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A CLINICAL STUDY TO EVALUATE THE EFFICACY OF JALAUKAVACARANA IN THE MANAGEMENT OF MUKHADUSIKĀ WITH SPECIAL REFERENCE TO ACNE VULGARIS

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ABSTRACT

Mukhadūṣikā, having a symptomatic correlation with Acne vulgaris, is one of the most challenging and stubborn skin disorder prevailing since vaidika era. It affects approximately 80% of the adolescents around the world. Acne vulgaris is a polymorphic chronic inflammatory disease of pilo-sebaceous units, characterized by comedones, papules, pustules, nodules, cysts, abscesses, and even widespread scarring sometimes. Ayurvedic texts have mentioned vitiation of Kapha, Vāta and Rakta responsible for disease. As the disease is having a chronic nature, modern medicines only subside the disease for short time period along with various side-effects and relapse also occur on withdrawing the medicines. Therefore, to identify an alternative, safer and permanent cure, Jalaukāvacārana (leech therapy) was selected for the present study to see its effect on Mukhadūṣikā. 15 patients, selected from the Panchkarma and Kaya-Chikitsa O.P.D. of the Rishikul Campus, UAU, Dehradun were treated with Jalaukāvacārana (4 sittings with a 7-day interval). Total duration of treatment was of 28 days along with a follow-up period of 30 days. Assessment was done on the basis of subjective parameters i.e. Piḍikā (Acne lesions) grading and associated complaint grading, as well as objective parameters i.e. count of lesions. Jalaukāvacārana was found to be significantly effective ($p < 0.05$) in reducing Piḍikā grading as well as associated symptoms i.e. Vedanā (Pain), Dāha (Burning), Pāka (Pus formation), Kandū (Itching), Vaivarnyatā (Discolouration) and Snigdhatā (oiliness). Intervention also significantly reduced count of lesions too. On follow-up after 30 days, only 20% of the patient showed relapse in grading of acne.

Keywords: Acne, Jalaukavacharana, Leech application, Mukhadūṣikā, Raktamokshana,

INTRODUCTION

Acne vulgaris, one of the most commonly seen disease in adolescence, is a chronic inflammatory disease of pilo-sebaceous units, characterized by the development of comedones in forms of papules, pustules and less commonly nodules.

The disease is mentioned by name of Mukhadūṣikā or Yuvānpidikā, as a kṣudra-roga (minor ailment, not a severe disease) in most of the Āyurveda texts.

Approximately 95% to 100% of adolescent boys and 83% to 85% of adolescent girls aged 16 to 17 years are afflicted with this disease¹. Although acne tends to resolve in many cases following adolescence, 42.5% of men and 50.9% of women continue to suffer from this disease even in their twenties².

Acne Vulgaris is regarded as a normal phenomenon by the common mass, especially parents, so much so that most people do not seek treatment for acne. Unfortunately, this leads to progression of acne into inflammatory lesions which heal only after leaving behind cosmetically troublesome scars. Most teenagers tend to spend a huge sum of money in buying OTC ointments/lotions making condition more troublesome.

Looking into the above mentioned facts there is a need for a treatment which can prevent complications of the disease as well as reduces the recurrence effectively.

An Ayurvedic text, Suśruta Samhitā, describes the disease as one of the 44 kṣudra-roga (minor ailments). There are no

specific etiological factors mentioned regarding the disease in the Āyurveda texts, although Kapha, Vāta and Rakta are said to be involved in the pathology³. Ācārya Caraka has stated involvement of vitiated Pitta along with Rakta in pathophysiology of Piḍikā⁴ (Acne lesion). So involvement of Pitta can also be considered here. As Medogarbhatā⁵ (filling meda (a bodily fluid) inside the Piḍikā) is one of the symptoms of the disease, the causative factors which vitiate Meda can also be incorporated as Nidāna (cause) of Mukhadūṣikā. No specific symptomatology is explained in the Ayurvedic texts regarding the disease. Ācāryas have mentioned Vamana (emesis), Virecana (purgation), Nasya (errhine therapy)⁶ and Raktamokṣana⁷ (blood-letting) as Śodhana (bio purification) therapy in the treatment of Mukhadūṣikā.

