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A Comparative Clinical Study to Evaluate the Efficacy of *Atarushadi Kwatha* and *Karanja Arka* in the Management of *Ekakushta* vis-a-vis Chronic Plaque Psoriasis

Chaitra B M[1], Mythrey R C[2], V Rajendra[3]

[1]PG Scholor, Department of PG studies in Kayachikitsa, Government Ayurveda Medical College, Mysuru, India
E-mail: *chaitrachaitra22345[at]gmail.com*

[2]Professor, Department of PG studies in Kayachikitsa, Government Ayurveda Medical College, Mysuru, India
E-mail: *mythreyrc[at]gmail.com*

[3]Professor & head, Department of PG studies in Kayachikitsa, Government Ayurveda Medical College, Mysuru, India
E-mail- *swast_kutir[at]yahoo.com.*

Abstract: ***Ekakushta is a Vata kapha pradhana tridoshaja kshudra kushta characterised by aswedanam, mahavastu and matsya shakalavat twacha. The symptoms of Ekakushta are similar to that of plaque psoriasis explained in contemporary system of medicine. Psoriasis is one among the most common skin disorder encountered in clinical practice characterised by erythematous, circumscribed, silvery skin lesions. Even though it can be considered as an autoimmune disorder affecting the skin, it cannot always be treated as a somatic lesion, it is in fact multifactorial in origin and conditioned by various constitutional and environmental factors.The current treatment modalities explained in contemporary medicine in the management of psoriasis have their own limitations and considerable side effects when used for a longer period. In the present situation there is a need to evolve a more comprehensive, economical and safe method of management of psoriasis.Hence the current study was taken up to evaluate the efficacy of Atarushadi Kwatha and Karanja Arka in the management of Ekakushta vis-à-vis Chronic plaque psoriasis.***

Keywords: *Ekakushta,* Plaque psoriasis, *Atarushadi kwatha, Karanja Arka, Karanja taila*

1. Introduction

Skin diseases are common and often have an impact on an individual's health-related quality of life. Patients of skin disease always experience physical, emotional and socio-economic embarrassment in the society. Skin disease appears to be becoming more common because there is a lowered threshold for seeking medical attention and are becoming increasingly important. The prevalence of skin diseases in general population has varied from 7.86% to 11.16% in various studies[1].All the skin diseases in Ayurveda have been discussed under the broad heading of "*kushta*". *Kushta* is further divided into *Mahakushta* and *Kshudrakushta.Ekakushta* is considered one among the *Kshudrakushta* and it is *vata-kapha pradhana vyadhi*[2]owing *lakshana* like *aswedana, mahavastu* and *matsya shakalavat twacha*[3]which bears a greater resemblance with Chronic plaque psoriasis.

Chronic plaque psoriasis is common type of stable psoriasis which manifests as coin to large palm-sized, well defined erythematous plaques-distributed bilaterally on extensors of the body[4]. The most commonly involved areas are the elbows, knees, gluteal cleft and scalp. Psoriasis is seen worldwide in all races and both gender with a prevalence from 0.1%-3%. Psoriasis can present at any age; bimodal age distribution is common. First peak at 20- 30 years and second peak at 50-60 years. Winter aggravation is common[5]. The world wide prevalence of psoriasis is around 2% but studies in developed countries have reported higher prevalence rates of an average about 4.6%, nearly 2/3rd of people with psoriasis have a mild form of the disease, with less than 3 % of the skin surface of the body affected, but others have more extensive involvement of the skin[6].

Currently the treatment modalities available for the management of psoriasis include topical steroid therapy, corticosteroids and photochemothrapy. Long term usage of topical glucocorticoids is often accompanied by loss of effectiveness and atrophy of the skin[7].Most of the treatment modalities have some limitations as they are only palliative hence psoriasis still remains a challenge for the management in contemporary system of medicine.

