versus traditional saphenous vein harvesting. Heart Surg Forum 2000;3(4):325–30.
16. Kiaii B, Moon BC, Massel D, et al. A prospective randomized trial of endoscopic versus conventional harvesting of the saphenous vein in coronary artery bypass surgery. J Thorac Cardiovasc Surg 2002 Feb;123(2):204–12.
17. Feyrer R, Seitz T, Strecker T, et al. Minimally invasive vein harvesting with the SaphLITE retractor system: Is it really better? Heart Surg Forum 2006;9(1):E511–4.
18. Olsen MA, Sundt TM, Lawton JS, et al. Risk factors for leg harvest surgical site infections after coronary artery bypass graft surgery. J Thorac Cardiovasc Surg 2003 Oct;126(4):992–9.

****

Acknowledgements
We would like to acknowledge all our personnel who assisted in serving our patients.

Author Contributions
Aram Baram – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Ahmad Mohammad Sherif – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Ashur Y. Izac – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor of Submission
The corresponding author is the guarantor of submission.

Source of Support
None.

Consent Statement
Written informed consent was obtained from the patient for publication of this study.

Conflict of Interest
Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.