Panchakarma can be used in the disease for expelling out the vitiated Doṣa (humor) causing the disease. As mentioned above, in Āyurveda texts, Vamana Karma and Raktamokṣana are chief purification procedures mentioned for the treatment of Mukhadūṣikā along with dozens of topical applications and oral medications.

As Vamana Karma is an exhaustive and time consuming procedure due to its pre and post therapeutics implementations and most of the patients of Mukhadūṣikā belong to SukumāraPrākṛiti (sensitive nature) and student profile. So Raktamokṣana is more suitable for them as a Śodhana procedure. Among Raktamokṣana, Jalaukāvacārana (Leech application) is a method, which is much safer, less complicated and an almost painless procedure as compared to others. It is recommended for the fearful, physically weak, women and tender natured people. As majority of patients suffering from

Acne are of teenagers including female, therefore Jalaukāvacārana was selected for Śodhana procedure.

MATERIAL & METHODS

Patients with Mukhadūṣikā were selected from the O.P.D. / I.P.D. department of Panchakarma & Kaya-Cikitsā, Rishikul Campus, Haridwar. The study was conducted on randomly selected patients on the basis of the criteria of inclusion and exclusion after detailed inspection of clinical history and a physical examination and other necessary / desired investigations.

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Ethical and consent statement: This study is carried out as per Declaration of Helsinki guidelines.

Total No. of patients: 15 Patients.

Patients were given **4 sittings of Jalaukāvacārana** on a 7-day interval in between.

Inclusion criteria

- Age: 12 – 35 years.
- Patients fit for Raktamokṣana.
- Diagnosed case of Mukhadūṣikā (Acne vulgaris).

Exclusion criteria

- Age <12 years and >35 years.
- Any other skin diseases.
- Patient with acne on regions other than face.
- Known cases of Diabetes Mellitus.
- Known cases of bleeding disorders.
- Patients not fit for Raktamokṣana.

Methodology for Leech Therapy

Source of leeches

All the leeches used in trial were purchased from a reputed biological product supplier, India Biologicals from Agra, UP.

Procedure of Leech Therapy

Preparation of the leeches

On every sitting new leeches were used for the procedure. Leeches were first prepared by keeping in Haridrā Jala (Turmeric water), prepared by adding few pinches of Haridrā Cūrna (turmeric powder) in a kidney tray half filled with fresh water. When the leech became active i.e. move very fast in the vessel then it was taken out and transferred in to a vessel containing fresh cold water⁸.

Preparation of patient

Patients was given mild Abhyanga (external oleation) followed by Vāṣpa Svedana (steam fomentation) over the face for few minutes to increase the superficial circulation and facilitate the blood-letting. The face was then cleaned by dry cotton to remove all the greasiness over the area. After that, patient was made to lie in a comfortable position.

Primary Procedure

Pricks by lancet were done near the pustules/papules for application of leeches at the particular sit. Prepared active leeches were then kept over the oozing blood. When a leech was attached to a site, wet cotton pad was placed over it. In most of the patients, 4-5 leeches of 3-4 inches were used on an average that used to suck 50-80 ml of blood.

Secondary Procedure

Leech Management

Generally after 30-45 minutes, leech automatically detaches from the site. HaridrāCūrna was then sprinkled over the leech's anterior sucker (mouth) for inducing vomiting. Sometimes gentle squeezing of the leech was required (from its posterior sucker toward anterior sucker) to expel out the sucked blood. After expelling all the blood from its gut, leech becomes active again and stored in fresh water.

