



**STUDY OF LEG WOUND COMPLICATIONS FOLLOWING SAPHENOUS VEIN
HARVESTING FOR CORONARY ARTERY BYPASS GRAFTING – A PROSPECTIVE
OBSERVATIONAL STUDY.**

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ABSTRACT

Background: In India CABG operations are increasing in number. Keeping up to its pace, the leg wound complications following traditional vein harvesting techniques pose a real challenge for treating dermatologists. **Aims:** To know the incidence and prevalence of various dermatological manifestations after saphenous vein harvest for CABG. To know the predictors of saphenous vein harvesting leg wound complications after CABG. **Methods:** In our institution 640 CABG with saphenous vein harvesting surgeries were done. We have conducted a study on 80 post operative patients who attended our OPD with various dermatological problems and found out the incidence and prevalence of the most commonly observed dermatological conditions. **Results:** Our study included 80 patients which is 12.5% of total CABG with saphenous graft (640), 92.5 % (74) males and 7.5 % (6) females with a mean age of 59.16±8.6 years. The commonly reported leg wound complications implicated after the saphenous vein harvesting for CABG include eczematous eruptions (30%), xerosis (27.5%), saphenous nerve neuropathy (12.5%), recurrent cellulitis (10%), hypertrophic scars (8.75%), chronic non healing ulcers (6.25%), lichenoid dermatitis (2.5%), hypohidrosis, bilateral persistent pedal edema, pretibial hair loss. **Conclusions:** These complications pose a great concern for patients in terms of morbidity which in turn has implication on cost of postoperative care of CABG patients and also on their quality of life. Early identification of patients at risk, and early administration of appropriate therapy will help in reducing the morbidity and thereby improving the quality of life among CABG patients.

KEYWORDS: CABG, Saphenous vein harvest, Leg wound complications.

INTRODUCTION

Coronary artery bypass surgery is one of the most common surgical interventions used today for the treatment of coronary artery disease. Despite increased use of arterial grafts for CABG, the greater saphenous vein still remains the most frequently employed conduit in coronary revascularization^[1] especially with triple vessel disease. Traditional longitudinal vein harvesting involves an incision that begins at the ankle and extends along the medial aspect of the leg and ends up to the level of mid thigh region. There have been reports of this saphenous vein harvest site complications in the literature from various cardiac centres across the world, recently owing to the higher prevalence rates of coronary artery disease and CABG operations. The reported incidence of these leg wound complications after GSV harvest ranges from 1% to as high as 43.8%^[2, 3]. Numerous studies have reported risk factors for the leg wound complications and impaired wound healing which

include age of the patient, female gender, hypertension, diabetes, smoking, peripheral vascular diseases, obesity, hyperlipidemia, low pre operative hematocrit and intra operative saphenous nerve injury.^[2-19] The commonly reported leg wound complications implicated include recurrent cellulites, eczematous eruptions, abscess, hematomas, lymphocele, xerosis, peri-incisional hair loss, saphenous nerve neuropathy and non healing ulcers.^[3- 19] The duration at which these complications occur has not been mentioned clearly in any of the previous studies in literature. The aim of our study is to know the incidence and prevalence of various dermatological manifestations after saphenous vein harvest for CABG. To know the predictors of leg wound complications after CABG and the duration at which these complications occur.

MATERIALS AND METHODS

Institutional ethical committee review and approval was taken and the patients who had undergone CABG with GSV grafts under cardiology department who attend Dermatology opd for some skin problem were taken as study group. This is a prospective clinical observational study conducted from March 2009 to June 2011. Consecutive patients were evaluated in the dermatology department of our hospital presenting with complications localized to the GSV harvesting site, these patients were included in the present study after taking their consent. Both male and female patients who undergone CABG with GSV grafts were included in the study. Patients with any past history of skin diseases, Peripheral neuropathy and history of previous surgical procedures on lower limbs were excluded from the study.

For all statistical analysis SPSS statistical software, version 16.0 for windows (SPSS Inc, Chicago, IL, USA) was used. Chi-square test done for statistical significance. In all instances, a $p \leq 0.05$ was considered statistically significant. Charts were prepared from Microsoft Excel 2007 version.

