

Surgical Treatment of Incompetent Perforator Veins by Subfascial Ligation

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ABSTRACT

Background: Chronic venous ulceration of the leg is a common presentation in surgical clinics. Although, the majority of ulcers can be healed by simple compression. Some chronic ulcers with venous incompetencies require correction surgeries. We in the current study tried to study the role of Cockett and Dodd's operation of subfascial ligation of below-knee perforator veins in the treatment of varicose veins of the lower limbs.

Methods: This cross-sectional study was done in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. N=40 cases of varicosities of the lower limbs with perforator incompetence with or without saphenofemoral incompetence. The patients were treated with perforator ligation alone with the Cockett and Dodd method or in combination with the stripping procedure.

Results: The clinical classification shows C5 healed venous ulcers and C6 active venous ulcers. 64% of cases belonged to these two categories and no case of C1 was found in our study. Perforator incompetence only was found in n=25 cases where perforator ligation alone was done given in table 4. In n=15 cases, perforator ligation and stripping with or without ligation of sphenopopliteal junction was done. The minimal mean duration of stay was 5.5 days the maximal mean duration of stay was 8.0 days.

Conclusion: Open subfascial perforator ligation by Cockett and Dodd's procedure is a good procedure in the treatment of primary varicose veins with perforator incompetence. The rates of complications can be largely reduced by careful patient selection and skill full operative techniques. Follow-up of patients must be done at intervals for the development of new incompetent perforating veins and varicosities which may lead to the recurrence of ulcer formation.

Keywords: Subfascial ligation, varicose veins, Cockett and Dodd's method

INTRODUCTION

The first described case of varicose veins was by Sushruta in the second volume of his work Samhita, who discussed siragranthi or "aneurysms of veins" ^[1]. Hippocrates (460-377 B.C.) cauterized varicose veins with a hot iron rod. In his works, he has described a lot of cases of venous disease of the lower limbs.^[2]Porter et al; ^[3] have classified varicose veins into seven classes according to the clinical signs and severity and disability rating scales. Varicose veins are defined as dilated usually tortuous subcutaneous veins of more than 3mm diameter when measured in an upright position and demonstrable reflux. 4. They are the result of prolonged erect posture. The risk of varicose veins is greater in females affects 25 – 30% of the population and males up to 15%. ^[4] The risk factors for the development of varicose veins are advancing age, female gender, heredity, and history of trauma to the extremity. ^[5]The presence of varicose veins causes the development of symptoms of which most common being the aching or heaviness, gradually increasing throughout the day. Other symptoms include ankle swelling and itching. 4 sometimes a burning sensation called venous neuropathy also occurs in some cases with advanced venous insufficiency. ^[5]The signs include dilated tortuous veins, telangiectasis, and fine reticular varicosities. The competency of the venous system effected in the superficial venous system, deep venous system, or perforating veins. If the incompetent perforators are not properly localized and ligated, they may complete the circuit of varicose veins draining blood from deep to superficial venous system leading to recurrence. ^[6]The clinical examination is done for localization of the site of incompetence to determine superficial or deep veins involved. In the superficial system, the problem usually occurs in the saphenofemoral or saphenopopliteal junction or at the perforator level. The test to determine it is Brodie Trendelenburg test, Tourniquet test, Perth's test, Schwartz test, Pratt's test, and Fegan's test. The clinical tests are combined with other diagnostic modalities

such as duplex ultrasound imaging which can exactly identify the incompetent sites and minimally invasive surgeries can be performed. [7] with this background, we in this study tried to determine the role of Cockett and Dodd operation of subfascial ligation of below-knee perforator veins in the treatment of varicose veins of the lower limb.

Material and Methods

This prospective study was conducted in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Written consent was obtained from all the participants of the study.

Inclusion criteria

1. Patients diagnosed with primary varicosities of the great or small saphenous system with perforator incompetence.
2. Patients were willing to voluntarily participate in the study.

Exclusion criteria

1. Patients with varicose veins not having perforator vein incompetence (those with
2. saphenofemoral or saphenopopliteal incompetence only) where not included in the study.
3. Patients with deep venous thrombosis were excluded from the study.

A thorough history and clinical examination were done to assess the venous system. The location of the varicosities, the presence or absence of skin pigmentation, edema, dermatitis, ulceration, etc. They were subjected to routine biochemical investigations (complete blood picture, complete urine exam, random blood sugar, blood urea, serum creatinine)

and routine imaging (Chest Roentgenogram), and an electrocardiogram. A Duplex study of the venous system was done preoperatively to assess the extent of the varicosities, the presence or absence of saphenofemoral incompetence, saphenopopliteal incompetence, perforator vein incompetence, and the status of the deep veins. Those patients without perforator incompetence were excluded from the study. For patients with venous ulceration, conservative management with daily saline dressings and elastocrepe bandage application was done till the active infection subsided. Patients were taken up for surgery once the inflammation and infection subsided and the ulcer floor was clean and granulating. Patients were not made to wait until complete healing of the ulcer. All patients were operated on in elective operating rooms with strict aseptic precautions. Anesthesia used was spinal anesthesia in all the patients. They were treated with perforator ligation alone or perforator ligation plus stripping and saphenopopliteal ligation wherever applicable. Perforator ligation was done by the Cockett and Dodd method. [8, 9]

Results

Out of the total of n=40 cases, n=36 (90%) patients were male and n=4 (10%) patients were females. The mean age group in male cases was 61.5 ± 2.5 years and the mean age of females was 57.5 ± 1.5 years. The youngest male case was 45.0 years and oldest was 69.5 years and the youngest female patient was 48.5 years and the oldest was 66.5 years. Although both sides were almost equally involved predominance of the left side was in 47.5% of cases and bilateral involvement was in 10% of cases depicted in table 1.

