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Vyanga, Present-day Challenge: Insights from Toxicological Standpoint

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Abstract

The condition of Vyanga can have significant repercussions, as facial disfigurement not only impacts an individual's psychological and social well-being but also hampers their overall contribution to society. This can result in reduced productivity, impaired social functioning, and diminished self-esteem. In classical Ayurvedic texts, Vyanga is categorized under Kshudrarogas, representing minor disorders with straightforward causes and symptoms. However, in certain instances, these conditions can lead to noticeable cosmetic impairments, causing considerable psychological distress. Vyanga presents as a distressing affliction that undermines an individual's potential, necessitating definitive treatment as a recognized disease. Addressing Vyanga is crucial to alleviate the associated psychological burden and enable affected individuals to lead fulfilling lives with restored confidence and social integration. Consequently, effective interventions aimed at managing Vyanga not only enhance the individual's quality of life but also contribute to the well-being of society as a whole. Therefore, prioritizing the recognition and treatment of Vyanga as a medically significant condition is imperative to address its multifaceted impacts comprehensively.

Keywords: *Vyanga*, *Kshudrarogas*, cosmetic, facial lesions, psychological

INTRODUCTION

In India, 20–30% of women between the age group of 25 and 60 years comes with a complaint of facial melasma. Sometimes, *Vyanga* may result in a marked cosmetic disability and gives rise to further psychological stress, which affects potential of person. Hence, there is a clear requirement for disease treatment. In modern science, there are many treatments available like medicinal-sunscreen and local applications like (hydroquinone, tretinoin, steroid), surgical peeling, etc., which can give temporary relief but there is too much possibility of recurrence. All the above alternative mentioned have their own limitations like local application may cause itching, pain and surgical peeling may cause scar or inflammation and are costly too. The complication of modern cosmetics drugs and being costlier in therapy made the society to approach ancient system of medicine i.e., Ayurveda.

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So, there is a need to find out noninvasive, effective, easy to use and cost-effective medicine. Here an attempt is made to review and summarise all available data on disease in such a way, it becomes easy to understand the disease thoroughly.

AIMS AND OBJECTIVES

To elaborate *Vyanga* in detail.

General Review

Vyanga

Melasma described in modern medicine can be compared with *Vyanga* of ayurvedic disorder, which comes under "*Kshudrarogas*" (minor

ailments). The word *Vyanga* is derived from "*vi* + *aṇga*" which means ('*vi*' means *vikṛta*, *vigata*, *vikala*) *vikṛta anga*. We can find description of *Vyanga* in almost all the available Ayurvedic classical books. *Kshudrarogas* are the group of minor pathological disorders which have *alpa rupa*. They are also known as *Swalpa*, *Adhama* or *Krura Vyadhi*.

Vyaṅga is one of disease, which is explained under *Swalpa* variety of *Kṣhudraroga*. The literal meaning of word *Vyaṅga* is spotted, speckled, freckles on the face, a blot or blemish.

We find description of Vyaṅga in all the *bṛhattrayī*. We find detailed and separate description of *Vyaṅga* in the chapter of '*Kṣhudraroga*' in Suśruta Saṁhitā which is mentioned with clear *nidāna, lakṣaṇa, samprāpti* and *sāpekṣa nidāna.*

Both Charaka Saṁhitā [1] and Suśruta Saṁhitā [2] have explained it as one of the '*Raktaja Roga*' and there is description of a common *samprāpti* for *Tilakālaka, Piplu, Vyaṅga* and *Neelikā* in *Triśothīya Adhyāya* has been given.

We also find elaborate description of *Vyanga* in *Astaṅga Hṛdaya* [3] *Uttaratantra*, under the '*Kṣhudraroga Prakaraṇa*'. Here *Dośānusāra Lakṣaṇas* of the disease are explained in detail.

We also find description in *Madhyakāla, Madhava Nidāna, Śarangadhara Saṁhitā* [4], *Cakradatta* [5], *Bhavaprākāśa* [6], *Yogaratnākara* [7] in the context of *Kṣhudraroga*.

We did not find specific causes of *Vyanga in* Charak Samhita. As per acharya Charak, *pitta* vitiation is main cause of *Vyanga*. *Krodha* and *aayasa* are the causes of *Vyanga* as per Susruta Samhita. *Madhava Nidan* [8] and *Yogaratnakara* also favour Susruta's point of view. *Soka* and *krodha* are the main causes for *Vyanga* as per Vagbhatta [9].

