Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 07, 2024

Comparison of leg wound complications in endoscopic vs open saphenous vein harvesting techniques: A Comparative prospective study

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Abstract

Background: Saphenous vein harvesting for Coronary artery bypass graft surgery (CABG) can be done by open and endoscopic methods. The present study aimed to evaluate the leg wound complications between endoscopic and open saphenous vein harvesting techniques.

Materials and Methods: This study was conducted in the department of General Surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu. Patients who underwent elective CABG were included in the study. A total of 50 patients were included in the study and divided into two groups each of 25 patients. All the patients demographic data, clinical and surgical data was recorded and analyzed. Statistical Package for Social Sciences (SPSS 20.0) version used for analysis.

Results: The mean age, gender distribution, comorbid conditions and euro score-II not showed any significant difference between the groups. In group-I and group-II maximum number of patients had one leg and thigh for vein harvest site. Harvested time and incision closure time showed significant difference between groups. Diabetes mellitus is common risk factor in both groups. Maximum number of patients in group-II had infection compare to group-I.

Conclusion : The study results concluded that endoscopic saphenous vein harvesting technique have more advantages with less complications.

Keywords: Coronary artery bypass grafting, Saphenous vein, Endoscopic, Harvesting, Diabetes mellitus, Chronic Kidney Disease .

Introduction

Vein harvesting is a surgical procedure that involves removing (harvesting) a 'spare' healthy blood vessel from another part of your body (in this case, patient's legs) and using it as a graft in coronary bypass surgery.[1,2] The blood vessel discussed in this factsheet is the great saphenous vein. Coronary Artery bypass graft (CABG) is a surgical procedure used to treat coronary heart diseases (CHD).[3] The CHD is the term that describes what happens when heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries (the two large blood vessels that supply oxygen-rich blood to your heart). A CABG involves taking a blood vessel from another part of the body (leg, chest wall, arm) and attaching it to the coronary artery below the narrowed area and above the root of aorta inorder to allow

the blood to flow round it.[4-6] This new blood vessel is known as a graft. The number of grafts needed will depend on number of coronary arteries are narrowed. While CABG remains the most widely used treatment modality for coronary artery disease (CAD), the procedure is associated with several cardiac and non-cardiac complications.[7] This procedure is associated with mild, moderate and severe complications. Post-operative cardiopulmonary health is severely compromised with impaired cardiac and pulmonary functions. They mainly experience pain, decreased respiratory rate, decreased exercise capacity, infection, bleeding, hematoma, CNS problems and reduce the physical activity and strength.[8] This is particularly relevant as the great saphenous vein is commonly harvested for coronary revascularization and therefore may be a source of additional post-operative complications.[9] Saphenous vein harvesting for CABG can be done by open and endoscopic methods. Each procedure has some benefits, limitations and complications. The present study aimed to evaluate the leg wound complications between endoscopic and open saphenous vein harvesting techniques.

Materials and Methods

Study design: Prospective comparative study

Study settings: The study was conducted in the department of General Surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari (Dist), Tamil Nadu.

Study period: The study was conducted for the period of one year (January 2023-December 2023)

Inclusion criteria

- Age between 30-60 years
- Both gender
- Coronary artery disease

Exclusion criteria

- Recent heart surgery
- clotting disorders
- Pregnant

Study groups

Group-I: Endoscopic vein harvesting (EVH)

Group-II: Open vein harvesting (OVH)

