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Clinical Evaluation of Therapeutic Effect of Amavatari Ras & Chitrakadi Churna Along with Swedan Therapy in Patients of Amavata Vis-À-Vis Rheumatoid Arthritis



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ABSTRACT

The study was conducted in 45 clinically diagnosed cases of Amavata (Rheumatoid Arthritis) with objectives of Clinical Evaluation of Therapeutic Effect of Amavatari Ras & Chitrakadi Churna along with Swedan therapy in patients of Amavata (Rheumatoid Arthritis) on the basis of various scientific parameters. The degree of severity of disease was almost equal in all the three groups, despite the difference between initial mean the rate of improvement was high in Group B (Group-B patients were treated with whole therapeutic regime mentioned in ayurvedic classics i.e., Langhana, Swedana, Use of Tikta, Katu and Deepan dravya prayoga, Virechan, Snehan and Basti) than Group A (Group-A Amavatari ras (500 mg BD), Chitrakadi churna 3g BD, Valuka sweda for 10- 15 mins 2-3 times a day for duration of three months) but patients improvement in Group C (Group – C patients fulfilling the criteria of amavata was given an Anti inflammatory drug, Diclofenac sodium extended release 100 mg / day divided in two doses (maximum dose).) was almost same to Group B.



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INTRODUCTION

Ayurveda today is recognized worldwide as a system of medicine that provides sound mind in sound body. This traditional system of medicine of India has an un-enviable position in the field of providing remedies for the ailments, as it provides satisfactory answers to all the problems the world is facing today. Amavata (Rheumatoid arthritis), is one of the challenging disease for the physicians due to its chronicity, incurability, complications and morbidity. From the modern point of view, this disease looks similar to Rheumatoid arthritis in its clinical appearance. For Amavata (Rheumatoid arthritis), Acharya Chakradutta has given emphasis on a therapeutic programme in terms of chikitsa sutra instead of single therapy for complete cure, without reoccurrence or to manage this disease. That includes langhana, swedan, use of bitters, deepan and katu dravya followed by virechana, snehapana and basti. Amavatari Ras with the reference of Bhaishajya ratnavali Amavata chikitsa Adhyaya, which fulfills deepana, pachana and anulomana. Management of *Amavata* (Rheumatoid Arthritis) is on the basis of various scientific parameters. According to Ayurvedic literature no any references of disease Amavata can be found in Vedic period.

MATERIAL AND METHOD

A total 45 patients of Amavata were randomly selected for the present study, from the Kayachikitsa OPD and IPD of Sir Sunder Lal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi. In the present study, total 45 patients were registered out of which 34 patients were completed the treatment. (Group A- 13 pts., Group B- 11 pts & Group C- 10). The case selection was random regardless of age, sex, occupation and socio-economic conditions. Both acute and chronic phase of Amavata patients were taken for the study, following the criteria of the diagnosis of rheumatoid arthritis in Modern Medicine and the clinical features of Amavata described in Madhava Nidana.

Drug

Group-A

No. of patients- 13

Patients were treated with Amavatari ras 500 mg BD , Chitrakadi churna 3 g BD, Valuka sweda for 10-15 mins 2-3 times a day for duration of three months.

Group-B

No. of patients- 11

Group – B whole therapeutic regime mentioned in ayurvedic classics i.e., Langhana, Swedana, Use of Tikta, Katu and Deepan dravya prayoga, Virechan, Snehapan and Basti.

Group-C

No. of patients- 10

Group – C patients fulfilling the criteria of amavata was given an Anti inflammatory drug, Diclofenac sodium extended release 100 mg / day divided in two doses (maximum dose). In acute phase the drug was given in high dose to the patient and when it recovers from the acute phase the drug was given in small dose as maintenance dose for three months.

Preparation of Drug

Amavatari Rasa & Chitrakadi churna are one of the well known therapeutic preparations described in Bhaishajya Ratnawali having very much similar gunas and action described in chikitsa sutra.