Table 1: Side involved in the cases of study

Side involved	frequency	percentage
Right lower limb	17	42.5
Left lower limb	19	47.5
Bilateral	4	10.0
Total	40	100

The clinical classification depicted in table 2 shows C5 healed venous ulcers and C6 active venous ulcers. 64% of cases

belonged to these two categories and no case of C1 was found in our study.

Table 2: Clinical classification of varicose veins

Clinical classification	Frequency	percentage
C1	0	0.00
C2	6	15.0
C3	5	12.5

C4	5	12.5
C5	8	24.0
C6	16	40.0

The etiological classification showed in table 3 all the 100% cases were Ep (primary category) of ulcers. Based on the anatomical classification perforator veins were involved most

commonly in 62.5% of cases. Based on the pathophysiological classification the 100% of cases were of reflux causes.

Table 3: Etiological, anatomical, and pathophysiological classification

Etiological Classification		
Class	frequency	percentage
Ec	0	0.0
Ep	40	100
Es	0	0.0
Anatomical classification		
As	0	0.0
Ap	25	62.5
Asp	15	37.5
Pathophysiological classification		
Pr	40	100
Po	0	0.0
PRO	0	0.0

Perforator incompetence only was found in n=25 cases where perforator ligation alone was done given in table 4. In n=15 cases, perforator ligation and stripping with or without ligation of sphenopopliteal junction was done. The minimal

mean duration of stay was 5.5 days the maximal mean duration of stay was 8.0 days.

Table 4: The type of surgery performed along with the duration of stay of each procedure

Procedure	Surgery		Mean duration of hospital stay
	frequency	Percentage	
Perforator ligation alone	25	62.5	5.5 days
Perforator ligation and Stripping (with/without ligation of the saphenopopliteal junction)	15	37.5	8.0 days

The total number of cases with varicose ulcers were n=16. The minimal healing time of ulcers in the cases was 6.5 days and the maximum healing time was 7 weeks. The average healing time of ulcers was 4.5 weeks. The most common complication recorded was residual perforator incompetence in 7.5% of cases and wound infection was recorded in 5.0%

and wound infections in 5.0% of cases.

Table 5: Complications of surgery in the cases of study

Complications of surgery	frequency	Percentage
Residual perforator incompetence	3	7.5
Wound Infection	2	5.0
Delayed wound healing	2	5.0
Hematoma	0	0.0
Nerve palsy	0	0.0

Discussion

In the current study out of the N=40 cases, n=36(90%) patients were male and n=4 (10%) patients were females. They could be because of social reasons females are hesitant to seek medical intervention for this problem. SN Kumar et al; ^[10] in a similar study found out of n=26 cases n=23 was male and n=3 were female cases. In this study, n=16 cases were C5 category with active ulcers. The active ulcers with infection and slough were preoperatively managed with debridement and daily dressing till the infection come down and the ulcer floor was covered with healthy granulations. In this study, the cases with isolated perforator incompetence were treated with Cockett and Dodd procedure whereas patients with saphenofemoral incompetence underwent stripping operation along with subfascial ligation. The follow-up cases were done every 2 weeks for 12 weeks to find any cause of complication and treat them as required. Friedgood et al; ^[11] in 109 cases found 84% of cases healed with subfascial ligation of incompetent perforating veins by using the Linton and Dodd method. Other studies have also described good to excellent results after surgical therapy directed on the perforating veins. ^[12, 13] Negus D^[14] followed 1000 cases for the 9 years and overall recurrence rates were 10%. The recent reports of recurrence suggest the recurrence rate was 15% in 767 limbs. ^[15] The minimal healing time of ulcers in the cases was 6.5 days and the maximum healing time was 7 weeks. Negus et al; ^[14] in 108 cases found ulcer healing time was 17 days and the healing rate was 84%. Tikrit et al; ^[15] reported ulcer healing of only 30% with an average healing time of 6 weeks. The most common complication recorded was residual perforator incompetence in 7.5% of cases and wound infection was recorded in 5.0% and wound infections in 5.0% cases. The complications of surgeries range from DVT. Pulmonary embolism, flap necrosis, wound infections, and other complications. Stuart et al; ^[16] found 45% local wound complication rates for subfascial ligation procedures. Bowen et al; found 44% wound infection in cases undergoing open perforator surgery by comparing the Cockett and Dodd procedure with SEPS. In this study, SEPS procedures were not undertaken due to economical technical reasons. Sybrandy et al; ^[17] compared the recurrence rates with perforator ligation and SEPS and concluded that ulcer healing times are similar in both surgeries. The minimal mean duration

of stay was 5.5 days the maximal mean duration of stay was 8.0 days. Stuart et al; ^[16] reported duration of stay of 9 days in open perforator ligation however recurrence rates were not determined due to lack of long-term follow-up. A long-term follow-up study by Negus D ^[14] found 84% were free of ulcerations upto 6 years after open perforator ligation surgery.

Conclusion

Open subfascial perforator ligation by Cockett and Dodd's procedure is a good procedure in the treatment of primary varicose veins with perforator incompetence. The rates of complications can be largely reduced by careful patient selection and skill full operative techniques. Follow-up of patients must be done at intervals for the development of new incompetent perforating veins and varicosities which may lead to the recurrence of ulcer formation.

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