Procedure

This study was included 50 patients. They were divided into 2 groups each of 25 patients. Study procedure was explained to all the patients and informed consent was obtained. In Group II GSV (Great saphenous vein) was exposed by means of a 2 cm transverse incision along the medial surface of the knee and the vein was circumferentially dissected with its

tributaries by using a C-ring dissector and bipolar loop scissors. All tributaries were divided, 0.5 cm incision was made at the groin and the proximal end of the vein was divided. SVG (Saphenous vein grafting) was harvested from the thigh then leg.In Group I, Subcutaneous tunnels were created distally and proximally. The endoscopic dissecting device was placed in proximal space (toward the groin). A tunnel was created by blunt dissection along the length of the saphenous vein in the thigh. After 3-5 cm of blunt dissection, insufflation was performed by using CO_2. Anticoagulant heparin was given to decrease the clot formation. The harvested vein was gently distended with low pressure heparinized saline, and the branches were secured with small clips or repaired by 7-0 Prolene sutures whenever needed. The wound was closed at the end of procedure after protamine administration. Drains were used only in 12 cases in EVH, when SVG was harvested from the thigh with a continuous oozing field to decrease hematoma formation. Harvesting time was approximately 35-45 min at the start and reduced to 25-35 min. The leg was then wrapped in an elastic bandage for 48 hours. All patients demographic, clinical data was collected. Intraoperative, risk factors and measures of wound healing was recorded for both groups and used for analysis.

Statistical analysis

The data was expressed in number, percentage, mean and standard deviation. Statistical Package for Social Sciences (SPSS 20.0) version used for analysis. Un paired t test and Chi square test applied to find the statistical significant between the groups. p value less than 0.05 considered statistically significant at 95% confidence interval.

Results

Table-1: Comparison of demographic data between the two groups

Demographic data	Group-I (n=25)		Group-II (n=25)	
Age (Years) (MEAN±SD)	58.45±8.45		52.19±2.90	
Gender				
Male	15	60.00	13	52.00
Female	10	40.00	12	48.00
Hypertension	20	80.00	18	72.00
Dyslipidemia	19	76.00	13	52.00
Diabetes mellitus	22	88.00	19	76.00
COPD	2	8.00	1	4.00
Chronic kidney disease	3	12.00	2	8.00
Peripheral vascular disease	0	0.00	1	4.00
Euro score-II (MEAN±SD)	1.67±0.45		2.14±1.56	

(*p<0.05 significant compared group-I with group-II)

Table-2: Comparison of vein harvest site between the two groups

Vein harvest site	Group-I (n=25)		Group-II (n=25)	
	Number	Percentage (%)	Number	Percentage (%)
One leg	25	100.00	20	80.00
Both leg	0	0.00	8	32.00

Thigh	20	80.00	0	0.00
Leg and thigh	13	52.00	4	16.00

Table-3: Comparison of intraoperative observations between the two groups

Intraoperative observations	Group-I (n=25) (MEAN±SD)	Group-II (n=25) (MEAN±SD)	p value
Harvested length (cm)	43.67±1.84	41.89±1.56	**0.34**
Harvested time (min)	38.45±1.32	13.45±1.45*	**0.0001**
Vein preparation time (min)	1.56±0.34	1.6±1.56	**0.67**
Incision closure time (min)	2.67±0.93	14.78±0.75*	**0.0001**
Number of grafts	2.6±1.34	2.8±1.89	**0.29**
Number of SVG bypass	2.10±0.45	2.53±0.93	**0.54**

(*p<0.05 significant compared group-I with group-II)

Table-3: Comparison of patient risk factors and measure of wound healing between the groups

Risk factors	Group-I (n=25)		Group-II (n=25)	
	Number	Percentage (%)	Number	Percentage (%)
Diabetes mellitus	6	24.00	4	16.00
Non-diabetes mellitus	2	8.00	1	4.00
Gender				
Male	4	16.00	3	12.00
Female	3	12.00	2	8.00
Obesity	5	20.00	4	16.00
Non-Obese	2	8.00	1	4.00
Measures of wound healing				
Drainage	0	0.00	6	24.00
Ecchymosis	2	8.00	2	8.00
Edema	1	4.00	3	12.00
Hematoma	0	0.00	2	8.00
Infection	0	0.00	12	48.00
Dehiscence	0	0.00	6	24.00