Amavatari Rasa

Parada (1 part), Gandhaka (2 part), Triphala-sambhaga (3 part), Chitrak (4 part), Guggulu (5 part), Eranda tail (Bhavana dravya).

Chitrakadi Churna

Chitrak (1 part), Indrayava (1 part), Patha (1 part), Katuka (1 part), Ativisha (1 part), Abhaya (1 part).

Preparation of Amavatari rasa

Process: 1 part of suddha Parada was added with 2 parts of suddha Gandhaka and Kajjali was prepared by triturating in a khalwa. 5 parts of guggulu was taken into a khalwa and it was pounded well by adding kajjali and 3 parts of Triphala, 4 parts of Chitraka. During the process Eranda taila of required amount was added and pounding was continued until a soft homogeneous mass formed. This soft mass was passed through pill cutter to prepare desired size of tablets (500 mg each). The prepared tablets were stored in well closed glass containers.

Diclofenac Sodium

Diclofenac Sodium (Dye-kloh-fen-ak soh-dee-um) is a medicine which is used in rheumatoid arthritis, juvenile rheumatoid arthritis, rheumatoid disease and rheumatoid arthritis.

Follow up studies:

The sample of 45 patients presenting with classical signs and symptoms of Aamavata according to Ayurvedic classics, after subjection to modern parameters were subdivided randomly into three groups. The treatment schedule decided for each group was as under:

Out of 45 patients only 34 patients completed the follow up study in which group A consist of 13 patients, group B consist of 11 patients, and group C consist of 10 patients.

GROUP – A :

No. of patients	Medicine	Dosage	Duration
13	1.Amavatari rasa 2.Chitrakadi churna 3.Valuka sweda	1. 500 mg BD 2. three g BD 3. for 10- 15 mins 2-3 times a day	The drug was given for three months

GROUP - B

No. of patients - 11

Group – B patients were treated with whole therapeutic regime mentioned in ayurvedic classics i.e., Langhana, Swedana, Use of Tikta, Katu and Deepan dravya prayoga, Virechan, Snehan and Basti.

Treatment schedule for group 'B'

- ✓ **Langhan** Therapy – light meal
- ✓ **Deepan** – Panchkola churna 2 gm B.D. before meal
- ✓ **Pachan** – Chitrakadi vati 2 Tablet B.D. after meal , given from 4th to 7th day.
- ✓ **Swedan** was done by **Valuka sweda** on the local parts involved.
- ✓ **Snehana** (Internal Snehana) was used from day 8th day to 15th for the purpose of internal **snehana** and **virechana**. For this purpose **Eranda taila** (Castor oil in the dose of 20 -30 ml) was given with the lukewarm milk at bed time.

- ✓ **Kshar Vasti** was given from day 18th to 25 th day.
- ✓ After the completion of Vasti the trial drug was given i.e., **Amavatari rasa** and **Chitrakadi churna** in above mentioned doses till the completion of three follow ups (90 days).

GROUP – C

No. of patients = 10

Group – C patients fulfilling the criteria of amavata was given an Anti inflammatory drug, Diclofenac sodium extended release 100 mg / day divided in two doses (maximum dose). In acute phase the drug was given in high dose to the patient and when it recovers from the acute phase the drug was given in small dose as maintenance dose for three months.

Inclusion Criteria

1. The patients of rheumatoid arthritis with mild, moderate and severe degree of presentation were included in the present study.
2. Seropositive and seronegative both cases were included in present study.
3. The patients included will be within age group of 15- 65 yrs.

Exclusion Criteria

1. The patients having severe degree of deformities.
2. The patient having severe ankylosed joints.
3. The patients with major complications were also excluded
4. The patients on corticosteroid therapy.
5. Patient of rheumatic arthritis, septic arthritis osteoarthritis and gouty arthritis or any other type of arthritis.

