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Efficacy of *Jalaukavacharana* and *Veshtana* in the Management of Myositis Ossificans Traumatica (MOT): A Rare Case Study

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ABSTRACT:
Myositis ossificanstraumatica (MOT) is a benign ossifying condition of muscles which follows after a trauma and probable pathology behind which may be the ossification processes that occur in subperiostealhaematoma. It is rare still important consequence which may happen after any trauma. It comprises 60-75% of all forms of myositis ossificans and mostly seen in athletic adolescents and young adults though can occur in any age. It usually develops in the proximal muscles of the body and may hamper the daily activities of the patient. It has very limited successful medical treatment and surgical excision is often associated with recurrence and progression. It is most common in elbow joint injury. In this case study a male of 27 years of age having history of injury to left upper limb following a RTA, had complaints of restricted left elbow joint with difficulty in holding and lifting the objects has been treated with the *Jalaukavacharana* (Medicinal Leech therapy, 1 leech per day to different parts of the left elbow)and *Veshtana* (a local bandaging technique using a medicated oil) continuously for 30 days.

KEYWORDS: *Jalaukavacharana,* Leech, Myositis ossificans traumatica, *Veshtana.*

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INTRODUCTION:

True extra skeletal bone formation that begins in areas of fasciitis following surgery, trauma, burns or neurologic injury is referred to as Myositis Ossificans Traumatica (MOT). This bony part is organized as lamellar or trabecular pattern with normal osteoblasts and osteoclasts conducting active remodeling, also well develop dhaversian (functional unit of bone that provides strength and allows for nutrient delivery to bone cells) system and marrow elements may be present. [1] Exact pathophysiology behind it is still obscure. Some believe it is due to connective tissue metaplasia as an adaptive response and may be a result of cell or tissue injury. [2] And others believe that trauma leads to bleeding that leads to local inflammatory sclerosis of the necrotic musculature that ultimately

causes calcification and ossification[3]. It presents initially as painful and tender lump in a limb muscle subsequently evolves into a painless, hard, well demarcated mass. [4] Consequences of it includestiffness of joint, either due to thickening of the capsule or due to bone blocking movement. In extreme cases, the bone bridges the joint resulting in complete loss of movements (Extra-articular ankylosis). Most affected areas are elbow joints and hip joints. [5] It has got three zonal organizations: Peripheral, Intermediate and central, among which peripheral is well organized and mature whereas central is immature and non-ossified. There is no compelling evidence that malignant degeneration ever occur. [6] It is usually self limiting or may be treated conservatively exception being near the joints where surgical excision is usually required which can be successful or sometimes may lead to progression and recurrences. [7]

Jalaukavacharana (Medicinal Leech therapy) one of the ancient methods of bloodletting procedure which is because of more than 100 bioactive substances has very promising results in these types of conditions. [8] Similarly, *Veshtana*, an ancient method of bandaging the local affected site with the help of medicated oil, [9] e.g. *NirgundiTaila*, helps in reducing the signs and symptoms associated with MOT.

CASE REPORT:

A 27 year married Hindu male patient from Mandya, Karnataka, India who is Police officer by profession gives following history. Patient reported chief complaints i.e. Restricted movements of left elbow joint since 1 year. The patient was apparently well before 1 year then he felt gradual restriction in the movements of left elbow joint. Movements where reduced upwards as well as downwards and sidewise. Restriction of joint movement was increasing in severity associated with difficulty in holding and lifting the objects by left hand. He felt hardening around the left elbow joint which is associated with pain initially, later the pain decreased in severity. There is no history of weight loss or any discharge from the left elbow joint region. He did not feel any mass around the left axilla.

History of past illness:

There is history of a road traffic accident 2 years ago where he had trauma over left upper limb

There is no history of diabetes mellitus, hypertension, epilepsy etc.

No similar history in past.

Treatment history:

Took analgesics for pain (details not available)

No history of any surgical intervention in past.

