

The Cumulative anti-inflammatory effect of bloodletting by Leech (*Jallaukavacharana*) in patients of Arthritis (*Aamvata*) w. s. r. inflammatory markers-a Research Realm

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Abstract:

Raktamokshana, is a para-surgical procedure directed for the treatment of specifically *Raktaja roga* (blood-borne diseases), along with many other surgical diseases. To expel out the vitiated blood, seven procedures are advocated: venesection (*Sira Vedhan*), horn application (*Sringa Avacharana*), gourd application (*Alabu Aavacharana*), leech application (*Jalauka Avacharana*), scrapping (*Pracchanna Karma*), cupping glass application (*Ghati Yantra Avacharana*), and needle application (*Suchi Avacharana*). The process of *Raktamokshana* can be traced back to the Vedic period only and not beyond that. In the *Koushika* sutra of *Atharvaveda*, references of bloodletting (*Raktamokshana*) by leech application are available. *Sushruta* and *Vagbhata* focused on the *Raktamokshana* in detail. Bloodletting

as a method of treatment is indicated in Gouty Arthritis (*Vatarakta*), *filariasis*, *herpes*, *tumors*, various skin disorders, genital infections, abscess, inflammatory conditions, *cellulitis*, painful ulcers, and chronic ulcers. On the other hand it is found to be contraindicated in generalized swelling, swelling in those suffering from anaemia, piles, phthisis and in pregnancy. With such conceptual things in mind a research work was undertaken to study the change in inflammatory markers in patients of arthritis treated with Leech Therapy. For this 30 patients of *Aamvata* (*Rheumatoid Arthritis*) in whom CRP and ESR was raised were selected for study. Leech Therapy was done alternate day in every patient in the knee and ankle joint for 10 days. Blood investigations were done prior to leech therapy and after leech therapy in every patient and it was

found that inflammatory markers were found to reduce, in these patients after the successful completion of the research protocol.

Keywords: *Raktamokshana, alabu, shringa, filariasis, herpes, cellulitis, ulcers, piles, inflammatory markers*

INTRODUCTION

Today is an era of fast life. The technology advancing day by day, but man's dependency increasing manifold on the electronic gadgets and one has to adjust to the smart life with similar lifestyle and smart fast food. In this process the principles of healthy lifestyle like *dincharya, ritucharya, aaharvidhividhan, vegvidharan* etc are getting on back foot. One has to accept these lifestyle modifications and move on. Hence with the advancing time man's most of the dietary habits, social structure, life style, and environment have been changing. Occurrence of Amavata on large scale is one of the outcomes of the lifestyle modification. It is commonest among chronic inflammatory joint diseases in which joints become swollen, painful, and stiff. It is a debilitating disease in view of its chronicity and complications.¹ Therefore; it has taken the foremost place among the joint disorders and continues to pose challenge to physicians due to its severe morbidity and crippling nature and claiming the maximum loss of productivity making it a biggest health issue worldwide, irrespective of races.² It can be equated with Rheumatoid Arthritis, an inflammatory autoimmune joint disorder. The lives of more than one million people are physically impaired

due to Rheumatic disorders.³ The onset is more frequent during 4th and 5th decade of life with 80% of patients developing the disease between the ages of 35 to 50 years. Women are affected three times more often than men.⁴ New classification criteria overruled the "old" ACR criteria of 1987 and are adapted for early RA diagnosis⁵. The "new" classification criteria, jointly published by the **American College of Rheumatology (ACR)** and the **European League against Rheumatism (EULAR)** establish a point value between 0 and 10. In these, 1 point is attributed to elevated e ESR (erythrocyte sedimentation rate), and or elevated CRP value (C-reactive protein).⁵

Amavata was first described as an independent disease in *Madhava Nidana*.⁶ Though *Ama* and *Vata* are the predominant pathogenic factors but the disease represents *Tridosha* vitiation.⁷ The affection of *Sandhis* by *Vata dosha* in association with *Ama*, reflects the equal role of both *Dosha* and *Dushya* in the causation of this disease.⁸

No doubt modern medical science has got an important role to play in overcoming agony of pain, restricted movement and disability caused by this debilitating articular disease. Simultaneously prolonged use of modern medicines is not only giving rise to many side effects, toxic symptoms and adverse reactions but also more serious complications are caused by them. Hence the management of this disease is merely insufficient in other systems of medicine and patients are continuously looking with a hope

