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EFFICACY OF JALAUKAVACHARNA IN THE MANAGEMENT OF ACNE VULGARIS: REVIEW ARTICLE

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ABSTRACT

According to *Ayurveda*, among the 56 *Upangas* face is at the top, so everyone and mostly youngsters are most cautious and careful about the beauty of face. Face is index of mind and mirror of the body. Unfortunately, skin of the face is affected by certain anomalies in adolescence age which is the golden period of life. In modern era, Acne Vulgaris is burning issue in almost 80% adolescent. Prevalence rate of this disease increases day by day due to excessive stress, hormonal imbalance, salty food, junk food, lifestyle also continue and long-term use of oil base cosmetics. Acne Vulgaris is a chronic inflammatory disease of the pilo-sebaceous follicles characterized by comedones, papules, pustules and often scars, chiefly on cheeks, chin, nose, forehead and upper trunk. It is symptomatically as well as pathologically resembles like *Yuvanapidaka/ Mukhdooshika*. There are a variety of medicines for acne vulgaris in modern science including various adverse effects such as irritation, nausea, photosensitivity, dry skin, hair loss etc. As per Ayurveda classics *doshas* and *dushayas* involved in *Mukhadushika* are *Kapha, Vata, Rakta & Meda* and these affects the individual locally (face). *Acharya Sushrut* has considered *Raktamokshana* as *Shodhan chikitsa* and he also considered *Raktamokshana* as *chikitsaardha*. It's fame is due to its bioactive enzymes packed saliva. Anticoagulant, anti-inflammatory, analgesic property of leech saliva helps in relieving the symptoms such as inflammation, pain & lesions. *Jalaukavacharna* proved to be an easy and less invasive treatment without causing any adverse effect.

Keywords: Acne Vulgaris, *Mukhadushika, Jalaukavcharana.*

INTRODUCTION

Human skin reflects their health and personality. Skin is the largest organ of the body[1]. Acne vulgaris is a disease of the pilosebaceous unit that causes noninflammatory lesions (open and closed comedones), inflammatory lesions (papules, pustules, and nodules), and varying degrees of scarring. It is an extremely common condition with a life time prevalence of approximately 85% and occurs mostly during adolescence [2]. Acne can persist into adulthood, with a 50.9% prevalence rate of acne in women ages 20 to 29 years versus 26.3% in women ages 40 to 49 years[3]. Female patients account for two thirds of visits made to dermatologists for acne, and one third of all dermatology office visits for acne are by women who are older than 25 years [4]. Acne leads to significant morbidity that is associated with residual

scarring and psychological disturbances such as poor self-image, depression, and anxiety, which leads to a negative impact on quality of life[5]. In one epidemiologic study by[6], 8.8% of patients with acne reported depression with women suffering from depression twice as often as men (10.6% vs. 5.3%), but this was unrelated to acne severity. In Ayurveda, a very similar description is given by Ayurveda stalwarts by the name of *Mukhadushika*, due to its nature of deteriorating the beauty of one's face and as the disease is seen in adolescent age group, *Yuvanpidika* term is also given by the Acharyas. *Sushrut Samhita* is the first Ayurveda text to explain *Mukhadushika.* This disease is mentioned in most of the texts as *Kshudra-roga*. *Acharya Sushrut* have mentioned the vitiation of *Vayu, Kaph and Rakta* in the pathology of the disease[7]. *Acharya Vagbhatt* has mentioned the role of Meda in the pathology of *Mukhadushika* which resembles the modern theory of sebum involvement in the pathogenesis of acne[8]. Acne Vulgaris is regarded as a normal phenomenon by the common mass, especially parents, 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 (*Vranavastu*)[9]. Modern medications for acne include topical therapies; antimicrobials, hormones, surgery, U-V Irradiations; Intra lesions injections etc. But these have their own limitations. The topical treatment includes Benzoyl peroxide (2.5-10%), Topical retinoids, Topical antibiotics and other topical agents like (salicylic acid, azelaic acid etc.). Systemic therapy includes systemic antibiotics, hormonal therapy and oral Isotretinoin. However, long term daily use of this drug results in frequent side effects, some of which may lead to disastrous complications resulting in difficulties in complying with the treatment. While Antibiotic resistance in acne patients to antibiotics is also an emerging problem. But all these modern treatment modalities burn a hole in the pocket without permanently curing the disease and are only effective until used, with a very high rate of relapse on leaving medicine[10]. 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. Looking into the above mentioned facts there is a need for a treatment which can treat effectively as well as reduces the recurrence of acne vulgrais. *Panchakarma* can be used in the disease for expelling out the vitiated *Dosha* [causative factor] causing the disease. In *Ayurvedic* texts, *Vamana Karma* [therapeutic emesis] and *Raktamokshana* [blood- letting] are chief treatment mentioned for *Yuvanapidaka/* Mukhadushika along with certain topical applications and oral medications. In *Raktamokshana, Jalaukavacharana* is a method, which is much safer, less complicated and an almost painless procedure as compared to others[11].