In the present situation there is a need to evolve a more comprehensive, economical and safe method of management of psoriasis. Considering the above reasons, it is relevant to search for an alternative management, which is effective and which gives long term remission. Various studies conducted in different centers has proven the efficacy of *vamana* and *virechana* in the management of *Ekakushta*. Even though *vamana* and *virechana (shodhana*) effectively combats the Chronic plaque psoriasis, nature of the disease is such that there is a high chance of re-occurance. Hence the disease needs to be managed with *shamanoushadhi* after *shodhana.*So to disintegrate the *samprapti* and to increase the duration between relapse, a formulation which has not only *kushtaghna* effect but also works at level of *dhatvagni* countering *kapha* and *vata dosha* is desirable. Hence the current study is taken up to assess and compare the clinical

efficacy of *Atarushadi kwatha* and *Karanja Arka* after *virechana karma* in the management of *Ekakushta* vis-à-vis chronic plaque psoriasis.

Objective of the Study

- To evaluate the efficacy of *Atarushadi kwatha* in the management of *Ekakushta* vis-à-vis Chronic plaque psoriasis.
- To evaluate the efficacy of *Karanja arka* in the management of *Ekakushta* vis-à-vis Chronic plaque psoriasis.
- To compare the efficacy of *Atarushadi kwatha* with *Karanja arka* in the management of *Ekakushta* vis-à-vis Chronic plaque psoriasis.

2. Materials and Methods

Materials

The Materials used in the study were:

- *Atarushadi Kwatha*[8] – *Atarusha(vasa), Amrita, Aranda, Haritaki and Avalguja.*
- *Karanja Arka*[9] – contains liquid extract of *karanja panchanga*.
- *Karanja beeja* taila[10] – contains only *Karanja beeja.*

Source of drugs and method of preparation

Atarushadi Kwatha and *Karanja beeja taila* were specifically prepared for the purpose of the study and procured from SN Pandit and sons Pharmacy (GMP Certified Unit), Shankar matt main road, opposite to Nataraja Choultry, Mysuru.

Methods

Source of data

Subjects were selected from the OPD and IPD of Government Ayurveda Medical College and Hospital, Mysuru and Government Hi–tech Panchakarma Hospital, Mysuru.

Sample size

The study was completed on 44 subjects of *Ekakushta* vis-à-vis chronic plaque psoriasis. The selected subject's detailed profile was prepared as per the proforma designed for the study.

Sampling method

It was an observational clinical study with pre post-test design.

Study design

It was a comparative clinical study with pre-post-test design.

Total 45 subjects were registered, there was 1 dropout in group B. The study was completed in 44 subjects.

Inclusion criteria

1) Subjects of all gender, between the age group of 18-60 years with the signs and symptoms of *Ekakushta* vis-à-vis chronic plaque psoriasis were selected for the study.
2) Subjects of Eka-kushta, who were fit for *virechana karma* were only included.
3) Freshly detected cases and treated cases of *Ekakushta* vis-a-vis chronic plaque psoriasis were taken for the study.

Exclusion criteria

1) Subjects suffering from uncontrolled diabetes mellitus (>200mg/dl), uncontrolled hypertension (systolic>160mm Hg and diastolic > 90mmHg) and other systemic disorders which interfered with the course of intervention were excluded.
2) Subjects unfit for *Virechana Karma* were excluded.
3) Pregnant women and lactating mothers were excluded.
4) Chronic plaque psoriasis with severe infective lesions were excluded.

Diagnostic Criteria

Diagnosis was made based on the *lakshana* of *ekakushta* and signs and symptoms of Chronic plaque psoriasis.

***Lakshana of ekakushta* are:**

Asweda (Absence of perspiration)
Mahavastu (Involvement of large area).
Matsya shakalavat twacha (Silvery scales)
Krishnaruna varna mandalas (Black or reddish brown skin lesions)
Abhraka patrasadrusha twacha (Scales resembling Abhraka patra)/

Symptoms of Chronic plaque psoriasis

Dry, raised, red skin lesions(plaques)covered with silvery scales.
Positive Auspitz sign.
Positive candle grease sign**.**

Assessment criteria

To assess the effect of therapy, the Psoriasis Area and Severity Index score(PASI) scoring method was adopted.
PASI scoring was calculated before starting, during and after completion of the intervention and total percentage of improvement in "PASI" scoring was calculated to assess the effect of the treatment on this parameter. Data was analysed by using contingency co-efficient table analysis. The assessment was done on the basis of severity of Itching, Erythema, Scaling and thickness in the affected area.

