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### THERAPEUTIC EFFICACY OF LAKSHA CHURNA VATI IN THE MANAGEMENT OF AVRAN KAND BHAGNA WITH SPECIAL REFERENCE TO COLLE'S FRACTURE

Amarprakash P. Dwivedi\*

Associate Professor, Shalya Tantra Department, D. Y. Patil School of Ayurved, Navi Mumbai, Maharashtra, India

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#### \*Corresponding author

Dr. Dwivedi Amarprakash, Associate Professor, Shalya Tantra Department, D. Y. Patil School of Ayurved, Navi Mumbai, Maharashtra, India  
E-mail: dr.dwivedi@amarayurved.com

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#### ABSTRACT

Fractures commonly results following accidents. However, the incidence of the long bones being fractured is higher and thus, demands special attention. The management of long bone fracture runs through the basic principle of fracture management i.e. reduction, immobilization and rehabilitation. Besides, the management often fails and leads to complications such as avascular necrosis, delayed union, mal-union etc. Hence, there is definite need for search of new drugs and therapy in the management of fracture. Sushruta has explained very clearly about the diagnosis and management of Bhagna stating clearly the basic principles involved in handling these cases with the most methodical approach like Anchana (Traction), Peedana (Counter traction), Sankshepana (Correction of deformity) and Bandhana (Immobilization). The fundamentals laid down by Acharya are based upon the sound footing of his scientific approach and a vast clinical experience with keen observations. The present study was conducted to evaluate clinical efficacy of Laksha Churna Vati in the management of Avran Kand Bhagna w. s. r. to Colle's Fracture. Post fracture symptoms like pain, swelling, tenderness, loss of function and callous formation was assessed during the treatment. The trial drug proved statistically significant in early bone healing. The results revealed that all the three groups have shown significant improvement ( $p < 0.01$ ) in all cardinal sign and symptoms, however, the statistical observation reveals that Group A with Laksha Churna Vati was found more efficacious in early callus formation phenomenon. The present study proved that the ancient management is safe, easily available, devoid of complications, and has better acceptability.

**Keywords:** Sushrut Samhita, Bhagna Chikitsa, Laksha, Aabha Guggulu, Fracture

#### INTRODUCTION

Fracture is a linear deformation or discontinuity of bone produced by forces exceeding modular elasticity. Even Ayurvedic texts have illustrated fracture as being the loss in the continuity of the bone due to pressure. A fracture is also often associated with pathological changes, bleeding, soft tissue injury, and damage to the neurovascular structure. The management of long bone fracture runs through the basic principle of fracture management i.e. reduction, immobilization, and rehabilitation. The entire management is supported by antibiotics, NSAID, corticosteroids and calcium salts.<sup>1</sup> Management of fractures, according to Ayurvedic principles helps in the process of union of fractured bone. It results in the restoration of the normal architecture of the disfigured bone without any further complications. Acharya Sushruta also has quoted the treatment of fracture as reduction, immobilization and rehabilitation, which is yet practiced by modern orthopedic surgeons.<sup>2,3</sup> There are number of easily available Ayurvedic drugs mentioned in the contest of fracture management to improve the union of the fractured bone and to rule out complications. Hence, a clinical study to evaluate efficacy of Laksha Churna Vati (internally) in the management of Avran Kand Bhagna (Simple, undisplaced, long bone fracture) with special reference to Colle's (Radius) Fracture was conducted.

#### Aims of Study

- To study the effect of Laksha Churna Vati in management of Avran Kand Bhagna (simple, undisplaced, long bone fracture) w. s. r. to Colle's (Radius) fracture along with removable forearm cock-up splint.
- Comparative study to assess the therapeutic efficacy of Laksha Churna Vati, Aabha Guggulu and Calcium Carbonate salt (internally) in the management of Avran Kand Bhagna w. s. r. to Colle's Fracture.

#### Type of Study

A prospective observational comparative clinical study

#### Source of Data

30 Patients of stable radius fracture were selected randomly from the Shalya Tantra- out patient department of D. Y. Patil Ayurvedic hospital according to the selection criteria.

#### MATERIALS AND METHOD

The selected patients were subjected to realignment of the fractured ends by reduction techniques of conventional closed methods by shake hand method as in Colle's fracture. After reduction, removable forearm cock-up splint was given to maintain this reduced position with roller gauge kept in collar sling. The Splint was opened

once in week without disturbing the fracture alignments to observe untoward changes if any. This treatment was continued for 6 weeks. The sample size was 30 in total. Further, these patients were divided into 3 groups (10 patients in each group). Group A patients were given Laksha Churna Vati, whereas Aabha Guggulu was given to Group B patients and Group C patients were given Calcium Carbonate salt –internally for 6 weeks. The present study was part of pilot study conducted in Shalya Tantra Department, with small sample size of 10 patients in each group; hence, ethical clearance from Institute was taken to start this research work. The raw material of ingredients of Aabha Guggulu and Laksha drug were collected from the local market. Its identification and authentication was done by Dravyaguna Department and the drugs were prepared according to the textual reference in Rasa Shastra- Bhaishajya Kalpana Department of D. Y. Patil School of Ayurveda. Similarly, Calcium Carbonate – 500 mg tablet was purchased directly from pharmacy. The Ethical Committee clearance number for the above pilot study was PDDYPU/4805 E/ 2009 , letter issued dated 01/06/2009.