Patient Management

When the leech detaches itself from the site, there occurs a secondary bleeding from the site of bite for 2-4 hours or more. Śatdhauta Ghrīta (Purified fat) of Vaidyaratnam Oushadhsala, Ollur) was applied over the bite lesions. Few minutes later, cotton gauze pieces were kept over the bleeding sites with firm pressure to absorb the secondary bleeding. When it got attached to the site forming a clot, patient was advised not to unplug it before next day morning to avoid any bleeding.

Methods of data collection

All the registered patients were evaluated for the acne grading and associated symptoms. Assessment was done before the initiation of trial, and then after every 7th day of **Jalaukāvacārana**. Therefore, in total 5 assessments were done until the completion of trial followed by a 6th assessment after 30 days of trial completion to look for any recurrence.

The chief grading system used was

- Grade-1(mild): Comedones, occasional papules.
- Grade-2(moderate): Papules, comedones, few pustules.
- Grade-3 (severe): Predominant pustules, nodules, papules
- Grade-4(cystic): Mainly cysts, abscesses, wide spread scarring.

Assessment of result

Effect of the therapies were compared before and after the treatment on the basis of self-formulated scoring scales based on subjective and objective parameters associated with the disease.

Table 1: Subjective and Objective parameters

Subjective parameters	Objective parameters
Type of Lesion (According to grade)	Number of Comedones
Scars (Vranavastu), if present	Number of papules
Kleda/Snigdhatā (Discharge)	Number of Pustules
Vedanā (Pain)	Number of Nodules
Vaivarmyatā (Discoloration)	Number of Cysts
Śoṭha (Swelling)	Number of Scars
Srāva (Discharge)	(Vranavastu)
Kandū (Itching)	
Dāha (Burning Sensation)	
Pāka (Pus formation)	

Table 2: Grading for subjective parameter

Piḍikā (Lesions)	Snigdhatā/Kleda (Oiliness)
0- No lesion	0- Absent /dryness
1- Comedones, occasional papules.	1- AlpaSnigdhatā (not visible)
2- Papules, comedones, few pustules	2- AtiSnigdhatā (visible)
3- Predominant pustules, nodules, cysts.	
4- Mainly cysts/abscesses, widespread Scarring	
Vedanā (Pain)	Vaivarnyatā (Discoloration)
0- No pain	0- Absent
1- Tenderness	1- Mild discoloration
2- Moderate pain, require local measures	2- Severe discoloration
3- Severe pain, unable to perform routine activity & require oral medication	
Śoṭha (Swelling)	Srāva (Discharge)
0- No swelling	0- No discharge
1- Swelling but not apparent	1- LasikāSrāva (watery)
2- Swelling obvious on the affected areas.	2- PūyaSrāva (thick)
3- Swelling obvious on the whole face.	
Kandū (Itching)	Dāha (Burning Sensation)
0- No itching	0- No burning sensation
1- Mild local itching	1- Mild burning sensation
2- Moderate local itching, resistible	2- Moderate burning, resistible
3- Severe itching, irresistible	3- Severe burning irresistible
Pāka (Pus formation)	Scar (Vranavastu)
0- No pākotpatti	0- No scars
1- Pāka with Pūya, without pain	1- Few scars visible
2- Pāka with Pūya with pain	2- Widespread scars

Statistical Analysis: -The obtained data was subjected to various tests. On all subjective parameters, Wilcoxon test was applied for comparison, while on objective parameters, paired t test was applied for comparison.

RESULT

Distribution of patients according to chief complaint

Patients were tabulated according to grading of acne lesions (Piḍikā), presence of scar, course of the lesions (Piḍikā) along with duration & number of lesions (Piḍikā) & Scars (Vranavastu).