PATHOGENESIS

Four key pathogenic processes lead to the formation of acne lesions: alteration of follicular keratinization that leads to comedones; increased and altered sebum production under androgen control; follicular colonization by *Propionibacterium acnes*; and complex inflammatory mechanisms that involve both innate and acquired immunity [12]. Genetics (twin studies [13], family history of severe acne[14], diet (glycemic index[15],including chocolate[16] and dairy consumption[17]; and environmental factors (smoking [18] ,occlusive cosmetics [19], occupational exposures[20] also contribute to the pathogenesis of acne. The pathogenesis of acne in adult women is particularly complex. Androgens play a major role [21], as evidenced by the response of acne in adult women to hormonal treatments, especially in the context of hyperandrogenism disorders such as polycystic ovary syndrome (PCOS) and the use of hormone-based therapies such as oral contraceptive and anti-androgen medications in women with normal androgen levels[22] .In addition, the lack of acne in androgen-insensitive women[23] and rising levels of dehydroepiandrosterone sulfate in association with the onset of acne in premenarchal girls and a subset of patients with PCOS also play a major role .[24]Androgens stimulate sebum production via androgen receptors on the sebaceous glands.

PUBERTY (Androgenic activity)

↓

Sebum production (Triglyceride & FFA)

↓

Retention Hyperkeratosis

↓

Obstruction of sebaceos gland

↓

Inflammation (Bacterial Colonization)

↓

Papule, Pustule, Nodule, Cyst

SAMPRAPTI: According to *Ayurveda*

Kapha,Vata & Rakta Dushti

↓

Kramshah Rasa Raktadi Dhatu Dushti

↓

Dhatwagnimandhyata (Medogni)

↓

Excessive Sweating

↓

*Srotosanga (*Obstruction *of Swedavah Srotomool- Meda & Lomkupa)*

↓

Acne Vulgaris

PURVARUPA

No *Purvarupa* of *Mukhdushika* is mentioned in *Ayurvediya Samhitas*.

RUPA

The *Purvarupa* of the disease *Yuvanpidika* is not available in almost all the *Ayurvediya Samhitas* but the *Rupavstha* of the disease is explained by all the *Acharyas*. According to *Acharya Sushruta*, the *Pidika* resembles like *Kantaka* of *Shalmali* tree. It is due to deranged condition of *Kapha, Vata* and *Rakta* are called as *Yuvanpidika* [25]. Detailed description regarding signs and symptoms of the *Yuvanpidika* in *Ashtanga Hridaya*. According to *Vagabhat* signs & symptoms are following (a- e)[26].

a) *Shalmali Kantakakara Pitika*- The eruption on face which looks like conical shape resembles with *Shalmali Kanta* is called as *Yuvan Pidika.*

b) *Saruja*- The eruptions are painful. The severity may vary from mild to severe.

c) *Ghana*- The word *Ghana* means solid, hard or indurated. The eruption is hard and thick. According to *kalyanakaraka* the *Pidika* is due to vitiated *Kapha*.

d) *Medogarbha* – The eruption is filled with the *Meda*. It occurs due to obstruction of the *Medogranthi*.

e) *Yuna Mukhe*- This disease usually affects in adults. This word shows the site of origin of *Pidika* and time of occurrence of the disease i.e. Disease occurs in young adults and affects the face.

f) Associated Symptoms- It includes-

1) *Vedana* - due to *vata* 2) *Kandu* - due to *kapha* 3) *Daha* - due to *pitta* 4) *Srava* - due to *kapha*

AIM AND OBJECTIVES

To evaluate efficacy of "*Jalaukavacharna"* in the management of Acne Vulgaris.

MANAGEMENT

Line of treatment – *Ayurvediya* management mainly comprises of the following:

I) Removal of causes (*Nidanparivarjana*)

II) *Samshodhana Chikitsa* [27, 28, 29]

1)*Vamana Karma*: According to *Acharya Sushuruta* in *Yuvaan pidika*, particular emesis is beneficial.

2)*Virechana Karma*: It is indicated especially to subside *Pitta Dosha* or *Pitta Sansargaja Dosha.*

3)*Nasya Karma*: *Acharya Vagbhatta* has also described this process *Mukhdushika.*

4)*Raktamokshana : Raktamokshana* is one of the best line of treatment explained in our classics, especially for *Raktaja/Pittaja* disorders.

