Original Research Article

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Can vein patch interposition after sapheno-femoral ligation prevent postoperative neovascularization at the saphenofemoral junction?

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ABSTRACT

Background: Majority of recurrence of varicose veins following both primary and repeated surgery was attributable to neovascularization. The aim of this study was to evaluate the efficacy and safety of the new natural origin anatomical barrier (vein patch) in decreasing neovascularization after initial surgery.

Methods: The study included 50 patients with primary varicose vein and incompetence of SFJ. The patients are divided randomly into 2 groups, group (A) (conventional surgical group) and group (B) (barrier technique group), each one included 25 patients. In group (A) SFJ ligation with ligation of all the tributaries and stripping of great saphenous vein (GSV) in the thigh portion was done. In group (B), after conventional surgical procedure was done vein patch was taken from striped LSV. The vein patch was applied on the cribriform fascia opening. This barrier of vein patch is reinforced by good tight subcutaneous tissue suture.

Results: Neovascularization was seen on duplex in 4 (16%) limbs of group (A) conventional surgical group at one year follow up, but in group (B) barrier technique group neovascularization was seen only in one (4%) limb. Groin infection was registered in 3 (12%) limbs, 2 (8%) of them in group (A) conventional surgical group and the third one (4%) in the group (B) barrier technique group.

Conclusions: Vein patch interposition after correctly SFJ ligation seems to lower the incidence of neovascularisation after one year. This technique may constitute additional option to prevent recurrence.

Keywords: Barrier technique, Neovascularization, Recurrent varicose veins

INTRODUCTION

Now, it is known that one of the important pathophysiological mechanisms leading to recurrence of varicose veins after saphenofemoral junction (SFJ) ligation is postoperative neovascularisation at the level of the ligated saphenous stump.¹⁻⁵ Neovascularization is detected after both primary and repeat surgery. 6-13 This postoperative neovascularization at the level of the groin can be detected with duplex scanning. 14-19

Systematic use of a prosthetic patch (Silicon or PTFE) in the groin after SFJ ligation had a significant lower incidence of neovascularisation on duplex ultrasound scanning one year after SFJ ligation. However, implantation of foreign material may lead to postoperative complications.²⁰ Therefore, systematic use of a prosthetic patch in the groin after SFJ ligation remains a questionable issue.21

Efficient natural origin anatomical barrier (vein patch) might offer a valuable alternative. For the present study, the author hypothesized that formation of an anatomical barrier (vein patch) in the groin after SFJ ligation might decrease the incidence of postoperative neovascularization at the SFJ and avoid the postoperative

complications of prosthetic patch implantation in the groin. To address this issue, the author studied the incidence of postoperative neovascularization and complications after 1 year in patients who had undergone anatomical barrier (vein patch) implantation in the groin after SFJ ligation

Aim of this study was to evaluate the efficacy and safety of the vein patch implantation in the groin after, SFJ ligation. This aim is sustained by detection of the incidence of postoperative neovascularization and complications.

METHODS

This study was prospective, randomized, control, single-blind study at the level of the ultrasonographist. This study was conducted at Vascular Surgery of Sohag Faculty of Medicine, between September 2015 and October 2016. This study Included 50 limbs with primary varicose vein suffering from incompetence of the SFJ and of the main trunk of the GSV above the knee with clinical severity ranging from C2-C6 (according to CEAP classification).

Patients were randomly divided into two groups, group A and group B:

Group (A) (conventional surgical group)

SFJ ligation with ligation of all the tributaries and stripping of great saphenous vein (GSV) in the thigh portion was done

Group (B) (barrier technique group)

The same surgical procedure was applied as in group A. after that, small segment of striped LSV (3cm) in length is taken and incised longitudinally, to be changed from tube chapped vein to vein patch. The vein patch applied on the cribriform fascia opening and was fixed to its edge with a 3.0 Prolene round body needle suture. This barrier of vein patch is reinforced by good tight subcutaneous tissue suture.

N.B

In case of stripped vein diameter less than 1 cm, the vein dilated at 1st by inflation of saline into the striped vein segment before its use. Patients in both groups were given similar postoperative care including early mobilization and the use of elastic compression stockings 1 week after surgery (Figure 1-6).

Clinical assessment and duplex imaging

Clinical assessment and duplex imaging was performed at 1, 6, 12months postoperatively. Clinical assessment was done for detection of post-operative complications and thigh varicosities. Duplex imaging was used for

detection of post-operative complications and neovascularization.