Table 3: According to grading of acne lesions (Piḍikā)

Acne Grading	No. of Patients	%
Grade I	3	20
Grade II	10	66.67
Grade III	1	6.67
Grade IV	1	6.67

Table 4: According to the presence of scars (Vranavastu) in the patients

Scar	No. of Patients	%
Present	3	20
Not Present	12	80

Table 5: Distribution according to associated complaints

Associated symptoms	No. of Patients	%
Snigdhatā	15	100
Vedanā	3	20
Vaivarnyatā	3	20
Śoṭha	0	0
Srāva	0	0
Kandū	7	46.67
Dāha	8	53.33
Pāka	11	73.33

Effect of Jalaukāvacārana on chief complaint & associated symptoms

After every sitting of Jalaukāvacārana, there was considerable amount of decrease in grading chief complaint as well as associated symptoms. Associated symptoms Kandū, Dāha, Pāka and Vedanā got maximum effect due the intervention.

Table 6: Effect of each sitting of Jalaukāvacārana on subjective parameters.

Parameter		Mean ± S.D.				
		BT	AT (1 st sitting)	AT (2 nd sitting)	AT (3 rd sitting)	AT (Final sitting)
Chief Complaint	Piḍikā	2.07 ± 0.8	1.80 ± 0.68	1.80 ± 0.68	1.33 ± 0.49	1.00 ± 0.53
	Scar	1.67 ± 0.58	1.67 ± 0.58	1.33 ± 0.58	1.00 ± 0.00	1.00 ± 0.00
Associated symptoms	Snigdhatā	1.27 ± 0.46	1.20 ± 0.41	0.80 ± 0.68	0.67 ± 0.72	0.80 ± 0.68
	Vedanā	1.00 ± 0.00	0.75 ± 0.50	0.50 ± 0.60	0.00 ± 0.00	0.00 ± 0.00
	Vaivarnyatā	1.33 ± 0.58	1.33 ± 0.58	1.33 ± 0.58	1.33 ± 0.58	0.67 ± 0.58
	Śoṭha	0	0	0	0	0
	Srāva	0	0	0	0	0
	Kandū	1.14 ± 0.38	0.71 ± 0.49	0.57 ± 0.53	0.29 ± 0.48	0.00 ± 0.00
	Dāha	1.00 ± 0.00	0.89 ± 0.30	0.56 ± 0.50	0.44 ± 0.50	0.00 ± 0
	Pāka	1.25 ± 0.50	1.17 ± 0.60	0.83 ± 0.60	0.58 ± 0.50	0.08 ± 0.30

Effect of Jalaukāvacārana on count of Piḍikā i.e. lesions (objective parameter)

All types of lesions got reduced in count after leech application. Maximum changes were observed after the 3rd sitting. Pustules and nodules got maximum reduction while least effect was observed on Scars (Vranavastu).

Table 7: Effect of each sitting of Jalaukāvacārana on objective parameters

Parameter (No. of lesions)	Mean ± S.D.				
	BT	AT (1 st sitting)	AT (2 nd sitting)	AT (3 rd sitting)	AT (Final sitting)
Comedones	20.53 ± 7.18	18.80 ± 7.41	16.60 ± 5.56	14.00 ± 4.83	10.87 ± 5.42
Papules	8.40 ± 5.65	7.33 ± 5.92	5.73 ± 5.01	4.33 ± 3.18	2.93 ± 2.28
Pustules	7.33 ± 4.20	4.62 ± 4.70	5.25 ± 5.60	2.62 ± 3.50	1.08 ± 1.80
Nodules	5.33 ± 3.06	4.33 ± 3.51	4.67 ± 3.21	1.33 ± 1.53	0.67 ± 1.15
Cysts/Abscess	3.00 ± 1.73	2.00 ± 1.73	2.33 ± 2.52	0.67 ± 1.15	0.00 ± 0.00
Scars (Vranavastu)	5.67 ± 5.59	5.33 ± 5.13	4.33 ± 4.16	4.00 ± 4.36	3.00 ± 2.65

Statistical analysis of Jalaukāvacārana result on subjective parameters

Table 8: Results obtained on Chief complaint & associated symptoms.