Overall assessment of clinical response

Complete remission - PASI score 0 after treatment.
Marked improvement – Reduction in PASI score >75%
Moderate improvement - Reduction in PASI score between 75% and 50%.
Minimal improvement – Reduction in PASI score <50%
Unchanged – No reduction in PASI score.

Assessment Schedule

First assessment (Pre-test) was done before administering the intervention i.e. after the *samsarjana krama* of *virechana karma* (0 day) and second assessment (Post-test) was done after completion of the intervention. i.e. on 20th day.

Investigation

Necessary investigations were conducted in required cases to rule out other systemic diseases or complications.

Intervention
Amapachana was done with *Ajamodadi Churna* 15g in three equally divided doses before food with warm water as *Anupana* till *Nirama Lakshana* were observed. *Guggulutiktaka Ghruta* was administered in a dose depending upon the *Koshta* of the subject from the day of *Nirama Lakshana* in *Arohana Krama*, starting with *Hrasiyasi Matra* until *Samyak Snigdha Lakshana* were observed. *Murchita tilatailaAbhyanga* followed by *nadi swedana* for 3 days in *Vishrama Kala* was given. *TrivrutLehya* was administered in the morning hours on empty stomach for the purpose of *Virechana*. Dose varied between 40-70gms, depending upon the *Koshta* of the subject. After *Atura Nireekshana*, *Samsarjana Krama* was advised according to *Shuddhi Prakara*.

Group A
Atarushadi Kashaya 60ml, in three equally divided doses *after* food for the next 20 days was administered with karanja beeja taila for external application twice a day.

Group B
Karnja Arka 36ml in three equally divided doses after food for the next 20 days was administered with karanja beeja taila for application twice a day.

Statistical Methods
The results were compared and analysed by using descriptive and chi squaretest using SPSS for window software.

3. Observation and Results

The study was completed in 44 clients. In the present study, 45 subjects were registered. There was 1 dropout in group B and study was completed in 44 subjects.

In this study, the results were analysed using PASI score in which the assessment was done on the basis of skin affected in each area by Itching, Erythema, Scaling and Thickness.

The results were assessed and analysed statistically. The statistical analysis of the results were done using descriptive statistics and Chi square test analysis using Service product for statistical solution (SPSS) for windows software.

Among 44 patients, a maximum of 15(33.3%) belonged to the age group of 18-30years, 10 (22.2%) belonged to the age group 31-40 years, 13(28.8%) belonged to the age group 40-50 years and 7 (15.5%) belonged to age group 50-60years.35 (77.7%) were male and 10(22.2%) were female, 37(82.2%) were Hindu, 5(11.1%) belonged to Islam religion and 3(6.6%) were Christian. among 45 subject, 2(4.4%)were Businessmen, 7(15.5%) were farmers, 2(4.4%) were students, 7(15.5%)were homemakers, 12(26.6%) were Employees and 14(31.1%)were labourers, 45 subjects, 35(77.7%) were married and 10(22.2%)were single, 24(53.3%) were from Rural area and 21(46.7%) belonged to Urban area. Among 45 individuals, majority of them belonged to Mixed food habits i.e. 44(97.8%) and 1(2.2%)belonged to vegetarian food pattern. It was observed that family history of Psoriasis, was present in 6(13.3%)individuals and absent in 38(86.7%)individuals. In the present study, among 45 volunteer's different sites of onset were observed. In majority, site of onset was scalp in 25(55.5%), 1(2.2%) on Elbows, 2(4.4%) on palm, 2(4.4%) patient on back, 3(6.7%) on Knee, 11(24.4%) on leg and 1(2.2%) on full body, all 45 (100%) subjects reported with worsening of symptoms in winter season.

