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## Comparative study of conventional stripping versus invagination stripping in varicose vein surgery

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### Abstract

Varicosity of lower limb develops in a very slow process, asymptomatic and probably harmless and only when the complications of Varicosity like Pain, Edema, Ulcer, Skin changes and thrombosis occur, and then the patients present themselves for the relief. Commonly this problem is tackled either by a conservative approach or by surgical interference, both of which have their limitations. Each patient with a typical history of symptomatic varicosity was subjected to physical examination and preliminary investigations. History and examinations were completed as mentioned in the proforma. The patient was examined in standing position with good illumination, exposing both the lower limbs completely. Duration of surgery is statistically similar in two groups with  $P = 0.792$ . Six of the conventional group patient developed hematoma postoperatively which was drained immediately, out of these six patients two wounds got infected which were managed successfully with sensitive antibiotics and clean dressing. None of the patients in invagination group had hematoma or wound infection.

The duration of stay in the hospital was almost similar in the both study group. Mean duration of stay in conventional group was 5.8 days and 5days in invagination group.

**Keywords:** Conventional Stripping, Invagination Stripping, Varicose Vein Surgery

### Introduction

Varicose veins can be better defined as 'a superficial vein of the lower limb, which has permanently lost its valvular efficiency, and as a product of the resultant venous hypertension in the standing position becomes dilated, tortuous and thickened' [1].

The upright posture which the man adapted as he evolved from primates made him vulnerable to the disease. The venous system of the dependent limb was the first to bear the burden of posture and blood has to be forced to the heart chamber against gravity [2].

To achieve this aim the human lower limbs adapted themselves to carry out the task by adopting various mechanisms which included division of the column of blood to segments by valves, constant muscular activity especially of the calf muscle to 'pump' the blood in the direction of heart, Intrathoracic negative pressure to 'suck' the blood up, the capillary pressure which 'pushes' the blood forwards and the pressure grade in the blood vessel.

Thus failure of any of these mechanisms may cause venous hypertension which may be the beginning of the onset of Varicosity [3].

The Edinburgh Venous study (EVS) published in 1998 examined over 1500 adults in UK showed that 39.7% of men and 32.2% of women had a dilated tortuous trunk of the long and/or short saphenous vein and their first or second order branches. The prevalence of webs or small reticular varicosities was even higher at over 80% for both males and females.

Although it was previously believed that varicose veins are more common in women, few other population studies confirm that varicose veins are at least as common in men.

Varicosity of lower limb develops in a very slow process, asymptomatic and probably harmless and only when the complications of Varicosity like Pain, Edema, Ulcer, Skin changes and thrombosis occur, and then the patients present themselves for the relief. Commonly this problem is tackled either by a conservative approach or by surgical interference, both of which have their limitations [4].

In this study comparison is done with one of the commonly performed varicose vein surgery i.e conventional stripping of long saphenous vein and invagination stripping.

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**Methodology**

Each patient with a typical history of symptomatic varicosis was subjected to physical examination and preliminary investigations.

History and examinations were completed as mentioned in the proforma. The patient was examined in standing position with good illumination, exposing both the lower limbs completely.

**Duplex scan**

Duplex scan is done to know the saphenofemoral junction incompetence, perforator incompetence and reflux site of perforators are marked pre operatively.

**Operative procedures**

**Conventional stripping**

After the incision through the skin has been made, the incision is carried straight down until the superficial fascia is encountered. This is opened by a stroke of the knife. The saphenous vein lies deep to this layer. When this layer has been opened, a small guage swab is taken and quite firmly wiped upwards and then downwards in the wound. This simple manoeuvre exposes the whole saphenofemoral junction rapidly, and safely, and avoids cutting lymphatics and small arteries.

Once long saphenous vein is identified, the fascia immediately outside the vein wall is dissected carefully with forceps. The saphena magna and its radicals are dissected steadily until the faint white line indicating the union with the femoral vein is seen just inside the foramen ovale. The femoral vein is exposed for 0.5 to 1 cm. above and below the foramen ovale and for half of its circumference.

When all the tributaries are defined, they are divided between ligatures. The outer ligatures are cut short but those on the long saphenous vein are held long, for traction on them elevates it to the surface and facilitates the operation.

The end of the long saphenous vein is ligated with stout silk or linen thread. To make the saphenous stump safe, a second ligature is applied to it, or better still, it is transfixed with fine silk or thread, and tied as is a hernial sac. Before trying the end of the saphenous vein, the femoral vein is excluded or else it may be mistaken for saphenous.

Stripping is possible because the saphenous trunk itself, remains relatively straight on the deep fascia. A stripper can, therefore, be introduced and made to pass along the whole length of the vein from above downwards.

The small tip is passed into the cut end of the saphenous vein at the groin, and the stripper is gently passed down the limb. To get it past the remains of valves and varies in the wall of the vein, gentle 'shaking' of the stripper up and down the vein a few times is done.

The end of the stripper is advanced to the below knee where it is cut down upon through a small transverse incision. When the stripper is extruded from the vein, the distal part of the vein going down towards the foot is divided and tied off. Then the acorn is firmly tied in the vein at the groin and the whole stripper is gently and firmly withdrawn with the vein above downwards.

