

Original Research Article

Comparison of Cockett and Dodd's and Hook Phlebectomy Method in perforator ligation surgery in the management of perforator incompetence of the lower limb veins

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Abstract

Background: Varicose veins are a common medical condition present in at least 20% of the general population. **Objective:** to assess the role of Cockett and Dodd's and Hook Phlebectomy Method in perforator ligation surgery in the management of perforator incompetence of the lower limb veins and the various complication of the surgery in the post operative period. **Materials and methods-** This hospital based study was conducted on varicose veins patients with perforator incompetence admitted in AVMC. This is a prospective study comprising 60 patients (n=106) of varicose veins patients with perforator incompetence over a period of 2 years from Sept 2016 to October 2018. **Results-** The mean age in Hook Phlebectomy group was 51.8±14.235 and in Cockett and Dodd group was 49.467±14.635. Patients in Cockett and Dodd group had significantly lower pain when comparing to Hook Phlebectomy group. Patients in Hook Phlebectomy group had significantly lower post operative day of discharge when comparing to Cockett and Dodd group. In Hook Phlebectomy group, 20(66.7%) patients had recurrence and in Cockett and Dodd group, 25(83.3%) patients didn't have recurrence. In Cockett and Dodd group, none of the patients had viscosities and wound infection. **Conclusion-** Cockett and Dodd method of open perforator ligation has an important role in treatment of perforator ligation with decreased incidence of wound infection and recurrence than in patients treated with Hook Phlebectomy procedure.

Keywords- Cockett and Dodd method, open perforator ligation, Hook Phlebectomy, recurrence, wound infection

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Introduction

Varicose veins of the lower limbs are the price paid by the man for choosing erect posture. About 25% - 30% of females and 15% of men are affected by varicose veins. Definition of varicose veins go by "dilated, tortuous, subcutaneous veins of >3mm in diameter measured in upright posture with demonstrable reflux". [1] Veins that connect the superficial venous system to the deep venous system and penetrate the fascia are properly called per crating veins. In each leg, there are about 90 -150 communications between the superficial and deep venous system. These veins are usually valved. These valves direct the blood from the superficial to the deep system. Presentation of varicose veins is diverse and the most commonest is continuous dull aching pain in the affected limb, oedema around the ankle, pruritis and ulcer. In patients with advanced disease cutaneous burning sensation called venous neuropathy is encountered. [2] This implies how debilitating the disease is when there is delay in seeking medical attention. Risk factors for developing varicose veins are advancing age, female sex, family history and profession requiring prolonged standing posture. [2] Clinical findings in varicose veins may include dilated, tortuous veins, telangiectasia and reticular veins. Diagnosis of varicose veins can be done with duplex ultrasound imaging with high sensitivity and specificity compared to clinical examination alone.

Duplex ultrasound scanning also helps in identifying incompetent venous perforators causing varicose veins apart from sapheno femoral junction incompetence. Negligence towards definitive care causes debilitating morbidity. Modern surgery of varicose veins started in 1806, when Tommaso Rima proposed a hemodynamic treatment with ligation of the upper GSV. This operation was re- proposed in 1890 by Friedrich Trendelenburg. [3] Babcock modified Keller's technique and proposed to use an acorn tip and a flexible rod⁴. Modern endovascular techniques started in 1964 with Werner and Mc Pheeters ("electrofulguration").

Interestingly various treatment modalities have been proposed for the management of varicose veins. In our research we compare the role of Cockett and Dodd's and Hook Phlebectomy Method in perforator ligation surgery in the management of perforator incompetence of the lower limb veins and the various complication of the surgery in the post operative period.

Materials & Methods

This hospital based study was conducted on varicose veins patients with perforator incompetence admitted in AVMC. This is a prospective study comprising 60 patients (n=106) of varicose veins patients with perforator incompetence over a period of 2 years from Sept 2016 to October 2018.

Inclusion criteria

- Patients with primary varicosities of the great or small saphenous system with perforator incompetence of the leg were included in the study.
- Patients of age group above 18.
- Both sexes.

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Exclusion criteria

- Patients with varicose veins not having perforator incompetence (those with saphenofemoral or saphenopopliteal incompetence only) were not included in the study.
- Patients with recurrent varicose veins.
- Patients with deep venous thrombosis were excluded in the study.
- Patients with significant cardiovascular disease – Patients on anti-coagulants - Patients with any hematological disorders.

Methodology

A study of 60 cases of varicose veins with perforator incompetence will be carried out in the department of General surgery, AVMCH. After obtaining a well informed written consent, the data will be entered in a pretest proforma approved by the guide. A detailed history including the identification detail of the patient, presenting complaints, duration of illness will be obtained.

General examination and detailed clinical examination will be done. Patient will be then subjected to relevant investigations.

