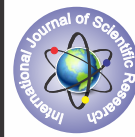


MODIFIED TRENDLENBERG SURGERY IN SYMPTOMATIC VENOUS DISEASE



Medical Science

KEYWORDS: Modified Trendlenberg surgery, CVI, CEAP Classification

Dr Sandeep Mahapatra

MS, DNB (Vascular Surgery), Assistant Professor, Department of vascular surgery, Nizam's Institute of Medical Sciences, Hyderabad

Dr Anusha Arumalla

MS, DNB Resident, Department of vascular surgery, Nizam's Institute of Medical Sciences, Hyderabad

Dr Muneer Ahmed Para

MS, DNB Resident, Department of vascular surgery, Nizam's Institute of Medical Sciences, Hyderabad

Prof Pinjala Ramakrishna

MS, FRCS, Prof and Head, Department of vascular surgery, Nizam's Institute of Medical Sciences, Hyderabad

ABSTRACT

Introduction: Venous disease claim fifty percent of the outpatient disease burden in a government hospital.

Materials and methods: We analyzed 142 patients who underwent Modified Trendlenberg procedure for symptomatic varicose veins with or without ulcer for a period of one year. The cost benefit analysis was done for the patients undergoing surgery with one year follow up.

Results: 98 patients were between 26 to 50 years of productive age group, with majority being in low socio economic status. 85% (120) were men and 56 patients had venous ulcer. High ligation and stripping of the GSV with avulsion of the varicosities was the commonly performed surgery. The patients on follow up Doppler show minimal varicosities in calf, with 12 patients requiring sclerotherapy on outpatient basis. All the patients with ulcers (56) had healing of the ulcer with quick return to work. 35 patients had minor complications of any sort.

Analysis: American venous forum upholds the role of surgery in C2-C3 venous disease. ESCHAR trial and the recommendation of American venous forum for symptomatic venous disease in C4-C6 advocate favourably to the role of venous surgery. The endovenous procedures, being effective and less morbid is being favoured worldwide, but the cost still remains a concern for the poor.

Conclusion: For the health care providing institutions catering the services for the public in general, trendlenberg surgery still stand as a cost effective procedure of choice for symptomatic venous disease.

Introduction: Varicose veins are well described in the literature since the days of Charaka and Sushruta. The complications of the disease and the different modalities of management of the disease have seen a dramatic change over a period of centuries. Science has evolved over years in better understanding of the disease and its management. The classic mid thigh Trendlenberg surgery is now practiced as a modified surgery with SFJ ligation in groin with the stripping of the GSV from the thigh coupled with ambulatory phlebectomy for the incompetent perforators. Minimally invasive procedures like thermal ablation of the superficial veins with or without sclerotherapy is compared against the Gold standard modified Trendlenberg procedure for epidemiological purposes. In Tertiary care Government hospitals, open modified Trendlenberg surgery still stands as a procedure of choice.

Materials and Methods:

We have done a retrospective study on 142 patients of symptomatic venous disease who underwent Trendlenberg surgery for the varicosities over a period of one year. We had followed them for next five years following surgery and a demographic analysis was made for its outcome

Aims & Objectives:

A) To study the procedural details of the patients undergoing varicose vein surgery in our institution

B) To analyze the peri-operative complications

Results: Patients ranging between 18 to 70 were included in the study (Table 1). The pregnant ladies, children and the patients with Peripheral Vascular Disease were excluded from the study.

Table 1: Demographic profile of Age & Range of the patients undergoing varicose vein surgery

AGE	RANGE
1-25	06
26-50	98
50-75	38
>75	-
TOTAL	142

28 patients were found to have diabetic and 43 patients were found to be diabetic and hypertensive respectively. On an average, we have operated the patients between 40 to 60 kg body weight (Table 2). Morbid obese patients were managed mostly conservatively.

Table 2: Distribution of patients according to the body weight:

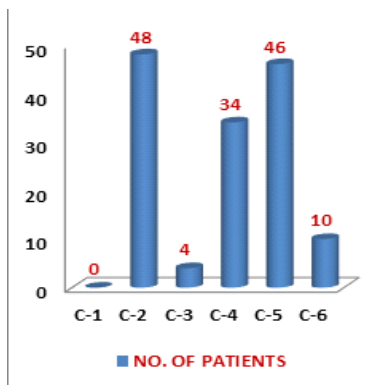
WEIGHT(Kgs)	NUMBER
<40	4
40-60	76
60-80	44
80-100	18

The disease seems to be distributed equally in both the lower limbs. There is a clear male preponderance in the disease distribution (122 out of 142 patients), probably related to the job profile and outdoor long standing activities. Out of 142 patients, 56 patients presented with severe form of chronic venous disease in the form of either healed or active ulceration. The patients for varicose vein open surgery were staged as per CEAP classification (Clinical, Etiological, Anatomical or Pathological) based on their disease severity. The patients with either healed or active ulceration are ascribed to have

severe form of chronic venous disease.