Sign and Symptoms of *Vyanga*

Vyanga lesion occurs in form of thin, grey coloured circular patch which occurs in facial region *Vyanga* is painless as per acharya Susruta. We did not find any specific *rupa* of *Vyanga in* Charak Samhita. Due to influence of *vayu*, *Vyanga* becomes hard, rough, and grey; and its surrounding becomes red or blue due to involvement of *pitta*; and when it is affected by *kapha*, it becomes white with itching; involvement of *rakta* makes it red or coppery coloured in surrounding and possesses burning and pricking.

Pathophysiology of *Vyanga*

According to Charaka, when imbalanced *pitta* dries within the blood vessels of the skin, it leads to the manifestation of conditions such as *Tilakalaka, Piplu, Vyanga*, and *Neelika*. But Susruta opinions described aggravation of *vayu* by anger and physical exertion along with involvement of *pitta* suddenly produces a thin, grey coloured circular patchy lesion, when it gets settle on the face.

There is involvement of second layer of *twaka* i.e., *lohita* in *Vyanga.* Vagbhatta suggests that the combination of *vayu* and *pitta* results in the formation of a light, greyish circular patch on the face. It becomes hard, rough, and grey due to involvement of *vayu;* and it becomes red or blue due to *pitta*; and involvement of *kapha* makes it white with itching. Involvement of *rakta* makes the lesion red or coppery coloured in surrounding and possesses burning and pricking.

Treatment of *Vyanga*

Yuktivyapashraya chikitsa is a treatment choice in *Vyanga*. *Raktamokshana* is considered as first line of treatment in affected part. *Lepa* should be applied after rubbing the lesion. *Samsamana chikitsa* should be indicated with some classical ayurvedic formulations orally. *Samsodhana chikitsa* was also consider four types of medicated *ghrita* preparations to have orally for the treatment of *Vyanga* in

Samsamana chikitsa, is explained in classics. Herbs like *haridra, peet chandhan, vata* and *kapitha* are mentioned to cure *Vyanga* in the classics.

Samprapti of *Vyanga* involves vitiated *bhrajaka pitta, kapha* and *vata dosha* in *rasa-rakta vaha srotus* leading to *syavatwam,* due to this the *prakopita bhrajaka pitta* gets deposited below the skin layers i.e., epidermis.

Because of presence of *tikta rasa* of *daruharidra, manjistha, kustha, peet chandhan, haridra, rakta chandhan, chakshushya, kamala* and *usna virya* of *daruharidra, manjistha, kustha, haridra*, it passify *vata dosha* along with stimulation of *bhrajaka pitta*, which further help in scrapping of the rough, thick, black dark layers formed on the skin.

The *laghu guna* of *daruharidra, kustha, peet chandhan, haridra, tinduka, chakshushya* and *tikshna guna* of *kustha, usna virya of daruharidra, manjistha, kustha, haridra* and *katu rasa* of *kustha, haridra* not only clears the channels but also helps the *bhrajaka pitta* and which further facilitates free movement of *bhrajaka pitta* on to the skin and *bhrajaka pitta* is responsible for *varna, chayya* and *prabha*. So, free movement of *bhrajaka pitta* will result in healthy looking skin.

Bhrajaka pitta can be correlated closely with melanin. It is a pigment which imparts colour to the skin.

CHEMICAL CONSTITUENTS FOUND IN THE DRUGS THAT MIGHT HAVE ROLE IN REDUCING MELANIN CONTENT

Flavonoids Found in *Kamala Beeja, Plaksha*

Flavonoids, which possess antioxidant and calming properties are frequently employed in cosmetics due to their multi-active nature. Because of its antiradical properties, it acts on skin in best way. Depletion of vitamin C concentration in skin occurs mainly due to free radicals. Further Vitamin C decomposition is prevented by flavonoids due to its strong anti-radical activity.