Parameter		N	Mean Score		Diff. X̄	S.D. ±	S.E. ±	% Change
			B.T.	A.T. (final)				
Chief Complaint	Piḍikā	15	2.07	1.0	1.07	0.46	0.19	51.61
	Scar	3	1.67	1.0	0.67	0.58	0.33	40.00
Associated symptoms	Snigdhatā	15	1.27	0.80	0.47	0.52	0.13	36.84
	Vedanā	4	1.00	0.00	1.00	0.00	0.00	100
	Vaivarnyatā	3	1.33	0.67	0.67	0.57	0.33	50
	Śoṭha	0	-	-	-	-	-	-
	Srāva	0	-	-	-	-	-	-
	Kandū	7	1.14	0.00	1.14	0.38	0.14	100
	Dāha	8	1.00	0.00	1.00	0.00	0.00	100
	Pāka	12	1.25	0.08	1.17	0.39	0.11	93.33

Table 9: Analysis of result obtained on chief complaint and associated symptoms (subjective parameters) by paired t test and Wilcoxon signed rank test

Parameter		't' score (paired t test)	'p' value (paired t test)	'p' value (Wilcoxon signed rank test)
Chief complaint	Piḍikā	9.02	<0.001	<0.001
	Scar	2	>0.05	>0.05
Associated symptoms	Snigdhatā	3.5	<0.01	<0.05
	Vedanā	-	-	>0.05
	Vaivarnyatā	2	>0.05	>0.05
	Śoṭha	-	-	-
	Srāva	-	-	-
	Kandū	8	<0.001	<0.05
	Dāha	-	-	<0.01
	Pāka	10.38	<0.001	<0.001

As shown by the table, 100% relief was observed in Vedanā, Kandū and Dāha followed by 93.33% relief in Pāka. 51.61% change was observed in the grading of chief complaint i.e. Piḍikā followed by 50% relief in Vaivarnyatā. There was 40% relief in Scars (Vranavastu) while Snigdhatā was relieved by 36.84% only. Śoṭha and Srāva were not found in any patient.

Changes in Piḍikā and Pāka were extremely significant (p<0.001). Relief obtained in Dāha was also highly significant (p<0.01). Effect of intervention on Snigdhatā and Kandū were also significant (p<0.05) while results obtained in Scar grading, Vedanā, Vaivarnyatā were not statistically significant (p>0.05).

Statistical analysis of Jalaukāvacārana results on objective parameters

Table 10: Analysis of result obtained on count of lesions i.e. Piḍikā (objective parameters) by paired t test.

No. of lesions	N	Mean Score		Diff. X̄	S.D. ±	S.E. ±	% Change	't' (paired t test)	'p' (paired t test)
		B.T.	A.T. (final)						
Comedones	15	20.53	10.87	9.67	6.15	1.59	47.08	6.08	<0.001
Papules	15	8.40	2.93	5.47	4.10	1.05	65.08	5.16	<0.001
Pustules	12	7.33	1.08	6.25	2.83	0.82	85.22	7.64	<0.001
Nodules	3	5.33	0.67	4.67	2.31	1.33	87.50	3.5	>0.05
Cysts/Abscess	3	3.00	0.00	3.00	1.73	1	100	3	>0.05
Scars (Vranavastu)	3	5.67	3.00	2.67	3.05	1.76	47.06	1.51	>0.05

100% relief was found in no. of cysts/abscess although the result was not statistically significant ($p>0.05$). 87.50% and 85.22% relief were found in nodules and pustules respectively while 65.08% relief was found in papules followed by a 47.08% relief in comedones. In scars (Vranavastu), 47.06% relief was

obtained. Results obtained in comedones, papules and pustules were extremely significant statistically ($p<0.001$). While the relief found on nodules and scars (Vranavastu) were not statistically significant ($p>0.05$).

Overall Effect of intervention on grading of chief complaint

Table 11: Distribution of patients according to grading of chief complaint before and after intervention.