A. CLINICAL ASSESSMENT OF THE DISEASE

Clinical assessment of the disease, its severity, extent and grades of inflammation were objectively done in terms of pain, swelling, tenderness, deformity, general function capacity and stiffness of the joints. The relative extent of all these criteria was recorded according to the rating scales in each patient at the initial stage and at subsequent follow ups. These are measured by simple count of clinically active joints.

1. Pain

It is determined by intensity of pain on passive movement and rate of analgesic drug requirement.

- 0 No pain
- 1 Pain complaints but tolerable
- 2 Pain complaints difficult to tolerate and taking analgesic once a day
- 3 Intolerable pain and taking analgesics two times a day
- 4 Intolerable pain and taking analgesics more than two times in a day.

2. Swelling

- 0 No swelling
- 1 Feeling of swelling + Heaviness
- 2 Apparent swelling
- 3 Huge (Synovial effusion) swelling

3. Stiffness

- 0 No stiffness
- 1 20% limitation of normal range of mobility
- 2 50% limitation of mobility
- 3 75% or more reduction of normal range of movement

4. General Function Capacity

- 0 Complete ability to carry on all routine duties
- 1 Frequent normal activity despite slight difficulty in joint movement
- 2 Few activities are persisting but patient can take care of him or herself
- 3 Few activities are persisting patient requires an attendant to take care him/herself
- 4 Patient is totally bed ridden

5. Tenderness

- 0 No tenderness
- 1 Mild tenderness
- 2 Moderate tenderness
- 3 Severe tenderness

B. LABORATORY PROFILE

For the purpose of diagnosis of a disease its assessment, severity, clinical improvement and to assess the possible side effects, certain routine and specific investigations were performed in every patients viz.

1. Hematological investigations

Every patient was investigated for complete haemogram. Following methods were adopted for the purpose.

(a) Total leucocytes count: This was done with the help of an improved Neubaur's hemocytometer and was recorded in the unit of per cubic millimeter.

(b) Differential leucocytes count: This was done with the help of thin blood smear prepared with Leishman's staining.

(c) Hemoglobin: Estimation of Hemoglobin in blood was done with Sahlis haemoglobinometer recorded in gm% unit.

(d) Erythrocyte Sedimentation Rate: This was done by the Wintrob's method and recorded in mm/hr unit for the first hour.

2. Biochemical: C - reactive protein (C-RP titer)

This was done by the method of qualitative and semi quantitative latex fixation slide test. The test was based on the immunologic reactions between CRP as an antigen and Latex particle counted with nonspecific anti-human CRP and sensitized to detect levels greater than six (6) microgram per milliliter (0.6 mg/dl).

3. Rheumatoid factor (RA titer)

In rheumatoid arthritis (R.A.), diagnostically useful auto antibodies termed as rheumatoid factor can be detected which are immunoglobulin of the class IgG, IgM, IgA and IgE, IgM class RF with specificity to human IgG Fc is the most prognostic marker for RA. RF plays a role in perpetuating the rheumatoid inflammatory process; the severity of joint damage could be predicted according to the strength of RF reactivity. A significant decline of RF with remission of disease activity has also been demonstrated. Therefore, quantified serial determinations of RF are more meaningful the diagnosis, prognosis and assessment of therapeutic efficacy of rheumatoid arthritis.

OBSERVATION & RESULTS

Along with literary and conceptual studies in the present study observation have been made on following aspects:

1. Clinical profile of Amavata (Rheumatoid arthritis).
2. Laboratory study of the effect of Amavatari ras and Chitrakadi churna along with Sweadan therapy Amavata (Rheumatoid arthritis).

In terms seropositivity and duration of illness. The observations are displayed in following tables (1-12).

