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Research Article

ANALGESIC AND ANTI-INFLAMMATORY ACTIVITY OF LEECH THERAPY IN THE MANAGEMENT OF ARTHRITIS

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ABSTRACT
The day-to-day advancement in each and every aspect has made human's life very fast, hectic and full of stress. In such an outfit every person is compelled to make the life fast and mechanical even shifted their food habits to fast food, altered their social structure and life style, having various negative impacts on the body. Occurrence of arthritis on large scale is one of the outcomes of this modification. It is commonest among acute as well as chronic inflammatory joint disease in which joint become painful, swollen and stiff. This study was designed to access the analgesic and anti-inflammatory activity of Leech Therapy in the treatment Arthritis. The study was randomized open phase clinical trial. Jalauka used for the therapy were obtained from fresh water pond of Madhyam Akara (4-6gms weight). Jalaukas were applied once in every week for six weeks duration. The patients of age group 18 to 60 were selected on the basis of Ayurvedic signs and symptoms of Sandhigata Vata. Observations were recorded for Pain, Swelling, Stiffness, Score of ACR, RA index, ARA joint count, Tenderness. The laboratory values of ESR, CRP and S.uric Acid were also recorded before and after the treatment. Since the assessment criteria was Quantitative, paired 't' test was applied. In the current Study the treatment was found significantly effective in treating arthritis. The effect of treatment was 44% patients were of Uttam Upashya in relieving Pain, 40% in swelling, 28% in stiffness, 32% in restricted movement, 16% in deformity. So, we can conclude that leech therapy is effective in the treatment of arthritis.
KEYWORDS: Analgesic, Anti-inflammatory, Leech therapy, Arthritis,

INTRODUCTION

The day-to-day advancement in each and every aspect has made life very fast, hectic and full of stress. In such an outfit, in order to adjust themselves every person is compelled to make the life fast and mechanical. Due to the changed pattern person is being enforced to expose to causative factors of the disease. Occurrence of arthritis on large scale is one of the outcomes of this modification. It is commonest among acute as well as chronic inflammatory joint disease in which joint become painful, swollen and stiff. It is a kind of disease if not treated properly can increase the incidence of disabled or crippled persons. Therefore, arthritis has taken the important place among all the disorders. It continues to pose challenges to physicians due to severe morbidity and crippling nature and claiming for maximum loss of human power, making it a biggest worldwide burning problem irrespective of races. Due to etiological factors like untimely food habits, taking meals without the digestion of prior one, meals quantity not in accordance to the appetite power, sleep during day time, trauma, water sports etc, Vata get vitiated and obstructed by himself and disease occurs[1,2,3]

The signs and symptoms of Sandhigata Vata mentioned by Ayurvedic Acharyas resembles with arthritis of modern medicine[4]. No doubt modern medical science has got an important role to play in overcoming agony of pain, restricted movement and disability caused by the articular diseases. Simultaneously prolonged used of allopathic medicines are not only giving rise to several side effects but also produce toxic symptoms, adverse reactions and organic lesion. Commonly the first choice of drug treatment in gout is NSAIDS, despite their gastrointestinal and cardiovascular risks. Loss of renal function, fluid retention and interaction with anticoagulants further discourage the use of NSAIDS.

There are no effective control measures available in any other pathies except Ayurveda. Other pathies provide only symtomatic relief however Ayurveda provides effective curative measures. To obtain therapeutic benefits in Vata-rakta, Ayurveda propounds a very distinct principal of biopurification because of the complex nature of its aetiopatogenesis.

Panchakarma is a very unique therapeutic procedure, because of it's preventive, promotive, prophylactic and rejuvenative properties as well as providing the radical cure. Rakta Mokshan (blood letting) is one of the best therapies mentioned in Ayurvedic classics for sandhigata Vata. Jalaukavcharan is the best measure for Rakta mokshan. During Rakta-mokshan, Doshas (especially pitta and rakta) are eliminated because rakta and pitta are integrally associated with each other[5]. Thus, Rakta mokshan had been selected for the treatment of sandhigata vata in the present study.

MATERIAL AND METHOD

The study was randomized open phase clinical trial conducted at S.S.Hospital, BHU Varanasi under the Department of Kayachikitsa as per clinical guidelines.

Plan of the Basal Study

The patients fulfilling the diagnostic criteria were selected for the study and interviewed thoroughly along with their family members and/or relative to obtain detailed information about the patient as well as the disease and collected in different data viz.

1. Demographic profile
2. Clinical profile

Duration of treatment

The total duration of treatment was fixed for six weeks with the regular weekly follow-ups. The patients registered for clinical sty were advised to not to take any other drug during the trial period both internally and externally.