Grade	BT		AT	
	No. of Patients	%	No. of Patients	%
No complaint	-	-	2	13.33 %
Grade I	3	20.00%	11	73.33 %
Grade II	9	60.00 %	2	13.33 %
Grade III	2	13.33 %	0	0.00 %
Grade IV	1	6.67 %	0	0.00 %

After the intervention completion, there was no patient of grade IV and grade III acne which were 6.67% and 13.33% respectively, before treatment. Before treatment there were 60% patient of grade II which also got reduced to 13.33%. 13.33% got complete remission after the completion of intervention. While there was an increase in grade I patients from 20% to

73.33% due to reduction in symptoms of higher grade patients after intervention.

Follow Up Study

Follow up scoring/grading was done after 1 month of completion of treatment/intervention.

Table 12: Follow up score with final scores

Grade	AT		After 1 month	
	No. of Patients	%	No. of Patients	%
No complaint	2	13.33	2	13.33
Grade I	11	73.33	8	53.55
Grade II	2	13.33	5	33.33
Grade III	0	0.00	0	0.00
Grade IV	0	0.00	0	0.00

There was an increase in grading of acne in 20% patients (number = 3) from grade I to grade II. 80% patients showed no increase in grade. Out of them 13.33% showed no relapse after complete remission.

DISCUSSION

Mukhadūṣikā or Yuvānpīdikā is one of the oldest skin ailment prevailing since Vaidika era in the society. Yuvānpīdikā was described under the heading of KṣudraRoga by ĀcāryaSuśruta for the first time, although this disease is not described in CarakaSamhitā. This shows that disease was prevalent even during SamhitāKāla (time when oldest Ayurvedic texts were written) and at that time too, people were conscious about their looks.

This disease is following a similar pattern even in the 21st century; as the disease is primarily seen in teenagers i.e. Yuvān; involving face i.e. Mukha chiefly; having lesion filled with sebum (Medogarbhātā) or papular/nodular type (Śālmālī Kantaka like).

Āyurveda texts have described the Vāta, Kapha and Rakta as the chief culprit Doṣa responsible for the disease, although Raktaja/Pittaja symptoms are found to be more pronounced in the patients.

As Pīdikā is the chief complaint found in the patients, which is a Rakta-Duṣṭi Lakṣana⁹ (symptom of blood derangement). ĀcāryaVāgbhatta has given a term Medogarbhā Pīdikā which can be assumed to be a lesion with whitish tinge or a lesion filled with Meda like substance i.e. sebum. On correlating this

with modern description of acne lesion, this can be a closed comedone filled with sebum or a pustule.

Ācārya Suśruta has described the Pīdikā like Śālmālī-Kantaka (thorn of Salmali^{malabaricatree}). As Śālmālī-Kantaka suggests a Pīdikā with semi-solid/solid consistency which correlates it with acne lesion- papule or nodule.

A Śālmālī-Kantaka like Pīdikā is suggestive of a lesion filled with Pūya (pus) but in Apakvāvasthā (unripen), which shows involvement of Kapha as ĀcāryaSuśruta has told that Pūya is not possible without Kapha¹⁰. Thus, this lesion can be correlated with papule (if small) or nodule (if large). And when this Pīdikā becomes pakva (ripened or mature) due to the involvement of Pitta, as Ācārya Suśruta has mentioned that Pākais not possible without Pitta, this can be correlated with a pustule (if small) or cyst (if large).

Other than Pīdikā and Rujā no other signs or symptoms of Mukhadūṣikā are found in the Āyurveda texts while modern medical science has explained few associated symptoms found in the disease like itching, discoloration, pain, swelling, discharge etc. As Āyurveda advocates the use of Yukti (logic) in undescribed conditions, all these symptoms are obvious due to the involvement of vitiated Vāta, Pitta and Kapha in the disease. Due to vitiation of Vāta, Pain (Vedanā), watery discharge and scar formation is possible while Pitta involvement can cause Pāka and Dāha. Śyāva Varna (Blackish discoloration) of skin occurs due to vitiated Vāta¹¹. Discoloration is also caused by vitiated Pitta because Pitta is responsible for imparting different colors to the skin¹². Vitiation of Kapha can lead to the formation of Pūya, Śoṭha, Kleda/Snigdhatā, Ghana Srāva (thick discharge) and Kandū.

