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ORIGINAL ARTICLE

STRIPPING VERSUS SEQUENTIAL AVULSION OF THE LONG SAPHENOUS VEIN.

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Aim: *In varicose veins, traditional surgery for long saphenous vein disease has been saphenofemoral disconnection along with stripping of the vein. This, however, can result in morbidity in the form of pain and bruising. The objective of the study is to evaluate sequential vein avulsion as an alternative to vein stripping.*
Patients and methods: *Sixty-one patients with primary varicose long saphenous vein and saphenofemoral incompetence were randomly treated by saphenofemoral flush ligation with either stripping to just below the knee or sequential avulsion.*
Results: *There was significantly more pain after stripping during the first postoperative week. The mean pain score was 50, reducing to 20 after one week after stripping compared with 20, reducing to 10, after sequential avulsion. The mean area of bruising measured after one week was 210 (range 20–1830) cm 2 for stripping and 85 (range 10–640) cm 2 for sequential avulsion. Sequential avulsion is less painful, reduces bruising and avoids a significant scar below the knee. There was no significant difference between the two methods as regards the time taken for vein removal.*
Conclusion: *Sequential avulsion avoids the inconvenient below knee scar of stripping. It is significantly less painful and causes less bruises. The length of surgery is almost the same for both methods and sequential avulsion is reliable in removing the whole LSV without complication.*

Keywords: *Primary varicose veins, venous surgery.*

INTRODUCTION

In the management of primary varicose veins of the lower limb, saphenofemoral ligation is performed where the saphenofemoral junction is incompetent and there are long saphenous system varicosities.(1) Stripping of the long saphenous vein (LSV) is important as the recurrence rate is lower than achieved by saphenofemoral ligation alone.(1–4) The vein should be stripped to just below the knee, but no further to avoid damage to the saphenous nerve. This procedure is usually followed by local avulsions of the most prominent varicosities performed through small leg incisions in the direction of Langer's lines.(1)

It has been observed that the use of a vein stripper is the main cause of pain and bruising after operation. These problems reduce mobility and prolong the return to full normal activity. In addition, a significant scar is left below the knee where the olive passes through the skin, compromising the cosmetic benefit.(5)

An alternative to stripping of the above-knee saphenous segment is to remove it sequentially using small incisions, exerting lesser trauma to surrounding tissues, and resulting in lesser bleeding and bruising.(5)

The aim of the study is to compare between stripping and sequential avulsion of the LSV in the thigh, particularly in relation to postoperative pain, bruises and the time of return to full normal activity.

PATIENTS AND METHODS

Sixty-one patients with unilateral primary varicose veins of

the LSV with saphenofemoral incompetence were randomized for removal of the LSV in the thigh either by stripping (30/61) or by sequential avulsion (31/61). Patients with saphenopopliteal incompetence were not included in the study.

Patients with comparable morbid anatomy (clinically and by duplex ultrasound) were randomized to either method. All patients underwent Duplex imaging on the Logic 500 pro GE Medical System Tokyo Japan, with a linear 7.5MHz probe. Ultrasonographic assessment was done to demonstrate saphenofemoral reflux, to exclude saphenopopliteal reflux, to map the anatomy and to image the deep system. Other aspects, apart from the method of LSV removal were standardized.

Patients were instructed as regards the different options of surgery and all the potential benefits and complications of varicose vein surgery. All surgical procedures were performed under general anaesthesia. All patients were crepe-bandaged at the end of the procedures from the metatarsal heads to the upper thigh and the bandage was left for one week to reduce haematoma formation. All patients received postoperative analgesia in the form of ibuprofen 200-mg once daily for the first 4 postoperative days. All patients went home within 24-48 h of the procedures and were given information sheets that gave standard postoperative instructions irrespective of the procedure carried out.

Stripping: The standard saphenofemoral flush ligation of the LSV was performed. The LSV was then exposed to just below the knee and a stripper wire was passed either from below or above. A medium olive was put on the lower end and was pulled proximally to lie just above the lower wound, which was then closed subcuticularly. Multiple avulsions and/or triple ligatures of varicosities in the leg were performed as necessary. Finally the stripper was withdrawn from the groin as the crepe bandages were applied. The time needed for LSV stripping was recorded, and also stated whether the vein removal was complete or not.