Inclusion Criteria

1) The patients were clinically diagnosed according to Ayurvedic signs and symptoms.
2) Age-18 to 60 yrs.
3) Sex- Either
4) Marital status- Either
5) Socioeconomic status- All classes.

Exclusion criteria

A) Patients of anorectal disorders
B) Patients diagnosed as arthritis suffering from
1) Tuberculosis (of any system)
2) Infective pathology of any system.
3) Chronic renal disorders
4) Any life threatening disease.

Procedure For Leech Therapy (Jalaukavcharan)

Selection of Leech (*Hirudo medicinalis*)

Out of twelve, only six varieties of nonpoisonous leeches are used for medicinal purpose. Sankumukhi type of leech is preferably used for medicinal purposes due to its rapid blood sucking capacity. As

per classical description of Ayurveda, Leeches used for the therapy were obtained from fresh water pond of medium size (4-6gms weight). Leeches were applied once in every week for three months duration.

Storage and maintenance of Leech

Leech should be stored in well labeled container having multiple pores on the top for proper aeration. Temperature should be maintained around 15-27° C. The water of container should be de-chlorinated and should be replaced after 5 to 6 day. About 50 leeches can be kept in one gallon (4 liter) of water. If it is not possible to get the de-chlorinated water then keep the container of chlorinated water open in the air for a period of time and then use it for storage of leech. It is better to avoid direct exposure of sun light to the leeches.

Preparation: To activate the Leeches as well as to make the skin of leeches antiseptic they were put in a bowl containing a solution of Haridra and water for a period of 15 minutes. Later on Leeches were cleaned by keeping them in another bowl of pure water for 15 minutes.

Position: The patients were advised to sit down in position of spreading both legs forward and sometimes in prone position when leeches were applied on affected joints.

Procedure: The posterior sucker of leech was held in one hand and anterior sucker was placed at site of application (maximum tenderness), where the leech was expected to be fixed. Thereafter, the posterior sucker was released from the hand & attached to the surrounding skin surface of the joint. Thereafter, the leeches were covered with wetted gauge piece. To keep it moist few drops of water were poured on & often. As soon as the leeches showed the sign of elevated head & pumping action of the anterior sucker region the time was noted, when the leeches got detached spontaneously or otherwise, the time was once again noted. After leeches get detached, the site of application was properly cleaned, thereafter, sprinkling of Madhuyasti powder was done followed by tight bandaging of the wound.

Precaution: With the onset of symptomps like burning, itching, pain etc., the leeches were removed by sprinkling Haridra powder or Saindhav.

Contra indication of leech therapy

1. Blood clotting disorder
2. Severe anemia
3. Allergic reaction to active substances of the leech like hirudin, calin, hyaluronidase, egline, kollagenage, apyrase, destabilase, piyavit etc.
4. Human with weak constitution.
5. Pregnancy.

CRITERIA FOR THE ASSESSMENT OF RESULT

To assess the efficacy of the therapy objectively, all the signs and symptoms were given score depending upon their severity. Gradation of signs and symptoms were as following:-

Pain

Gradation of pain by visual analogue scale

0-1 - No pain
2-3 - Mild
4-5 - Uncomfortable
6-7 - Distressing
8-9 - Intense
10 - Worst possible

Swelling

0 Nil.
1 Mild tenderness, causing patient to wince on digital pressure.
2 Moderate tenderness, causing patient to wince and withdraw on digital pressure.
3 Severe tenderness; patient does not allow to touch.

Stiffness

0 Nil.
1 Mild.
2 Moderate.
3 Severe – All movements of leg impossible.

Richie Articular index : Each joint is evaluated on a score of 0-3, where zero indicates non-tender, 1 indicates tender, 2 indicates tender and winced and 3 indicates tender, winced and withdrawn.

ARA joint count: The number of clinically active jointes is determined on the basis of tenderness on pressure or pain on passive movement. Following joints to be examined – Elbow, Wrist, Hip, Knee, Ankles, Tarsals, Temparomandibular, Joints of cervical spine, Sternoclavicular, Metatarsophalyngeal, interphalyngeal of great toe.

Restriction of Movement:

0 - Absence of movement restriction
1 - <25% restriction of movement
2 - 25-50% restriction of movement.
3 - > 50% restriction of movement.

Technique to be applied

1. Sign and symptoms on rating scale.
2. Hematological studies.
3. Biochemical studies.

Statistical Analysis: Since the assessment criteria was Quantitative, paired 't' test was applied.

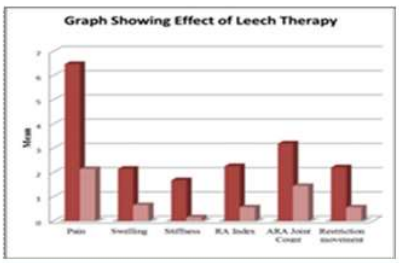
RESULT

All statistical analysis is done by student unpaired t-test 'p' value <0.001 were considered to be statistically highly significant. The 'p' value >0.05 were considered to be non-significant.