4. Results

Total PASI of Head Region:
In Group A, before intervention, mean was 2.9238 with SD of 2.25785 and after intervention, the mean was 0.1717 with SD of 0.19785.

In Group B, before intervention mean was 2.8455 with SD of 2.41537 and after intervention, the mean 0.1909 with SD of 0.23686.

Thus the result obtained within the group is highly significant with the P value 0.000 and result obtained between the group is non-significant with the P value 0.886 and the study showed that both the groups are equally effective.

	Groups	Mean	Std. Deviation	N
Head bef treatment	Group A	2.9238	2.25785	22
	Group B	2.8455	2.41537	22
	Total	2.8837	2.31218	44
Head aft treatment	Group A	.1714	.19785	22
	Group B	.1909	.23686	22
	Total	.1814	.21631	44

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
CHANGE	163.626	2	81.813	61.730	.000
CHANGE * groups	.322	2	.161	.121	.886
Error(CHANGE)	108.677	82	1.325		

Total PASI of Upper Extremities:
In Group A, before intervention mean was 7.9182 with SD of 3.85927, and the mean was 0.5636 with SD of 0.46858 after intervention.

In Group B, before intervention mean was 9.2000 with SD of 4.82888, and the mean was 0.4545 with SD of 0.50590 after intervention.
The result obtained within the group is highly significant with the P value 0.000 and result obtained between the group is non-significant with the P value 0.342. Thus the study showed that both the groups are equally effective.

	Groups	Mean	Std. Deviation	N
Upper extremities bef	Group A	7.9182	3.85927	22
	Group B	9.2000	4.82888	22
	Total	8.5591	4.36830	44
Upper extremities after	Group A	.5636	.46858	22
	Group B	.4545	.50590	22
	Total	.5091	.48504	44

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Change	1506.176	2	753.088	146.410	.000
Change* groups	11.168	2	5.584	1.086	.342
Error (Change)	432.069	84	5.144		

Total PASI of Trunk:
In Group A, before intervention, mean was 11.6455with SD of 5.64419, and after intervention the mean 1.0636 with SD of .94745.

In Group B, before intervention mean was 11.0182 with SD of 7.20011, and after intervention mean was 0.5500 with SD of 0.79507.

The result obtained within the group is highly significant with the P value 0.000 and result obtained between the group is non-significant with the P value 0.899. Thus the study showed that both the groups are equally effective.

	Groups	Mean	Std. Deviation	N
TRUNK_bt	Group A	11.6455	5.64419	22
	Group B	11.0182	7.20011	22
	Total	11.3318	6.40130	44
TRUNK_AFTER	Group A	1.0636	.94745	22
	Group B	.5500	.79507	22
	Total	.8068	.90255	44

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
CHANGE	2552.141	2	1276.071	121.851	.000
CHANGE * groups	2.235	2	1.117	.107	.899
Error(CHANGE)	879.677	84	10.472		

Total PASI of Lower Extremities:
In Group A, before intervention mean was 15.1091 with SD of 7.56627, and after intervention the mean was 1.1455 with SD of 1.15335.

In Group B, before intervention mean was 17.7636 with SD of 9.93822, and after intervention the mean was 0.8727 with SD of 0.86969.

The result obtained within the group is highly significant with the P value 0.000 and result obtained between the group is non-significant with the P value 0.275 and the study showed that both the groups are equally effective.

	groups	Mean	Std. Deviation	N
LOWER_ extremities bt	Group A	15.1091	7.56627	22
	Group B	17.7636	9.93822	22
	Total	16.4364	8.83158	44
LOWER_ extremities AFTER	Group A	1.1455	1.15335	22
	Group B	.8727	.86969	22
	Total	1.0091	1.01885	44

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Change	5537.244	2	2768.622	138.498	.000
Change * groups	52.371	2	26.185	1.310	.275
Error(Change)	1679.185	84	19.990		

Overall Assessment of PASI of Group A and Group B in Percentage
In the present study, out of 22volunteers in Group A, it was observed that, 2(9%) got complete relief and 20(90%)got marked relief.

