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Ambashtadi Gana Kashaya Pana in *Bhagna Sandhana* - A Case Study

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ABSTRACT

Background: A Fracture is defined as a complete or incomplete break in the continuity of a bone. Fractures are more common nowadays due to various reasons like fall and RTA. Long Bones are commonly affected due to RTA and fall. In the context of *Bhagna* mentioned by our ancient *Acharyas*, we can find out that it resembles the clinical feature of Fractures. In this study a humble attempt is being made to evaluate the role of *Ambashtadi Gana Kashayapana* in long bone fractures. **Aim:** To evaluate and compare the effect of *Ambashtadi Gana Kashayapana* with Calcium supplements in the management of *Bhagna* w.s.r. to long bone fractures. **Materials and Methods:** 40 patients are divided into 2 groups randomly with each group containing 20 patients each. Group A patient receives *Ambashtadi Gana* orally along with conventional fracture management. Second group was kept as control group in which Calcium supplements were given along with conventional Fracture management. Results are documented clinically and studied statistically to draw the conclusion. **Results:** In Group A, highly significant results were seen in 60% of patients for swelling and loss of function and even better results for pain and tenderness. Even in Group B, 58% of patients were having good improvements. **Conclusion:** Group A is comparatively better in managing symptoms like swelling and Loss of Function. Even marked improvement was seen on pain and tenderness as well. Thus, it indicates that *Ambashtadi gana* is beneficial in the management of fracture.

Key words: *Bhagna, Ambashtadi Gana, Long Bone Fracture.*

INTRODUCTION

Trauma is a major problem worldwide, due to widespread industrialization and use of vehicles, where incidents of accidents resulting in fracture especially long bones are higher.

As fracture being defined as break in the continuity of a bone,[1] Ayurvedic texts have illustrated fracture as being as loss in the continuity of a bone due to pressure, fall, blow etc.[2]

However the incidence of long bone fractures are higher and requires special attention.

The management of long bone fracture includes the basic principles of Reduction, Retention and Rehabilitation.[3] Even after following these basic principles, sometimes fracture may not heal properly and leads to complications like non-union, mal-union and shortening of limbs.

Management of fractures according to modern principles include reduction and immobilization over the fractured are and use of NSIAD, Calcium supplements etc.[4] In ancient treatise many indigenous compounds have been explained which can promote the healing of the fracture. With reference to *Sushrutha Samhita*; here *Ambashtadi Gana*[5] was used for fracture management.

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In the classics, there is no proper mentioning about usage of *Ambashtadi Gana*, it is only given as *'Bhagna Sandhana'*. There is no other explanation of this drug, whether to use it externally or internally. Hence, this study was started with the purpose to validate the use of *Ambashtadi Gana* internally.

Materials and Methods

Research design and study population

It is a randomized comparative clinical study. The study population was composed of subjects diagnosed with *Bhagna* (Long Bone Fracture) with X-ray as the medium from OPD and IPD in Sri Sri College of Ayurvedic Science and Research Hospital, Bengaluru. The ethical clearance from the institutional ethical committee was obtained before the initiation of the clinical trial.

Eligibility Criteria

Inclusion Criteria

1. Patients aged between 18-60 years of age, irrespective of sex.
2. Patients with simple and undisplaced fractures of long bones.

Exclusion Criteria

1. Patients aged below 18 years and above 60 years.
2. Patients with Pathological fractures.
3. Patients with multiple or communuted fractures.
4. Fracture with open wound
5. Patients on immunomodulatory drugs and steroids.

Diagnostic criteria

Diagnosis is mainly based on simple and undisplaced fractures of long bone, which is being confirmed by radiological investigations.

Intervention

A Randomized controlled clinical trial in which 40 patients were divided into 2 groups of 20 each.

Table 1: Study Design

Group A (Trial group)	20 patients of this group were subjected to intake of *Ambashtadi Gana* in *Kashaya* form internally after immobilization for 30 days.
Group B (Standard group)	20 patients of this group were subjected to Calcium supplements orally after immobilization for 30 days.