III) *Shamana Chikitsa*

JALAUKAVACHARNA

Mukhdooshika is caused due to vitiation of *Kapha, Vata* and *Rakta Dosha*. *Acharya Charaka* has highlighted the role of *Panchakarma* therapy by stating that the disease treated by *Shodhana* will never recur in due course of time. These *Shodhana* probably may leads to certain biochemical changes responsible for the alleviation of Acne pathological process. Hence *SamShodhana (Jalaukavacharna*) therapy seems to be line of treatment. Among all the *Shodhana karma* first preference is given to *Jalaukacharna* by the physicians because of its broad spectrum applicability and simplicity with least possibility of complications. Among *Shodhanas, Jalaukavacharna* is best for the diseases of *Pitta* & *Rakta Pradoshaja vikara* which are main *dosha* of *Mukhdooshika*.

DISCUSSION

Acc. to *Acharya Sushruta, Jalaukavacharana* is the preferred method of bloodletting in *Bala*, *Nari, Durbala*, *Bhiru* and *Sukumara*[30]. As majority of patients were going to be female which comes in *Bhiru*/*Nari* category, also the major age group in which this disease occurs belongs to *Sukumara* category. *Jalaukavacharana* is indicated by *Acharyas* in *Rakta-Dushti* with *Pitta* involvement. In *Mukhadushika* also, there is primarily *Rakta-Dushti* due to *Pitta* and *Kapha*[31]. *Jalauka* removes vitiated *Rakta* from the nearby area which causes *Srotoshodhana* locally. *Due to Srotoshodhaka* property of *Jalaukavacharna* which can be assumed responsible for additional relief in pustules and *Medogarbhata* causing further reduction in no of comedones. By this *Srotoshodhana*, vitiated *Pitta* as well as *Kapha* which were residing in the blood get removed and further reducing *Kandu, inflammation* and no of papules, pustules & nodules. *Srotoshodhana* also leads to *Anulomana* of obstructed *Vata* which may be the reason for significant relief in pain. As vitiated *Pitta* imparts different colours to the skin [32]while *Raktamokshana* causes improved complexion[33], *Shodhana* of the vitiated *Pitta* and *Rakta* by *Jalaukavacharana* improves complexion. Also, it subsides the associated symptoms that were occurring due to the vitiated *Pitta* like *inflammation and discoloration.* Recent studies have reported presence of analgesic substances in leach saliva, which supports this particular effect of *Jalaukavacharana.* Leech's saliva contains a complex mixture of different biologically and pharmacologically active substances which gets secreted into the wound. Biologically active substances in leech saliva help the cells to absorb necessary nutrition and eliminate toxins[34].

Components of medicinal leech saliva and their effects in the host's body are given in the table no. 1 [35].When leeches are feeding, it is essential for them to maintain the blood in a liquid state. It is necessary to prevent coagulation at the bite site, obstruction of the deep vessels and also to prevent an increase in blood mass in their digestive tract. To ensure this, leeches secrete saliva containing a number of active substances, such as anticoagulants, platelet aggregation inhibitors, proteinase inhibitors, etc. The salivary glands are composed of 3 cell populations that cover 2 sorts of secretions: A mucous secretion, the main role of which is mechanical, to lubricate the jaws but also to ensure hydration of the stored blood. According to modern science, leech injects anti-inflammatory and bacteriostatic substances with its saliva which helps in subsiding the associated symptoms[36]. 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 present[37].

BIOCHEMISTRY OF LEECH SALIVA [38]

ANTICOAGULANTS:-

1. **Hirudin:-** This is a peptide secreted by the leech's salivary glands that is injected into the wound during sucking to prevent the blood coagulating.

a) It inactivates thrombin by taking the place of its natural substrate: fibrinogen.

b) It also acts on factor Xa, which catalyzes the conversion of prothrombin into thrombin. Hirudin has the capacity to significantly accelerate release of factor Xa from the epithelial cells. Under the action of hirudin, factor Xa is therefore dissolved in the plasma, where it is subjected to the action of its inhibitors.

There are several variants of hirudin:

HV1, which comes from the body of the leech and has no antithrombin activity.

HV2, which comes from the head and has an antithrombin activity. This is the most studied active substances in leech extracts and has been produced using a recombinant process. However, recombinant hirudin is less active than natural hirudin. The major difference between recombinant hirudin and natural hirudin is the desulphated form of the tyrosine residue in position 63; these "desulphatohirudins" are 10 times less active than natural hirudin.