Personal history:

Diet: non-vegetarian

Appetite: good

Bowel: regular

Micturition: regular

Sleep: sound

Habits: non-smoker, non-alcoholic, no tobacco chewing

Examination of the patient:

General examination:

General condition: Fair, moderate built

Pallor: absent

Icterus: absent

Lymphadenopathy: absent

Cyanosis: absent

Clubbing: absent

Oedema: absent

Dehydration: absent

Vitals:

Blood pressure: 130/80 mmHg

Temperature: 98.6^0 F

Pulse: 84 bpm, regular, normovolaemic
Respiratory rate: 18/min

Systemic examination:

- CVS: $S_1S_2M_0$
- CNS: Intact, Conscious, oriented to time, place and person
- Per Abdomen: Soft, non-tender, no organomegaly
- Respiratory system: B/L equal air entry, Normal vesicular breath sounds, no added sounds

Local examination:

Inspection:

Left elbow joint: mild swelling is present with minimal erythema
Looks bigger in size than contralateral normal right elbow joint
No external wounds, discharges, sinuses
No muscular wasting, no fasciculations

Palpation:

Mild localized raise in temperature along with mild tenderness present.
Swelling extends from left elbow joint distal aspect to upwards about 10 cm. It is circumferential, irregular in shape, size cannot be determined, hard in consistency, non-fluctuant, non-transilluminant, non-reducible, no impulse, non-compressible, non-pulsatile, and fixed inside the skin
Regional lymph nodes are not palpable
Power: on flexion 5/5; on extension 5/5
Tone: hypertonic in active and passive movements
Reflexes: biceps, triceps and supinator reflexes were normal.
Sensation: light touch, pin prick, vibration, temperature, proprioception sensation were normal.

Investigations:

- Hb- 13.4 gm%
- TC- 8600 cells/cmm
- DC- N60, L31, M1, E3
- ESR- 06 mm 1st hour
- S.creatinine: 0.9 mg/dl
- Lipid profiles: within normal limits
- FBS- 91.6 mg/dl
- HIV and HBsAgare negative
- Bleeding time 2 sec and clotting time 4 sec

X-ray left elbow AP and Lateral:

Calcification is seen in and around elbow joint, denser in posterior distal end of humerus. X-ray of left elbow joint AP and lateral, before the commencement of the treatment shows to calcified mass around elbow joint posterior to distal end of humerus (Figure-1).

Plain axial CT scan of left elbow joint:

Impression: Dense calcification along posterior cortex of distal end of humerus and overlying muscle? Myositis Ossificans (Figure 2 & 3).
Figure 2 and 3 shows CT scan of the left elbow joint which shows a plaque like dense calcification along posterior cortex of distal end of humerus and overlying muscles i.e. triceps brachii which is consistent of myositis ossificans.

Diagnosis:

On the basis of clinical history, examination and relevant investigations it is diagnosed as:
Myositis Ossificans Traumatica (MOT) – around left elbow joint involving triceps brachii and brachialis muscles

Treatment executed:

Daily *jalaukavacharana* (medicinal leech therapy)- Application of one leech over different sites of left elbow joint with withdrawal of about 3-4 ml of blood in each sitting for continuous 30 days. Different leeches were used every day for the treatment. (Figure 4 &5)

1. Daily *Veshtana* (local warm bandaging with medicated oil- oil of *Nirgundi- Vitexnegundo*) for 1 hour once a day for continuous 30 days. (Figure 6)

2. Complete rest
3. Moderate joint movement exercises

Result: After 30 days of treatment

- Stiffness and pain of left elbow joint are almost completely resolved
- No swelling or edema is observed
- He can lift and hold the objects
- Softening of posterior aspect of elbow joint
- Range of movement is increased

Patient's range of movement before and after the treatment where angle of flexion of left elbow joint was not more than 90^0 and after the treatment it was increased to 140^0 (table-1). The extension was not less than 80^0 and after treatment it was 10^0. The angle of supination was not less than 80^0 before treatment and after treatment it was 0^0 and the angle of pronation was not less than 80^0 before treatment and after treatment it was 0^0.

