Case Report on *Vyanga* with specific reference to Melasma – change in MASI Score treated with Shashtika Sali Sweda

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Abstract: Introduction: Vyanga, commonly referred to as "hyperpigmentation" in modern medical terms, is a skin condition characterized by darkened patches, primarily affecting the face. Melasma to which Vyanga is often correlated is generally harmless and does not cause physical discomfort, but it can affect self-esteem and confidence. Rooted in ancient Ayurvedic texts, this condition is often viewed through a holistic lens, integrating physical, emotional, and environmental factors. In Ayurveda, Vyanga is linked to an imbalance in the body's doshas (Vata, Pitta, and Kapha). It is primarily associated with an excess of Pitta dosha, which governs metabolism.

Case report detailing about a 47year old female presented with the clinical features of Vyanga. She has been treated with external therapies like Shashtika Sali Avagundana Sweda with varnyagana ksheerapaka. The case was assessed pre and post treatment with MASI scoring and found significant changes.

Conclusion:Vyanga is more than just a cosmetic concern; it reflects an imbalance within the body. By understanding its causes and adopting a holistic approach to treatment, individuals can work towards restoring balance and improving their skin health. Integrating Ayurvedic practices with modern skincare can lead to effective management of this condition, promoting not only clearer skin but also overall well-being.

Key words: Vyanga, Melasma, Hyperpigmentation, Ayurveda, Panchakarma

INTRODUCTION

Vyanga is a term used to describe various skin conditions, primarily pigmentation issues which is painless, thin and blackish discolorations[1]. It is particularly noted in Ayurveda as being caused by the accumulation of Pitta dosha in the skin, often in conjunction with Vata imbalance[2]. Excessive heat (Pitta) and dryness (Vata) can disrupt the natural health of the skin, leading to the appearance of discoloration and blemishes.

According to classical Ayurvedic texts such as Sushruta Samhita[3] and Ashtanga Hridaya[4], excessive physical or mental stress, including excessive work and anger, are significant contributors to the imbalance of Vata and Pitta doshas which result to this disease. These imbalances, when they accumulate and localize in specific regions of the body, can manifest as various skin disorders, including Vyanga (pigmentation, typically referred to as spots or blemishes on the face). Vata is associated with movement, dryness, and the coarseness of the body. When Vata becomes aggravated (due to overexertion, stress, or emotional imbalance like anger), it can cause dryness, roughness, and a loss of moisture in the skin[5]. It may also lead to imbalances in circulation, affecting the appearance and health of the skin. Pitta governs metabolism, transformation, and heat in the body. When Pitta is aggravated (due to excess heat, anger, or excessive work), it can lead to inflammation, redness, or burning sensations in the skin. Pitta imbalances are often linked to conditions such as acne, rashes, and pigmentation disorders[6]. In Ayurvedic pathology, when doshas (Vata, Pitta, or Kapha) are aggravated, they can move from their normal locations and localize (Sthansanshray) in specific areas of the body. Sthansanshray indicates that the doshas, when out of balance, settle in a specific tissue or organ, leading to a localized manifestation of the disorder[7]. When Vata and Pitta are disturbed, they can localize in the face and cause skin problems, including Vyanga (which

manifests as dark spots, blemishes, or uneven pigmentation). Vagbhata and Sushruta mentions Nasya, Raktamokshana, and lepa treatment for Vyanga[8]. Administration of sheeta virya and ushna virya dravyas are told to be beneficial as per dosha dominance.

Melasma otherwise known as chloasma is a condition which typically resembles the clinical presentation of Vyanga in Ayurveda. Melasma is indeed a common dermatological condition characterized by the appearance of dark, pigmented patches on the skin, primarily on the face. These patches are usually brown or gray-brown in color and typically appear on areas that are most exposed to the sun, such as the cheeks, forehead, upper lip, nose bridge, and chin[9]. While melasma can affect both men and women, it is notably more prevalent in women, especially during periods of hormonal fluctuation. Common factors contributing to melasma are hormonal fluctuations, pregnancy, intake of contraceptives or other hormonal therapies, exposure to sun rays and even genetic predisposition can also contribute to its manifestations[10].