Intervention Procedure

Group B (Standard group)

Patients having simple and undisplaced long bone fractures will be reduced and immobilized and calcium supplements were administered for 30 days.

Group A (Trial group)

Materials Required

Table 2: *Ambashtadi Gana Dravyas*

Drug Name	Botanical Name	Family
Ambashta	*Cissampelos pariera*	Menispermaceae
Dhataki	*Woodfordia fructicosa*	Lytharaceae
Lajjalu	*Mimosa pudica*	Mimosaceae
Katvanga	*Oroxylum indicum*	Bignonaceae
Madhuka	*Madhuka longifolia*	Sapotaceae
Bilva	*Aegel marmelos*	Rutaceae
Savara Rodhra	*Symplocos racemosa*	Symplocaceae
Palasa	*Butea monosperma*	Leguminosae
Nandi Vriksha	*Gmelina arborea*	Lamiaceae
Padma Kesara	*Nelumbo nucifera*	Nelumbonaceae

These ingredients were taken in equal quantity and dried and separately coarse powder was prepared and then was mixed together.

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A sachet containing 15gm of the coarse powder was given to the patient and asked them to prepare *kashayam* in 240 ml of water, which is reduced to 30 ml and was advised to take orally twice, before breakfast and dinner for 30 days.

Figure 1: Group A (*Ambashtadi Gana*)

Ambashta

Dhataki

Lajjalu

Katvanga

Savara rodhra

Maduka

Padma kesara

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Bilva

Nandi Vriksha

Palasha

Ambashtadi Gana Dravyas in coarse powder form

Assessment criteria

The patients were assessed on the basis of subjective and objective parameters on 0^{th}, 15^{th} and 30^{th} day. The improvement on each patient will be assessed mainly on the relief in the signs and symptoms.

Subjective Parameters

Table 3: Pain

Symptom	Grading
0	No pain
1	Mild pain
2	Moderate pain
3	Severe pain

Objective Parameters

1. Swelling

Table 4: Swelling Grading

Symptom	Grading
0	Absent
1	Present

2. Tenderness

Table 3: Tenderness Grading

Symptom	Grading
0	Absent
1	Present

3. Loss of Function

Table 4: Loss of function Grading

Symptom	Grading
0	Normal Function
1	Able to perform with difficulty
2	Unable to perform

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Statistical Method

The results were analysed statistically using parametric test like Paired T-test within the group for objective parameters and non-parametric tests like Mann Whitney test within the group, Wilcoxon test between the groups for subjective parameter and final statistics using Chi-square test with the help of SPSS software version 20.

OBSERVATIONS

A minimum of 40 patients were enrolled for the study and completed the study. Among 40 patients enrolled to this study, maximum number of patients i.e., 30% belongs to age group between 18-30 years. 27.5% of patients were 31-40 years of age. 22.5% were of age group between 51-60 years and 20% in 41-50 years. Majority of patients in Group A was of age between 31-40 years, where as in Group B, Majority was between 18-30 years. (Table 5) In this study, 57.5% patients were male and 42.5% was female. In both the groups males were more. (Table 6) While analysing the cause of fracture that maximum number of patients i.e., 52.5% were due to RTA, 32.5% due to fall and 15% were due to other reasons like heavy objects falling on them. (Table 7) On the basis of occupation, it has been observed that 27.5% of patients where housewives, 17.5% of them were business persons, 25% were students, Engineers constitute 7.5 %, Labour workers were of 5% and others constitute 12.5%. (Table 8) Among the 40 patients, 52.5% of them were having Radius fracture, 12.5% were having humerus fracture, 20% were having fracture over fibula, 10% were of tibial fracture and 5 % constitute fracture over ulnar region. (Table 9)

Table 5: Age wise distribution

Age Group	Group A	%	Group B	%	Total	%
18-30	5	25	7	35	12	30
31-40	7	35	4	20	11	27.5
41-50	4	20	4	20	8	20
51-60	4	20	5	25	9	22.5