DISCUSSION

The study and results obtained from the clinical study have been described under here along with logical interpretation on the basis of ayurvedic/modern principles. In the present study, total 45 patients were registered out of which 34 patients were completed the treatment. (Group A-13 pts., Group B- 11 pts & Group C- 10). Maximum patients i.e. 37.77 % were belonging to 36- 45 years and 22.22 % were belonging to 26- 35 years. Maximum patients of this series were females (71.11%), majority i.e. 84.44 % were Hindu, 60 % of pts were housewife, 80 % of patients were married and 51.01 % were of middle class. Maximum number of patients were of Urban origin showing life style modification causing more no. of diseased patient in urban areas. Maximum i.e., 64.44% of patient's dietary habit was of mixed type i.e., vegetarian and non vegetarian both. 53.33 % patients were having Kapha-vata prakriti. Maximum i.e. 64.44 % of pts were having Avara agnibala, & 60 % of patients having altered bowel habit. Maximum number of patients i.e. 77.77 % had Negative family history, 57.74 % of pts were having chronicity less than 2 years. Maximum 53.33 % of pts were R.A. positive. Though the presence of Rheumatoid factor does not establish the diagnosis of Rheumatoid arthritis. But it can be prognostic importance, because patient with high titer have more severe and progressive disease with extra articular manifestation. Pain, swelling, tenderness and stiffness were found significantly reduced in Group A, B & Group C. Appetite was increased significantly in Group A and B, in comparison to Group C , rather it was deranged in some of the patients in Group C. The degree of severity of disease was almost equal in all the three groups, despite the difference between initial mean the rate of improvement was high in Group B than Group A patients but improvement in Group C

was almost same to Group B. The trial therapy has produced improvement in joint function in all the three Groups A, B & C. Though the improvement was more & almost equal in Group B & C in comparison to Group A, but Group A also showed significant improvement. This is observed in terms of walking time, grip power, and pressing power. The Agnibala was improved in most of the cases of Group A & B in comparison to Group C. The total mean reduction of ESR value has been seen in Group A, B & C, the change was however statistically significant in Group B. Significant mean reduction was observed in titer value of Rheumatoid factor in all the Groups A, B & C but it is reduced much in Group B. Similarly positive changes i.e., mean reduction in CRP values were observed in Group A, B & C but it was reduced to a greater extent in both Group B & C.

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CONCLUSION

On the basis of observations and the results that has been come out of the study; it can be concluded that effect of the trial drug i.e., Amavatari rasa & Chitrakadi churna along with Swedan therapy & Total Ayurvedic regime are equally effective like Standard group of Diclofenac Sodium. But if we talk about the efficacy between the trial drug and total regime, total regime was more effective in treating all the sign and symptoms and other associated lakshanas (symptoms) of the disease, the sign and symptoms e.g., Loss of appetite, Flatulence, Regurgitation etc.

REFERENCES

1. American College of Rheumatology Ad Hoc Committee 1996 Guidelines for the management of rheumatoid arthritis. Arthritis and Rheumatism. 39; 713-722.
2. API. Text Book of Medicine. Published by Association of Physician of India, 5th ed. 1992.
3. Bhaishajya Ratnavali ,Gobind Das sen with vidhyotini hindi commentary by Ambika Dattashastri.
4. Chakrapani Datta: Ayurveda Dipika Comm. on Charaka Samhita, Nirnaya Sagar
5. Davidsons principles and practice of Medicine, 17th edition, Churchill – livingstone publication. Manual of Rheumatology and Outpatient Orthopedic Disorders: Diagnosis and Therapy : Division of Rheumatic Diseases, Department of Orthopedic Surgery, Hospital for Special Surgery, Cornell University Medical College, New York

City 4th edition (February 2000): By Stephen A Paget MD, Allan Gibofsky MD, JD, John F Beary III, MD & Paul Pellicci MD By Lippincott, Williams & Wilkins.