#### Inclusion Criteria

- Stable radius lower end (Colle’s) fracture.
- Both Male and Female patients
- Patient’s age group between 20 to 60 years.

#### Exclusion Criteria

- Open radius fractures
- Patients with nerve and vessel injury
- Patient suffering with any other debilitating diseases
- Infective diseases of the bone like osteo-myelitis
- Patients having other diseases like diabetes, hypertension and coronary artery disease.

#### Diagnostic Criteria

- Patients with history of trauma / fall on the affected side
- Clinical features like pain, swelling, tenderness and loss of function
- Positive findings of lower end of radius fracture radiographically.

#### Drug Profile

Table 1: Drug profile in trial group A, B and C

Trial group	Name of Drug	Content	Dose	Duration
Group A	Laksha Churna Vati	Laksha Churna <sup>4,7</sup> ( <i>Laccifer lacca</i> )	500 mg , 4 tablets, twice a day	6 Weeks
Group B	Aabha Guggulu <sup>8,9</sup>	1. Babula Twak ( <i>Acacia arabica</i> )-1 Part 2. Triphala ( <i>Terminalia chebula</i> + <i>Terminalia bellerica</i> + <i>Embelica officinale</i> ) -1 Part 3. Trikatu (Dried <i>Zingiber officinale</i> + <i>Piper nigrum</i> + <i>Piper longum</i> )- 1 Part 4. Guggulu ( <i>Commiphora mukul</i> )-3 Part 5. Ghrita –Q.S. (Clarified Butter Milk)	500 mg, 2 tablet, twice a day	6 Weeks
Group C	Calcium supplement	Calcium Carbonate salt	500 mg, 1 tablet, twice a day	6 Weeks

#### Assessment of Therapy

Patients were examined on initial day zero and further followed up weekly and the changes of signs and symptoms in the patients were recorded weekly once, based on the research proforma.

#### Assessment of Results

For the purpose of assessment of result, 0 to 3 grade points were used considering the severity of different signs and symptoms.

#### Subjective Parameters

The improvement in the clinical symptoms of the disease was assessed based on the gradation of each symptom as follows-

**Table 2: Assessment parameters and relative gradation criteria**

Symptoms	Gradation			
	0 (-)	1 (+)	2 (++)	3 (+++)
<b>Pain</b>	No pain	Mild pain (which does not interfere in normal functioning)	Moderate pain (which interferes with normal functioning)	Severe unbearable pain (which interferes in the normal functioning and does not subside even after taking analgesics)
<b>Swelling</b>	No swelling	Swelling 0-1 cm.	Swelling 1-2 cm.	Swelling more than 2 cm.
<b>Tenderness</b>	No tenderness. (Absent)	Tenderness on firm Pressure (Mild)	Tenderness on touch. (Moderate)	Patient denies even to touch. (Severe)
<b>Loss of Function</b>	Normal function	Loss of function to some extent, in either proximal or distal joint	Loss of function in either joint	Loss of function in both (proximal and distal) joints
<b>Callus formation</b>	Hard callus	Soft callus	Moderate callus	No callus

**Tenderness**

Tenderness was elicited on first day, by palpating site of fracture by using a thumb. Then consequent assessment was done on 7<sup>th</sup> day, 15<sup>th</sup> day, 30<sup>th</sup> and 45<sup>th</sup> day by springing test.

**Loss of function**

The Loss of function was assessed nearer to the joint.

**Objective improvement**

To assess the objective improvements, radiographic examination was carried out before the initiations of treatment then weekly till the clinical union of the fracture (Callus formation).

**Assessment Scale**

- Pain was assessed by medical research council grading of pain and by VAS (Visual Analog Scale).

- Swelling was assessed by measuring the circumference in cm and comparing with the normal limb.
- Tenderness elicited by the back of the thumb on first day, on 15<sup>th</sup>, 30<sup>th</sup> and 45<sup>th</sup> day by springing test.
- Loss of function
- Radiograph - Visible callus on X-ray / Continuity of bone trabeculi.

**OBSERVATIONS AND RESULT**

**Effect of therapy on cardinal sign and symptoms**

In Group A, pain subsided in 53.57 % patients, swelling 57.14 %, tenderness 51.61 %, loss of function 52.38 % and callus formation observed in 60.00 %. In Group B, pain subsided in 61.53 % patients, swelling 62.96 %, tenderness 58.62 %, loss of function 57.69 % and callus formation observed in 43.75 %. Similarly, In Group C, pain subsided in 40.74 % patients, swelling 58.62 %, tenderness 39.13 %, loss of function 43.47 % and callus formation observed in 57.14 %.

