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‘Review on Deep Vein Thrombosis & Role of Ayurveda and its Management.’

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Abstract:

Deep vein thrombosis (DVT) is a serious life-threatening condition that may lead to sudden death. Deep vein thrombosis (DVT) is the third most common vascular disease, after ischemic heart disease (IHD) stroke and it is silent killer. It affects approximately 0.1% of persons per year. DVT several times remains undiagnosed until and unless any throbbing pain in limbs or severe symptoms are visible. The unlodged thrombus in circulatory system may manifest with various conditions such as stroke, heart attacks, pulmonary embolism, kidney failure and many more. All these conditions are life threatening & result in death of patients within no time. The emergency management of DVT requires the aid of modern medicines; Once diagnosed, it requires hospitalization, expensive treatments with inject able Heparins, Warfarin and Venous Thrombectomy which is a costly affair & also reduces one's quality of life as well as earning capacity. Ayurveda has lot more to contribute in such conditions. It might prove useful in prevention of future clots formation thereby avoiding such fatal episodes & life-threatening conditions. Attempt has been made in this article to review the various Ayurvedic treatment modalities for DVT as ayurvedic management of Deep vein thrombosis that would be cost effective, easily accessible and non-burdensome to the patients with good results.

Keywords: DVT, Ayurvedic Management, Leech therapy.

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Introduction:

DVT (Deep Venous Thrombosis) refers to the formation of a blood clot within deep veins. They mostly occur in the legs. DVT is said to be a major cause of mortality & morbidity all over the world. It is a silent killer.¹ The mechanisms underlying DVT, known as Virchow's triad, are venous stasis, hypercoagulability and endothelial injury.² Mainly two types of venous thrombosis are seen, superficial vein thrombosis (Thrombophlebitis) and deep vein thrombosis (Phlebothrombosis). It commonly occurs in low extremity & is associated with life threatening complication of pulmonary embolism, referred together to as venous thromboembolism (VTE).³ The most common causes of DVT are major surgery, cancer, pregnancy, trauma, anti-phospholipids syndrome, central venous catheters, combined oral contraceptive, auto-immune diseases, Myocardial infarction, Nephrotic syndrome, Bechet's disease, Hip fracture, Abdominal or pelvic surgery Congestive cardiac failure inflammatory diseases, obesity, infections, HIV, polycythemia Vera, Myelofibrosis, hormonal replacement therapy, congenital factors (i.e. hereditary thrombophilia like Factor V Leiden, prothrombin deficiency) old age etc. Venous thrombosis is mostly asymptomatic and is clinically manifested in 40 % or less cases. It manifests as throbbing pain which is aggravated by muscular activity at the site of thrombus. Swelling is minimal at dependent part along with tenderness in the region of the vein. As per modern view, Treatment of DVT aims at reduction the

propagation of thrombus, to limit the damage to the venous valves and to reduce the probability for pulmonary embolism. In the established cases of DVT the treatment include bed rest, elevation of legs, elastic stockings and use of drugs like heparin, coumarin derivatives (warfarin), fibrinolytic drugs (streptokinase), Hemocheck and aspirin etc.⁵

Prevalence of DVT:

Deep vein thrombosis (DVT) and pulmonary embolism (PE), collectively known as venous thromboembolism (VTE), affects an estimated 900,000 people in the U.S. each year resulting in thousands of hospitalizations and about 300,000 deaths [6]. In general, surgical patients without prophylaxis against VTE, the incidence of DVT has been reported to be as high as 30%, with an associated fatality risk of 1%.⁶ Low incidence has been reported in Asians and it can be attributed to several factors like high fibrinolytic activity, complete lack of Activated Protein C resistance, a higher incidence of blood group "O", low intake of fat, lower incidence of obesity and various climatic differences.⁷⁻¹¹