RESULTS

In our study 80(12.5%) patients were included who developed dermatological manifestations after surgery out of 640 patients operated and data was collected. There were 92.5 % (74) males and 7.5% (6) females, with a mean age of 59.16 ± 8.67 yrs. Maximum number of patients were in the age group between 51 – 60 years. (Table 1) Bilateral saphenous vein harvest was done in 37.5% (30) of patients and unilateral saphenous vein harvesting left side was chosen in 55% (44) and right side in 7.5% (6)

Table 1: Distribution of age as per Gender

		AGE					TOTAL
		30-40	41-50	51-60	61-70	71-80	
SEX	MALE	2	6	22	20	3	53
	FEMALE	0	1	1	1	2	5
TOTAL		2	7	23	21	5	58

Co- morbidities like hypertension was present in 76.5% (61), diabetes 55% (40), obesity 47.5% (38). History of smoking was present in 40% (32), history of alcoholism was present in 35% (28) of patients. CKD was seen in 15% (12), out of which grade 1 - 2%, grade 2 - 6.4%, grade 3- 6.6% . Preexisting peripheral vascular disease present in 3.75% (3) of patients. (Table 2)

Table 2: Incidence of various risk factors in patients underwent saphenous vein harvest for CABG.

Risk factors	Frequency	Percentage
Hypertension	61	76.5%
Diabetes	40	55%
Obesity	38	47.5%
Smoking	32	40%
Alcohol	28	35%
CKD	12	15%
PVD	3	3.75%

Eczematous lesions were the most common presentation in our study. Among the eczematous lesions, asteatotic eczema and stasis eczema were most common, followed by nummular eczema. Second most common complication which was noticed was xerosis. Other complications were saphenous neuropathy, cellulitis, hypertrophic scar, chronic non healing leg ulcers and lichenoid dermatitis. (Table 3).

Table 3: Incidence of various complications following CABG.

Complications	Frequency	Percent
Eczema	24	30%
Xerosis	22	27.5%
Saphenous neuropathy	10	12.5%
Cellulitis	8	10%
Chronic non healing ulcer	5	6.25%
Hypertrophic scar	7	8.75%
Lichenoid dermatitis	2	2.5%

In our study we found a range and mean duration of occurrence of the complications individually. Eczema which was the most common complication in our study presented with in a mean interval of 13 months (range = 1- 18 months). Xerosis which was the second most common complication presented with in a mean interval of 4 months (range = 1 – 12 months). Saphenous neuralgia was the first complication to appear in our study i.e. with a mean interval of 1 month (range = 0.5 - 2 months). Cellulites presented after a mean interval of 17 months (range = 3 – 60 months), chronic non healing ulcer appeared within 2 months (range = 2-4 months), hypertrophic scar presented at 2 months (range = 1 – 3 months), lichenoid dermatitis was noticed with a mean interval of 8.5 months (range = 5 – 12 months).

There is a statistical significance at 5% confidence interval (chi- square = 153.000, df = 81, $p = .000$) between eczematous lesions and the mean duration at which it was presented post saphenous vein harvest for CABG.

There is a statistical significance at 5% confidence interval (chi-square = 96.000, df = 36, p = .000) between xerosis and the time at which it presented post saphenous vein harvest for CABG.

There is a statistical significance at 5% confidence interval (chi-square = 16.000a, df = 4, p = .003) between

saphenous neuralgia and the time at which it presented post saphenous vein harvest for CABG.

And there is no statistically significant correlation between the incidence of hypertrophic scar, cellulites, non healing ulcer and lichenin dermatitis and the time of their appearance after saphenous vein harvesting for CABG.

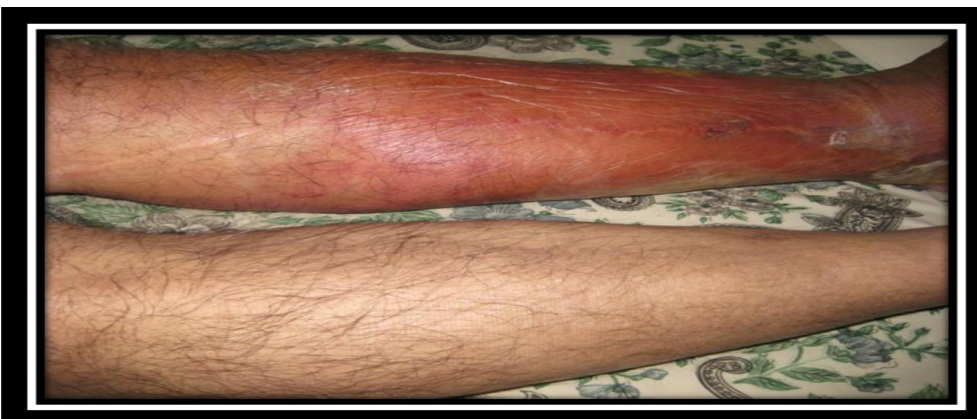
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Picture 1 Asteatotic eczema following CABG

