

Leech Therapy in DVT (Deep Venous Thrombus): A Case Study

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ABSTRACT

Deep venous thrombus (DVT) is an acute thrombus of the deep veins. Postoperative immobilization, pressure on the calf muscles, sluggish blood flow, and prolonged bed rest are the various factors which precipitate deep vein thrombosis. In this case study, the patient had left lower limb DVT after LSCS (Low segment Caesarean section). *Jalauka's* saliva has many enzymes and chemicals that inhibit blood coagulation and have thrombolytic effects. *Acharya Charaka, Acharya Sushruta and Acharya Vagbhata* mentioned *Raktavishrvan* in *Raktaja roga*. So, to evaluate the efficacy of *Jalauka* in DVT I take this as case study and I was successful in the treatment of DVT through *Jalauka*.

KEYWORDS: DVT, *Jalauka*, *Raktaja roga*

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I. INTRODUCTION

The most common presentations of venous thrombosis are deep vein thrombosis (DVT) of the lower extremity and pulmonary embolism. Venous thrombus is a very common surgical problem, which has great influence on the morbidity and mortality of surgical patients. DVT is the 3rd most frequent vascular illness after ischemic heart disease (IHD) and stroke.

EPIDEMIOLOGY:

During pregnancy and after childbirth, acute VTE in about 1.2 of 1000 deliveries. Despite it being relatively rare, it is a leading cause of maternal morbidity and mortality. Populations in Asia have VTE rates 15 to 20%.¹

AETIOLOGY:

Three factors play major roles in etiology of venous thrombosis. These are-

1. Stasis
2. Venous endothelial injury
3. Hypercoagulability of the blood

These three are known as Virchow's triad.

Types of venous thrombus: Mainly two types of venous thrombosis are seen.

1. Thrombophlebitis – This is mainly seen in the superficial veins, particularly in varicose vein or in veins which have been cannulated for infusion. In these cases, venous thrombosis is associated with acute inflammatory response giving rise to pain, local swelling, redness and tenderness. Although acute inflammatory changes occur in the vein wall, bacteria are rarely present.
2. Phlebothrombosis (deep vein thrombosis) – Here the thrombus produces little local sign or symptoms and may be loosely attached to the vein

wall, so that emboli may be dislodged from this thrombus to cause fatal pulmonary embolism.

Proximal DVT is one that is located in the popliteal, femoral, or iliac veins.

Isolated distal DVT has no proximal component, is located below the knee, and is confined to the calf veins (peroneal, post., ant. tibial and muscular veins)

CAUSES OF DVT:

- Postoperative thrombosis (Most common cause) – common after the age of 40 years. Incidence following surgeries is 30%. In 30% cases both legs are affected. Usually seen after prostate surgery, hip surgery, major abdominal surgeries, gynaecological surgeries, cancer surgeries. Bedridden more than 3 days in the postoperative period increases the risk of DVT. Prothrombotic states / Inherited hypercoagulable states
- Trauma-to leg, ankle, thigh, pelvis
- Muscular violence
- Immobility-bedridden patients, individuals on long duration air or bus travel (Traveller's thrombosis)
- Polycythemia vera, thrombocytosis
- Deficiencies of Antithrombin 3rd, Protein C or S deficiency, Factor V Leiden mutation, thrombophilia
- Recent myocardial infarction, heart failure, nephrotic syndrome
- Thrombosis can occur in individuals who sit with computers for long time - thrombosis
- Hormone therapy – OCPs
- Smoking
- Splenectomy – leads to thrombocytosis
- Pregnancy – is associated with an increased risk of thrombosis, 5-50 times higher in pregnant versus non-pregnant women, that may be due to obstruction of IVC by the enlarged uterus, as well as the hypercoagulation state associated with pregnancy.

In the days and weeks after surgery, a higher chance of developing a deep vein thrombosis (DVT). They are most common in the leg. In this case study, LSCS done on dated 01-01-2022. Patient do walk on 3rd day (03-01-2022), leg movement do on bed on 2nd day (02-01-2022).

CLINICAL FEATURES:

- Fever – earliest symptom.
- Pain and swelling in the calf and thigh. Pain is often so severe that the patient finds it difficult to

flex or move the leg. If there is massive thrombosis there may be an extremely severe aching at the site of the thrombosis.

- Leg is tense, tender, warm, pale or bluish with stretched and shiny skin.
- Positive Homan's sign – passive forceful dorsiflexion of the foot with extended knee will cause tenderness in the calf.
- Mose's sign – gentle squeezing of lower part of the calf from side-to-side is painful. Gentleness is very important otherwise it may dislodge a thrombus to form an embolus.
- Most often, DVT is asymptomatic and presents suddenly with features of pulmonary embolism like chest pain, breathlessness and haemoptysis.