Hormonal Changes: Pregnancy: One of the most common causes of melasma is pregnancy, a condition that leads to hormonal changes that can trigger hyperpigmentation. Oral Contraceptives & Hormonal Therapy: These hormonal treatments alter estrogen and progesterone levels, which can stimulate melanin production in the skin, leading to pigmentation. Other conditions or treatments that cause hormonal fluctuations, such as disorders like polycystic ovary syndrome.

Sun Exposure: UV Exposure: The Ultraviolet radiation stimulates melanocytes (cells that produce melanin) in the skin, leading to an increase in pigmentation. In addition to direct sun exposure, melasma can also be aggravated by light from other sources, such as fluorescent lighting or indoor light, though the effect is much less significant than sun exposure.

Genetic Predisposition: Family history plays a role in melasma. Individuals with a close relative who has had melasma may be at a higher risk of developing the condition.

Skin Type: Melasma is more common in individuals with darker skin tones (Fitzpatrick skin types IV to VI), as their skin produces more melanin, making them more prone to developing pigmentation issues. However, melasma can affect people with lighter skin as well.

Other Factors: Medications: Certain medications, especially those that make the skin more sensitive to sunlight, can also trigger melasma. For example, drugs like some antibiotics and anti-seizure medications may increase the risk. Emotional stress is thought to potentially exacerbate melasma, though its role is less well understood than the hormonal and environmental factors.

Clinical Picture: The primary symptom of melasma is the appearance of irregular, brownish patches on the skin. These patches are usually symmetrical, often appearing on both sides of the face. Melasma is typically diagnosed through a visual examination by a dermatologist. In some cases, a Wood's lamp (a specialized light) may be used to assess the depth of pigmentation in the skin[11].

The melasma area severity index (MASI)[12] score is calculated by assessment of three parameters: Area (A), darkness (D), and homogeneity (H) of involvement where in forehead (f) constitutes 30%, right malar region (rm) 30%, left malar region (lm) 30%, and chin (c)-10%]. The MASI score is calculated by adding the sum of the severity ratings for darkness and homogeneity, multiplied by the value of the area of involvement, for each of the four facial areas. The total score range is 0–48. Higher the score, higher is the severity. A numerical value assigned for the corresponding percentage area involved is as follows: 0=no involvement; 1=< 10% involvement; 2=10-29% involvement; 3=30-49% involvement; 4=50-69% involvement; 5=70-89% involvement; and 6=90-100% involvement. The darkness of the melasma (D) is compared to the normal skin and graded on a scale of 0 to 4 as follows: 0=normal skin color without evidence of hyperpigmentation; 1=barely visible hyperpigmentation; 2=mild hyperpigmentation; 3=moderate hyperpigmentation; 4=severe hyperpigmentation. Homogeneity of the hyperpigmentation (H) is also graded on a scale of 0 to 4 as follows: 0=normal skin color without evidence of hyperpigmentation; 1=specks of involvement; 2=small patchy areas of involvement < 1.5 cm diameter; 3=patches of involvement> 2 cm diameter; 4=uniform skin involvement without any clear areas).Treatment options include protection of skin from exposure of harmful sunrays or even it is one among the most crucial step in managing melasma. Daily use of broad-spectrum sunscreen

(SPF 30 or higher) is essential to prevent further pigmentation. Topical treatments: useful in the condition are a) Hydroquinone - A common bleaching agent that can help lighten dark patches, b) Retinoids: These vitamin A derivatives promote skin cell turnover and can improve melasma. c) Azelaic acid- Known for its anti-inflammatory and skin-lightening properties, d) Kojic acid - Another skin-lightening agent that can reduce melanin production. Chemical Peels: Superficial peels using glycolic acid or other agents can help exfoliate the skin and reduce pigmentation. Laser Treatments: Various laser therapies can target and break down melanin in the skin. However, caution is required, as some lasers may worsen pigmentation in darker skin types. Microneedling: This procedure can promote collagen production and improve the appearance of melasma over time.

AIMS AND OBJECTIVES

To evaluate the effect of Ayurvedic treatment protocol in Vyanga

MATERIALS AND METHODS: This female patient of 47 years walked in to the OPD with the complaints of discolouration over the face since 5 years. She was asymptomatic before 5 years started noticing irregularities in complexion of face with distinct blackish discolouration over forehead, malar area of both sides and around chin. Along with that she started noticing a few blackish macules of 1-2 cm over face. She had used some topical applications and cosmetic products but found not much relief in the condition. Instead she started feeling burning sensation over the face on applying anything. Her bowel movements altered extensively depending on the nature of food. Patient came to the OPD of Mangalayatan Ayurveda Medical College Hospital, Aligarh. O/E blackish discolouration over malar area, around chin, forehead and on either side of nose. Nadi-Vatapaittika, Bowel-irregular, Tongue-Coated, Sparsha- Ushna Natiruksha.