Table: Showing effect of leech therapy in Patients of arthritis

Symptoms	Mean±SD		Paired t- Test		
	Before leech therapy	After leech therapy			
Pain	6.47± 0.93	2.14± 0.66	4.32± 1.07,	t=23.67,	p<0.001
Swelling	2.15± 0.56	0.65± 0.60	1.50 ± 0.50,	t=17.23	p<0.001
Stiffness	1.68± 0.68	0.15± 0.36	1.53 ± 0.70,	t=12.62,	p<0.001
RA Index	2. 26± 0.45	0.56± 0.50	1.50 ± 0.50,	t=12.62,	p<0.001
ARA joint count	3.19 ±0.78	1.44 ±0.56	1.75±0.76,	t=12.99,	p<0.001
Restriction of movement	2.21± 0.41	0.56± 0.50	1.65 ± 0.69,	t=13.90,	p<0.001

Upashaya: Result of Jalaukavcharan has been accessed on certain parameters like Pain, Swelling, Stiffness, RA index, ARA Joint Count and restriction of movement. Mean before and after the leech therapy can be graphically presented as-



DISCUSSION

The medicinal Leech is a beautiful symbol of give-and-take and is sustainable resource management. Hirudo medicinalis is one of the oldest surviving animals on earth. The first documented accounts of the use of Leeches for medicinal purpose is from the time of extreme antiquity, more than 2500 years before in Ayurvedic texts, then long later during the period of Hippocrates. Dhanwantari, the Indian God of Ayurveda holds a leech in one of his hands. This simply suggests the importance of leeches in medical field by ancient Indian sciences. Leeches have and will always be thought of as the "wonder doctors" of science.

Arthritis, also called degenerative joint disease. Gout is one of the type of arthritis, which is characterized by progressive loss of cartilage in the joints due to the deposition MSU crystals and is associated with symptoms such as pain, tenderness, stiffness and reduced mobility[6]. Treatment often includes the use of non-steroidal anti-inflammatory drugs (NSAIDs) and topical analgesics. This approach provides symptom relief but does not change the course of the disease.

Leech therapy may be more effective than topical analgesics and anti-inflammatory agents in the treatment of arthritis[10]. Although leeches may not be safe for people with diseases that impair blood clotting or for those with compromised immune function, it is believed to be safe for most other people. Its immediate effect on pain, inflammation, lasting effects on stiffness and dysfunction; high degree of safety suggest that this therapy has great potential in the management of gouty arthritis. Patients with gouty arthritis, who were treated with leech therapy, experienced clinically significant improvements in self-perceptions of pain for a limited period. Moreover, a single application of leeches improved functional ability and joint stiffness for at least 3 months.

The saliva of leeches contains a variety of substances such as Hirudin, hyaluronidase, histamine like vasodilators, collagenase, destabilase[14], inhibitors of kallikrein, superoxide production and poorly characterized anesthetics and analgesic compounds[9]. These substances might reach deeper tissue zones and possibly the joint spaces. Various bioactive substances in leech saliva may also be as pharmacologically potent as hirudin and thus exert substantial effects in periarticular tissue and adjacent structures[11]. It has been proved through Laser Doppler Flowmetry that there is a significant increase in superficial skin perfusion following leech application, especially 16 mm around the biting zone[7]. Therefore, a regional analgesic and antiphlogistic effect by these substances enforced by hyaluronidase, as well as counter–irritation might be the possible reason of improvement by treatment with leeches. Leech therapy could induce pain relief through antinociceptive effects and counter-irritation. However, it is not known to what extent leech bites may induce such mechanisms. The jaws of the leech pierce the skin so that these potent biologically active substances can penetrate into the deeper tissues. Hyaluronidase (spreading factor), an enzyme in leech saliva, further facilitates the penetration and diffusion of these pharmacologically active substances into the tissues. Its effect is similar as the topical application of diclofenac gel to the knees of patients with knee joint effusions; the drug could be detected in the deep periarticular tissues and body compartments. With the additive effect of hyaluronidase, it is highly probable that the antiphlogistic substances in leech saliva can penetrate deep enough to exert significant effects on periarticular myofascial structures and perhaps even on intra-articular structures. A recent study showed that peri-articular myofascial structures play an important role in the development of chronic joint pain and regional pain syndromes in patients with arthritis.