6. Dr. J.P.Singh & Prof. S. K. Tiwari (Superwiser) , M.D. Ay. Thesis (Kayachikitsa Dept.) 2006, IMS, BHU, Varanasi.

7. Primer on the Rheumatic Diseases THIRTEENTH EDITION Edited by John H. Klippel, MD John H. Stone, MD, MPH Leslie J. Crofford, MD Patience H. White, MD, MA

8. Principles of Internal medicine by Harrison, 15th edition, Mac-graw hill Publication.

9. Watson WC, Cremer MA, Wooley PH and Townes AS: Assessment of the potential pathogenecity of type II collagen and antibody in patients with rheumatoid arthritis. Arthritis Rheum. 29: 1316, 1976.



Pain :

Table 1 : Change in pain-score in 34 patients of Amavata [Rheumatoid arthritis] :

Group	Grading	Pain								Intragroup comparison (Wilcoxon test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	0	0	0	0	2	15.4	5	38.5	$\chi^2 = 31.857$ p = < 0.001
	1	2	15.4	7	53.8	7	53.8	6	46.2	
	2	6	46.3	4	20.58	3	23.1	2	15.4	
	3	4	30.8	1	7.7	1	7.7	0	0	
	4	1	7.7	1	7.7	0	0	0	0	
B	0	0	0	0	0	3	27.3	7	63.6	$\chi^2 = 29.727$ p = < 0.001
	1	2	18.2	4	36.4	3	27.5	4	36.4	
	2	2	18.2	6	54.4	5	45.5	0	0	
	3	5	45.8	1	9.1	0	0	0	0	
	4	2	18.2	0	0	0	0	0	0	
C	0	0	0	2	20	3	30	5	50	$\chi^2 = 23.267$
	1	2	20	4	40	5	50	4	40	
	2	4	40	3	30	1	10	1	10	p = < 0.001
	3	3	30	0	0	1	10	0	0	
	4	1	10	1	10	0	0	0	0	
Group A vs Group B		z = 0.944 p = 0.392		z = 0.51 p = 0.65		z = 0.031 p = 1.00		z = 1.422 p = 0.207		
Group A vs Group C		z = 0.033 p = 0.976		z = 0.768 p = 0.483		z = 0.777 p = 0.483		z = 0.577 p = 0.605		

Swelling :

Table 2 : Change in Swelling in 34 patients of Amavata [Rheumatoid arthritis]

Group	Grading	Swelling								Intragroup comparison (Wilcoxon test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	1	7.7	4	30.8	7	53.8	8	61.5	$\chi^2 = 25.983$ p = < 0.001
	1	7	53.8	7	53.8	6	46.2	5	38.5	
	2	5	38.5	2	15.4	0	0	0	0	
	3	0	0	0	0	0	0	0	0	
B	0	2	18.2	2	18.2	6	54.5	8	72.7	$\chi^2 = 21.00$ p = < 0.001
	1	2	18.2	6	54.5	3	27.3	3	27.3	
	2	5	45.5	3	27.3	2	18.2	0	0	
	3	2	18.2	0	0	0	0	0	0	
C	0	2	20	5	50	7	70	8	80	$\chi^2 = 19.78$ p = < 0.001
	1	3	30	3	30	3	30	2	20	
	2	5	50	2	20	0	0	0	0	
	3	0	0	0	0	0	0	0	0	
Group A vs Group B		z = 0.136 p = 0.297		z = 0.570 p = 0.605		z = 0.770 p = 0.522		z = 0.351 p = 0.483		
Group A vs Group C		z = 0.1054 p = 0.331		z = 0.885 p = 0.459		z = 0.359 p = 0.776		z = 0.567 p = 0.649		

Stiffness

Table 3 : Change in stiffness in 34 patients of Amavata [Rheumatoid arthritis]