Figure 1: Conventional surgical technique.

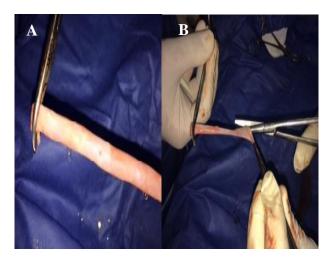


Figure 2: A) Inflation of LSV segment, B) Incision of LSV segment.



Figure 3: Vein patch.

Neovascularization

Neovascularization is defined as communicating serpentine venous tributaries that present between the CFV and the area superficial to it. Appear by duplex entering the common femoral vein at the site of the old saphenofemoral junction after calf compression or

Valsava's maneuver. If a neovascular vein was detected, its diameter and duration of reflux were measured (pathological reflux if > 0.5 sec).

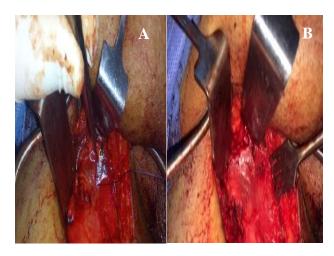


Figure 4: A) Fixation of vein patch on cribriform fascia B) Complete barrier formation by vein patch.

A duplex ultrasound grading system of neovascularization was used to describe the degree of neovascularisation.

- Grade 0: no neovascularisation
- Grade 1: <3 mm diameter vessels not connecting with any superficial vein.
- Grade 2: >3 mm diameter vessels with pathological reflux and connecting with thigh varicose veins.

This grading system has been previously applied in many other studies. ^{2,17,24}

Statistics

Data was analyzed using STATA intercooled version 14.2. Quantitative data was represented as mean, standard deviation. Data was analyzed using student t-test to compare means of two groups. Qualitative data was presented as number and percentage and compared using either Chi square test or fisher exact test. P value was considered significant if it was less than 0.05.

RESULTS

Between September 2015 and October 2016, 50 limbs (38 patients) with varicose vein met the inclusion criteria and enrolled in the current series in one of the 2 groups according to randomization schedule, 25 limbs in each group.

The baseline characteristics of the study patients

There was no significant statistically difference regarding demographic data, side involvement and clinical severity score for each group which are summarized in (Table1).

Neovascularization

Neovascularization was seen on duplex in 4 (16%) limbs of group (A) conventional surgical group at one year follow up, but in group (B) barrier technique group neovascularization was seen only in only one (4%) limb chart.¹

Table 1: Age distribution of patients.

	Group A (conventional surgical group)	Group B (barrier technique group)	P value
Mean age (in years)	30.3	29.9	0.82
Sex			
Male	10	9	0.77
Female	15	16	
Side involvement			
Rt	13	12	0.78
Lt	12	13	0.78
Clinical severity			
C2-C3	10	11	0.77
C4-C6	15	14	0.77

P value was considered significant if it was > 0.05.

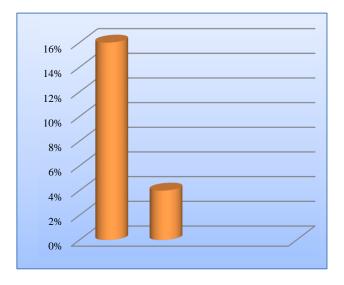


Figure 5: Total incidence of neovascularization on duplex examination in conventional surgical group and barrier technique group at one year follows up.

Complications

Groin infection was registered in 3 limbs of 3 different patients. Two (8%) of them were in limbs of group (A) conventional surgical group but, the third one (4%) in group (B) barrier technique group.

Two of the three cases were diabetic, one of them was in group (A) conventional surgical group but the other was in group (B) barrier technique group (Table 2).

Table 2: Complications.

	Group A (conventional surgical group)	Group B (barrier technique group)	P value
Complications			
Groin infection	(2/25) 8%	(1/25) 4%	1.00

DISCUSSION

This prospective, randomized control single-blind study of 50 limbs (38 patients) that divided into 2 groups 25 limbs in each. After one year, duplex revealed postoperative neovascularization at the SFJ in 16% of conventional surgical group and in 4% of barrier technique group.