All these symptoms correlate Mukhadūṣikā with Acne vulgaris involving face only.

In all Kṣudra-rogas, Rakta-Duṣṭi is seen as the prime pathology. While Raktamokṣana is advocated as the preferred method of Śodhana or treatment in Rakta-Duṣṭi¹³. As Mukhadūṣikā is also a Kṣudra-roga, above statement is not an exception to it. While in many Kṣudra-rogas, Jalaukāvacārana is directly indicated, Sirāvedha (venipuncture) is mentioned as the preferred method of Raktamokṣana in Mukhadūṣikā.

According to ĀcāryaSuśruta, Jalaukāvacārana is the preferred method of bloodletting in Bāla (children), Nārī (women), Durbala (weak), Bhīru (fearful) and Sukumāra (sensitive or tender nature)¹⁴. As majority of our patients were going to be female which comes in `Bhīru/Nārī category, also the major age group in which this disease occurs belongs to Sukumāra category, Jalaukāvacārana was selected as the primary intervention.

Jalaukā is also said to be the best “Anuśastra” (used in place of Śastra (surgical instrument) in those who fears from surgery) by Ācārya Vāgbhatta¹⁵.

Jalaukāvacārana, being a painless procedure, is more suitable than Sirāvedha to most of the patients.

As in Mukhadūṣikā, vitiated Doṣa/Dhātu/Mala get accumulated in Srotasi.e. Lomakūpa (pilo-sebaceous glands), causing blockages and leads to Piḍikā formation.

Jalaukāvacārana being a bio-purificatory method removes deeply seated toxins by letting out blood, clearing Srotasa(bodily channels) and pacifying vitiated Doṣa.

As Jalaukāvacārana is the preferred way of blood-letting in SukumāraPrakṛiti, therefore it was selected here for Raktamokṣana.

Although the amount of oozed blood in case of leech therapy is very less in comparison to tradition venipuncture, but the efficacy should not be judged by the amount of blood. Leech application not only removes blood from the site but also injects biologically active substances which help to manage various ailments. Hirudin and calin, which act as anticoagulants, also prevents inflammation and slowly cleansethewound too. Histamine by its vaso-dilating property allows more blood to come to the site of leech application or lesion thus replacing old stagnant blood with fresh blood. Overall, all biologically active substances render thrombolytic, anti-inflammatory and immune stimulant action¹⁶. Secondary bleeding for few hours, due to hirudin, causes removal of toxins along with increased circulation to that particular area, promoting faster wound healing without any scar formation. A healthy cell gets sick when it is deprived of needed oxygen and nutrition, and is unable to remove toxins accumulated during metabolism. Biologically active substances in leech saliva help the cells to absorb necessary nutrition and eliminate toxins¹⁷.

During leech therapy, leeches are placed directly on the site of lesion, so that they can feed directly on the pus and at the same time, more leeches are placed around the diseased area to get rid of the pooled blood. Because pooled blood causes pressure, leading to tenderness bloodletting, on the other hand, relieves the patient from pain. Also, it is already proven that leech saliva contains analgesics which may be the reason behind pain relief. It can also be assumed as the leech sucks stagnant blood, Śodhana of the morbid Doṣa via sucked blood occurs, which in turn results in the Srotośuddhi (opening/cleansing of body channels) and trapped Vāta gets relieved which was responsible for the pain.

According to modern science, leech injects anti-inflammatory and bacteriostatic substances with its saliva which helps in subsiding the associated symptoms. A study revealed that

Staphylococcus aureus bacteria, which causes infection of blood, bones and lungs, feeds on iron. Therefore, lesser the available iron in the system, less the chance of staphylococcus infection being present¹⁸. Relief in infective/inflammatory conditions by Jalaukāvacārana can be attributed to results obtained by this study.