Group	Grading	Stiffness								Intragroup comparison(Wilcoxsion test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	0	0	1	7.7	2	15.4	6	46.2	$\chi^2 = 31.11$ p = < 0.001
	1	1	7.7	7	53.8	9	69.2	6	46.2	
	2	8	61.5	4	30.8	2	15.4	1	7.7	
	3	4	30.8	1	7.7	0	0	0	0	
B	0	0	0	0	0	4	36.4	8	72.7	$\chi^2 = 27.78$ p = < 0.001
	1	3	27.3	7	63.6	7	63.6	2	18.2	
	2	5	45.5	4	36.4	0	0	1	9.1	
	3	3	27.3	0	0	0	0	0	0	
C	0	0	0	1	10	6	60	7	70	$\chi^2 = 23.27$ p = < 0.001
	1	4	40	7	70	3	30	3	30	
	2	4	40	2	20	1	10	0	0	
	3	2	20	0	0	0	0	0	0	
Group A vs Group B		z = 0.771 p = 0.494		z = .000 p = 1.000		z = 1.536 p = 0.207		z = 1.126 p = .331		
Group A vs Group C		z = 1.428 p = 0.208		z = 0.926 p = 0.446		z = 1.889 p = .088		z = 0.774 p = 0.522		

Tenderness :

Table 4 : Change in Tenderness index in 34 patients of Amavata [Rheumatoid arthritis]

Group	Grading	Tenderness								Intragroup comparison (Wilcoxon signed ranks test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	0	0	3	23.1	8	61.5	9	69.2	$\chi^2 = 30.75$ p = < 0.001
	1	6	46.2	8	61.5	5	38.5	4	30.76	
	2	7	53.8	2	15.4	0	0	0	0	
	3	0	0	0	0	0	0	0	0	
B	0	0	0	0	0	4	36.4	8	72.7	$\chi^2 = 27.25$ p = < 0.001
	1	4	36.4	7	63.6	6	62.6	2	18.2	
	2	3	27.3	4	36.4	1	10	1	9.1	
	3	4	36.4	0	0	0	0	0	0	
C	0	1	10	4	40	6	60	8	80	$\chi^2 = 23.400$ p = < 0.001
	1	4	40	5	50	3	30	1	10	
	2	4	40	1	10	1	10	1	10	
	3	1	10	0	0	0	0	0	0	
Group A vs Group B		z = 0.138 p = 0.927		z = 0.837 p = 0.483		z = 0.733 p = 0.563		z = 0.405 p = 0.784		
Group A vs Group C		z = 1.318 p = 0.228		z = 1.718 p = 0.150		z = 1.203 p = 0.303		z = 0.036 p = 1.000		

General Function Capacity :

Table 5 : Change in General function capacity index in 34 patients of Amavata [Rheumatoid Arthritis]

Group	Grading	GF Capacity								Intragroup comparision (Wilcoxon signed ranks test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	0	0	0	0	5	38.5	6	46.1	$\chi^2 = 28.241$ p = < 0.001
	1	6	46.2	11	84.6	6	46.2	5	38.4	
	2	5	38.5	1	7.7	2	15.4	2	15.3	
	3	2	15.4	1	7.7	0	0	0	0	
B	0	0	0	2	18.2	3	27.3	7	63.6	$\chi^2 = 25.12$ p = < 0.001
	1	3	27.3	6	54.5	8	72.7	3	27.27	
	2	5	45.5	3	27.3	0	0	1	9.09	
	3	3	27.3	0	0	0	0	0	0	
C	0	0	0	1	10	5	50	6	60	$\chi^2 = 26.077$ p = < 0.001
	1	3	30	7	70	4	40	3	30	
	2	5	50	1	10	1	10	1	10	
	3	2	20	1	10	0	0	0	0	
Group A vs Group B		z = 0.995		z = 0.290		z = < 0.01		z = 0.470		
		p = 0.361		p = 0.820		p = 1		p = 0.691		
Group A vs Group C		z = 0.705		z = 0.215		z = 0.953		z = 0.65.3		
		p = 0.522		p = 0.879		p = 0.410		p = 0.563		

Walking Time :

Table 6 : Change in Walking time index in 34 patients of Amavata [Rheumatoid Arthritis].