DIFFERENTIAL DIAGNOSIS FOR DVT:

- Ruptured Baker's cyst, Ruptured plantaris tendon, Calf muscle haematoma, Cellulitis leg, Superficial thrombophlebitis

INVESTIGATIONS:

- Blood counts – to rule out polycythemia
- D-dimer – can also be positive in cancer, pneumonia, sepsis and MI
- USG veins/Doppler study of veins, Venography (Ascending contrast venography)
- USG Abdomen – to rule out malignancy
- Chest X-ray - to rule out malignancy
- Procoagulant work up
- In pulmonary embolism – Chest MDCT (Multidetector CT) / CT Pulmonary Angiogram / Ventilation-perfusion scan

TREATMENT:

1. Bed rest – this is to allow thrombi to become adherent to the vein wall. It also prevents formation of pulmonary embolus.
2. Elevation of legs above the heart level – preventing venous stasis and formation of new thrombi.
3. Elastic stoking, standing and sitting ideally should be prohibited
4. Anticoagulants- LMWH, warfarin, phenindione. Oral anticoagulants being teratogenic cannot be used during pregnancy. LMWH is the drug of choice used during pregnancy and postpartum period.
5. Coumarin derivatives
6. Fibrinolytic drugs - streptokinase

7. Aspirin
8. Surgery

PREVENTION OF DVT:

- Reposition the patient every 2 hours following surgery or more frequently as ordered and for comfort.
- Perform or ask the patient to perform frequent passive or active ROM exercises.
- Promote early ambulation following surgery
- Apply antiembolism/compression stockings or an intermittent pneumatic compression device
- Apply graduated compression stockings according to manufacturer's written instructions. Remove every 8 hours, or according to facility protocol, to assess skin and for DVT.
- Maintain adequate hydration to prevent hemoconcentration.
- Administer prescribed anticoagulants to prevent thrombus formation, monitor for bleeding and review laboratory test results for coagulation studies.
- Smoking increases the viscosity of blood and so should be stopped.
- Patient on oral contraceptive or oestrogens should stop the drug 6-8 weeks prior to any elective surgery.

COMPLICATIONS OF DVT:

- Pulmonary embolism: cough, chest pain, acute right ventricular dilatation and failure.
- Infections, venous gangrene
- Chronic venous hypertension around the ankle region causing venous ulcers – chronic venous insufficiency – CVI
- Recurrent DVT
- Propagation of thrombus proximally

II. CASE REPORT

1. Particulars of the patient-

Patient name: Shweta
Age: 23 Years
Sex: Female
OPD NO.- 9360
IPD NO.- 1009
Ward/Bed No.- 2/16
Phone NO. 88.....26
Date: 13-05-2022
Religion: Hindu
Social Status: Middle
Occupation: Housewife

Residence: Kotdwar, Uttarakhand, India
Hospital Name: OPD No.-07 (Shalya Tantra OPD), Gurukul Campus, Haridwar, Uttarakhand Ayurveda University, Dehradun.

2. Chief Complaints-

Pain and swelling in left lower limb and thigh since 4 months



Fig 1.1 Note the swelling in the thigh and leg

3. History of Present Illness-

Before coming to gurukul campus, Haridwar, she consulted Chandramohan Singh Negi Govt. Base Hospital, Kotdwar, dated 31-01-2022, slip no. 9001, where she presented with Pain and swelling in the thigh and leg (swelling from inguinal ligament to heel), unable to walk, fever since 10days, history of LSCS 1 month back and diagnosed with DVT Lt. lower limb after LSCS by color doppler of left lower limb. After those 2 days (02-02-2022), she consulted at the Shri Guru Ram Rai Institute of Medical & Health sciences, Dehradun and the patient presented with the left lower limb and thigh swelling, for which she was admitted (02-02-2022), investigated & diagnosed as Left lower limb DVT Post LSCS. Patient was managed conservatively. The patient is being discharged (07-02-2022) under satisfactory general condition. After 3 months, the patient visited Gurukul campus, Haridwar, UAU, Dehradun for better management at 13th may,2022. According to the patient's statement, it was found that pain was so severe that the patient finds it difficult to walk, not radiating to any other part. She has no history of HTN, DM, trauma or previous surgery except LSCS.

4. Past History-

No DM, TB, HTN.