Liquorice Found in *Madhuyasti*

Liquorice (*Glycyrrhiza glabra* L): Liquorice extracts contains a wide range of bioactive natural products. Glycyrrhizin, one of major content is a triterpene-type saponin, which has antiviral, anti-inflammatory, antitumor and antimicrobial properties. Skin injuries caused due to oxidative stress can be prevented by extract of liquorice roots. The hydrophobic portion of liquorice extract is known as glabridin and it inhibits the tyrosinase activity in cultured B16 melanoma cells without disturbing the synthesis of DNA at concentration which ranges from 0.1 to 1.0 μg/ml. Other active compounds such as glabrene, isoliquiritigenin, licuraside, isoliquiritin and licochalcone isolated from liquorice extracts that inhibit tyrosinase activity. Glabridin have potentially activity in cosmetic products due to antioxidant, estrogenic, anti-inflammatory and skin-whitening agent. It is also incorporated in topical products due to its skin depigmentation activity. Liquiritin has no effect on the tyrosinase activity and further causes depigmentation. Studies demonstrate that using 20% liquiritin cream at a dosage of 1 g per day for a duration of 4 weeks effectively treats melasma.

Polyphenols Found in *Haridra* and *Daruharidra*

Polyphenols are plant-derived compounds naturally present in various plant-based foods such as fruits, vegetables, nuts, seeds, flowers, and bark. Apart from possessing antioxidant properties, polyphenols also exhibit the ability to hinder melanogenesis. Their antioxidant capabilities surpass those of vitamin C or E in aqueous environments. Polyphenols restrain the proliferation of melanocytes and the production of melanin by inhibiting tyrosinase synthesis in melanocytes.

Antioxidant

It was also observed that all the drugs used in the medicine were having chemical compounds that show powerful antioxidant activity. Prolonged exposure to UV radiation induces oxidative stress,

activating the melanogenesis process. Antioxidants play a pivotal role in minimizing hyperpigmentation issues by combating the oxidative cellular stress caused by the accumulation of harmful hydrogen peroxide (H_2O_2) and reactive oxygen species (ROS) in the skin. These accumulated ROS further stimulate melanogenesis by interacting with the tyrosinase enzyme. Therefore, antioxidants are essential not only for controlling but also for reducing the formation of free radicals in the skin through scavenging and neutralizing them, as well as promoting the degradation of free radicals. Additionally, antioxidants have the potential to reduce hyperpigmentation conditions by interacting with o-quinones present in melanin intermediates and chelating copper ions at the active site of the tyrosinase enzyme.

By inhibition of hyperpigmentation and by down regulating UV, antioxidant induces melanogenesis prior to further tyrosinase gene transcription. The most common phytochemicals such as flavonoids, vitamin C and vitamin E that exhibit antioxidant properties in the prevention of melanogenesis.

Vitamin C from *Kamala*

Other natural antioxidant such as Vitamin C or ascorbic acid prevent skin hyperpigmentation problem via regulation of signalling factors such as UV radiation. These are common content in most of cosmetic products. Vitamin C serves as a safe and efficient antioxidant agent for skin brightening purposes. Research indicates that its antioxidant properties are demonstrated by reducing melanin intermediates during the oxidation process in melanogenesis, such as L-DOPA. When tyrosinase oxidizes L-DOPA to L-Dopaquinone, the conversion of melanin intermediates to melanin is hindered, thus reducing melanin production. Additionally, vitamin C aids in neutralizing harmful reactive oxygen species (ROS) generated in the skin after UV exposure by binding to copper ions in the tyrosinase active site, thereby suppressing tyrosinase enzyme activation and ultimately inhibiting melanin production. A study involving healthy female volunteers over a six-month period demonstrated significant skin improvement with the application of 5% vitamin C.

Vitamin B Found in *Kamala*

Niacinamide, another frequently used natural skin brightening component in cosmetics, is the active form of niacin (Vitamin B), naturally occurring in yeast and certain vegetable roots. It works by limiting the transfer of melanosomes from melanocytes to keratinocytes, thereby reducing skin hyperpigmentation. Consequently, only a minimal amount of melanin-containing melanosomes will be transferred and deposited in keratinocytes.

MODERN CONCEPT

Melanin

Melanin is a pigment found in layer of skin which is mainly responsible for colour of skin. In humans, melanin is the primary determination of skin colour. It is also found in hair. It has variety of functions like-

1. Protection of the tissue
2. Gross colouration of the animals

The disorder of melanin pigmentation has two types:

1. *Hypermelanosis*: In this condition, there is increased amount of melanin pigmentation in the skin which appears brown or black colour in the appearance.
2. *Hypomelanosis*: In this condition, there is a lack of melanin pigmentation in the skin, which appears white or lighter than the normal colour.