In Group B out of 22 volunteers, it was observed that, 6(27.2%) got complete relief and 16(72.7%) got marked relief.

			groups		Total
			Group A	Group B	
overall	Marked	Count	20	16	36
		% within groups	90.9%	72.7%	81.8%
	Complete	Count	2	6	8
		% within groups	9.1%	27.3%	18.2%
Total		Count	22	22	44
		% within groups	100.0%	100.0%	100.0%

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.444	1	.118

The result obtained between the groups is statistically insignificant with the P value 0.118. However, on comparing both the groups, Group A showed 90% reduction in PASI score whereas Group B showed 97% reduction in PASI score. Thus clinically Group B is significant than Group A.

5. Discussion

Probable Mode of action of *Atarushadi kwatha*
Action on *Dosha* -
Atarushadi kwatha acts on *tridosha*
As majority of the drugs possess *tikta, Kashaya rasa, pitta dosha* is pacifies and due to the *ushna virya vata kapha dosha* is pacified, it acts as *kanduhara* by acting on reduction of vitiated *vatakapha dosha*.

It is *kushtaghna*, *kandughna* and *krimighna* by the effect of *bakuchi*, *amrita*, *vasa* and *haritaki*

Action on *Dhatu*
Atarushadi kwatha has *tikta* and *Kashaya rasa*, these two rasa by virtue of their pharmacological properties causes *twak, mamsa sthirikarana* (nourisgment and strengthening of skin and muscle) it also does *vishaghnata, kleda upashoshana* and *ropana.*

By the *anulomana karma* of *haritaki* there will be *shodana* of vitiated *dosha*.

Haritaki exhibits potent improvement of erythema and scaling scores, decrease of epidermal, ear and skin fold thickening, decrease of tumour necrosis factor α (TNFα), interleukin(IL)-17A, IL-23 and matrix metalloproteinase(MMP)-9 expression and decrease of keratinocyte proliferation.[11]

The phytochemical review shows that the methanol, ethanol and water extract of Tinospora cardifolia possess active components such as polyphenols, flavonoids and tanninsnwhich contribute to the strong free radical scavenging activity. This can be correlated to the anti inflammatory and anti arthritic activity of Tinospora as the free radicles are involved in the process of inflammation.

The anti depressant activity of total furanocoumarins present in *bakuchi*(Psoralea corylifolia) helps in reducing stress and depression in the patients of psoriasis. [12]

Probable mode of action of *Karanja Arka*

करंज्योवमिवातार्शक्रिमिकुष्ठप्रमेहजित् **||61||-** Arka prakasha
The ingredient of *karanja arka* is *Karanja. Arka* prepared from *karanja* is indicated in *vataroga, arsha, krimi, kushta* and *prameha roga.*

Action on *Dosha-*
Karanja acts as *vata kaphahara* due to its *katu rasa, laghu ruksha guna* and *ushna virya.* It acts as *kushtaghna, krimighna, vishaghna* by its *tikta* and *katu rasa pradhana dravya.*[13]

Action on *Dhatu-*
The *dravyas* with *Tikta rasa* may help to bring *sthiri karana* of *mamsa* and *twacha* and there by *twak prasadana* is attained. Vitiation of *twagadi dhatu* may be relieved by *shodhaka* property of *Karanja* . *Tikta* and *katu rasa* makes the *shoshana* of excessive *kleda* and *lasika*. It does the *lekhana* of *dooshita mamsa* and acts as *vrana ropaka, vrana shodhaka*.

Krimighna property of the drug may prevent secondary infection as well as it helps in reducing the skin lesions.

Arka kalpana acquires highest position in obtaining the potentially active volatile oils as the condensation takes place during the process of distillation. This process helps in obtaining maximum active principle of the drug.