The stripper track is compressed gently with a big swab or rolled towel for about three minutes while coagulation occurs and the torn off branches contract and then the clot is massaged from out of the track first down, then upwards.

**Invagination Stripping**

In patients undergoing an invaginated strip, a similar stripper

was used with a smallest available acorn. After disconnection, the GSV was tied to the stripper, and by pulling the stripper toward the foot, the first side branch forces the GSV to invaginate. Once retrieved outside the lower leg, the invaginated vein was checked for completeness. Blood that subsequently accumulated in the subcutaneous upper-leg tunnel was rolled toward the groin using a 10 x 20-cm gauze. Weighed dry gauzes were then used to absorb these small inguinal pools of blood. This procedure was repeated twice within 30 s following the stripping procedure. All bloody gauzes were weighed again and blood loss was calculated by subtraction.

**Results**

**Groups of patients studied**

**Table 1:** Comparison of duration of surgery in two

Duration of surgery	Conventional		Invagination	
	No	%	No	%
60-72mins	13	43.3	10	33.3
72-90mins	16	43.3	19	63.3
>90mins	1	3.3	1	3.3
<b>Total</b>	30	100.0	30	100.0

Duration of surgery is statistically similar in two groups with P = 0.792

**Groups of patients studied**

**Table 2:** Comparison of length stripped in two

Length stripped	Conventional		Invagination	
	No	%	No	%
<40 cm	14	46.7	9	30.0
>40 cm	16	53.3	21	70.0
<b>Total</b>	30	100.0	30	100.0

Length stripped is statistically similar in two groups with p=0.288

**Table 3:** Comparison of amount of blood loss in ml in two groups of patients studied

Amount of blood loss (GRM)	Conventional		Invagination	
	No	%	No	%
<20	0	0.0	2	6.7
20-30	8	26.7	28	93.3
>30	22	73.3	0	0.0
<b>Total</b>	30	100.0	30	100.0

Amount of blood loss is significantly less in Invagination groups with p<0.001\*\*

**Discussion**

Surgery is superior to conservative measures in the treatment of uncomplicated varicose veins [1]. Moreover, symptomatic saphenous vein varicosis is effectively treated with saphenofemoral ligation, but more so in combination with removal of a portion of the insufficient GSV [5]. Ideally, a short portion of the GSV is to be pulled out (stripped) from the groin to just below knee level, as this will minimize saphenous nerve damage. However, the best technique of stripping is still uncertain and open to discussion. Many advocate conventional surgery using acorns mounted on a stripper [6, 7], whereas others favor some form of invagination [6].

The concept of vein removal by invagination is attractive. A conventional strip may result in a "thick wrap of vein mounted on an oversized acorn" that is pulled toward the knee while damaging surrounding tissue, including nerves and lymphatics [7, 8]. Vein and acorn are usually removed via an additional infraglenal incision, although a separate tie fixed to the acorn

may be used to draw the complex back into the groin wound, thus limiting the length of the infraglenar wound. Invagination proponents have claimed superiority of their technique but studies usually have limited evidence

Two randomized trials yielded conflicting results [9]. Interestingly, a frequently used vascular reference book has introduced invagination as the gold standard surgical technique for GSV varicosis, although studies on long term results are absent [10].

Most studies on invagination suggest that there is attenuated blood loss following inverted stripping. However, volume of blood loss was measured in one study only, and this report indeed demonstrated a 50% reduction in blood loss.

Postoperative hematoma surface as a possible reflector of total blood loss was similar in three randomized studies. One study measuring clot formation using a red blood cell labeling technique demonstrated that venous inversion resulted in diminished thigh blood pooling compared to conventional stripping [11, 12].

In the present study it was decided to define intraoperative blood loss as the total amount that was obtained from the groin following three rolling maneuvers at upper-leg level immediately following removal of the stripper.

In the present study there was no significant difference in the duration of surgery done, as there is no major difference in the technique. Invagination stripping done with a smallest mounted acorn as compared to conventional technique.

There was no difference in length of vein stripped, because in both the groups the great saphenous vein was stripped from groin to just below the knee.

The amount of blood loss was calculated by subtracting wet mop from dry mop weight was significantly high in conventional group than in invagination group, 34grm in conventional and 22.5grm in invagination group. This was statistically significant. Post-operative pain was analyzed by using visual analog score (VAS) at 24 hours and 48 hours and in our study invagination group complained of less pain compared conventional group. None of the patients in our study had nerve damage.

Six of the conventional group patient developed hematoma postoperatively which was drained immediately, out of these six patients two wounds got infected which were managed successfully with sensitive antibiotics and clean dressing. None of the patients in invagination group had hematoma or wound infection.

The duration of stay in the hospital was almost similar in the both study group. Mean duration of stay in conventional group was 5.8 days and 5 days in invagination group.

In conclusion, invagination of the great saphenous vein is associated with less surgical damage compared to conventional stripping techniques.

### Conclusion

There is no significant difference in both the methods with respect to duration of surgery, hospital stay, wound infection and nerve damage.

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