2. **Platelet aggregation inhibitors:-**In plasma, platelets can aggregate under the influence of numerous substances, such as ADP, epinephrine, thrombin and collagen. Leech saliva proves to be an effective platelet aggregation inhibitor. This property might explain the fact that leeches are capable of separating the "coagulation time" and the "bleeding time". The characteristic anticoagulant effect of a leech bite is due to the hirudin secreted while the animal is feeding, although it has been demonstrated that hirudin was degraded after around 15 minutes, whereas bleeding persisted for several hours. The bleeding is thought to be a result of inhibition of platelet functions.
3. **Calin:-** This protein interferes directly with the platelet-collagen interaction but also with Von Willebrand factor and collagen. These 2 effects might contribute to inhibition of platelet adhesion.
4. **Apyrase:-** This is a phosphohydrolase that hydrolyses ATP and ADP. It is a potent anti-platelet aggregant.
5. **Collagenase:-** This enzyme splits the collagen chain. And collagen is involved in activation of platelet aggregation.
6. **A prostaglandin:-** This substance acts like prostacyclin and its analogues and has an effect on platelet aggregation by preventing the attachment and diffusion of platelets on collagen and activating the adenyl-cyclase of the platelet membranes, thereby generating an anti- aggregant substance.
7. **Proteinase inhibitors:-**

❖ **Bdellin**- This enzyme is an inhibitor of trypsin and chymotrypsin. Its action obstructs the action of hirudin on blood coagulation. There are 2 types: Bdellin A & B.

❖ **Eglin-** This is a lysosomial and bacterial proteinase inhibitor released during certain inflammatory processes, like chymotrypsin, elastase produced by human neutrophils, cathepsin G and other enzymes made by human/granulocytes. This enzyme can play a preventive role in pulmonary emphysema. The elastase/antielastase balance plays a critical role in maintaining the integrity of human pulmonary alveolar structures.

8. **Kallikrein inhibitor:-** This is an inhibitor of the coagulation factors, kallikrein and factor XIIa, which play a role in the intrinsic coagulation process.
9. **Proteinases:**

❖ **Destabilase-** This acts like an isopeptidase i.e. it liquefies soluble fibrin by lysing the ε-(γ glutamyl)- lysine bonds of fibrin stabilized by factor XIIIa in the presence of Ca2+. This enzyme therefore gives leeches the ability to lyse clots; this

is therefore no longer simply an anticoagulant process but a fibrinolytic supply process.

- **Lipase and esterase-** The salivary secretions of Hirudo medicinalis have a lipolytic capacity in order to play a digestive role with respect to the ingested blood. Two enzymes are responsible for this capacity: a lipase and a cholesterol-esterase.
- **Hyaluronidase-** Leech extract presents a diffusion factor. The enzyme responsible for this activity is a strict endo-β-glucuronidase with hyaluronic acid as the only substrate. This enzyme, hyaluronidase, degrades hyaluronic acid, thereby increasing the diffusion of all the active substances inoculated by the annelid's bite.

10. **A vasodilator substance:-** This is a substancesimilar to histamine that is thought to play a role vasodilator during sucking.
11. **An anaesthetizing substance:-** The fact that leech bites are practically painless suggests the presence of anaesthetizing substances, although this has not been demonstrated.

Table 1:

Active Substance	Effect on the Host
Hirudine	Inhibits blood coagulation by binding to thrombin
Calin	Inhibits blood coagulation by blocking the binding of Von WIllebrand factor to collagen. Inhibits collagen mediated platelet aggregation.
Destabilase	Monomerizing activity, Dissolves fibrin, Thrombolytic effect
Hirustasin	Inhibits Kallikrein, trypsine, chymotrypsine and neutrophilic cathepsin G
Bdellins	Anti inflammatory, Inhibits trypsine, Plasmin, Acrosin
Hyaluronidase	Increases intestinal viscocity, Antibiotic
Leech derived tryptase inhibitor(LDTI)	Inhibits proteolytic enzymes of host mast cells
Eglins	Anti inflammatory, Inhibits the activity of Alpha chymotrypsine
	Chymase substilicin, Elastase, cathepsin G
Factor Xa inhibitor	Inhibits the activity of coagulation factor Xa by forming equimolar complexes
Complement inhibitors	May possibly replace natural Complement inhibitors if they are deficient
Carboxypeptidase A inhibitor	Increases the flow of blood at bite site
Histamine like substances	Vasodilator, Increases the flow of blood at bite site
Acetylcholine	Vasodilator
Anesthetic substances	Anesthetic

CONCLUSION

It can be concluded that *Jalaukavacharna* which is efficiently decreases the clinical symptoms, controls infection, hastens the healing process can be recommended in the management of Mukhdooshika (Acne vulgaris).

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