towards Ayurveda to overcome this challenge.⁹

The first description of leech therapy, classified as blood Letting, was found in the text of *Sushruta Samhita* (dating 800 B.C.) which described 12 types of leeches (6 poisonous and 6 non-poisonous).¹⁰ Diseases where leech therapy was indicated were skin diseases, sciatica, and musculoskeletal pains etc. Medicinal leeches have been found to secrete saliva containing about 60 different proteins. These achieve a wide variety of goals useful to the leech as it feeds, helping to keep the blood in liquid form and increasing blood flow in the affected area. Several of these secreted proteins serve as anticoagulants (such as *hirudin*), platelet aggregation inhibitors (most notably *apyrase*, *collagenase*, and *calin*), vasodilators, and *proteinase* inhibitors. It is also thought that the saliva contains an anaesthetic, as leech bites are generally not painful and enzymes containing analgesic and anti-inflammatory properties. Medicinal leeches are any of several species of leeches, but most commonly *Hirudo medicinalis*, the European medicinal leech.¹¹ Hence Leech Therapy has been established as one of the most efficacious therapies in the management of various skin conditions like psoriasis, Eczema, cysts, abscess, and inflammatory conditions of skin and soft tissue like cellulites, and joints like arthritis etc. *Acharya Sushruta* has mentioned *Avsechana Karma* or *Raktamokshana* as second most important procedure in the treatment of Vranashotha.¹²

1.2 Plan of Study:

The present study primarily aims at studying the change in inflammatory markers such as C reactive proteins (CRP), Erythrocyte Sedimentation Rate (ESR), TLC (total leukocyte count), and DLC (differential *leucocyte* count) in a group of 30 patients of *Aamvata* (Rheumatoid Arthritis). From numerous researches it is evident that CRP, ESR, TLC and DLC are important inflammatory markers and found to increase in various conditions like Rheumatoid Arthritis, Myocardial Infarction, *Alzheimer's disease*, Diabetes Mellitus, and other diseases where there is inflammatory process in body. Leech Therapy has been proved as an important anti-inflammatory therapy by certain variety of researches worldwide.^{13to26} The present study aims at determining the changes in inflammatory markers like CRP, ESR, TLC and DLC in the patients of *Aamvata* (Rheumatoid Arthritis) treated with Leech Therapy.

1.3 Research Question:

Whether Leech Therapy is effective in reducing inflammation in joints in patients of Rheumatoid Arthritis (*Aamvata*) with special reference to inflammatory markers?

1.4 Need of Study

From the limitations of the treatment modalities in modern science and the serious debilitating nature of the disease. it can be stated that there is scope for the establishment for newer modalities of treatment in RA to arrest the disease progress in its early stages.

There are number of researches done on Leech Therapy and Arthritic conditions. Most of these researches done are based on subjective parameters but not on objective parameters like inflammatory markers.^{27,28} With the citation of various articles it has been found that TLC, DLC, CRP and ESR have been mentioned as important markers of inflammation in variety of diseases like RA, Diabetes etc.^{29to39}

Considering all these aspects”The Cumulative anti-inflammatory effect of bloodletting by Leech (*Jallaukavacharana*) in patients of Arthritis (*Aamvata*) w.s.r inflammatory markers-a Research Realm” has been selected for study.

2.AIM AND OBJECTIVES

2.1 Aim:

To assess efficacy of Leech Therapy on Inflammatory Markers in the patients of *Aamvata* (Rheumatoid Arthritis)

2.2 Objectives:

- 1) To assess the anti-inflammatory effect of Leech Therapy in patients of *Aamvata* (Rheumatoid Arthritis)
- 2) To assess the efficacy of Leech Therapy on Pain
- 3) To assess the effect of Leech Therapy on joint movement

3.REVIEW OF LITERATURE

The entity *Amavata* is available since the period of *Charaka* as a reference in the context of various treatments.^{40, 41, 42} However, *Amavata* as a separate disease entity was described for the first time in detail by *Madhavakara* (900 AD)⁴³

3.1 Review of Leech Therapy:

The first description of leech therapy, classified as bloodletting,

was found in the text of *Sushruta samhita* (dating 800 B.C.).⁴⁴ Medicinal leech therapy made an international comeback in the 1970s in microsurgery, used to stimulate circulation to salvage skin grafts and other tissue threatened by postoperative venous congestion particularly in finger reattachment and reconstructive surgery of the ear, nose, lip, and eyelid. Other clinical applications of medicinal leech therapy include varicose veins, muscle cramps, thrombophlebitis, and osteoarthritis, among many varied conditions. *Jalloukavacharana* has been an established therapy of *Raktamokshana* by *Anushastras*, others being *Ghatiyantra*, *Shringa karma* and *Alabu Karma*.⁴⁵

Indications for *Raktamokshana* (bloodletting):

- *Vranashopha*(Cellulites),*Kushtha*(Skin Diseases),*Visarpa*(Erysipelas),*Pidaka* (Skin eruptions),*Raktapitta*(Bleeding disorders),*Gudapaka*(Proctitis),*Pleeha*(Splenomegaly),*Vatarakta*(Gout),*Arsha*(Haemorrhoids),*Vidradhi*(Abscess),*Arbooda*(tumour),*Shwitra*(Leucoderma),*Dadru*(ring worm)

3.2 Rheumatoid Arthritis Review

Rheumatoid arthritis (RA) is a long-lasting autoimmune disorder that primarily affects joints. It typically results in warm, swollen, and painful joints. Pain and stiffness often worsen following rest. Most commonly, the wrist and hands are involved, with the same joints typically involved on both sides of the body. This results in inflammation and thickening of the joint capsule. It also affects the underlying bone and

cartilage. The diagnosis is made mostly on the basis of a person's signs and symptoms. X-rays and laboratory testing may support a diagnosis or exclude other diseases with similar symptoms.