In the disease melasma, there is dark brown or black colour of the skin which is due to hyper melanosis in the skin.

MELASMA

Etiology and Pathogenesis

Etiology and pathogenesis refer to the origins and mechanisms underlying the development and progression of a disease, respectively. Understanding both aspects is crucial in medical research and clinical practice as they provide insights into how diseases arise and evolve within the body.

"Etiology" explores the various factors or agents that contribute to the onset of a disease. These factors can be diverse, including genetic predispositions, environmental exposures, infectious agents, lifestyle choices, and immunological factors. Identifying the etiology of a disease helps healthcare professionals to implement preventive measures and develop targeted treatments.

On the other hand, "pathogenesis" delves into the intricate processes by which a disease unfolds and manifests in the body. It involves the sequence of events from the initial trigger to the development of symptoms and complications. Pathogenic mechanisms can encompass a range of biological processes such as inflammation, immune responses, cellular dysfunction, tissue damage, and organ dysfunction. Understanding the pathogenesis of a disease enables clinicians to better predict its course, diagnose it accurately, and design effective therapeutic strategies.

In summary, etiology and pathogenesis are fundamental concepts in medicine that shed light on the causes and mechanisms of diseases. By elucidating these aspects, healthcare professionals can enhance their ability to prevent, diagnose, and treat various medical conditions, ultimately improving patient outcomes and quality of life.

Exposure to Sunlight

When person is exposed in sunlight, then because of UV radiation, there is formation of more melanin pigment by process of Melanogenesis, which result in activation of tyrosinase and many of the melanosomes appear within melanocytes. So due to exposure to sunlight, melasma appear more and comparatively less in winter.

Pregnancy Induce Melasma

Prevalence of melasma nowadays is more in pregnancy due to increased level of MSH (Melanocyte Stimulating Hormone) causes more stimulation of melanocytes and due to increase in progesterone and estrogen hormone in pregnancy, the percentage of occurrence is more.

Hormonal Therapy

Melasma can occur due to progesterone and estrogen containing oral contraceptive pills. Also in hormonal replacement therapy, due to increase in progesterone hormone there is increase in pigmentation. So, incidence of melasma is more in females taking contraceptive pills.

Cosmetic

The various soaps and powders containing tar, hydrocarbon derivatives like benzene, etc., has important role in phototoxic mechanism.

Medications

The patient who taking phenytoin/mephenytoin (antiseizure medicines) leads to increased pigmentation which causes melasma.

Genetic

The genetic predisposition is one among the various cause of melasma.

Treatment

1. Sun Protection: Use sunscreen or cover the face with cloth while going outside to the house.
2. Avoid use of strong soaps or other face cleaners which contain chemicals.
3. Many bleaching creams contains hydroquinone which inhibits formation of new pigment.
4. Laser resurfacing is sometimes worthwhile but should be performed cautiously as it can aggravate pigmentation.
5. Local application – Hydroquinone (2–4%), Tretinoin cream, Steroid (Hydrocortisone) chemical peeling, intense pulse light and fractional laser, discontinue hormonal contraception.

DISCUSSION AND RESULT

The face is a crucial and frequently exposed area of our anatomy. It is also a prime organ of individual personality. As face is the "Organ of Emotion" and it is a channel to identify. People are more concerned for the complexion of face. Importance is given to colour of skin in terms of biologically, cosmetically, and socially. Melanin is the main factor for the maintenance of skin colour. Melanin provides protection to the skin from harmful effects of UV and other ultraviolet components in atmospheric light, over production of melanin pigment causes the disease melasma. Diagnosis of psoriasis is usually based on the appearance of the skin.

CONCLUSION

Vyanga comes under *Kshudraroga* in Classical Ayurvedic Science. The causative factors of *Vyanga* highlight psychological elements such as anger (*Krodha*), grief (*Shoka*), and exhaustion (*Shrama*), among others, mirroring observations in conventional medical practice. Acharya Charaka has indicated that the primary trigger for the onset of the condition lies in the aggravation of *pitta* and *rakta*, as elucidated in its pathogenesis.

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