Internal Regimens: Only pathyas were advised such as intake of freshly prepared food; include more fibers and vegetables in diet, light food, vegetables with bitter taste. And to avoid jaggery, fish and meat items, fermented food and drinks.

Treatment Protocol: Shashtika Sali Avagundana Sweda and mukhabhyanga with murivenna oil[13]. Abhyanga for face and neck was done for 15 minutes and Shashtika Sali Avagundana Sweda was done for 30 minutes daily for five days from 18/09/24.

Shashtika Sali Avagundana Preparation: 30 g of Shashtika rice boiled and cooked in Varnyagana ksheerapaka[14]. Varnaygana ksheerapaka is made in the ratio of 1part of powdered medicines to eight part of water and eight part of milk. This is boiled till milk part only remains.

Sl No	Drug	Scientific Name
1	Chandana	Santalum album
2	Tunga	Calophyllum inophyllum
3	Padmaka	Prunus cerasoides
4	Usheera	Vettiveria zizanoides
5	Madhuka	Glycyrrhiza glabra
6	Manjishta	Rubia cordifolia
7	Sariva	Ipomea paniculata
8	Payasya	Hemidesmus indicus
9	Sita	Cynadon dactylon
10	Lata	Cynadon dactylon

Result: During the course of five days of treatment the patches seems fading and there is improvement in the overall skin tone and texture of skin. Blackish patches over forehead, malar areas, nose and chin got faded. Skin become soft and supple after treatment. Bowel pattern also seems improved with good signs of digestion and proper appetite. It was advised to continue the pathyas for one month after the treatment. During the follow up period of one month skin tone and texture got maintained. During the assessment scattered pigmentation were avoided. Informed consent were taken for the photograph and publication of the medical history.

MASI SCORE PRE AND POST TREATMENT

	Area Involvement (A)		Darkness(D)		Homegeneity(H)	
	BT	AT	BT	AT	BT	AT
Forehead	6	3	3	1	3	1
Left Malar	6	3	3	1	3	1
Right Malar	5	3	3	1	3	1
Chin	5	3	3	1	3	1

MASI score before treatment is 33.6 and after treatment is 6.

DISCUSSION

Vyanga being a twakgata vikara with the predominance of vata pitta dushti need to be addressed with nidana parivarjana, doshapratyanika and dhatuposaka chikitsa. Varnyagana drugs are used in this treatment protocol as bahiparimarjana chikitsa. In Ayurveda, Bhrajaka Pitta plays a critical role in the functioning of the skin, particularly in relation to the absorption and processing of external substances, such as medicated oils or powders, which are applied during treatments like abhyanga (oil massage), Parisheka (pouring liquids), Avagaha (immersion), and Lepa (applications of pastes[15]).

Bhrajaka Pitta and its role in absorption: Bhrajaka Pitta is a subtype of Pitta dosha localized in the skin. It governs the transformation and absorption of substances applied externally. When medicaments (such as oils, herbal pastes, or other treatments) are applied to the skin, Bhrajaka Pitta processes and absorbs these substances into the body through the skin's numerous pores.

Pores and Roma Koopa (hair follicles): The skin is covered with countless tiny pores, each associated with a Roma Koopa (hair follicle). These pores serve as channels through which substances (like sweat, oils, and medicinal herbs) are carried in and out of the skin. Bhrajaka Pitta influences the function of these pores by controlling the movement of Rasa Dhatu (the plasma or nutritive fluid of the body), which nourishes the skin and other tissues[16].

Nourishment and illumination of complexion: Bhrajaka Pitta not only helps in the absorption of medicaments but also plays a role in the nourishment of the skin, impacting the complexion. By interacting with the Rasa Dhatu, it helps maintain skin health, improving its tone, texture, and luster. This is why the role of Bhrajaka Pitta is often emphasized in Ayurvedic treatments aimed at enhancing skin health and beauty.