Signs and symptoms

RA primarily affects joints, but it also affects other organs in more than 15–25% of individuals.

Joints-Arthritis of joints involves inflammation of the synovial membrane. Joints become swollen, tender and warm, and stiffness limits their movement. Larger joints like the shoulder and knee can also be involved leading to loss of function.

RA typically manifests with signs of inflammation, with the affected joints being swollen, warm, painful and stiff, particularly early in the morning on waking or following prolonged inactivity. These signs help distinguish rheumatoid from non-inflammatory problems of the joints, often referred to as osteoarthritis. The pain associated with RA is induced at the site of inflammation and classified as *nociceptive* as opposed to neuropathic. The joints are often affected in a fairly symmetrical fashion, although this is not specific, and the initial presentation may be asymmetrical.

The ACR/EULAR Rheumatoid Arthritis Classification Criteria

In 2010 the ACR / EULAR Rheumatoid Arthritis Classification Criteria were introduced. **The new criterion is not a diagnostic criterion but a classification criterion to identify disease with a high likelihood of developing a chronic form. However a score of 6**

or greater unequivocally classifies a person with a diagnosis of rheumatoid arthritis.

❖ Acute phase reactants:

“1 point for elevated erythrocyte sedimentation rate, ESR, and or elevated CRP value (C-reactive protein)” by EULAR (European League against Rheumatism)

❖ Duration of arthritis: 1 point for symptoms lasting six weeks or longer.

In clinical practice, the following criteria apply:

- Two or more swollen joints
- Morning stiffness lasting more than one hour for at least six weeks
- The detection of rheumatoid factors or autoantibodies against citrullinated proteins (ACPA), autoantibodies to mutated citrullinated vimentin MCV can confirm the suspicion of RA. A negative autoantibody result does not exclude a diagnosis of RA.

Treatment

There is no cure for rheumatoid arthritis. But recent discoveries indicate that remission of symptoms is more likely when treatment begins early with strong medications known as disease-modifying ant rheumatic drugs (DMARDs).

Medication: NSAIDs, Steroids. Disease modifying anti-rheumatic drugs (DMARDs). .Biological Agents

Surgery: Synovectomy, Tendon repair Joint fusion, Total joint replacement^{46,47}

3.3 Review of Inflammatory Markers:

❖ **CRP(C reactive proteins) and ESR(erythrocyte sedimentation rate)**

Acute-phase reactants are proteins whose concentrations in blood increase or decrease by 25% or more during inflammation. The acute-phase reactants most commonly used for diagnostic purposes are C-reactive protein (CRP) and the erythrocyte sedimentation rate (ESR), these are simple, cost-effective and valuable diagnostic tools to distinguish inflammatory from non-inflammatory conditions and to monitor the response to treatment for a number of disorders.

CRP can be induced by 1000-fold. CRP begins to rise within 4-6 hours after an inflammatory stimulus and reaches its peak level in blood within 48-72 hours. Fibrinogen, the major determinant of the ESR, can increase by threefold and peaks over a week after initial stimulus.

Measuring CRP is perhaps the most practical way to detect and monitor the presence and progress of a systemic inflammatory response, due to its large dynamic range, rapidity of response, short half-life and relative simplicity of measurement. CRP is stable in serum or plasma and can be measured by relatively simple and inexpensive analytical methods such as enzyme-linked immune sorbent assay (ELISA), turbidimetry and nephelometry. The plasma half-life of CRP is 19 hours and its clearance is constant, meaning that it is the rate of synthesis that determines its concentration.

The ESR is defined as the distance that erythrocytes settle in anti-coagulated whole blood, under gravity, in one hour. It is measured as the length in mm, of clear plasma at the top of a vertical tube. Thus it actually measures the amount of sedimentation in an hour as opposed to the rate per hour. The ESR is a simple and inexpensive test. In the laboratory, there are two main methods for measuring ESR: the *Westergren* and *Wintrobe* methods. These two methods use different standardised tubes and anticoagulants, and the results are not interchangeable. Erythrocyte sedimentation is dependent on the ability of red blood cells to aggregate and form rouleaux. This, in turn, is determined by factors such as red blood cell number, size and shape, electrostatic charges and plasma viscosity.