The lower incidence of DVT could also be because of the lack of awareness among the doctors, patients, and non-availability of diagnostic facilities in this part of the world, thus many cases remain undiagnosed. Most of the studies which have reported very low incidence of DVT in India have been conducted in patients undergoing elective orthopedic surgery and used color duplex for diagnosis Kakkar et al¹² in their review article

have stated that the Indian perspective on this topic is lacking due to the non-availability of published Indian data. Hence in the absence of any study in this population under the high-risk condition of trauma, it is not wise to assume that Indians are genetically protected against VTE after Trauma. Some recent studies report an increasing incidence of VTE in the Indian subcontinent.^{13,14} The increased incidence is attributed to increased life expectancy, changing lifestyle and better methods of diagnosis.¹⁴ Clinical signs doesn't exactly point out the diagnosis of VTE. This is especially true in trauma patients in whom lower limb swelling, pain, chest pain, breathlessness and fever can all occur due to injury.¹⁵

Ayurveda Perspective:

In Ayurveda, there is no direct correlation of this disease, but causes, signs and symptoms of DVT closely resembles with *Siraj vata* or *Siraj granthi*. In *Siraj Granthi*; *Vata* and *Rakta-dushti* occurs along with narrowing of veins i.e. *Sira*. Due to trauma to the left leg, vitiation of *vata* results which further causes vitiation of *rakta* as a consequence. *Vagbhat* had explained the "Aashrayashri Sambandha" between *Rakta* and *Pitta*. So *Vata-Pittaghna Chikitsa* may prove useful in its management. *Acharya Charak* had depicted *Virechana* (Purgatives), *Upavasa* (Fasting) and *Raktastravan* (bloodletting) as the management tool in *Rakta Dushti-janya Vikar*. As per them, *Sira* is the *Upadhatu* of *Rakta*. *Pitta* & *Rakta* possess *Aashrayashri Sambandha*. *Virechana* and *Jalaukavacharan* are the first line of treatment for *Pitta- Rakta Dushtijanya Vyadhi*. These *Shodhan Karma*

cures the diseases & also helps in its progression, recurrence as well. Basically, the principle of Ayurveda is to maintain health of a healthy individual & treat the disease of patients. It offers vast varieties of various drugs formulations, techniques for the treatment of mankind. *Raktamokshana* (bloodletting) is one of the biggest innovations in the field of Ayurveda, which also includes the Leech therapy in the form of *ashstrakrita raktamokshana*.¹⁶ It is safe, painless and highly effective. While going through the *Lakshanas* mentioned by *Susruta*, *Charaka* and *Vagbhata Acharya*, we can correlate this to *Raktavruta vata*, *Raktagata vata* and *Gambhira vatarakta*. This is caused due to the imbalance in *Vata*, *pitta doshas* and *Rakta dhatu*. In *Raktavruta vata* *Acharya Susruta* mentioned the symptoms of pricking pain, hyperaesthesia and numbness of the affected area (*Srikanta Murthy*, 2010). Another condition called *Raktagata vata*, in which *Vagbhata* has mentioned there is severe pain, warmth, and redness. Considering the *Nidana* of *Vatarakta*, *Abhighata* (trauma), *Achankramanasheelinam* (sedentary period) etc. are mentioned by *Charaka* and *Vagbhata Acharya*. One of them is *siragata vata* in which there is pain in the region of *sira* along with narrowing or obstruction in the lumen of *sira*.¹⁷ Another condition called *raktaavritta vata* has been described with symptoms of pricking pain, hyperaesthesia and numbness of the area affected.¹⁸ As far as etiology of the disease is concerned, many factors mentioned in *nidana* of *vatarakta* like *achankramansheelinam* (prolonged

sedentary period), *abhigata* (trauma), *sthulata* (obesity) etc¹⁹ are also predisposing factors for DVT. In such condition of *vata* affecting the *sira*, *Acharya Sushruta* has exclusively mentioned the treatment regime which includes *raktamokshana*.²⁰ *Acharya Vagbhatta* has mentioned that leech can be applied in the area where blood is clotted.²¹ *Acharya Charka* has enumerated blood related disorders and their treatment by various type of bloodletting.²²