Inspection

- Varicose veins: whether great saphenous or small saphenous system or both are involved. In many cases, Tributaries of great saphenous vein are involved instead of the main trunk.
- Swelling: localized swelling in case of uncomplicated varicose veins. Thrombophlebitis causes localized swelling. Generalized swelling is seen in cases of deep venous thrombosis.
- Skin of the limb:
 - Colour: local redness may be due to thrombophlebitis. White leg may be seen in phlegmasia alba dolens (due to excessive edema or lymphatic obstruction). Blue leg (phlegmasia cerulea dolens) is seen in DVT due to congestion.
 - Texture: Skin may be stretched and shiny due to edema in DVT.
 - Eczema may be seen at the ankle
 - Pigmentation of the skin affecting mostly the medial aspect of lower leg.
 - Foot and toes are to be inspected to note loss of hair or brittleness of nails indicating impending venous gangrene.
- Venous ulcer: Number, location, size, shape, margin, floor of the ulcer have to be noted. Scar may be seen in the gaiter area indicating healed ulcer.
- Visible impulse on coughing: At the saphenous opening (saphena varix).

Palpation

- Palpation is done along the course of the vein for thickening and tenderness. Sometimes, the veins cannot be seen but felt as a tender area. This is especially true in cases of short saphenous vein as its termination runs deep to the deep fascia.

- One should also look for pitting edema or thickening, redness or tenderness along the lower part of the leg which are seen in cases of chronic venous hypertension following deep venous thrombosis.

Special tests for evaluation of varicose veins[4]

- Brodie Trendelenburg test: This test is performed to test the incompetence of saphenofemoral junction (BT 1) and perforator incompetence (BT 2). This test was first described by Sir Benjamin Brodie and its significance was later established by Trendelenburg. In both the tests, the patient is first placed in the recumbent position and his leg is raised and veins are emptied by milking.

- I. Brodie Trendelenburg test Part 1: This is to test the incompetence of saphenofemoral junction. With the veins emptied and patient is supine position, pressure is applied over the saphenofemoral junction with the thumb or by tying a tourniquet and the patient is made to stand up. Then, the pressure over the saphenofemoral junction is released. If the veins fill up very quickly, it indicates saphenofemoral incompetence.

- II. Brodie Trendelenburg test Part 2: This is to test the incompetence of the perforating veins. Here, the pressure over the saphenofemoral junction is not released after patient stands up. Pressure is maintained for about 1 minute. Gradual filling up of the veins during this period indicates perforator incompetence.

In case of short saphenous incompetence, the same is performed with occlusion of the saphenopopliteal junction.

- Tourniquet test (FIG.1.13): Multiple tourniquets are tied round the thigh and leg at different levels after the veins are emptied by making the patient lie down and elevate the limb. Patient is then made to stand up. Filling up of veins between any two Tourniquets indicate incompetence of perforators in that region of the limb. This test can also be done with a single tourniquet by changing its position along the limb.

Out of 60 patients by random selection method 30 patients were planned for hook phlebectomy and 30 patients for cockett and dodd method. Preoperative antibiotics will be given and daily dressings and elastocrepe bandage application was done till the active infection subsides in case of venous ulcer. Patient will be planned for surgery.

Statistical analysis

All the statistical analysis was performed using SPSS version 19. The clinical profile of patients was analyzed by chi-square test for qualitative variables. Student t test was performed for comparison of quantitative variables. 5% probability level was considered as statistically significant i.e., $p < 0.05$.

Results

In Hook Phlebectomy group, majority of patients were between 40-60 years (60%) and also in Cockett and Dodd group majority of patients were between 40-60 years (50%) old. The mean age in Hook Phlebectomy group was 51.8 ± 14.235 and in Cockett and Dodd group was 49.467 ± 14.635 . The comparison was done by chi-square test and there is no significant difference between the groups ($p = 0.617$). Table 1

Table 1: Age distribution

Age in Years	Hook Phlebectomy Method		Cockett and Dodd Method	
	Numbers	Percentage	Numbers	Percentage
<40 Years	7	23.3%	7	23.3%
40-60 Years	18	60%	15	50%
>60 Years	5	16.7%	8	26.7%
Total	30	100%	30	100%

Chi-Square = 0.965

P Value = 0.617

Not Significant

Majority of patients were males in both Hook Phlebectomy group (80%) and in Cockett and Dodd group (73.3%)($p = 0.542$). In Hook Phlebectomy majority of patients had type 2 diabetes mellitus (33.3%) whereas in Cockett and Dodd group majority of patients had asthma (33.3%). There is no significant difference between the groups ($p = 0.947$). Table 2

Table 2: Associated Comorbidities

Associated Comorbidities	Hook Phlebectomy Method		Cockett and Dodd Method	
	Numbers	Percentage	Numbers	Percentage
Type 2 Diabetes Mellitus	10	33.3%	9	30%
Systemic Hypertension	6	20%	6	20%
Asthma	8	26.7%	10	33.3%
No comorbidities	6	20%	5	16.7%
Total	30	100%	30	100%

Chi-Square = 0.366

P Value = 0.947

Not Significant

The mean value of Pain Score in Hook Phlebectomy group was 6.767 ± 2.011 and in Cockett and Dodd group was 3.6 ± 2.143 ($p < 0.001$). Patients in Cockett and Dodd group had significantly lower pain when comparing to Hook Phlebectomy group.