Assessment of disease activity of autoimmune/ auto inflammatory conditions (increase in serum CRP and ESR levels)-

Rheumatoid arthritis, Juvenile idiopathic arthritis, Seronegative arthritis, Ankylosing spondylitis, Reactive arthritis, Psoriatic arthritis, Crohn's disease, Rheumatic fever, Vasculitis, Bechet's syndrome, Polyarteritis nodosa, Pancreatitis, Assistance with diagnosis and monitoring of infection, Bacterial endocarditis, Abscess, Postoperative infection, Response to antibiotic therapy.⁴⁸ Along with CRP, ESR, TLC (total leucocyte count) and DLC (differential leucocyte count) will be done in every patient prior to treatment and after treatment.

TLC (Total Leucocyte Count):

Leucocytosis is very common in acutely ill patients. It occurs in response to a wide variety of conditions, including viral, bacterial, fungal or parasitic infections, cancer, haemorrhage and exposure to certain medications like steroids, beta agonists etc. **It is frequently a sign of an inflammatory response**, strenuous exercise, convulsions, pregnancy, labour, anaesthesia, emotional stress etc. There are five principal types of leucocytosis

DLC (Differential Leucocyte Count):

This gives relative percentage of each type of white blood cells and also helps reveal abnormal white blood cell population. Both are blood tests counted in lab under complete blood count (CBC) ⁴⁹

3.4 Leech Review

Leeches are segmented worms that belong to the phylum Annelida and comprise the subclass Hirudinae. The majority of leeches live in freshwater environments, while some species can be found in terrestrial and marine environments, as well. The best-known leeches, such as the medicinal leech, *Hirudo medicinalis*, are hematophagous, feeding on vertebrate blood and invertebrate hem lymph. Almost 700 species of leeches are currently recognized, of which some **100 are marine, 90 terrestrial and the remainder freshwater taxa**. Leeches, such as the *Hirudo medicinalis*, have been historically used in medicine to remove blood from patients. In modern times, leeches are used medically in procedures such as the reattachment of body parts and reconstructive and

plastic surgeries and, in Germany, treating osteoarthritis. ⁷⁷There are many other species of leeches in medicinal use. In Asia *H. Manillensis* is used for treatment and in Europe *H. Medicinalis* is used for treatment. Along with this other species like *H. Verbana*, *H. Orientalis* are also used for treatment purpose. ⁵⁰

4. MATERIALS AND METHODS

4.1 Materials:

Leeches and Leech Lab and other procurements as per the requirements given in specific subheadings and tablets of Paracetamol,

4.2 Methodology:

The patients suffering from *Aamvata* (Rheumatoid Arthritis) who satisfy the criteria of case definition in the present study were selected. The patients were subjected to detail clinical examination and investigations as per the specially designed proforma.

The present clinical study comprises of 30 subjects which were treated by leech therapy alternate day for 20 days. They will be considered as a single group ie, experimental group.

Leeching was done on 1 or 2 painful joints at a time with 1 or 2 leeches applied to every joint. This procedure was repeated for other painful joints on next sitting with same plan. Changes in symptomatology were noted simultaneously on the CRF. Similar procedure was repeated on alternate days for whole month. Investigations like CRP and ESR and TLC, DLC were done prior to leech Therapy and

after the completion of Leech Therapy. For statistical comparisons, similar joints were selected. Any undesired reactions were taken care of. Patient was given absolute liberty to opt out of study if not willing during the course of treatment.

There was a provision that the patient whosoever if sustains severe pain during the study will be given tab Paracetamol 500 mg stat for pain relief if required.⁵¹

These patients suffering from *Aamvata* (Rheumatoid Arthritis) were selected from OPD of Shalya Tantra dept and OPD of Kayachikitsa dept. of MGACH & RC, Salod, Wardha.

Detailed clinical Examination – History taking comprised the major complaints with duration, history of present and past illness, personal history, and family history. The additional gynaecological and obstetrical history was also taken in females. Also the general examination for the detection of any abnormality in the chest, abdomen and other parts of the body was done.

Investigations like Hb (haemoglobin), RBS(Random blood sugar), HIV(Human immune deficiency syndrome test), HbsAG(Australia antigen test), Bleeding Time(BT), Clotting Time(CT), Prothrombin time(PT) were done prior to and after treatment in every patient. A provision to perform investigations like **Serum Pro-calcitonin levels** was kept in cases where the CRP levels of a patient were increased by 5 times (normal range is 0 to 6 mg/dl), **Tissue biopsy**⁵² would be done where ever required.

Patients for Leech Therapy were subjected to Purvakarma, Pradhana Karma and Paschatakarma

4.3 *Purvakarma*:

1) Procurement- 2) Written Consent- 3) Leech storage 4) Patient care - 5) Care of the Leech (Leech disinfection)

4.4 *Pradhana Karma*:

The area where leech was to be applied was first cleaned thoroughly with sterile water. The leech was taken from the jar and its mouth placed precisely over the spot. The leech would be lightly covered with moist cotton (pads), while it sucked blood. Leeches normally suck about 5ml to 10 ml of blood. It would be allowed to finish on its own

4.5 *Paschata Karma*:

a) Aftercare of patient - b) Care of the Leech - The leech was used for the same patient more than once, but it was purified after each application. Massaging the leech from tail to mouth helped to vomit ingested blood. Once the leeches were vomited of the blood, they were kept in dilute saline, turmeric water and plain water simultaneously and later placed in jars. The water in the jar was changed every day to remove any toxins. Used, leeches would not be considered fit for use, for at least 7 days. Leeches applied to one patient were kept in labelled jars and were not used for other patients

Special agendas of study:

- Patients diagnosed with RA were selected for leech therapy.