Thus the average control of vitiated *vata* can achieve by internal medicine and help to reduce discolouration of the skin.

The root bark of pongamia pinnata has afforded a new biflavonyloxymethane, pongabiflavone, along with a known furanoflavone, 3-methoxy-(7,8,2",3") furanoflavone. The structure of this new compound was elucidated from extensive spectral studies, including 2D-NMR spectrocscopic experiments. The antioxidants, radical quenching activity-superoxide and nitric oxide quenching activities of both pongabiflavone have been evaluated which can be a key to cure psoriasis.

Docking scores of karanjin and pongapin with different studied receptors were found to be comparable to that of methotrexate, a known drug for treating psoriasis. Docking results suggest that karanjin and pongapin might also help in controlling the disease. Overall, our results indicate that flavones could be natural and better alternative in curing psoriasis without any side effects.[14]172a

Probable mode of Action of *Karanje beeja taila*

Action on *Dosha*
Karanja beeja is having *katuvipaka* (pungent-post digestive effect), *katutikta rasa*(pungent –bitter taste), *laghu rukshaguna, ushna virya, vatakapha shamaka* property and *kushtaghnakarma*. Though *kushta* is *tridosha* dominant disease, the predominance of *vata* and *kapha* is found in psoriasis. Acharya Hemadri has given *shoshana* property of *ruksha guna* and *shodhana* property of *tikshnaguna* which is having *kaphashamaka* property. *Acharya Madhava* has described *Kaphavatahara* and *lekhana guna.*

Action on *Dhatu*
Katu rasa – One property of *katu* rasa described by *Acharya charaka* is "*Marganvivrunoti*" which means it dilates the *srotas* and thus acts on cellular level and stops the uncontrolled production of cells which causes hyperkeratanization. Other properties of *katu rasa* described by *charaka samhita* are *vishaghna, kandughna* and *vranaprasadana*. *Tikta rasa* has the property of *Raktaprasadana, vishaghna, kushtaghna, kandughna*. By its *srotoshodhaka* property, it acts on minute channels and removes the *amavisha*.

Discussion on the action of *taila* in general as external application
The keratin layer acts as a reservoir for a drug, hence *taila* slowly diffuses into the deeperlayer of the skin for many hours. The *taila* also acts as lubricant which may help to reduce the fissure formation within the lesions and assists in maintaining flexibility and elasticity of the affected skin. Study on the effect of oil has shown keratinocyte proliferation inhibition, retarding the cell division to 90% level.

6. Conclusion

On the basis of the conceptual analysis and observations made in the present study, the following conclusions were drawn.

Eka-kushta is a *vata kaphaja rakta pradoshaka vyadhi* and one among the *kshudra kushta* and it bears a greater resemblance with chronic plaque psoriasis.Symptoms like *matsyashakalopamam, Krishna aruna mandala,mahavastu* and *abhrakapatra sadrusha* lesions are the cardinal features of *eka-kushta* and they are similar to that of plaque psoriasis.

A comparative clinical study was conducted on 44 subjects, who were assigned into two groups i.e, group A with 22subjects were treated with*Atarushadi Kwatha* internally and *Karanja beeja taila* for external application, whereas group B with 22 subjects were treated with *Karanja Arka* internally and *Karanja beeja taila* for external application for consecutive 20 days. Intervention was started after *samsarjana krama* of *virechana*.

In both the Group PASI score was reduced remarkably.

Group B showed clinically significant result in reduction of all the symptoms when compared to Group A

In the present study out of 22 subjects in Group A, the Overall assessment showed complete relief in 2 subjects, 20 subjects got marked relief.

In Group B out of 22 subjects, it was observed that,6 subjects got complete relief, 16subjects got marked relief. Hence it is inferred that *Karanja Arka*has shown little better results than *Atarushadi Kwatha*in the management of *Eka-kushta* vis –a –vis Chronic Plaque Psoriasis.

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