As per *charaka*, the sign & symptoms of DVT closely resembles *Gambhir*(deep) *vatarakta* & is mentioned as situated in deeper *dhatu*s. In this condition, there is swelling, stiffness & hardness with severe pain inside, quivering & inflammation. *Vayu* moves with force frequently in joints, bones & marrow as if cutting & making them crooked produces limping or lameness while moving all over the body.²³ *Acharya charaka* also advises purgation after unction with unctuous or rough mild purgatives & frequent enema also been advised. Besides these, massage, sprinkling, uncting substances which do not causes burning are advised.²⁴ For *siragat vaat*, he has mentioned that, if *vayu* is located in *siras*, body experiences mild pain & swelling dries up and quivers with *siras* (blood vessels) as motionless, constricted or dilated.²⁵

Effects of leech therapy:

Anti-coagulating effect

The saliva of leech contains enzymes and compounds that act as anticoagulating agent. It's most important content is hirudin which binds itself to thrombin's, thereby inhibiting coagulation of the blood. Another

compound that prevents coagulation is calin which acts as an anticoagulant by prohibiting the von Willebrand factor to bind itself to collagen, and it is also inhibits platelet aggregation caused by collagen. The leech saliva also contains factor Xa inhibitor which also block the action of the coagulation factor Xa.²⁶

Clot dissolving effect of leeches

The action of destabilase is the break up any fibrin that have formed. It also has a thrombolytic effect, which can also dissolve clots of blood that have formed.

Anti-inflammatory effect of leech

Bdellinsin; a compound in the leech's saliva; that acts as anti-inflammatory agent by inhibiting Trypsin as well as plasmin. It also inhibits the action of acrosin. Another anti-inflammatory agent is the eglins.²⁷

Vasodilating effects of leech:

There are 3 compounds in the leech's saliva that saliva that act as a vasodilator agent, and they are the histamine-like substances, the acetylcholine and the carboxy-peptidase A inhibitors. All these acts to widen the vessels, thus, causing flow of blood of the site.

Bacteriostatic and Anesthetic effects of leeches:

The saliva of leeches also contains anesthetic substances which relieve pain on the site and also bacteria inhibiting substances which inhibit the growth of bacteria.²⁸ *Jalaukaavacharan* (hirudotherapy) is safe and effective method in management of D.V.T. than modern treatments.²⁹ As DVT is a *Siragata roga*, *Upanaha*(poultice) procedure can also be adopted in its management.

Swedana in the form of Upanaha over the affected area can help to get relief from inflammation and pain. Upanaha reduces the inflammation by modifying secretion of various inflammatory mediators. It also relaxes local musculature by physical effect of heat and thereby reduces pain and increase the rate of trans-dermal drug delivery (Akhil et al., 2020). Kashaya dhara is also highly effective in reducing the pain. It also promotes fat metabolism and eases the muscle. Kashaya dhara is considered as best Vatakapha samaka, Sothahara, Shoolahara, and Balya. This helps in vasodilatation also. The pharmacological action of the medicine and the temperature which is maintained during the treatment act as a counter irritant which is the thermal stimulus and it may help in reducing pain sensation and itching sensation.

Case studies done till now:

A study was done to assess the effect of Punarnavadi Mandoor and Shiva Gutika in Acute Deep Vein Thrombosis showing laxanas of Pittaja Vata-rakta (pain and swelling). Punarnavadi Mandoor which possess Shothahara (anti-inflammatory) and Raktaprasadana (Blood purification) properties has been administered to patients. For lekhana (scrapping) of the thrombosis, Shiva Gutika has been administered as it have Ushna and Teekshana property. At 3rd visit, Mahamanjisthadi Kashaya has been added for the discoloration as it has the property of Raktashodhana (Nimba, Triphala), Bhedana (Katuki), Guduchi (best Vataraktahara). Kaishor Guggulu is best Rasayana for the Tridoshaja Vata-rakta as it contains Virechaka

drugs (Danti, Trivrit, Triphala), Ushna Veerya and Tikta Rasa Pradhana Dravyas along with Guduchi and Guggulu. Yastimadhu is having Rasayana property, Sheeta Veerya (Dahahara), Madhura Rasa and Guru and Snighdha Guna (Vatahara), contains natural steroids and anti-oxidant property which reduces the swelling. Balaguduchyadi Kashaya is added because it is indicated in Sadaha (burning sensation), Saruja (pain), Sasopha (swelling) Vata-Rakta. which given relief from pain, swelling, discolouration, nasal & gum bleeding. Post treatment ,no fresh thrombus had been observed in veins of legs.³⁰