- Application of Leeches was done alternate day for 20 days. CRP and ESR along with TLC and DLC were done prior to Leech therapy and after completion of Leech therapy.
- If required patients were admitted to Shalya tantra IPD.
- Ethical issues of leech therapy were considered
- .Leeches were destroyed as biomedical wastage.
- Written consent was mandatory for every patient.
- Death record of every leech was maintained.⁵³

4.6 Complications: Like

- 1) Infection
- 2) Local hypersensitivity reaction, itching, blister forming, ulcerative necrosis and even local tissue damage due to existence of some toxins in leech saliva. Appropriate treatment given if these symptoms occur.

- 3) Skin marks (scar)
- 4) Blood loss
- 6) Any complication or drug allergy or hypersensitivity

All these things were kept in mind while treating the patients with Leech Therapy and were treated accordingly.

4.7 Inclusion Criterion:

- Patients in the age group 20 to 60 yrs. were selected for study
- Patients with special features of RA were selected for study
- Two or more swollen joints

- Morning stiffness lasting more than one hour for at least six weeks
- The detection of rheumatoid factors or auto antibodies against ACPA.
- A negative autoantibody result patient will be considered for study.
- Patients with elevated erythrocyte sedimentation rate (ESR), or elevated CRP value (C-reactive protein)
- Symptoms lasting six weeks or longer

- Patients who gave written consent of study
- Patients of uncomplicated RA were included in the study.

4.8 Exclusion Criterion:

- Anaemic patient in which Hb is below 8 gms
- Pregnant ladies,
- Patient below 20 yrs. and above 60 yrs. of age
- Children
- Patient who is HIV positive
- Patients having HbsAg positive

4.9 Specially designed protocols were followed as follows –

- **Measurement of Pain** - Pain was measured before and after the treatment in each individual with the help of visual analogue scale (Bond and Pilowsky,(1966) Visual analogue scale - A line of 10 cm long drawn on a page on which at one end 'no pain' and at the other end 'severe pain I ever felt' were written. The patient was asked to mark the line at the point corresponding to the intensity of pain at that very moment.

No pain ----|----|----|----|----|----|----|----|----|----|----|----| severe pain I ever felt
 1 2 3 4 5 6 7 8 9 10

❖ **Measurement of Swelling:** The regular meter tape on the one side of which is the unit of centimetres was used to measure the swelling in centimetres before and after the treatment so that the change or alteration should be noted.

❖ **Tenderness:** Tenderness was recorded in four grades, depending upon the patient's reaction to firm pressure of the 'joint between finger and thumb.

- Grade 1 : The patient says the joint is tender.
- Grade 2 : The patient winces.
- Grade 3 : The patient winces and withdraws the affected part.
- Grade 4 : The patient will not allow the joint to be touched.

Similarly these grades were denoted as the signs +, ++, +++, ++++ respectively according to severity. This was noted before and after treatment.

❖ **Redness:** This character was inspected locally. The affected joint was observed for change in colour i.e. it was compared to normal skin colour and the redness was noted on comparison.

- Grade 1 : Mild redness (just equal to normal)
- Grade 2 : Mild to moderate redness.
- Grade 3 : Moderate redness.
- Grade 4 : Severe redness.

This was done before and after treatment.

❖ **Rise in temperature:** This is known as local heat or local warmth. Even about this character, the clinical methods do not mention the way to classify rise in local temperature.

Hence, for the sake of convenience, it was assumed in two Grades.

- Grade 1 : Presence of rise in local temperature.
- Grade 2 : Absence of rise in local temperature.

❖ **Restricted movements :** This is also called as range of movements. These included active and passive movements of the painful joints. Later, it was assessed whether the patient could perform important functions with the joints associated with recovery. Active movements included the flexion, extension, adduction, abduction, circumrotating etc. on his own.

For the sake of convenience, the degree of flexion was made the criteria for assessment of restricted movements. For this a protractor or Goniometer was used. This was done, before and after treatment.

❖ **Walking effect:** This observation was especially confined to the joints of lower limbs. As the joints under consideration for application of leech were of majority of lower limbs, this was a major criterion of observations. This was assessed by observing the initial range of motion in meters i.e. before treatment. Similarly after treatment the range of motion] in metres was also calculated.

In this way the observations were drawn.

Observations:

In the present study the various criteria of classification and findings are as follows –

1. Classification according to Age:

Sr.No	Age group	No. of Patients
1	21to 30 yrs	13
2	31to 40 yrs	13
3	41 to 50 yrs	4

13 patients were in age group of 21 to 30 years.13 patients were in age group of 31 to 40 years.4 patients belonged to age group 41 to 50 years.