On segregation of the patients of varicose vein surgery (Table 3) 48 patients presented with disfiguring varicosities, 46 patients with healed ulcerations, 34 patients with eczematous skin changes, 10 with active ulcerations. Superficial venous system involvement was noted in 134 patients out of. In fact, the rest 8 patients had deeper venous reflux in addition to the superficial venous reflux. 122 patients had duplex documented reflux, 14 had obstruction to venous outflow (Either partial obstruction in deeper venous system or thrombosed superficial venous system). 8 patients had both obstruction in the superficial venous system and reflux.

Table 3: CEAP staging of the patients undergoing surgery



Spinal anaesthesia is the most preferred anaesthesia in patients undergoing varicose vein surgery (130 out of 142 patients, 81%). 124 patients underwent AFJ ligation, 14 patients underwent SPJ ligation and in 4 patients, both SFJ and SPJ ligation was carried out.

High ligation with crosssectomy was done in 100 patients undergoing varicose vein surgery. In rest 28 patients, crosssectomy was not done. 124 patients underwent GSV stripping in the entire extent of the thigh. Due to small size, 4 patients did not undergo GSV stripping. As a routine practice, 136 patients had undergone perforator ligation. Out of 56 patients, 32 patients had ulcers with slough requiring surgical debridement, the rest was managed medically with application of compression bandages post procedure. Only 4 patients required skin grafting for the ulcers.

Complications:

As a routine practice, we follow the patients with colour Doppler every 6 months to see any recanalization. The patients were followed up after one year to assess the results of the surgery. There was overall improvement in the symptoms. There were no bleeding incidences following the surgery. The oedema secondary to the venous hypertension improved, without any dragging sensation and enabling them fit to join the duties. The complications were analyzed in terms of bleeding, echymosis, infection, ulceration, DVT, Lymphorrhoea. Echymosis was found to be the most common complication, which usually disappeared few days after surgery (Table 4). The most troublesome complication was Lymphorrhoea, requiring prolonged medication, regular dressings for a longer period of time. The other complications are minor that resolve over a small period of time.

Table 4: Complications of Trendlenberg varicose vein surgery:

COMPLICATIONS	N=33
BLEEDING	04
ECHYMOSIS	12
INFECTION	08
ULCERATION	04
DVT	01
LYMPHORRHOEA	04

Discussion:

The basis of surgery of great saphenous vein insufficiency is the concept coined by Friedrich Trendelenburg in 1891. Over the years varicose vein stripping was modified to finally result in the highly effective concept of crosssectomy at the groin and stripping. For decades this has been the Gold standard in surgery of varicose vein insufficiency. All the other minimally invasive therapeutic techniques which have been developed in the last decades had to compete with crosssectomy and stripping. For a minority of patients with specific anatomical pathologies as well as countries with limited health resources, Modified Trendlenberg vein stripping with crosssectomy remained as a surgical standard procedure.

Varicose veins are one of the most common conditions and affect approximately 25% of the adult population.¹ Conventional surgery involves saphenofemoral or saphenopopliteal disconnection, stripping of the great saphenous vein (GSV) with avulsion of superficial varicosities. This circumvents venous reflux during exercise allowing the calf pump to reduce superficial venous pressure to near-normal levels as in healthy volunteers. GSV stripping is usually associated with better immediate results with a reduction in the long-term recurrence and risk of recurrence.^{1,2} It is not advisable to strip the GSV below the knee where the perforators are connected to the posterior arch circulation. Moreover, below-knee stripping increases the risk of saphenous nerve injury that closely runs with the GSV.

The main reason for stripping the GSV is to prevent recurrence by disconnecting thigh perforators and reducing the chance of groin recurrence can be explained either through cross-groin collateral pathways or neovascularization.^{3,4,5} The common clinical understanding is that recurrent GSV varicosities are frequently associated with failure to strip the GSV in the thigh. The stripping of the GSV reduces the incidence rate of recurrence has recently been confirmed by a randomized controlled trial.⁶ However, the fact remains that many surgeons may not routinely perform stripping as part of their standard operative approach. This may be for one or more of the following reasons: a. concern that stripping will increase the short-term morbidity of the operation because of pain and hematoma b. this will increase the length of the surgery c. this will increase the length of stay in hospital d. this may lead to a reduction in the number of patients that can be dealt with satisfactorily as day care surgical procedure.

Although, in most cases, stripping is a straightforward procedure, experience and present data suggests that it is not always successful or complete. It might relate to hemodynamic or cosmetic factors. The available wisdom says that: shorter the column of blood left refluxing in the saphenous system, the greater the expected beneficial effect on ambulatory venous pressure. Patients who were stripped had a significant reduction in proximal SFV reflux, and popliteal vein reflux. However, the disease got worsened in the incompletely stripped group. Successful stripping of the thigh GSV also led to a significant reduction in reflux in the below knee GSV, which had been previously shown by another group.⁷ Stripping improves the cosmetic outcome of the operation by providing a more complete and durable removal of varicosities.