- No post treatment complications were observed
- No complications of myositis ossificans observed e.g. like ankylosis of joint
- Increased quality of life of the patient.

Table-1: Range of movement of left elbow joint BT and AT:

Movement	Normal range	Patient's range Before treatment	Patient's range after treatment
Flexion	140-150°	Not more than 90°	140°
Extension	0°	Not less than 80°	10°
Supination	0°	Not less than 80°	0°
Pronation	0°	Not less than 80°	0°

Figure-1: X-ray left elbow joint AP and lateral view before treatment

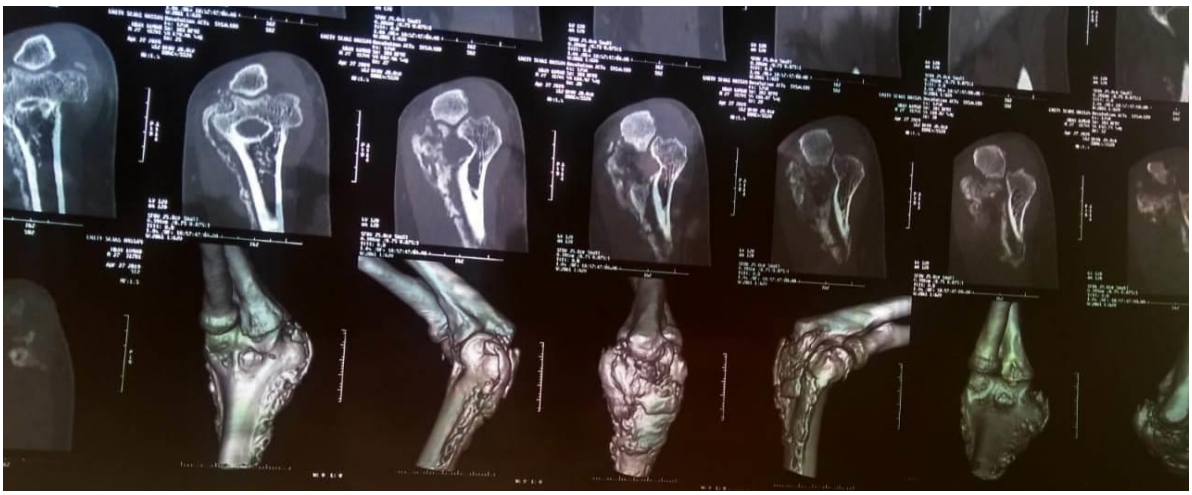
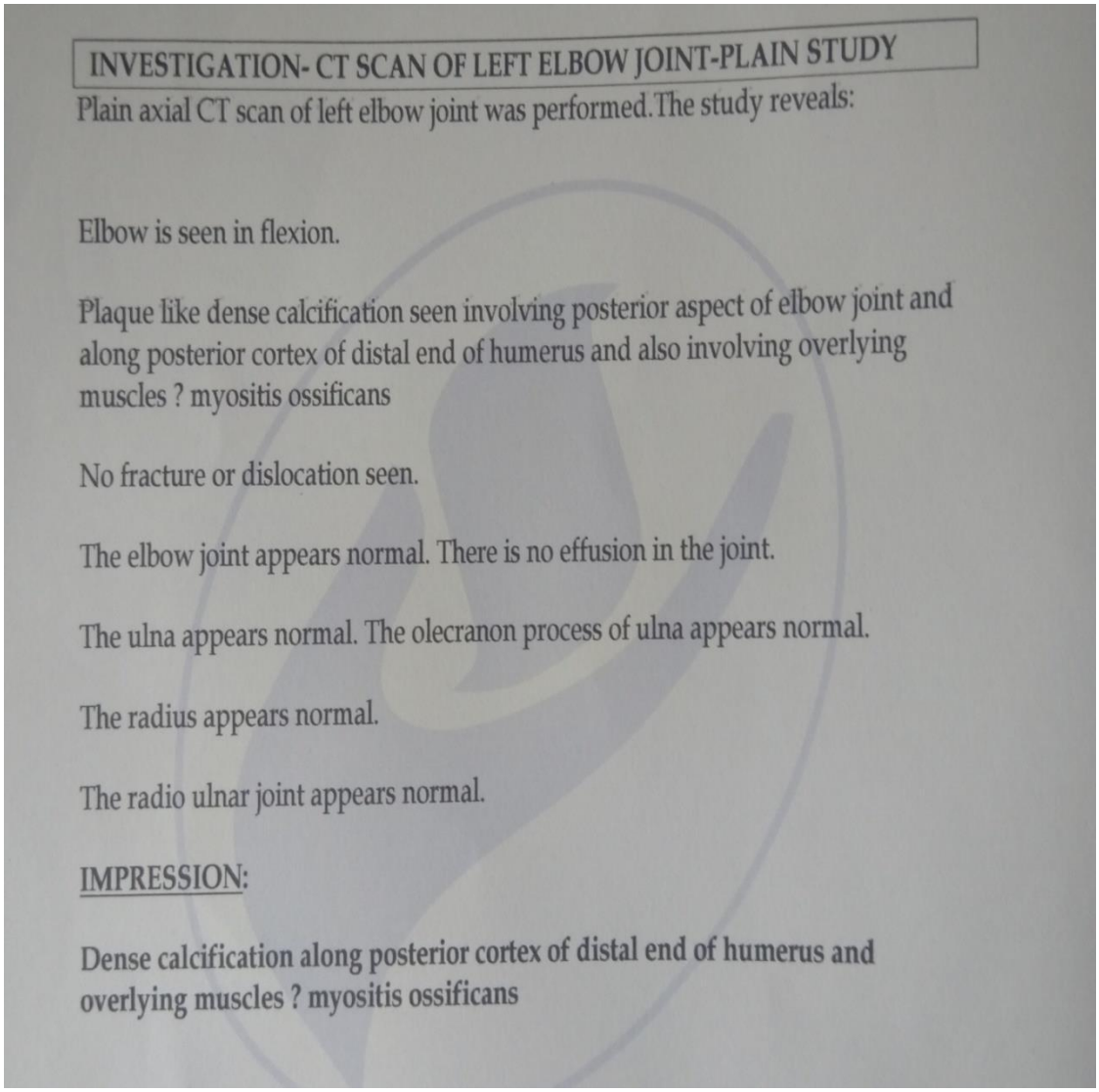