2. Classification according to Sex:

Sr.No	Category	No. of Patients
1	Male	05
2	Female	25

Out of 30 patients, 25 were male and 5 were female.

3. Classification according to Socio Economic Status

Sr.No	Socio Economic class	No. of Patients
1	Lower	20
2	Middle	10
3	Higher	-

Out of 30, 20 patients belonged to lower and 10 belonged to higher socio economic class .

1. According to marital status

Sr.No.	Category	No. of Patients
1	Married	22
2	Unmarried	8

22 Patients were married and 8 were unmarried.

2. According to diet

Sr.No.	Type of diet	No. of Patients
1	Mishra ahar	24
2	Niramisha ahar	6

24 were having mixed diet (mishrahar) and 6 were having Niramisha ahar.

6. According to Dosh Prakruti

Sr.No	Type of Dosh Prakruti	No. of Patients
1	Vata pittaj	11
2	Pitta Kaphaj	13
3	Vata Kaphaj	6

Out of 30 patients, 11 were having vata pittaj, 13 pittakaphaja and 6 were having vata kaphaja prakruti.

3. According to Manas Prakriti

Sr. No.	Type of Manas Prakriti	No. of Patients
1	Satva	0
2	Raja	18
3	Tama	12

Out of 30, 18 patients had Rajasika manas prakruti and 12 patients had Tamasik manas prakruti.

4. According to Agni Parikshana

Sr.No.	Type of Agni	No. of Patients
1	Mandagni	20
2	Vishamagni	9
3	Tikshnagni	1

Out of 30, 20 patients had mandagni, 9 had vishamagni while 1 had tikshnagni.

5. According to Koshtha

Sr.no	Type of Koshtha	No. of Patients
1	Mridu	6
2	Madhya	21
3	Krur	3

Out of 30, 6 had Mridu koshtha, 21 had madhyam Koshtha, and 3 patients had Krura koshtha.

6. According to the Joint involved

Sr. no.	Joints involved	No. of Patients
1	Knee Joint	15
2	Ankle Joint	8
3	Wrist Joint	4
4	Elbow Joint	2

Out of 30 patients, 15 had knee joints involved, 8 had ankle joints involved, 4 patients had wrist joint involved, 2 patients had elbow joint involvement.

7. According to Chronicity of symptoms

Sr,no	Time period	No. of Patients
1	0- 6 months	20
2	7 months	6

	- 3 years	
3	3 years & above	4

Out of 30 patients, 20 patients had 0-6 month's chronicity, 6 patients had 7 months to 3 years, 4 patients had 3 years and more chronicity of duration.

8. According to Habits

Sr. No	Type of diet	No. of Patients
1	Alcohol	4
2	Gutkha	17
3	Tobacco	19
4	Pan	10

Of the 30 patients, 4 indulged in alcohol consumption, 17 in gutkha, 10 in gutkha and tobacco consumption and 10 in pan consumption.

9. According to Type of Work

Sr. No.	Type of work	No. of Patients
1	Active	18
2	Sedentary	12

Out of 30, 18 had active lifestyle and 12 had sedentary lifestyle.

10. According to marital status

Sr.no	Category	No. of Patients
1	Married	18
2	Unmarried	12

Out of 30, 18 were married and 12 were unmarried.

Discussion:

Observations in these 30 patients were subjected to statistical tests like paired t test, mean etc. It was found that there was significant relief in pain in patients after leech therapy was done. The mean percentage relief in pain is found to be 69.99%.

Swelling in ankle joint and right knee joints were compared prior to and after leech therapy and it was found that there was significant reduction in swelling in centimetres and this decrease was found due to leech therapy and not due to sampling error..

Patients were observed for restricted movement. Initially the degree of flexion was noted in each patient and it was found that there is significant increase in movements of Knee and ankle joints. Similarly percentage weekly relief in restricted movement in knee joint flexion after 14th day of leech application is 33.33.

Patients were observed for walking effect. Initially walking capacity was noted in metres. Patient was made to walk and distance was noted in meters before and after treatment and it was found that there is mean increase in walking effect which is due to Jallaukavacharan.

Patients were observed for Redness on joints prior to and after leech therapy. There was 61.66% of relief in redness after treatment with leech therapy for 20 days.

Patients were observed for tenderness on joints prior to and after leech therapy. There was 41.66% of relief in redness after treatment with leech therapy for 20 days

Patients were observed for rise in local temperature on joints prior to and after leech therapy. It was found that % of patients with rise in local temperature has changed from 91.66 to 33.33. Thus application of leech is effective in all the patients of arthritis.

The laboratory investigations were done before and after treatment in almost every patient. Those who were not done due to any reason were not considered for statistical analysis.