Sequential avulsion: The standard saphenofemoral flush ligation of the LSV was performed. The LSV was then tightly stretched in a cephalic direction. A forefinger was pushed down into the thigh posterior to the vein proximally and a simple stab was made just distal to the finger. The upper portion of the vein was then directed on to a hook and was delivered through the stab incision. The LSV was strained again by tight stretching in the thigh to be palpated about 10 cm distally. Another stab incision was made at this point and the upper portion of the vein was redelivered. This procedure was repeated sequentially down the thigh until the whole LSV was removed. Local pressure was applied to the groin wound. Multiple avulsions and/or triple ligatures of varicosities in the leg were performed as necessary and finally, crepe bandages were applied. The number of avulsion sites and the time needed for LSV removal was recorded, and also stated whether the vein removal was complete or not.

Postoperative assessment: On discharge, patients were asked to complete a postoperative symptom chart at home, which included a daily linear analogue pain score and a daily activity score. The pain score ranged from 0 to 100. Zero represented no pain while 100 the most severe pain. A score of less than 10 was graded as mild pain, a score of 10-50 was graded as moderate pain and a score of more than 50 as severe pain. The activity score ranged from 0 to 7 Table 1.

Table 1 Activity scores

Score	Activity
1	Unable to walk
2	Walks but with pain
3	Walks but not upstairs
4	Mobile at home
5	Mobile outside with difficulty
6	Freely mobile outside
7	Back to full normal activity

Patients returned after one week to have their bandages removed. The symptom charts were collected and the wounds assessed for complications of haematoma or infection. The area of bruising in the thigh was measured in two dimensions. Further assessment was made 6 weeks later for any late complications. Patients were specifically asked when they returned to work or full normal activity.

Collected data were statistically compared and analyzed for both groups. Continuous data (age, pain score, duration of stripping, area of bruising) were expressed as mean (range) and compared by two-tailed unpaired student T-test. Categorical data (going upstairs) was examined by Fisher's exact test. Probability values under 0.05 were considered significant. Statistical analysis was done using SPSS 11.5 for windows.

RESULTS

The Sixty-one patients included in the study, were 16 males and 45 females. The mean age was 43 (range 23–62) years. There was no significant age or sex difference between the two groups. 30/61 underwent stripping and 31/61 underwent sequential avulsion.

The mean time for LSV removal from the thigh for both methods was almost the same, 7 (range 5–10) min. Failure of passage of the wire from above or below occurred in three patients undergoing stripping due to the tortuosity of the vein. Failure of complete removal of the LSV occurred

in two patients undergoing sequential avulsion and in one patient undergoing stripping.

The mean number of avulsion sites in the thigh for sequential avulsion of the LSV was 5 (range 4–7). The mean number of avulsions and/or triple ligatures of varicosities in the leg for each method was the same number 8.

On the first postoperative day, the mean pain score was 50 for stripping and 20 for sequential avulsion ($p<0.001$). The number of patients experiencing no pain on the first postoperative day was 3/30 for stripping and 9/31 for sequential avulsion. During the first postoperative week, the pain gradually diminished in both groups. The mean pain score reached 20 for stripping and 10 for sequential avulsion by the end of the week ($p<0.05$). (Fig. 1).

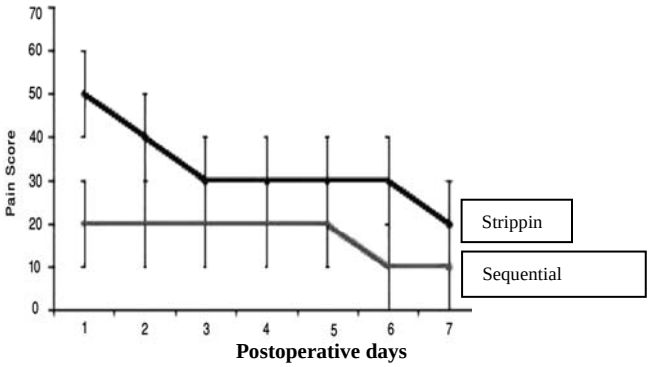

Fig 1. Mean pain scores

By comparing and analyzing the activity scores (Figs. 2,3), it was found that on the first postoperative day 10/30 patients who underwent stripping were not capable of going upstairs, compared to 5/31 patients who underwent sequential avulsion. There was no significant difference in activity of patients over the whole week for both methods. By the end of the week 72% of patients (44/61) were fully mobile outdoors. 35/47 (74%) of those in employment returned to work within 2 weeks.