**Table 3: Effect of trial on subjective and objective parameters of group A**

S. No.	Sign and symptoms	No of pts	Mean		Diff.	% of relief	S.D.	S.E.	t value	p-value
			BT	AT						
1	Pain	10	2.8	1.3	1.5	53.57	0.527	0.167	9.00	< 0.001
2	Swelling	10	2.8	1.2	1.6	57.14	0.698	0.221	7.23	< 0.001
3	Tenderness	10	3.1	1.5	1.6	51.61	0.515	0.163	9.79	< 0.001
4	Loss of function	10	2.1	1.0	1.1	52.38	0.568	0.180	6.12	< 0.001
5	Callus formation	10	1.5	0.6	0.9	60.00	0.568	0.180	5.01	< 0.001

BT: Before Treatment, At: After Treatment

**Table 4: Effect of trial on subjective and objective parameters of group B**

S. No.	Sign and symptoms	No of pts	Mean		Diff.	% of relief	S.D.	S.E.	t- value	p-value
			BT	AT						
1	Pain	10	2.6	1.0	1.6	61.53	0.515	0.163	9.79	< 0.001
2	Swelling	10	2.7	1.0	1.7	62.96	0.673	0.213	7.96	< 0.001
3	Tenderness	10	2.9	1.2	1.7	58.62	0.483	0.153	11.1	< 0.001
4	Loss of function	10	2.6	1.1	1.5	57.69	0.527	0.167	9.00	< 0.001
5	Callus Formation	10	1.3	0.6	0.7	53.84	0.483	0.153	4.58	< 0.01

BT: Before Treatment, At: After Treatment

**Table 5: Effect of trial on subjective and objective parameters of group C**

S. No.	Sign and symptoms	No. of pts	Mean		Dif f.	% of relief	S.D.	S.E.	t- value	p-value
			BT	AT						
1	Pain	10	2.7	1.6	1.1	40.74	0.736	0.23	4.71	< 0.01
2	Swelling	10	2.9	1.2	1.7	58.62	0.483	0.153	1.10	< 0.001
3	Tenderness	10	2.3	1.6	0.9	39.13	0.483	0.153	4.58	< 0.01
4	Loss of function	10	2.3	1.3	1.0	43.47	0.815	0.258	3.87	< 0.01
5	Callus formation	10	1.4	0.6	0.8	57.14	0.420	0.133	6.00	< 0.001

BT: Before Treatment, At: After Treatment

## DISCUSSION

In the process of fracture healing, callus formation is influenced by constituent of patient, tissue involved and treatment modality used. The above factors can affect the period of appearance of callus in the X-ray radiograph too. The other important factor which influence the healing of fracture is the age of the patient, as it is related with the increased vascularity and ability of the cells of periosteum to differentiate in young patients. Similarly, callus formation also depends upon the nature of tissue involved in bone fracture. Fractures, particularly in the diaphyseal region develop more callus than metaphyseal fractures. The difference is related to the amount of periosteum enveloping the bone. In these cases, clinical parameters, such as lack of pain with movement or tenderness on palpation, are used to assess fracture healing. Radiographic evidence of callus is dependent on site of bone involved, as well as the nature of fracture.<sup>10</sup>

### Probable Action of Laksha Churna Vati

Palliative use of Laksha Churna with milk is advocated by Sushruta in context of fracture management. The drug has Kashaya Rasa in predominance; hence, it definitely enhances the bone healing and bone growth by promoting callus formation. Further, this drug possesses Snigdha and Ushna Virya property; due to which, it pacifies Vata, thus act as analgesic and anti-inflammatory too. In the present study, callus formation was started early in Group A. This shows that, Laksha churna Vati stimulated the callus formation at an early stage to facilitate early bone healing. It may act beneficial in fracture healing by influencing cellular organization and activity in the repair phenomena. It may help in raising mucopolysacchride contents and the collagen content of the treated bones. Thus, may help in initiating early collagenization phase than the control series. However, further study is required to establish its exact mode of action in the management of fracture.

## CONCLUSION

It is very clear from the results that all the three groups have shown significant improvement ( $p < 0.01$ ) in all cardinal sign and symptoms, however, the statistical observation reveals that Group A with Laksha Churna

Vati was found more efficacious in early callus formation phenomenon. The onset of healing i.e. considerable amount of callus formation was noted from the 7<sup>th</sup> day to the 15<sup>th</sup> day of treatment in Group A. Similarly, Aabha Guggulu proved more significant in subsiding pain, swelling and tenderness within one week of treatment in Group B. Besides the progressive signs and symptoms in the patients, the radiological evidence of healing in both Group A and B was significant. Furthermore, in Group C (Calcium Carbonate), the over all relief was less significant or inferior in comparison to other groups (Group A and B) in subsiding pain, swelling, tenderness and callus formation. Thus, the present study revealed that the ancient management is safe, easily available, devoid of complications, and has better acceptability.

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