Picture 2 Non healing ulcer following CABG

Picture 3 Cellulitis following CABG

Picture 4 Hypertrophic scar following CABG





DISCUSSION

In our study we have evaluated the demographics, preoperative co-morbid conditions and dermatological complications that arise after saphenous vein harvesting on the legs following CABG procedure. We also evaluated the incidence of various risk factors which could in many ways alter the course of normal healing of saphenous vein harvested wounds. In our study of 80 patients out of 640 (12.5%) CABG surgeries came with dermatological complications of leg wound. The initial studies done by, Keith B Allen *et al*⁶ found incidence of complications to 17.5%. Incidence of leg wound complications varied in different studies from 0.5% to 32%. This variation may be due to under reporting by the patients with minor complications. Our hospital is a tertiary care centre for cardiology. people travel over long distances and come to get operated and they might not wish to travel so long for dermatology consultations for leg wound complications which can be taken care by locally. Mean age of presentation was 59.16 + 8.67yrs. Maximum numbers of patients were in the age group between 51 – 60years, as this is the age group who are more predisposed to cardiovascular diseases.

Our study had hypertension as a primary risk factor in 77.6% of patients, which is consistent with other studies conducted by Volker *et al*⁴, Chih Hung Ku *et al*⁵, it is probably because in hypertension increased pressure within the vessels, endothelial damage occurs constantly, this leads to local intravascular activation of clotting cascade, fibrinoid necrosis of small blood vessels, release of more vasoconstrictors. This cascade of events might further cause vascular injury, tissue ischemia, and an auto regulatory dysfunction leading to wound healing disturbances and is in a way responsible for incidence of various complications. Diabetes was found to be a risk factor in 55.2% of patients which is marginally higher when compared to western studies due to more prevalence of diabetes in southern part of India.

The initial studies conducted by Volker *et al*⁴, Keith B Allen *et al*⁶, Margaret Oslenet *al*⁷, found high incidence of obesity as a risk factor, which are consistent with our study showing 46.6%, obese patients typically have more problem in wound healing when compared to

non obese patients, and more likely to develop hematoma, lymphocele, and scar dehiscence.

Smoking and Alcoholism was found in 41.4% and 29.3% respectively, smoking contribute to the leg wound complications by aggravating peripheral vascular disease.

CKD as a risk factor for wound healing was found in 13.8% of patients, Peripheral vascular disease 11.8% contribute to poor wound healing by decreasing the peripheral blood flow.

Eczematous lesions were the most common complication observed in 29.3% of patients. The possible pathogenesis for its occurrence could be due to a complex interplay between vascular and neurological structures which invariably get traumatized during the process of traditional vein harvesting. Indian study done by CR Srinivas *et al*⁸ and Sudip Kumar Gosh *et al*⁹ also found high rate of incidence of Eczema 30% & 38% respectively. The second most important complication in the region of saphenous vein harvest is Xerosis. Diuretics and statins used by patients with cardiovascular diseases contribute to the onset and the severity of xerosis. Saphenous neuropathy recently gained significance. Incidence of saphenous neuropathy as observed by CR Srinivas *et al*⁸ was 80% and only 9.5% in a similar Indian study conducted by sudip kumar Gosh *et al*⁹. Even the western studies showed variable results, our study reported incidence of 13.8%. Variable reports of incidence of saphenous neuropathy in various studies is probably misinterpretation of pain that patients generally experience due to tight elastic stockings. Incidence of cellulites is also variable in different studies, our study reported an incidence of 12.1%. Other complications like hypertrophic scar and non healing ulcer are seen in minority of patients.

All the complications are more common in patients with underlying risk factors like Elderly age group, Hypertension, Diabetes, Obesity, Peripheral vascular diseases, Smoking, Alcoholism, Chronic kidney disease, Low preoperative hematocrit levels, Intra operative saphenous nerve injury.

The mean interval between the time of CABG and the appearance of all cutaneous manifestations is 13 months for eczema (range = 1- 18 months). There might be several reasons for the long range that we observed in eczema, it might be probably because of variations in the local immunity and healing process in the elderly individuals with various underlying risk factors. The second most important complication xerosis was observed after mean interval of 4 months. Saphenous neuralgia the earliest complication reported with a mean interval of 1 month.

There was a significant statistical correlation at 5% confidence interval between the eczematous lesions ($p=.000$), xerosis ($p=.000$) and saphenous neuralgia ($p=.003$) and the mean duration at which it was presented post saphenous vein harvest for CABG.

CONCLUSION

Early identification of patients at risk, preoperative evaluation of vascularity, patient's education, selecting proper vein harvesting techniques with meticulous application, prompt recognition of complications with early administration of appropriate therapy will help in reducing the morbidity and thereby improving the quality of life among CABG patients.

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