The result in this study is comparable to the result that reported in many other literatures which used barrier technique either (PTFE or silicon) patch or cribriform fascia closure. 5,20-25 Vashist et al, reported in prospective randomized single blinded study, including patients with primary varicose veins, none of the 25 patients (0%) in the PTFE patch group developed neovascularization while 5 out of 25 patients (20 %) in the group in which patch was not applied showed the presence of neovascularization on ultrasonography at 1-year follow-up. Also, Creton et al reported that recurrent varico-femoral junction (RVFJ) was 4.2% after re-do surgery with PTFE patch interposition for 170 limbs with (RVFJ) at follow-up (mean 4.9 years). 20,21

Also, Van Rij et al reported in randomized control study a highly significant decrease in neovascular recurrence at the S.F.J. when a polytetrafluoroethylene patch (PTFE patch, 3×3 cm) is interposed between the ligated vein stump and the overlying soft tissue for patients presented with primary varicose vein. The 3-year recurrence was halved, from 46 % to just 23% in patients in whom PTFE patch was applied.²² In another prospective study that was done by Maeseneer et al on primary varicose veins with use of silicone implant.²⁴ Maeseneer et al has reported total incidence of the postoperative neovascularization on duplex scans reduced significantly from 17% (35 of 212 limbs) to 6% (13 of 210 limbs) one year after interposition of a silicone implant. Also, in another study which was done by Maeseneer et al, on repeated operation to treat recurrent varicose veins caused by new incompetence at the level of the saphenofemoral junction, the incidence of neovascularization that was diagnosed by duplex in silicon patch saphenoplasty group was (6%) lower than that in control group in which no additional barrier technique was used where the neovascularization was (27%).

Lastly, in prospective study that was done by Maeseneer et al on patients with primary varicose vein after closure of cribriform fascia. Maeseneer et al reported that duplex scan showed neovascularization at SFJ ligation site after closure of cribriform fascia in 15 of 223 re-examined limbs (6.7%) after one year. In that study Maeseneer et al compared cribriform fascia closure group with historical control group in which either a silicone patch saphenoplasty or no barrier technique. Neovascularization in cribriform fascia closure group was comparable to the group of 191 limbs with silicone patch saphenoplasty (5.2%) and superior to the group of 189 limbs without barrier (14.8%)

The neovascularization in this study is less than that reported in many other literatures which used barrier technique. 6,26 Bhahi, et al, reported that duplex scan showed the presence of new tributaries at the SFJ in 19% of 70 examined limbs after PTFE patch saphenoplasty to treat recurrent varicose vein.²⁶ Also, in study, that was done by Earnshaw on PTFE patch saphenoplasty for (51 primary varicose veins and 15 recurrences) to prevent neovascularization. Duplex scan revealed neovascularization at the SFJ ligation site accounted for 10 (15%) of 66 limbs after one year. This difference in the results may be due to the vein patch which was used in this study (2×3) cm, whereas in the study of Earnshaw, and Bhahi, et al the PTFE patch was (1×2) cm.

The complications detected in this study were in the form of groin infections (3/50) (6%). Groin infection was detected in 2 cases (8%) of conventional surgical group but, in one case only (4%) in barrier technique group. Two of the three cases were diabetic patients. One of these two cases was in the conventional surgical group and the other was in the barrier technique group. Also, Maeseneer et al reported that the complication rate was 28 (7.4%) and 16 (19.5%) after silicone patch saphenoplasty at the saphenofemoral junction for primary GSV surgery and repeat surgery consequently. Wound infection was registered in 13 limbs (2.8%).²⁰ lymphocele or lymphedema in the groin or thigh was present in 15 limbs (3.2%). Symptomatic or asymptomatic proximal venous thromboembolism was present in 14 limbs (3.0%) and swelling of the thigh due to important stenosis of the common femoral vein visible on duplex scan was present in 4 limbs (0.9%). Two of the latter remained symptomatic even after venoplasty and stenting of the stenosis of the common femoral vein. However, Vashist et al, Bhatti, Creton, and Van Rij reported that with use of PTFE patch no complications were detected in form of deep venous thrombosis, wound infections, lymphocele, and lymphedema. 20,26,21,22

CONCLUSION

The present study suggests a potential benefit of vein patch interposition after SFJ ligation, where this new technique lowers the incidence of neovascularization. This technique should be added to adjunctive measures as one of the armamentarium which is used to prevent neovascularization. However, long term clinical and duplex results are awaited.

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Institutional Ethics Committee

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