. The alterations in pathological investigations before treatment and after treatment were noted as follows. Haemoglobin was found to reduce by approximately 0.5 to 1gm after treatment. TLC was found to increase by almost 200 to 500/cu.mm. In the DLC, polymorphs were reduced and lymphocytes were increased by 2 - 3 approximately.

Sometimes eosinophils were also found to reduce. ESR was found to reduce by 10-15 mm. Bleeding time was found to reduce by 10-12 sec and clotting time was found to increase by 10-15 sec.

All the other medicines were stopped during treatment.

In my study, out of 30 patients of Aamvata, 7 were RA test positive, 23 were RA test negative.

One patient complained of burning and itching at the ankle joint after application of leech for 24 hours almost she was advised to apply Jatyadi Ghrit over the site. Some 5 to 6 patients complained of itching after application of leech at the site. This may be an IgG mediated immune reaction which produces urticarial rash or itching due to the enzymes produced by leech at the site while

sucking in some hypersensitive patients.

Bleeding occurred for some 1 -2 hours and later oozing followed.

Bleeding occurred for 24 hours in some patients. In one patient, bleeding occurred for 36 hrs. Later sphatika powder was applied and bleeding was stopped

ESR was found to reduce by 5mm to 10 mm of average after raktamokshana by leech therapy.in 30 patients for 15 days.

CRP was found to reduce by 5 mg to 10mg as average in 30 patients after raktamokshana by leech therapy for 10 days on every alternate day.

4 patients had severe itching at leech application site. It was taken care with Jaatyadi ghrita application.

3 patients were dropouts of treatment.

Conclusion:

In this way, it can be concluded that leech therapy is an innovative Para surgical tool from the anushastras that can be used in inflammatory conditions of joints. It renders pain relief, reduces swelling, redness, local temperature, increases restricted movement and thus helps improving walking effect.

At the same time leech therapy helps in bringing alterations in bleeding profiles after treatment for 15 sittings on alternate day. The most painful joint was selected for Leech therapy preferably large joint. Leeching was done for 10 to 15 sittings to achieve maximum pain relief. Blood profiles like CBC, RBS, BT, CT, HIV, Hbsag were done prior to and after Leech Therapy. The alterations in pathological investigations after

before treatment and after treatment were noted as significant as discussed above. Thus it can be estimated that Leech therapy has a significant role to play in reducing inflammation in joints causing statistically significant alterations in markers of inflammation like CRP and ESR, and other hemodynamic parameters.

Conflict of interest –nil

Source of support –nil

REFERENCES & BIBLOGROPHY

1. RA –FAQ's www.fightRA.org
2. Diseases and conditions- RA www.rheumatology.org
3. RA, medicine, diet, treatment - www.medicinenet.com
4. Basic Pathology by Kumar, Cotran, Robins, Cellulitis,Prism Publishers,2000,
5. RA, Wikipedia, the free encyclopaedia
6. Rheumatoid arthritis – centre, symptoms, pain relief,www.webmed.com
7. fast facts about RA, www.niams.nih.gov.in
8. What is RA, Arthritis foundation- www.arthritis.org
9. RA-expert information- www.about.com
10. www.leeching history in india.com
11. www.Leechmeknow.com – cited on 29/06/16.
12. Sushruta Samhita, .K.R.Shrikantha Murthy, 2014,Chaukhamba Orientalia Publishers ,sutra sthana, Chapter17, verse 18.
13. Effect of Leech Therapy in Management of Quadriceps

- Femoris Tenosynovitis a case study- IJRAP – Bhandare M. et al.
14. Anti-inflammatory effect of leech therapy in the patients of Psoriasis (EK Kushtha) (Journal of Pharmaceutical and scientific innovation 2012- Akhilesh Kumar Singh.
 15. Application of Leech Therapy and Khadir is Psoriasis – LAP Lambert academic publishing (2013-07) By- Dilip Kumar Verma.ISBN-10-3659389056.
 16. Clinical evaluation of leech Therapy in the management of Knee Osteoarthritis- A pilot study – Ancient science of life – Azad Hussain Long – Dept.of Mualajut ,National Institute of Unani Medicine, Mogadird Bangalore India.
 17. Efficacy of Leech Therapy in the management of Osteoarthritis (Sandhivata) – P.K. Rai, et al - ayu.
 18. Role of Leech Therapy in skin diseases with special reference to Eczema- Chandrashekhar Kaushik et al.
 19. A clinical study to evaluate the efficacy of leech therapy and Panchtikta Ghrita in the management of Psoriasis- Manjurani et al.
 20. Application of leech therapy in the management of Shwitra (Leucoderma)–M.Mrutyunjaya Rao et al.
 21. Effectiveness of Leech therapy in chronic lateral epicondylitis - A RCT– Backer M et al.
 22. Analgesic and Anti-inflammatory effect of leech therapy in the patients of psoriasis (EK Kushtha) - Akhilesh Kumar Singh et al.
 23. Efficacy of leech therapy and Ayurveda compound in vitiligo – An experimental study – Panigrahi Hemanta kumar et al- IJRAP
 24. Management of Diabetic foot ulcer with Leech Therapy- A minimal invasive procedure. Dwiwedi Amarprekash et al.
 25. 32) Hematophagy – Wikipedia- last – edited in july 2015 cited on 8/11/2015
 26. Hirudotherapy: a guide to using leeches to drain blood from tissue Clinical Pharmacist CP- April 2014, Vol-6 No.3 by Micheel Bennett – Marsolen, Annie N.
 27. The positive effect of Leech Therapy on Arthritis scientifically proven. - Leech me now.com Emmanuel Renaud, certified Leech Therapist, holistic practitioner trainer - leech therapy.
 28. Management of Amavata with 'Amrita Ghrita': A clinical study- P. S. Lekurwale,, Kamlesh Pandey, and P. Yadaiah, Ayu-oct to dec 2010
 29. Leech Therapy the healing art- www.amazing leeches.com
 30. Raval H.N. and Thakar A.B., Role of Raktamokshana by Jalloukavacharana and Siravedhana in the management of Vicharchika(eczema),Journal AYU,2012,33(1), 68-72.
 31. Sushruta Samhita, K.R.Shrikantha Murthy, 2014,