No any history of trauma and operation except LSCS

10. Investigations-

01-02-2022				
1. Color doppler Lt. Lower Limb- Subacute thrombosis of Lt. external iliac and Lt. popliteal vein				
02-02-2022				
2. RFT				
Urea-22 mg/dl	Creatinine 0.4mg/dl	uric acid 2.1mg/dL	albumin 3.40 g/Dl	globulin 4.00 g/dL
Serum alkaline phosphatase, S. Na, S. K, S. Phosphorus, S. total cholesterol: within normal limit				
3. LFT				
T.BIL-0.7mg/dL	SGOT- 46 U/L	SGPT- 42U/L	albumin 3.40 g/Dl	globulin 4.00 g/dL
Serum GGT-10U/L	Serum Bilirubin conjugated – 0.0 mg/dl			
3. Prothrombin Time (PT) / INR				
Test PT	9.8	11.0 - 16.0	Sec.	Nephelometry
INR	0.890	1.000 – 1.300	Sec.	
4. D-Dimer, Quantitative Immunoturbidimetry				
D-Dimer	H	6000	<255	ng/mL
5. COMPLETE HAEMOGRAM/CBC				
Haemoglobin (Hb)	10.9	12.0 – 15.0	gm/Dl	
Neutrophils	68.9	44.0 – 68.0	%	
Lymphocytes	21.5	25.0 – 48.0	%	
RBC	3.59	3.80 – 4.80	millions/cu.mm	
PCV	34.2			
Other elements value is within normal limit.				
6. RDW				
RDW Histogram	12.10	11.60-14.10	CV%	Derived by RBC
03-02-2022				

5. Obs. History-

P₁L₁

P₁ = Boy/01-01-2022, 12:30 am/Kotdwar Govt. Hosp./3.5Kg/LSCS/Cord around neck

6. Surgery history-

LSCS- 01-01-2022

Patient do walk on 3rd day (03-01-2022), leg movement do on bed on 2nd day (02-01-2022)

6.1. Drug History-Not

6.2. Allergy History- Not

7. Personal History –

Smoking: No

Drinking of alcohol: No

Diet: Regular, veg., not takes spicy food

Marital status: Married

8. Family History- none

9. Physical examination

9.1. Local Examination-

9.1.1. Inspection: swelling present over left leg and thigh.

9.1.2. Palpation:

1. Tenderness, Homan's and Moses's sign were not done because it dislodges emboli to cause pulmonary embolism

8. SARS-COV-2 (COVID-19) Real-time PCR - Negative
9. X-RAY- CHEST PA-VIEW Normal study
10. Urine examination no significant abnormality detected
04-02-2022
11. USG WHOLE ANDOMEN No significant abnormality detected
12. ECHO CARDIOGRAPHY & COLOR DOPPLER REPORT No significant abnormality detected
13. Serum Homocysteine 8.1 4.7 – 12.6 umol/L Enzymatic (Cystathionine betasynthase)
05-02-2022
14. Factor V Leiden, Mutant Detection positive (Heterozygous)

11. Clinical Diagnosis- Left lower limb DVT post LSCS

12. Treatment- Jalaukavacharana: 12 sittings at 7 days interval

Investigation prior to leech therapy-

BT, CT, HBs Ag, HCV, HIV

Jalaukavacharana Vidhi -

- *Poorva karma* – Purification of leech by pouring the leech into water mixed with turmeric powder.
- *Pradhana karma* – Prick the skin with a sharp, sterile needle to release a drop of blood, then apply the leech through its mouth end and cover it with wet cotton.
- *Paschata karma* –
- Leech removal: After 45 minutes, the leech usually leaves the site itself. If it doesn't remove itself, then apply turmeric powder to the leech's mouth.
- Care of wound: After the leech has been detached, the mouth of the leech leaves a triangular wound. The use of *Jatyadi Ghrita* with a tight bandage stops the bleeding from the wound.
- Jalauka's *Vamana*: The leech used on the affected site will have to go through a *vamana* process so that it can be used on the same patient again. Turmeric powder is put to the leech's mouth for *vamana*. To purify itself, the leech vomits impure suck blood. For good *vamana*, it is sometimes necessary to press the leech from the caudal to the frontal end. After proper *vamana*, the leech should be placed in fresh water where it will swim quickly, and it should be placed in a clean container filled with water having multiple pores on the top for proper aeration.
- **No. of sittings** – 12 at 7 days interval.

Jalaukavacharana started on May 24th, 2022. Total 4 leeches were applied at each sitting; position of leech applications is below inguinal ligament, popliteal fossa, medial and lateral malleolus. Total 12 sittings were taken by patient after that color doppler study of left lower limb (Arterial and venous) was advised.