Figure-2: Plain axial CT scan images of the left elbow joint before treatment



INVESTIGATION- CT SCAN OF LEFT ELBOW JOINT-PLAIN STUDY

Plain axial CT scan of left elbow joint was performed.The study reveals:

Elbow is seen in flexion.

Plaque like dense calcification seen involving posterior aspect of elbow joint and along posterior cortex of distal end of humerus and also involving overlying muscles ? myositis ossificans

No fracture or dislocation seen.

The elbow joint appears normal. There is no effusion in the joint.

The ulna appears normal. The olecranon process of ulna appears normal.

The radius appears normal.

The radio ulnar joint appears normal.

IMPRESSION:

Dense calcification along posterior cortex of distal end of humerus and overlying muscles ? myositis ossificans

Figure -3: Report of CT scan of the left elbow joint before treatment

Figure -4: Jalaukavacharana i.e. application of medicinal leeches over the left elbow joint to the medial aspect of the joint.

Figure-5: shows leech being applied over the affected joint laterally.

Figure 6: *Veshtana*(Local bandaging around the left elbow joint with warm medicated oil of *Nirgundi- Vitexnegundo)*

DISCUSSION:

The term myositis ossificans traumatica implies to an inflammatory ossification of the muscles followed after an injury or trauma. Many believe that it occurs in haematoma after any trauma but still exact mechanism or pathophysiology is unknown. The probable mechanism of action may be: skeletal muscle injury leads to inflammatory cascades releasing cytokines like BMP (Bone morphogenetic protein), TGF (Transforming growth factor), they act on vascular endothelial cells of skeletal muscle and cause them to undergo endothelial-mesenchymal transition that ultimately causes the transformation of mesenchymal stem cells to chondrocytes or osteoblasts and producing cartilage and bone respectively, later cartilages also convert to bones[10].

Jalaukavacharana(medicinal leech therapy) consists of application of medical, non-

poisonous leech (*Hirudo medicinalis*) over the affected part which releases more than 100 bioactive substances in that site and exhibiting various functions. It has anti-inflammatory and analgesic properties because of presence of chemicals like Antistatin, Hirustatin, complement C1 inhibitor; increases blood flow because of presence of Acetylcholine and histamine like molecules; prevents collagen mediated platelet aggregation because of saratin and Calin; acts as anticoagulant as it has Hirudin (binds with thrombin to prevent coagulation cascade), Gelin, factor Xa inhibitor[8]. Destabilase dissolves the fibrin and helps in thrombolysis preventing the ossification[11].These properties will help in prevention of further progression of the disease and provide immediate symptomatic relief. Long term effects are shown by enzymes like Hyalurinidase, Collagenenase etc. as they help in degradation of the extracellular bone matrix[11]. That may reverse the ossification in long term dispensing the originality of tissues. Hirudin a chemical which prevents the clot formation and re-absorbs the formed clots also found to depress fibrosis by regulating the proteins related to fibrosis [12]. Hence clots and fibrosis that occur after trauma to cause calcified mass can be prevented by *Jalaukavacharana.*

Veshtana is a local bandaging technique using warm medicated oil. Oil used here is Nirgunditaila (Medicated oil made up of plant *Vitexnegundo*). This technique uses both local fomentation and oleation. Local fomentation causes increased permeability of the skin that facilitates the absorption of oil so that the active ingredients of *Vitexnegundo*like alkaloid (Nishindine), flavones, glucoside, casticin, get absorbed and act locally and systematically[13]. Local rise in temperature causes improved local blood circulation, relieves musculoskeletal pain, relaxes muscles and softens the ossification on the other hand oil is best known for its analgesic action it also increases local circulation of blood and lymph, relaxes muscles, softens the hardened part of the muscle, improves joint flexibility and other than that it also decreases the fibrotic load of the local area, clears the adhesions and gradually decreases the extra-skeletal bony growth[9].

CONCLUSION:

As many of times myositis ossificans traumatica is a self-limiting entity which rarely requires intervention but chronic progression without any improvement compels to medical as well as surgical intervention. The prolonged cases with obvious extra-skeletal bone formation can also be treated with this modality of Ayurvedic intervention. The use of *Jalaukavacharana* (Medical leech therapy) and *Veshtana* (Local bandaging using warm medicated oil) found to be very effective within a period of 1 month. This management resolved the problem of decreased range of movement of left elbow joint along with other symptoms also prevented from the elbow ankylosis. So, this can be a very good alternative to surgical and other medical interventions for the management of myositis ossificans traumatica which can be adopted anywhere to all patient groups with minimal of cost.

Limitation of the study:

This was a case study so a large scale study may be needed for the generalization of the treatment.

Consent of patient:

The consent of the patient has been taken for publication and procedure without disclosing the identity of the patient.

Conflict of interest: The author declares that there is no conflict of interest.

Guarantor*:* Thecorresponding author is the guarantor of this article and its contents.

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