Group	Grading	Walking time								Intragroup comparison (Wilcoxon signed ranks test)
		BT		F ₁		F ₂		F ₃		
		No.	%	No.	%	No.	%	No.	%	
A	0	0	0	2	15.4	6	46.21	7	53.8	$\chi^2 = 28.806$ p = < 0.001
	1	7	53.8	8	61.5	5	38.5	4	30.8	
	2	4	30.8	2	15.4	2	15.4	2	15.4	
	3	2	15.4	1	7.7	0	0	0	0	
B	0	3	27.3	4	36.4	5	45.5	7	63.6	$\chi^2 = 19.36$ p = < 0.001
	1	2	18.2	5	45.5	5	45.5	3	27.3	
	2	5	45.5	2	18.2	1	9.1	1	9.1	
	3	1	9.1	0	0	0	0	0	0	
C	0	2	20	5	50	6	60	7	70	$\chi^2 = 15.766$ p = < 0.001
	1	4	40	4	40	3	30	3	30	
	2	4	40	1	10	1	10	0	0	
	3	0	0	0	0	0	0	0	0	
Group A vs Group B		z = 0.460 p = 0.691		z = 0.990 p = 0.392		z = 0.127 p = 0.910		z = 0.526 p = 0.649		
Group A vs Group C		z = 1.010 p = 0.370		z = 1.703 p = 0.131		z = 0.910 p = 0.563		z = 0.562 p = 0.643		

Grip Power :

Table 7 : Change in Grip Power in 45 patients of Amavata [Rheumatoid arthritis]:

Group	Grading	Grip Power								Intragroup comparison (Wilcoxon test)
		Rt ₀		Rt ₁		Lt ₀		Lt ₁		
		No.	%	No.	%	No.	%	No.	%	
A	0	1	7.7	4	30.8	0	0	2	15.4	Rt Z = 2.972 p = < 0.05 Lt Z = 3.41 P = < 0.001
	1	4	30.8	8	61.5	2	14.4	7	53.8	
	2	6	46.2	1	7.7	8	61.5	4	30.8	
	3	2	15.4	0	0	3	23.1	0	0	
B	0	2	18.2	7	63.6	4	36.4	5	45.5	R Z = 2.714 p = < 0.001 Lt Z = 2.12 p = < 0.05
	1	5	45.5	3	27.5	2	18.32	5	45.5	
	2	3	27.3	1	9.1	4	36.4	1	9.1	
	3	1	9.1	0	00	1	9.1	0	0	
C	0	0	0	6	60	4	10	5	50	R Z = 2.61 p = < 0.001 Lt Z = 2.00 p = < 0.05
	1	2	20	2	20	4	40	3	30	
	2	5	50	1	10	4	40	2	20	
	3	3	30	1	10	1	10	0	0	
Group A & B		z = 1.196 p = 0.277		z = 1.353 p = 0.228		z = 2.12 p = 0.47		z = 1.767 p = 0.106		
Group A & C		z = 1.134 p = 0.313		z = 1.359 p = 0.257		z = 1.729 p = 0.115		z = 0.520 p = 0.832		

Press Power :

Table 8 : Change in Pressing Power in 34 patients of Amavata [Rheumatoid arthritis]:

Groups	Grading	Press Power								Intergroup comparison (Wilcoxon signed ranks test)
		Rt ₀		Rt ₁		Lt ₀		Lt ₁		
		No.	%	No.	%	No.	%	No.	%	
A	0	4	30.8	10	76.9	2	15.4	6	48.2	Rt Z = 2.64
	1	5	38.5	2	145.4	5	38.5	5	38.5	p = < 0.05
	2	3	23.1	1	7.7	5	38.5	2	15.4	Lt Z = 3.000
	3	1	7.7	0	0	1	7.7	0	0	p = < 0.05
B	0	1	9.1	4	36.4	1	9.1	5	45.5	R Z = 3.05
	1	3	27.3	6	54.5	2	18.2	5	45.5	p = < 0.05
	2	5	45.5	1	9.1	7	63.6	1	9.1	Lt Z = 2.762
	3	2	18.2	0	0	1	9.1	0	0	p = < 0.05
C	0	0	0	5	50	4	40	5	50	R Z = 2.828
	1	6	60	4	40	5	50	5	50	p = < 0.05
	2	4	40	1	10	1	10	0	0	Lt Z = 1.00
	3	0	0	0	0	0	0	0	0	p = > 0.05
Group A & B	Rt ₀	z = 1.66 p = 0.119		z = 1.788 p = 0.119		z = 1.100 p = 0.331		z = 0.127 p = 0.910		
Group A & C	Rt ₁	z = 1.071 p = 0.34		z = 1.218 p = .323		z = 1.913 p = 0.079		z = 0.517 p = 0.648		

Table 9 : Change in RA titer in 45 patients of Amavata [Rheumatoid arthritis]

Groups	RA Mean \pm SD		Within the group comparison paired t- test(BT-AT)
	BT	AT	
Group A	60.26 \pm 53.22	42.75 \pm 34.47	17.26 \pm 21.63 t = 2.87 p = < 0.05
Group B	64.64 \pm 72.46	30.58 \pm 31.20	34.06 \pm 46.4 t = 2.43 p = < 0.05
Group C	55.78 \pm 60.62	26.66 \pm 29.99	29.12 \pm 40.01 t = 2.30 p = < 0.05
Between the group comparison One Way ANOVA test	F= 0.054 p = > 0.05	0.804 p = > 0.05	-

Table 10 : Change in CRP in 45 patients of Amavata [Rheumatoid arthritis]:

Groups	CRP Mean \pm SD		Within the group comparison paired t-test (BT-AT)
	BT	AT	
Group A	19.70 \pm 13.82	13.92 \pm 13.89	5.77 \pm 8.96 t = 2.324 p = < 0.05
Group B	31.00 \pm 15.80	17.45 \pm 9.40	13.54 \pm 9.56 t = 4.69 p = < 0.001
Group C	28.3 \pm 15.44	18.23 \pm 13.81	10.07 \pm 11.79 t = 2.7 p = < 0.05
Between the group comparison One way ANOVA	F = 1.884 p = > 0.05	F = 0.557 p = > 0.05	-

Table 11 : Change in ESR in 68 patients of Amavata [Rheumatoid arthritis]:

Groups	ESR Mean \pm SD		Within the group comparison paired t-test (BT-AT)
	BT	AT	
Group A	44.92 \pm 12.182	29.00 \pm 13.6	15.923 \pm 17.390 t = 3.301 p = < 0.05
Group B	49.36 \pm 14.55	27.55 \pm 22.219	21.81 \pm 16.510 t = 4.383 p = < 0.001
Group C	39.70 \pm 11.136	22.60 \pm 9.180	17.100 \pm 16.895 t = 3.201 p = < 0.05
Between the group comparison on way ANOVA	F = 1.51 P = > 0.05	F = 0.48 P = > 0.05	

Table 12 : Change in Hb% in 68 patients of Amavata [Rheumatoid arthritis]:

Groups	Hb Mean \pm SD		Within the group comparison paired t- test(BT-AT)
	BT	AT	
Group A	10.45 \pm 2.75	10.48 \pm 2.55	0.023 \pm 0.45 t = 0.18 p = >0.05
Group B	10.67 \pm 10.78	10.62 \pm 1.65	0.05 \pm 0.55 t = 0.274 p = >0.05
Group C	12.12 \pm 1.78	12.07 \pm 1.68	0.05 \pm 0.44 t = 0.36 p = >0.05
Between the group comparison on way ANOVA	F = 1.80 p = >0.05	F = 1.958 p = >0.05	