Fig. 1.2 Leech therapy in Left lower limb DVT after LSCS

After completion of 12 sittings of leech therapy, color doppler study of left lower limb (arterial and venous) was done and report is given below:

17-08-2022

COLOR DOPPLER STUDY OF LEFT LOWER LIMB (ARTERIAL AND VENOUS)

Impression- normal study of left lower limb arteries

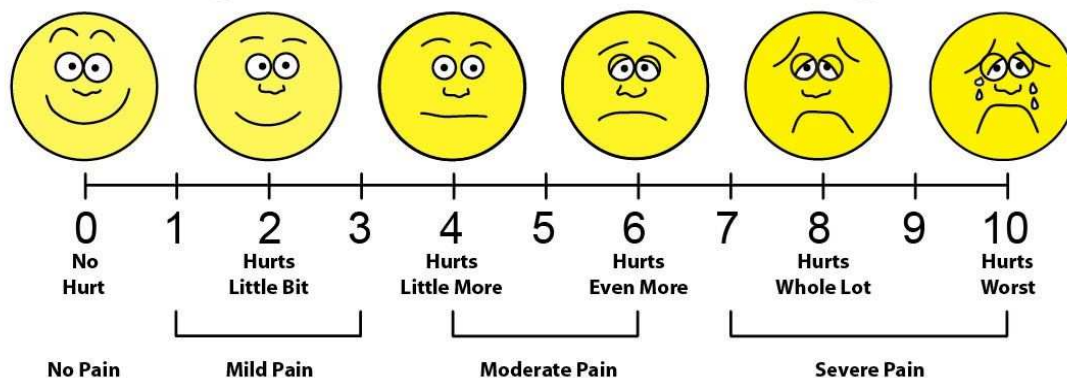
No evidence of DVT in left lower limb

13. Assessment Criteria-

13.1. PAIN

EXPLANATION	GRADE
No complaint of pain	0
Pain at long time standing position and 1-3 on face pain scale	1
Mild pain at rest and 4-6 on face pain scale	2
Severe pain at rest and 7-10 on face pain scale	3

Wong-Baker FACES Pain Rating Scale



13.2. SWELLING (present over the left thigh and leg)

EXPLANATION	GRADE
Absent	0
Present	1

13.3. Discolouration and non-healing ulcer

EXPLANATION	GRADE
Absent	0
Present	1

13.4. Colour Doppler study of left lower limb**III. RESULT**

	BT	AT
Pain	Pain grade was 3	Pain grade was 0
Swelling on left lower limb	Present	Absent
Discoloration & non-healing ulcers	Absent	Absent
Colour Doppler study of left lower limb	DVT in Left External iliac and popliteal vein	<ul style="list-style-type: none"> ➤ No evidence of DVT in left lower limb ➤ Normal study of left lower limb arteries.

IV. DISCUSSION

According to *Acharya Sushruta*, *Raktmokshan* have been done through 2 methods-

1. *Shastra krita* has 2 types – a. *Prichaan vidhi*, b. *Siraveda*.
2. *Ashastra krita* has three types – *shringa*, *jalauka*, and *alabu*.

Raktmokshan is a unique para-surgical procedure indicated in *pitta* and *rakta* vitiated diseases by all the *Acharyas*. *Acharya Vagbhata* and *Sushruta* indicates *Jalauka* in deep situated *Raktaja dusti* (thrombosis).

अवगाढे जलौकाः || (S.Sh.26/8), (A.H.Su.26/54)

Enzymes and chemicals secreted by leech saliva which are effective in DVT are Hirudin, which prevents blood clots following surgery; calin inhibits platelet aggregation induced by collagen, hyaluronidase, which is a spreading agent that ensures that the other active substances that are active at bitten areas can be spread; destabilase- dissolves fibrin, has thrombolytic effects, eglins factor XA inhibitor inhibits the activity of coagulation factor XA, carboxy peptidase A inhibitors increase the inflow of blood. Acetylcholine and histamine like substance also cause vasodilator and apyrase inhibitor of platelet aggregation by inhibition of adenosine triphosphatase.

V. CONCLUSION

Jalaukavacharana proves significant in DVT due to enzymes and chemicals secreted by leech saliva, so *jalauka* is non-invasive technique, highly economical with no complications. *Jalaukavacharana* is an OPD level procedure and leeches are easily available. According to *Acharya Sushruta*, it is the easiest method of bloodletting. If DVT not treated, it can cause pulmonary embolism, secondary varicosity, non-healing ulcers, and permanent oedema of the limb. Due to this, the limb has an inverted bottle appearance (Champagne Bottle Leg). So allopathic

doctors suggested injection heparin, warfarin, inferior vena caval filters, and surgery as last resort. Surgeries are Palma operations and May-Husni operation. In Ayurveda, only leech applications cure DVT permanently.

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