



RESEARCH ARTICLE

BUERGER'S DISEASE-WHERE'S THE RELIEF?: A CRITICAL REVIEW

Kumar Rajeev, Arya Chandramohan and Verma Sarita

M.S. (Ayu.) Scholar, P.G. dept. of Shalya Tantra, Rishikul Campus, Haridwar,
Uttarakhand Ayurved University, Uttarakhand, India

ARTICLE INFO

Article History:

Received 10th March, 2016
Received in revised form
18th April, 2016
Accepted 25th May, 2016
Published online 30th June, 2016

Keywords:

TAO,
Smoking,
Leech Therapy,
Intermittent Claudication etc.

ABSTRACT

Buerger's disease is a chronic disorder, also known as Thrombo-Angitis Obliterans (TAO). It is a nonatherosclerotic, segmental inflammatory disease that most commonly affects the small and medium-sized arteries and veins in the upper and lower extremities. It frequently occurs in cigarette smokers. Poor hygiene, genetic factors, autonomic over-activity are other factors for this disease. Buerger's disease presents with rest pain, intermittent claudication, discoloration and gangrene formation. Clinical features and angiographic findings are the basis of early diagnosis of TAO. Medical management in form of aspirin, pentoxifylline and verapamil increase pain-free walking distance in intermittent claudication, but long term usage fails to prevent disease progression in patients who continue to smoke. Surgical treatment in form of lumbar sympathectomy and amputation help reduce pain and promote healing of trophic changes. Ayurveda the great science of life has elaborately described leech therapy (Jalaukavcharan) to remove vitiated doshas from affected organ. Leech therapy has its excellence by improving blood circulation through vasodilatation effect.

INTRODUCTION

Buerger's disease, also known as Thromboangiitis obliterans (TAO) is a rare disorder characterized by inflammation of the small and medium arteries and veins (A Concise Textbook of Surgery, 2012). The inflammation in TAO frequently leads to blockages of arteries in the lower segments of the arms and legs and may cause claudication or rest pain and non-healing sores or ulcers. It is characterized by segmental thrombosing acute and chronic inflammation of small and medium size arteries. It was Buerger who named the disorder "thromboangiitis obliterans", and only briefly mentioned its relationship with smoking. In 1924, Buerger reported that tobacco use was probably a predisposing factor.

Etiology

Smoking: It causes direct endothelial damage that leads to hypercoagulability and thrombosis, matrix metalloproteinase up regulation (e.g., MMP-1 and MMP-9) by promoting the adhesion and binding of monocytes to the endothelial wall of blood vessels (Mills et al., 1987).

Genetics: There may be a predisposition to development of TAO. Some cases had preponderance of HLA-A9 and HLA-B5 antigens.

Lower socioeconomic condition with poor hygiene (A Concise Textbook of Surgery, 2012).

Immunologic Mechanisms: The immune system seems to play a critical role in the etiology of TAO. However, knowledge about immunological aspects involved in the progression of vascular tissue inflammation, and consequently the evolution of this disease, is still limited. The presence of different antibodies, such as antinuclear, antielastin, anticollagens I and III, and antinicotine antibodies, as well as identification of deposits of immunoglobulin (Ig) G, IgC3, and IgC4 in the blood vessels of patients, provided evidence to the theory of the immune character of TAO (Roncon de Albuquerque et al., 1989)

Autonomic over activity: Over stimulation of sympathetic system leads to peripheral vasospasm (Das, 2012).

Pathological Aspect

Acute-phase: lesion is characterized by acute inflammation involving all coats of the vessel wall, especially of the veins. Around the periphery of the thrombus, there are often polymorphonuclear leukocytes with karyorrhexis, the so-called microabscesses.

Chronic phase: is characterized by organization of the occlusive thrombus with extensive recanalization, prominent vascularization of the media, and adventitial and perivascular fibrosis.

*Corresponding author: Kumar Rajeev,
M.S. (Ayu.) Scholar, P.G. dept. of Shalya Tantra, Rishikul Campus,
Haridwar, Uttarakhand Ayurved University, Uttarakhand, India.

Clinical features

Pain due to superficial nodular phlebitis and ischaemic neuritis.

- Intermittent claudication.
- Rest pain, chronic ischemic ulcerations –toe, feet etc.
- Tingling and burning sensation in the limb.
- Discoloration (Trophic changes).
- Gangrene.