The mean post operative day of discharge in Hook Phlebectomy group was 1 ± 0 and in Cockett and Dodd group was 3.967 ± 0.718 . The comparison was done by 't' test and there is a significant difference between the groups ($p < 0.001$). Patients in Hook Phlebectomy group had significantly lower post operative day of discharge when comparing to Cockett and Dodd group. Table 3

Table 3: Post operative day of discharge (in days)

Group	Post operative day of discharge (in days)			
	Mean	SD	't' Value	P Value
Hook Phlebectomy Method	1	0	22.618	<0.001*
Cockett and Dodd Method	3.967	0.718		

In Hook Phlebectomy group, 20(66.7%) patients had recurrence and in Cockett and Dodd group, 25(83.3%) patients didn't have recurrence. Table 4

Table 4: Recurrence

Recurrence	Hook Phlebectomy Method		Cockett and Dodd Method	
	Numbers	Percentage	Numbers	Percentage
Yes	20	66.7%	5	16.7%
No	10	33.3%	25	83.3%
Total	30	100%	30	100%

Chi-Square = 15.429

P Value < 0.001

Significant

In Hook Phlebectomy group, 7(23.3%) patients had surgical site infections and in Cockett and Dodd group, none patients had surgical site infections (0%). In Hook Phlebectomy group, 8(26.7%) patients had viscosities and 7(23.3%) patients had wound infections. In Cockett and Dodd group, none of the patients had viscosities and wound infection. Table 5

Table 5: Complication of surgery

Complication of Surgery	Hook Phlebectomy Method (n=30)		Cockett and Dodd Method (n=30)	
	Numbers	Percentage	Numbers	Percentage
Viscosities	8	26.7%	0	0%
Wound Infection	7	23.3%	0	0%
Total	15	50%	0	0%

Discussion

The present study assess the role of Cockett and Dodd's and Hook Phlebectomy Method in perforator ligation surgery in the management of perforator incompetence of the lower limb veins and the various complication of the surgery in the post operative period.

A total of 30 patients underwent in Cockett and Dodd procedure and other 30 patients underwent Hook Phlebectomy procedure in the Arupadai Veedu Medical College and Hospital from September 2016 to October 2018.

The mean age in Hook Phlebectomy group was 51.8 ± 14.235 and in Cockett and Dodd group was 49.467 ± 14.635 . There is no significant difference between the groups ($p = 0.617$).

Majority of patients were males in both Hook Phlebectomy group (80%) and in Cockett and Dodd group (73.3%). There is no significant difference between the troupes ($p = 0.542$).

Between the groups ($p < 0.001$). Patients in Cockett and Dodd group had significantly lower pain when comparing to Hook Phlebectomy group.

In Hook Phlebectomy majority of patients were voided (66.7%) and also in Cockett and Dodd group majority of patients were voided (66.7%). there is no significant difference between the groups ($p = 1$).

The mean post operative day of discharge in Hook Phlebectomy group was 1 ± 0 and in Cockett and Dodd group was 3.967 ± 0.718 . There is a significant difference between the groups ($p < 0.001$).

Patients in Hook Phlebectomy group had significantly lower post

operative day of discharge when comparing to Cockett and Dodd group. Stuart et al reported an average hospital stay of 9 days for patients undergoing open perforator ligation procedure. [5]

In Hook Phlebectomy group, 20(66.7%) patients had recurrence and in Cockett and Dodd group, 25(83.3%) patients didn't have recurrence. There is a significant difference between the groups. Patients in Cockett and Dodd group, had significantly lower recurrence when comparing to Hook Phlebectomy group ($p < 0.001$). Negus showed that 84% of the patients were free of ulceration 6 years after open perforator ligation procedure. [6]

In Hook Phlebectomy group, 7(23.3%) patients had surgical site infections and in Cockett and Dodd group, none patients had surgical site infections (0%). There is a significant difference between the groups ($p = 0.005$).

In Hook Phlebectomy group, 16(53.3%) patients had right side of diagnosis and in Cockett and Dodd group, 18(60%) patients had left side of diagnosis. There is no significant difference between the groups ($p = 0.301$). In hook Phlebectomy group, 8(26.7%) patients had viscosities and 7(23.3%) patients had wound infections. In Cockett and Dodd group, none of the patients had viscosities and wound infection. Sato et al reported a 45% local wound complication rate for the subfacial ligation procedure. [7]

Conclusion

Cockett and Dodd procedure of open subfascial perforator ligation is a useful and better procedure than Hook Phlebectomy procedure in

treatment of patients with primary varicose veins with perforator incompetence.

Cockett and Dodd method of open perforator ligation has an important role in treatment of perforator ligation with decreased incidence of wound infection and recurrence than in patients treated with Hook Phlebectomy procedure.

The most feared local wound complications of the procedure can be prevented with careful patient selection, meticulous operative technique and assiduous postoperative care. With these precautions, the wound complications can be minimized.

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