A case study of 38 years old male patient having history of D.V.T.& complaintsof pain and numbness in right leg for 8 months was done to assess the Role of Jalaukavacharan (Leech Therapy) in the management of Deep Vein Thrombosis. A Color Doppler Ultrasound was positive for D.V.T. The Jalaukavacharana was done weekly along with oral medication Ekangaveer Rasa, Mahayograj guggulu ,Maharasnadi Kwatha with external medications like abhyanga with vishgarbh tail, nadi swedana with rasna-saptak kawath. Patient was assessed on VAS scale which showed gradual reduction in pain grade from grade8 to slowly till 3 & came down to grade1after 3-4 weeks of treatment along with reduction in swelling on within two weeks. There was gradual improvement in increased walking ability from distance of 25 meters to 70 , 90, 200 meters respectively.³¹ A case study was published on ayurvedic management of Deep vein Thrombosis wherein a 32 years old male patient having

right lower limb DVT was successfully treated with Ayurveda by *Jalaukaavcharana* (Leech therapy), *Nitya Virechana*, *Raktamokshan* (bloodletting), *guduchyadi basti* (Enema of *Tinosporia cordifolia* & other drugs). The patient was cured by this Ayurvedic regimen within one month. The Venous Doppler showed dramatic changes before and after the treatment. It proved that Ayurvedic management of Deep vein thrombosis is faster, cost effective and easily available for a common man.³²

Discussion :

The three major goals of conventional medicines are: 1) Resolving the thrombus, 2) Minimize the chance of pulmonary embolism (PE), 3) To prevent recurrence and post thrombotic syndrome. Modern medicinal therapy has some reported limitations, namely, i) The anticoagulant does not act on existing clot, rather it prevents further coagulation, ii) Use of heparin in medical patients does not change risk of death or pulmonary embolism, though its use decreases risk of DVTs; it also increases risk of major bleeding (Alikhan et al., 2014), iii). Regular blood tests are essential, iv) Risk of bleeding doubles with VKA treatment and is contraindicated in pregnant woman (Hyers et al., 2001). Hence systematic Ayurvedic treatment with administration of suitable medicines would prove crucial in the management of DVT. As these are basically *Raktapradoshaj-avikaras*, so *Jaloukavacharana* is preferred. Leeches possess biologically active compounds in their secretions, especially in their saliva. An enzyme in their saliva called hirudin is a

powerful anticoagulant. Recent researches on leech saliva unveiled the presence of a variety of bioactive peptides and proteins involving antithrombin, antiplatelet, factor Xa inhibitors, antibacterial and others. Thus, *Jaloukavacharana* helps in lysis of thrombus. Clinical studies revealed that it can reduce blood coagulability with an anti-inflammatory effect in patients (Baskova et al., 1997).

Conclusion:

DVT can be managed through Ayurvedic intervention very effectively. Pain, swelling, discoloration can be decreased through ayurvedic medicine without any complication. Anti-platelets and anti-coagulant drugs have various complications like nasal and gum bleeding etc. The hazards of prolong use of Anti-platelets and anti-coagulant drugs could be managed effectively through Ayurvedic medicine, which is cost effective and safer for use. Various external interventions like *jalaukacharan*, *raktamokshana*, *upnaaha* may prove useful in preventing the recurrence of Deep vein Thrombosis. Leech therapy is a unique ayurveda treatment modality which could aid in anti-coagulation, clot dissolving effect, Anti-inflammatory, bacteriostatic, Vasodilating effect. These all properties of ayurveda intervention would prove beneficial in long term management, prevention, recurrence & thereby could result in preventing life threatening incidence.

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