Jalaukāvacārana is indicated by Ācāryas in Rakta-Duṣṭi with Pitta involvement. In Mukhadūṣikā also, there is primarily Rakta-Duṣṭi due to Pitta and Kapha.

As Jalaukāvacārana removes vitiated Pitta/Rakta, which causes reduction in Pāka, Dāha and no. of pustules & cysts. It also reduces the pooled blood and pus which results in Srotośodhana (opening/cleansing of body channels). This Srotośodhana causes normalization of Kapha and further reducing Kandū and no of comedones, papules & nodules. Srotośodhana also leads to Anulomana of obstructed Vāta which may be the reason for significant relief in pain.

As vitiated Pitta imparts different colours to the skin¹⁹ while Rakta causes improved complexion²⁰, Śodhana of the vitiated Pitta and Rakta by Jalaukāvacārana improves complexion by relieving Vaivarnyatā which might be the reason behind the reduced Vaivarnyatā in the patients involved in this study.

Jalaukāvacārana when given as an intervention, 51.61% improvement was observed in the chief complaint i.e. Piḍikā while 40% improvement was seen in scar. In associated symptoms, 100% improvement was seen in Vedanā, Kandū&Dāha followed by 93.33% improvement in Pāka. 50% relief in Vaivarnyatā was observed while Snigdhatā was relieved by 36.84% only. Śoṭha and Srāva were not seen in any selected patient. Results observed in Piḍikā and Pāka were extremely significant ($p<0.001$). Relief obtained in Dāha was also highly significant ($p<0.01$). Improvements seen in Snigdhatā and Kandū were also significant ($p<0.05$) while results obtained in scar, Vedanā and Vaivarnyatā were not statistically significant ($p>0.05$).

On analyzing objective parameters, 100% reduction was found in no. of cysts/abscess. 87.50% and 85.22% reductions were found in nodule and pustule count respectively while 65.08% relief was found in papule count followed by a 47.08% reduction in no. of comedones. On Scars (Vranavastu) count, 47.06% drop was obtained. Results obtained in comedones, papules and pustules count were extremely significant statistically ($p<0.001$). While the decrease in no. cysts, nodules and scars (Vranavastu) when tested statistically, was found to be insignificant ($p>0.05$).

This data suggests that Jalaukāvacārana was most effective on nodular and pustular lesions. It was found to be highly beneficial in reducing Kandū, Dāha and Pāka. Jalaukāvacārana was also capable of reducing Snigdhatā to some extent. It also completely resolved cystic lesions but this result cannot be considered significant due to small sample size and might occurred due to chance. Similarly, Jalaukāvacārana provided complete relief in Vedanā too but this result might also have occurred due to chance as the sample size was small.

On Vaivarnyatā also, Jalaukāvacārana showed promising results, but this effect too can't be considered significant due to small sample size.

Jalaukāvacārana provided complete resolution in 13.3% patients. It was also found to be effective on grade III and grade IV lesions, as no patient with grade III and grade IV lesions was seen after Jalaukāvacārana, which were 6.67% and 13.33% respectively, before the initiation of treatment. Grade II lesions were also found to be reduced as 60% patients were suffering

from grade II lesions before treatment and only 13.33% were seen after Jalaukāvācārana.

CONCLUSION

Mukhadūṣikā has clear-cut resemblance with modern disease Acne Vulgaris which is called to be a physically and psychologically scarring disease. Although Vāta, Kapha and Rakta are mentioned as Doṣa-Dūṣya involved in the pathogenesis of the disease, Pittaja symptoms are also found in the disease like Dāha and Pāka.

Above discussed results suggest that Jalaukāvācārana significantly reduces the Piḍikā grading. Also Jalaukāvācārana is highly effective in relieving the associated complaint Kandū, Dāha and Vedanā. However, it is not effective in reducing scars in one-month period. As a conclusion of this study, we can say that Jalaukāvācārana provides a sustained relief in Mukhadūṣikā with minor relapse rate.

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