Table 6: Gender wise distribution

Sex	Group A	%	Group B	%	Total	%
Male	12	60	11	55	23	57.5
Female	8	40	9	45	17	42.5

Table 7: Cause of Fracture

Causes	Group A	%	Group B	%	Total	%
Fall	6	30	7	35	13	32.5
RTA	10	50	11	55	21	52.5
Others	4	20	2	10	6	15

Table 8: Occupation

Occupation	Group A	%	Group B	%	Total	%
Student	4	20	6	30	10	25
Engineer	1	5	2	10	3	7.5
Labours	2	10	0	0	2	5
Business	5	25	2	10	7	17.5
Housewife	4	20	7	35	11	27.5
Farmer	2	10	0	0	2	5
Others	2	10	3	15	5	12.5

Table 9: Site of Fracture

Site	Group A	%	Group B	%	Total	%
Radius	11	55	10	50	21	52.5
Ulna	1	5	1	5	2	5
Humerus	2	10	3	15	5	12.5
Tibia	1	5	3	15	4	10
Fibula	5	25	3	15	8	20

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RESULTS

Subjective parameter

While analysing the subjective parameter of pain between Group A and Group B, It has been noted that Group B shows better result than Group A and is statistically significant as p value being 0.000(Table 10)

Table 10: Effect of treatment on Pain

Pain	Groups	N	Mean rank	P value
	Group A	20	28.58	0.000
	Group B	20	12.43	

Objective Parameter

While analysing the objective parameter of Tenderness between Group A & Group B, the results shows that Group B shows better results than Group A and is statistically significant with P value being 0.000.

Table 11: Effect of treatment on Tenderness

Tenderness	Groups	N	mean	STD	SE	t value	P value
	Group A	20	0.85	0.366	0.082	2.135	0.000
	Group B	20	0.55	0.510	0.114		

When we look at the symptom of swelling between Group A and B after the treatment, the Group B shows better result than Group A and is statistically significant with P value 0.000.

Table 12: Effect of treatment on Swelling

Swelling	Groups	N	mean	STD	SE	t value	P value
	Group A	20	0.20	0.410	0.092	2.179	0.000
	Group B	20	0.00	0.000	0.000		

When we look at the symptom of Loss of Function between Group A and B after the treatment. Both A and B shows the same result and is statistically significant as Pvalue being 0.001

Table 13: Effect of treatment on Loss of Function

Loss of Function	Groups	N	Mean	STD	SE	t value	P value
	Group A	20	1.10	0.308	0.069	2.055	0.001
	Group B	20	0.90	0.308	0.069		

Table 14: Overall Assessment

Overall Assessment	Tenderness	Swelling	Loss of Function	Pain
Chi-Square	6.400	25.600	57.800	13.850
P value	.011	.000	.000	.001

From the overall assessment from Chi-square test shows that P Value of pain, tenderness, swelling and loss of function are less than 0.005, and is statistically significant. As Chi-square test gives the comparison between the two groups, hence we can conclude that the trial drug had shown improvements.

DISCUSSION

Discussion on Demographic Data

Age

Incidence of 40 patients of long bone fractures shows more number of patients in the age group 18-30 years, i.e. 30% followed by 27.5% in 31-40years, 22.5% in 51-60 years and 20% in 41-50 years. As there is no much difference between the values, it shows that fracture can occur at any age.

Gender

In the sample taken for study, males (57.5%) have been affected more than female (42.5%), which shows

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that young and middle aged group males are affected more.

Cause of Fracture

RTA is the most common factor for a fracture, in this it constitutes 52.5% of the patients, 32.5% are due to fall due to outstretched hands or legs where as 15 % constitute the other category.

Site of Fracture

Radius fracture was common with 52.5% as most of them had a history of fall from two-wheeler with outstretched hands. 12.5% were having humerus fracture as they fall on one side with pressure towards the humerus. 20% were having fracture over fibula, 10% were of tibial fracture due to slide and false step and 5 % constitute fracture over ulnar region.