Table 1: Rutherford classification (Dormandy and Rutherford, 2000).

Grade	Category	Clinical
0	0	Asymptomatic
I	1	Mild claudication
I	2	Moderate claudication
I	3	Severe claudication
II	4	Rest pain
III	5	Ischemic ulcer not exceeding digits
IV	6	Severe ischemic ulcer or gangrene

Diagnosis: Diagnosis can be made as follows

Clinical Examinations of Buerger's Disease

- **Inspection:** Flattening of terminal pulp of toes, nails become brittle, flattened and ridged, skin becomes shiny, cracks, ulceration, gangrene with clear line of demarcation) and limb atrophy of muscles.
- **Palpation:** Palpation of peripheral pulses, tenderness, pitting edema, ulcer and gangrene etc.

Physical tests

- **Buerger's Postural Test:** Normally raising the leg by 90 degree remains pink but in severe arterial occlusion raising the leg by less than 30 degree becomes pallor,
- **b.Capillary Refilling Test:** Normally limb remains pink but in ischemic limb becomes pallor after 20-30 seconds becomes pink.

Investigations

Blood examination, blood sugar, lipid profile etc.

- Plain X-ray–Shows calcified areas in major arteries, mainly lateral branches are involved.
- Echocardiography (ECG).
- Doppler ultrasound.
- Duplex scans (B-mode USG along with Doppler study).
- Arteriography (angiography)-There is information of distinctive small-vessels, collaterals around areas of occlusion known as "corkscrew collaterals.
- Plethysmography –Measures the blood flow in the vessels.

Complications

- Blocked leg arteries.
- Increased chances of heart attacks.
- Finger and Toe ulcers.
- Toe and Foot gangrene.
- Amputation of limb.

Treatment

Conservative Treatment: The most effective treatment for Buerger's disease is to stop smoking. It is therefore essential that patients diagnosed with Buerger's disease must stop smoking and the use of all tobacco products. Patients should be advised for Buerger's position and exercise.

Vasodilators: When vasodilator therapy is given, vessels proximal to the occlusive lesion and vessels parallel to the lesion dilate and improve blood flow to that neighboring vascular bed. Vasodilators also have the capacity to reduce overall systemic vascular resistance, leading to a reduction in perfusion pressure. A dihydropyridine calcium channel blocker, such as amlodipine or nifedipine, seems to be effective if vasospasm is present.

Pentoxifylline: is a methylxanthine derivative that has numerous effects. Its primary effect was thought to be an improvement in red blood cell deformability. Other effects include a decrease in blood viscosity, platelet aggregation inhibition, and a reduction in fibrinogen levels but improvement in quality of life is limited.

Cilostazol: Cilostazol is a phosphodiesterase type III inhibitor. By increasing the levels of cAMP in platelets and blood vessels, there is inhibition of platelet aggregation and a promotion of smooth muscle cell relaxation. Numerous side effects occur with the long-term use of all these medicines like headache, Gastrointestinal side effects like diarrhea and bulky stools. Another side effect is palpitations, and patients on long-term treatment must be evaluated for cardiovascular status and drug discontinued if patient develops congestive heart failure.

Surgical treatment

Surgical revascularization: is rarely possible for patients with Buerger's disease due to the diffused vascular damage and the distal nature of the disease.

Sympathectomy: may be performed to decrease arterial spasm in patients with Buerger's disease. Sympathectomy has been shown to provide short-term pain relief and to promote ulcer healing in some patients with Buerger's disease, but no long-term benefit has been confirmed (Nesargikar et al., 2009).

Omentopexy: is an attractive option, but it needs proper mobilization of omentum by experts and more surgical time, increasing complications. Prolonged ileus, wound infection, closure difficulties, and hernia have been reported (Hoshino et al., 1983).

Ilizarov's technique: is very effective to induce neoangiogenesis in TAO (Chaudhary et al., 2006). According to Ilizarov, gradual traction on living tissues can stimulate and maintain regeneration and active growth of tissues (bone, muscle, fascia, nerve, vessels, skin, and its appendages)

Amputation–It is limited to area of gangrene.

The Answer?

Fortunately, in Ayurveda, there are well established measures that men can take to avoid this scenario, known as leech therapy.

Leech Therapy (*Jalaukavacharan*) in Buerger's Disease

The method of *Jaloukavacharan* is done according to ancient method as described by *Acharya Sushruta*.