The study had included 50 patients and divided into two groups. Group-I patients under went EVH and group-II patients OVH. The mean age of group-I and group-II is similar not showed any significant difference. Males and females are more in group-I compared to group-II. Group-I had more number of hypertension, dyslipidemia, diabetes mellitus and COPD compared to group-II. Comparison of comorbid conditions between the group-I and group-II not showed any significant difference. Euro score-II not showed any significant difference but group-II showed higher value than group-I (Table-1). 25 in group-I and 20 in group-II had one leg vein harvest site. In group-II 8 members underwent both legs and 20 in

group-I thigh. 13 patients in group-I and 4 in group-II vein harvested site at leg and thigh (Table-2).

In the intraoperative observations, harvested time and incision closure time showed significant difference between the group-I and II with p value 0.0001. Harvested length, vein preparation time, number of grafts and number of SVG bypass not showed any significant difference (Table-3). Diabetes mellitus and obesity are most major risk factors in both groups. 6 in group-II had wound site drainage 0 in group-I. Infection is more common in group-II compared to group-I. Hematoma, infection and dehiscence are absent in group-I (Table-4).

Discussion

The two procedures will be done at the same time in an operating theatre. The whole procedure will be done under general anaesthetia . Vein harvesting can take between 30 and 60 minutes depending on how many grafts are needed and a CABG can take up to five hours in total. For more information about what will happen during the procedure, please read 'Coronary Artery Bypass Graft' factsheet. Patients will be given a copy of this during pre-operative assessment appointment. There are two different ways to remove a vein: Open vein harvesting (also known as traditional vein harvesting) For this method, we will make a large cut (approximately 25cm long) in your leg. We will then use surgical instruments to remove a section of the vein. We will then repeat this for each graft needed. To finish the procedure, we will sterilise nearby tissue and close the wound with dissolvable stitches, before covering it with a dressing and a bandage.

This method of vein harvesting can leave a visible scar on the leg. Endoscopic vein harvesting (also known as keyhole surgery) is a less invasive method of removing the veins from your legs. Rather than making a large cut in the leg, we will make a small cut (approximately 2cm long) near the knee. We will then insert a special device called an endoscope (a thin, long flexible tube with a light source and video camera at one end) into the cut. The images produced by the endoscope will appear on an external television monitor, allowing us to locate the great saphenous vein. We will then pass surgical instruments along the endoscope to remove a section of the vein. To finish the procedure, we will sterilise nearby tissue and close the wounds with dissolvable stitches, before covering the area with a dressing and a bandage.

In some cases, we may need to convert from the endoscopic method to the open method mid-procedure. If this is the case, we will explain why we had to do this after procedure. The preoperative risk factors of leg wound complications are female, diabetes mellitus, obesity and hypoalbuminemia. EVH reduced the effect of diabetes and obesity on the incidence of wound complications. EVH from the thigh may reduce the wound complications of diabetes because of vasculopathy, which is a small vessel disease, affected wound healing more below the knees

Kalra et.al[15]. The present study also showed major risk factors are diabetes mellitus, female and obesity. Another study done by Siddiqi et.al.,[16] explained that leg wound complications may be a major cause for postoperative morbidity. Infection, oedema and inflammation may be the causes for delayed wound healing. In the present study also maximum patients had infection which decrease the therapeutic outcome. Bitondo et.al.[17] explained pre and post-surgical complications can be depending on the comorbid conditions.

In his study diabetes mellitus and hypertension are major risk factors. In our study diabetes mellitus, obesity and hypertension are major risk factors. This study results showed that endoscopic surgery has more benefit and less complications compared to open surgery.

Conclusion

The study results concluded that endoscopic vein harvesting is reliable, safe and beneficial. EVS has better cosmetic, patient compliance and early mobility. This study recommend EVH has better outcome than traditional harvesting procedures.

Conflict of interest: Nil

Funding: Self

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