Discussion on effect of treatment on Swelling

The percentage of severity of swelling in Group A showed a reduction by 91% in both Group A and 100% in Group B, the reduction of swelling scores in both groups are analysed statistically using unpaired 't' test and it showed both the groups are highly significant with p value being 0.000. Swelling may be due to accumulation within the cavity with excess synovial fluid or blood. In this condition the predominant *Dosha* will be *Vata.*

Immobilization prevents not only the effusion, but offers adequate rest to the affected part. Hence in both the group the treatment is much effective in relieving swelling. The result points out the fact that *Ambashtadi Gana* is beneficial in reducing swelling in fractures, as it is *Bhagna Sandhanakara.*

Discussion on effect of treatment on Pain

The percentage of severity of pain in Group A showed a reduction by 80% as against 90% in Group B, It shows that both the treatments are highly effective in relieving pain. The reduction of pain in both groups is analysed by Mann-Whitney test. The pain receptors in the skin and other tissues are endings of sensory nerve fibres. Most sensory nerve fibres can be excited by multiple stimuli. When blood to a tissue is blocked, the tissue become very painful.

According to *Ayurveda, Vaigunya* of *Vata* is the cause for pain. *Avaranatwa* of *Kapha* causes vaigunya in *Vata*, thus resulting in pain. Hence, *Ambashtadi Gana* removes the *Avarana*.

Discussion on effect of treatment on Loss of Function

In Loss of function, the study showed marked improvements in the range of movements in treated Group A as compared to Group B. The commonest symptom in every patient after removing the immobilization will be the restricted movements of the respective limbs which affected, which includes adduction, abduction, flexion and extension.Normal movements like extension and flexion is due to *Shleshmaka Kapha*. Due to *Srotho Avarodha, Shleshmaka Kapha Abhava* occurs and causes stiffness resulting in restricted movements. By the action of *Ambashtadi Gana Kashayam* internally, *Shleshmaka Kapha Vridhi* occurs and this results in bringing back the normal function of the limbs.

Probable mode of action of *Ambashtadi gana* in Fracture

On analysing the properties of ingredients in *Ambashtadi Gana*, we get the following properties as predominant : *Sheeta Veerya* - 50%, *Madhura Rasa* - 50%.

According to Ayurveda, *Asthi Dhatu* is formed by the deposition of *Shleshma* over *Prithvi*, *Vayu* and *Agni Mahabhootha.*[6] Also it states that *Asthi Dhatu* is formed and nourished by its previous *Datu*, i.e. *Medho Dhathu*. A fracture means temporary loss of *Asthi Dhatu*. So repair of fracture refers to formation of fresh *Asthi Dhatu*. Here in *Ambashtadi Gana*, from the properties of individual drug we conclude that it is having predominance of *Kapha Vardhaka* properties which provides favourable condition for formation of new *Asthi Dhatu*.

Considering this fact the treated patients of Group A got fast and comparatively good results than the

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Group B in symptoms like loss of function, swelling and pain.

CONCLUSION

Ambashtadi Gana is a unique formulation mentioned by *Acharya Susrutha* in the context of *Bhagna*. In this study 40 patients of simple and undisplaced fractures are divided in to two groups, where in both the groups, fracture is reduced with conventional methods of management. But in one group *Ambashtadi Gana Kashayam* is given internally twice daily for a period of 30 days. In this group symptomatic relief is noticed after the treatment. It proves that drug is effective in the process of healing of fracture which was assessed on the basis of radiological investigation, with the short duration of treatment. The callus is the first sign of union visible on X-rays, usually 3 weeks after the fracture.[7] The formation of this bridge of woven bone imparts good strength to the fracture. Callus formation is slower in adults than in children and in cortical bones than in cancellous bones.[8] But from these findings we cannot confirm that the *Ambashtadi Gana* is effective in healing of fracture. More detailed studies may be conducted with this *Gana* in fracture healing. An attempt can be made to find a lesser expensive intervention which will be a great contribution.

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