On follow up visits, patients complain of paresthesia as the result of saphenous nerve injury. Although for most patients this is not a major source of symptoms, a small proportion of patients can be distressed by it and an even smaller number have chronic neuritic pain develop. The neuritic pain is difficult to eradicate in the immediate post operative period. The incidence rate of injury can be reduced by stripping only to the knee and possibly by using the inversion technique.^{8,9}

Publications dealing with the complications of varicose vein surgery have generally focused on particular aspects such as vascular or nerve injury.^{10, 11, 12, 13, 14} By contrast, Hagemuller presents figures from his own unit extrapolated the results on a national basis¹⁵. Many

patients, and probably many medical practitioners, regard varicose vein surgery as essentially simple. However, the complications can be quite disturbing and challenging too. The incidence of wound complications was 4.2% of all limbs and is within the limits usually cited for clean surgery¹⁶. No attempt was made to distinguish between haematoma, cellulitis or abscess, as in varicose vein surgery infection is usually preceded by haematoma formation. Leakage of lymph from the groin only occurred in cases requiring reexplorations, with an incidence of 4 in 142 limbs. Reexploration of the groin for recurrence is a potentially dangerous procedure. Unnecessary reexploration is best to be avoided as there is a higher risk of haematoma formation, infection, lymphatic fistula and venous injury than in primary surgery. It is also observed that management of a lymphatic leak may be extremely difficult in spite of all measures to stop it. Some respond quickly to a few sutures placed under local anaesthesia, but we have encountered leaks from the groin lasting 4-6 weeks. The perpetually wet groin and leg is of equal embarrassment to the patient and the surgeon in spite of sclerosants employed to seal off the lymphatic tracts. Repeated operations on the groin cause major interruption to the lymphatics and are a recognised cause of lymphoedema¹⁷.

Negus¹⁹ recorded an incidence of 4.2% in a retrospective study on patients having limited long saphenous vein stripping to below the knee. In a prospective controlled study, Holme et al.¹⁸ found saphenous nerve injury in 7% of patients having stripping to below the knee and in 39% of patients having stripping to the ankle. Our figure is comparably less than the literature, by applying the results from the previous studies. The literature does not provide data on the incidence of major neurological injury.

We report a low incidence of thromboembolic complications. (1 in 142 cases). Hagemuller¹⁵ suggests a much lower incidence at 0.15% for deep venous thrombosis and 0.06% for pulmonary embolism. We do not advocate routine anticoagulation, contrary to the cited literature²⁰. He has also suggested that, in the Federal Republic of Germany, about 50 femoral vein injuries occurred annually from varicose vein surgery, estimated about 50 000 varicose vein operations per annum, giving a risk of 0.1%.

Hagemuller¹⁵ reported an annual incidence of 10 cases of arterial injury after varicose vein surgery in the Federal Republic of Germany. This gives an incidence of 0.02%, implying that venous injury is five times more common than arterial injury. Ligation of the femoral or popliteal arteries as well as arterial stripping are described²¹. We were fortunate enough not to have any arterial injury in the cases done at our institute. It has been suggested that these catastrophes occur in operations carried out by inexperienced surgeons who are still in training²¹.

Other complications are recognized but are beyond the scope of this paper as they would require careful prospective study. These include residual and recurrent varicosities, keloid scars and the troublesome venous flares which sometimes appear around the phlebectomy scars. This paper shows that the risks of varicose vein surgery are trivial in nature and that a complication of some sort occurred in 35 out of 142 patients (24.6%). Many of the minor complications that can be managed effectively.

Evidence Based recommendations from American Venous Forum in C2-C3 suggested advantage of :a.Surgery over conservative (1B) b. Ambulatory phlebectomy over Sclerotherapy (1B) with no need for thrombosis prophylaxis in all modalities without risk factor (1C) . Evidence Based recommendations from American Venous Forum in C4-C6 till Ulceration also suggested advantage of a.Surgery over conservative (1A)b.Endovenous Laser(1C) In preventing Ulcer Recurrence.^{22,23}. This is being adopted in our study for all the patients undergoing modified Trendelenberg surgery.

REACTIV trial showed that at 2 years of follow up, the patients undergoing high ligation and Stripping were found to have better

symptomatic relief, cosmetic relief and more improvement in the quality of life²⁴. Randomized control trial conducted by Rasmussen et al showed that the recurrence in high ligation and stripping was found to be lower than the endovenous procedures(4.8% vs 5.8%, p value <0.001)²⁵. This again strengthens our procedure in this part of the country.

Conclusion:

The modified trendelenberg procedure for varicose veins is still a age old cost effective procedure in this part of the country. The complications from the surgery are minor and are usually neither limb nor life threatening. However, judicious case selection in trained hands can give the results at par with the minimally invasive ablative procedures.

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