- Chaukhamba Orientalia Publishers ,Sutrasthana 13-3.
32. Making sense of inflammatory Markers– common sense pathology- A Royal college of Physicians.
 33. Markers of inflammation and cardio vascular disease- American heart association- circulation - Aha journals.
 34. Inflammatory markers elevated in Patients with stable pain- Fran Lonery – Sept. 30, 2013 Medscape - Medical news from the American Academy of pain Management (AAPM) 24th Annual clinical meeting.
 35. Inflammatory markers may predict Alcohol dependence – December.10, 2014 Deporeh Brauser Medscape Medical News from the American Academy of Addiction psychiatry (AAP) – 25th Annual Meeting.
 36. Inflammatory Markers and Risk of Type 2 Diabetes – A systematic Review and metaanalysis - Xia wang – American Diabetes Association 2013
 37. Clinical Utility of inflammatory markers and advanced lipoprotein testing – advice from an expert panel of lipid specialists- Journals of clinical lipideology (2011) 5, 338-367 Michal H. Davidson.
 38. C-reactive proteins / Definition of CRP- Medical dictionary / Thesaurns, Acronyms, Encyclopaedia, Wikipedia, cited on 9/11/12.
 39. Emerging inflammatory markers for assuring coronary heart disease risk – Carson MA et el. US National library of Medicine NIH.
 40. Current guidelines on CRP-.... testing – DHA & ACC New recommendations
 41. 40)) Agnivesha, Revised by Charaka and Dhradabala; Charaka Samhita; 4th Ed, Varanasi; Chaukhambha orientalia publishers ,Chikitsa sthana12/52
 42. Agnivesha, Revised by Charaka and Dhradabala; Charaka Samhita; 4th Ed, Varanasi; Chaukhambha orientalia publishers Chikitsa sthana 16/61
 43. Agnivesha, Revised by Charaka and Dhradabala; Charaka Samhita; 4th Ed, Varanasi; Chaukhambha orientalia publishers, Chikitsa sthana16/63
 44. Madhavakara; Madhava Nidana; with Madhukosha Sanskrit commentary by Vijayarakshita and Srikanthadatta; with Vidyittini Hindi commentary by Sudarshan shastri Part-II; 30th Ed, Edited by Yadunandan Upadhyaya; Varanasi, Chaukhambha orientalia publishers; 2001; Pp 508, Madhava Nidana 25
 45. Srinivas Acharya, Panchakarma illustrated, Jalloukavacharana, Delhi(India), Chaukhamba Sanskrit Pratishthan, 2006, pg no 429.
 46. Sushruta Samhita, K.R.Shrikantha Murthy, 2014, Chaukhamba Orientalia

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| <p>Publishers ,sutra sthana, Chapter14, verse 25.</p> <p>47. Davidsons Principles and Practise of Medicine-</p> <p>48. Mayo's clinic- Rheumatoid Arthritis</p> <p>49. Making sense of inflammatory markers-http://www.rcpa.edu.au cited on 24/3/16</p> <p>50. Panchakarma Sangraha, editor M. K. Shamkuwar, Laxmi publishing house, second edition, chapter 8, pg no 368.</p> <p>51. Cellulitis-wikipedia.org, mesh-doo2481,e-medicine,speciality</p> | <p>infectious diseases, Medline plus.</p> <p>52. Paracetamol uses, e-medicine medscape.com, cited on 24/03/16</p> <p>53. Article on-Quantitative cultures of biopsy specimens from cutaneous cellulitis, Duvanel et al, cited on 24/3/17</p> <p>54. Medicinal Leeches—historical use, ecology, genetics-bio one www.bioone.org/doi/abs/10.1608/FR.1.4 cited on 24/3/17</p> |
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