Venous congestion is another important complication that threatens the viability of the affected joints following crystal orthopaties like gout[11]. It can be best treated with the application of leeches. Leech therapy has two phases, active bloodletting and passive bleeding from the leech wound after detachment, which can last for several hours. The small blood volumes removed by medicinal leeches and the augment blood removal during the passive-bleeding phase of leech therapy results remarkably decrease in venous congestion in the joints. In addition to this, a broad number of anticoagulant agents decrease venous congestion such as the thrombin inhibitor hirudin, apyrase as well as collagenase, hyaluronidase, Factor Xa inhibitor and fibrinase I and II[8,12,13].

In summary, traditional leech therapy seems to be an effective in treatment for gouty arthritis. The effectiveness and safety of this treatment, especially when applied repeatedly, should be further evaluated in larger randomized studies. In addition, the active compounds in leech saliva and their local release (that is, in the synovial fluid) deserve further study. Currently, no pharmacologic agent has similar lasting effects after a single local administration. Further research into the anti-inflammatory compounds of leech saliva could lead to the development of new effective substances for treating gouty arthritis.

CONCLUSION

In the current Study the treatment was found significantly effective in treating Gout. The effect of treatment was 44% patients were of Uttam Upashya in relieving Pain, 40% in swelling, 28% in stiffness, 32% in restricted movement, 16% in deformity. So, we can conclude that leech therapy is effective in treatment for gouty arthritis.

REFERENCES

1.Shastri KN, Chaturvedi GN. Chikitsa Sthana Rasayanadyay. Charak Samhita, "Vidyotini" Hindi Commentary Part-II. Varanasi, Chaukhambha Bharti Acadami; Edition Reprint 1998;819-40

2.Shastri Kaviraj Ambika Dutt. Chapter 1 Nidan Sthan. Sushrut Samhita, "Ayurveda Tatwa Sandeepika" Hindi Commentary Part I. Varanasi, Chaukhmbha Sanskrit Sansthan; Edition 11th:231-32.

3.Upadhyay Yadunandan. Nidan. Vatshonit Nidanadyaya. Astang Hridya, "Vidyotini" Hindi Commentary. Varanasi, Chaukhmbha Sanskrit Sansthan; Edition-2003;280-284.

4.Joshi YG, Rasayan Chikitsa. Kayachikitsa; Pune, Pune Sahitya Vitaran; Edition 4th 2001;287-96.

5.Singh RH. Rasayan and Vajikaran. Swasthyavritta Vigyan; Delhi, Chaukhmbha Sanskrit Pratisthan, Edition 2007;521-28.

6.Mohan Harsh, Text Book of Pathology, Published by Jaypee Brothers Medical Publishers (P) Ltd. Edition 3rd 1998; P 1009-16.

7.Knobloch K, Gohritz A, Busch K, Spies M, Vogt PM; Handchir Mikrochir Plast Chir. 2007 Apr;39(2):103-7). Leech gut contents contain a large molecular weight compound responsible for antibacterial activity (Elizabeth Pierson; Biochemistry (Moscow), 66(12): 1368-1372 Rigbiet al. 1986: 568-571

8.Connor NP, Conforti ML, Heisey DM, Vanderby R, Kunz D, Hartig GK; J Rehabil Res Dev. 2002 Jul-Aug;39(4):505-12

9.I.P. Baskova, G.I. Nikonov, Destabilase " An enzyme of medicinal leech salivary gland secretion that hydrolyses isopeptide bonds in stabilized fibrin" Biokhimia (USSR) 50(1985) 363-375.

10.Andereya S, Stanzel S, Maus U, Mueller-Rath R, Mumme T, Siebert CH, Stock F, Schneider U. "Assessment of leech therapy for knee osteoarthritis: a randomized study". Acta Orthop. 2008 Apr;79(2):235-43.

11.Michalsen A, Lüdtke R, Cesur O, Afra D, Musial F, Baecker M, Fink M, Dobos GJ. "Effectiveness of leech therapy in women with symptomatic arthrosis of the first carpometacarpal joint: a randomized controlled trial" Pain 2008 Jul 15;137:452-9.

12.Sviridkina LP, Borovaia EP, Makhneva AV. "Hirudotherapy in combined sanatorium-spa treatment of patients with coronary heart disease" (Article in Russian). Vopr Kurortol Fizioter Lech Fiz Kult. 2008 May-Jun;(3):12-5.

13.Baskova IP, Zavalova LL, Kostrjukova ES, Titova GA, Lazarev VN, Zgoda VG. "Proteomic analysis methods for characterization of proteins from the salivary gland secretions of the medicinal leech during different seasons" Biochemistry (Mosc). 2007 Feb;72(2):219-25.

14.L.L. Zavalova , I.P. Baskova b, S.A. Lukyanov etc. "Destabilase from the medicinal leech is a representative of a novel family of lysozymes" Sverdlov Biochimica et Biophysica Acta 1478 (2000) 69-77 .

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