Collection of jalauka

Acharya Sushruta has told that the *jalauka* can be caught with a piece of wet leather.

Preservation of jalauka

After collecting the *jalauka* like above, they should be kept in a wide and new pot. The pure water of tank with lotus is put into the pot. *Jalauka* is then Fedded with *Shaivala, vallura* (dry meat) and powder of tubers of small plants.

Indications of jalaukavacharana

Acharya Sushruta mentioned *raktamokshana* in acute inflammatory conditions, indurated, cyanosed, painful, swellings, and strictly advised *jalaukavacharana* in contaminated wound.

Application of Leeches (Procedure)

Jaloukavacharan is a parasurgical measure & the procedure is divided into 3 parts-

Purvakarma (Pre-operative Care)

A. Purification of Leeches: By keeping in HaridrāJala, prepared by adding a few pinches of HaridrāCūrna in a kidney tray half filled with fresh water.

B. Preparation of Patient:

Before applicant of leech's patient's proper counseling should be done for better outcome of leech therapy. Preferably patients should be in lying down position. The part of the application was cleaned.

Pradhankarma (Operative Care): Selected site for leech therapy should be cleaned carefully. The number of leeches to be applied varies according to severity of the disease. If a leech does not stuck, then it is applied after making a puncture by sterile needle at that site (Shastri et al., 2013). The leech sucks blood by its anterior sucker which is attached to the base by posterior sucker. During sucking of blood leech should be covered with cold and wet cotton swab to protect the leech from excessive heat of blood. Number of application of leeches depends on severity and involved area.

Pashchatkarma (Post-operative Care):

Leech care

The leeches are removed from the site by sprinkling turmeric powder or rock salt powder or otherwise leech will left the site on its own when completely sucked. Vomiting is induced to leeches so that sucked blood is removed by sprinkling turmeric powder on its mouth and by slowly & gently squeezing from tail to mouth & then kept in fresh water. Again application of leech can be done after one week interval

Patient Management

Dressing should be done by sprinkling of *Triphalakasaya* and application of turmeric powder (*Curcuma longa*), application of honey (madhu) as these are haemostatic, antiseptic and analgesic in nature¹¹. After cessation of bleeding, tight bandaging should be done to avoid chances of bleeding. Patient has been instructed to be aware of oozing of blood from the site about 1-8 hrs.

Contraindication of Leech Therapy

It is contraindicated in treatment of hemorrhagic diseases like hemophilia, severe anemia, hypotension active tuberculosis, high fever, immuno-compromised patients.

DISCUSSION

TAO is a distinct form of systemic vasculitis of unknown aetiology though strongly linked to cigarette smoking. Clinical features and angiography form the main basis of diagnosis. Abstinence from smoking is the only definitive treatment to prevent disease progression. Medical line of treatment with vasodilators, pentoxifylline, and cilostazol may help improve pain-free walking distance but cannot prevent disease progression. Surgical treatment in form of revascularization, sympathectomy, Ilizarov, and omentopexy increases peripheral blood flow and decreases the rate of amputations. But all above methods have no complete cure for this disease. They also have many adverse effects which prevent quality of good life. In *Ayurveda Acharya Sushruta* (2000 BC) has elaborated leech application (*Jalaukavacharana*) under the topic of *Raktamokshana*. Leech therapy improves capillary perfusion and hence better tissue healing occurs due to decreased edema following bloodletting by leech therapy. When the leech sucks the blood, contrarily it injects salivary component eg. bdelins, enkephalins, hirudin inhibits both the platelet aggregation and the coagulation cascade thus releasing the venous congestion and induces neovascularization (Baskova et al., 2004). Analgesic and anti-inflammatory effects, increases micro-capillaries circulation and improves wound healing are also its benefits. Sole leech therapy is highly beneficial in many arterial occlusive diseases like Buerger's disease. Leech therapy is cost effective, minimum instrumentation, least complications, no hospitalization.

It is a minimal access and invasive parasurgical procedure. It may be used for the restoration of normal health through the prophylactic & palliative action. There is no pain in Leech application as compared to surgical incision. Leech therapy as *Ayurvedic* management is very effective and definitely prevents further progress of disease. Therefore, in the present era a large number of sufferers of this distressful disease are being benefited by judicious *Ayurvedic* management (*Jalaukaavacharan*) and are living with a symptom free better quality of life.

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