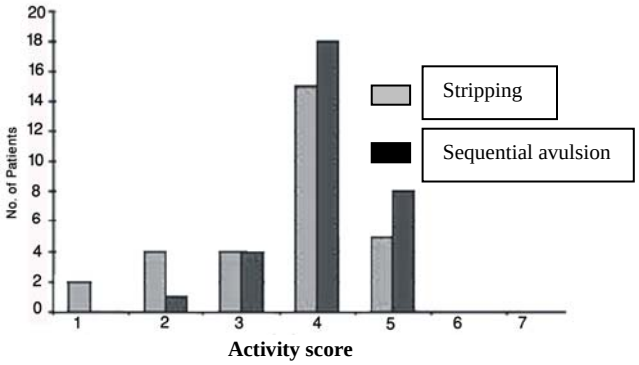

Fig 2. Activity score on the 1st postoperative day

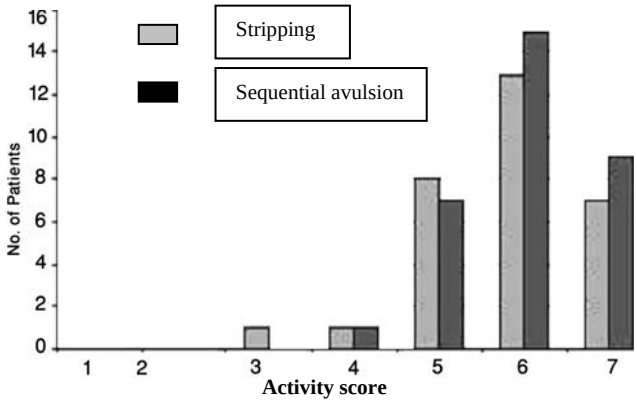

Fig 3. Activity score on the 7th postoperative day

After one week, the measured area of bruising in the thigh ranged from 20 to 1830 (mean 210) cm2 for stripping and from 10 to 640 (mean 85) cm2 for sequential avulsion (P, 0·01).

Three patients had minor sensory loss in the distribution of the saphenous nerve. Two underwent stripping and one underwent sequential avulsion.

DISCUSSION

Saphenofemoral valvular incompetence as cited by Trendelenburg is probably a secondary effect in the aetiology of varicose veins, being the result of ascending reflux caused by a primary wall structural defect. The features of reduced collagen and increased muscle and hexosamine content suggest the primary structural abnormality of the vein wall.[1] In management, stripping is important as the recurrence rate is lower (18.7%) than achieved by saphenofemoral ligation alone (35.1%).[3] If the LSV is not removed, there is retrograde flow in 45% of residual LSVs.[2,3] Recurrence is also reduced by good preoperative assessment of the sites of incompetence and appropriate surgical attention to the saphenofemoral junction site.[4]

Stripping is associated with pain, bruising and perhaps a below knee inconvenient scar. Several modified methods were introduced by several authors to overcome the below knee scar such as cryostripping, pin-stripping and tying the stripper with inversion.[6-8] Another study demonstrated that with any method of removing varicose veins, high-compression adhesive bandages instead of crepe bandage could significantly reduce postoperative bleeding and pain.[9]

In this study, all aspects apart from the method of LSV removal were standardized including analgesia. The number of patients experiencing no pain on the first postoperative day was 3/30 for stripping compared to 9/31 for sequential avulsion and 10/30 patients who underwent

stripping were not capable of going upstairs, compared to 5/31 patients who underwent sequential avulsion. After one week, the measured area of bruising in the thigh for sequential avulsion was less than half of that for stripping.

The previous results may be explained by that sequential avulsion requires little force compared to stripping. The force exerted on a segment during avulsion is very little, thus the procedure is less painful and less traumatizing. During avulsion, side tributaries are avulsed separately and go into spasm some distance away from the main track of the LSV itself. Thus the procedure is accompanied by less bleeding and bruising.

In this study, there was inadequate time for patients to forget how painful or debilitating the procedures had been, since the pain and activity score sheets were collected at the end of the first postoperative week and before the removal of bandages.

Sequential avulsion avoids the inconvenient below knee scar of stripping. It is significantly less painful and causes less bruises. The length of surgery is almost the same for both methods and sequential avulsion is reliable in removing the whole LSV without complication.

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