Paka (transformation): When medicated substances are applied externally, they are absorbed and undergo a process of Paka (maturation or transformation) under the influence of Bhrajaka Pitta. This process ensures that the substances interact properly with the body's tissues, providing the desired therapeutic effects, such as soothing, detoxifying, or nourishing the skin[17].

As per Ayurvedic pharmaco-therapeutics medicinal substances applied externally can enter the body and exert their effects is rooted in the understanding of Sira mukha (the opening or mouth of the siras or blood vessels), as well as the properties and potency (Virya) of the drugs used[18].Sira mukha refers to the openings or mouths of the siras (the blood vessels or channels through which the blood circulates). The skin has many pores, sweat glands, and hair follicles (roma koopa), which are closely associated with the circulation of rasa dhatu (the lymph or plasma), and sira mukha refers to the potential entry points of medicinal substances into the bloodstream. These pathways are seen as channels through which dravyas (medicinal substances) can enter the circulation. Virya in Ayurveda refers to the potency or strength of a medicinal substance[19], which determines how effectively it can interact with the body. The substances can influence various Dhatus (tissues) and organs, depending on the nature of the drug and its Virya. For instance, heating drugs may stimulate the body's metabolism, while cooling drugs may act as anti-inflammatory agents and pacify excess heat in the body.madhura (sweet), tikta (bitter), and Kashaya astringent) are the primary rasas (tastes) associated with the drugs used in this protocol. Madhura(sweet) rasa is often associated with soothing and nourishing qualities[20]. It is known to have a calming effect on Vata and Pitta doshas, especially when used externally. It also helps to promote skin regeneration and healing. Tikta(bitter) rasa has a cooling effect and is often used to reduce heat and inflammation. It is effective in pacifying Pitta and can be particularly useful in conditions like acne or Vyanga, where excess heat is a contributing factor. Kaṣhaya (Astringent) taste is drying and is useful for Vata and Pitta imbalances[21]. It can help tighten tissues and absorb excess moisture or oil, which is beneficial in cases of Pitta-dominated skin issues like Vyanga or pigmentation disorders. Laghu (light) and Ruksha (dry): These properties are characteristic of Agneya Dravyas (substances that stimulate digestion or metabolic activity). Laghu and Ruksha properties help enhance the Prabha (radiance) and Prakasa (brightness) of the skin by reducing excessive moisture or oiliness and stimulating the body's metabolic processes. These properties balance each other to improve the skin's Varna (complexion) and Prabha (radiance). The term Twachi Vipakva means that the medicinal

properties of the drugs, after being absorbed into the system (through the skin's Sira Mukha or pores), have a positive effect on the skin, improving its texture, tone, and appearance. The Vipaka is responsible for the drugs' deeper action in the body, leading to an improvement in skin health and the reduction of conditions like Vyanga[22]. In short bahi parimarjana treatments in Ayurveda are designed to restore balance to the skin by utilizing specific Rasas (tastes), Gunas (qualities), and Virya (potency) of the drugs. These Rasas work synergistically to Chhedana (cut off or reduce) of the Prakupita (vitiated or aggravated) Vata and Pitta doshas, which are often the root causes of Vyanga. The Chhedana action refers to the process of alleviating the imbalances and preventing them from further aggravating the skin condition. By doing this, the external application ensures that Utklesha (agitation or disturbance) of the doshas is prevented, maintaining their equilibrium and restoring balance to the skin.

By choosing herbs with Madhura (sweet), Tikta (bitter), and Kashaya (astringent) tastes, the treatment addresses the root causes of Vyanga, which is often linked to Pitta imbalance. Shita Virya drugs, combined with their Madhura Vipaka, help soothe and nourish the skin, enhancing complexion, and reducing pigmentation. The medicinal properties are absorbed through the skin's Sira Mukha and enter the bloodstream, where they act on the skin and overall health, promoting a clearer, more vibrant complexion. There is effect of prakruti also in the pathogenesis of Vyanga with prevalence in Pittavata patients followed by Vatapitta[23]. The skin consists of three primary layers: the epidermis, dermis, and hypodermis (subcutaneous layer). These layers and their components contribute to the metabolism of topically applied substances in different ways. Viable epidermal cells beneath the stratum corneum are metabolically active and contain various enzymes that can alter the chemical structure of compounds applied to the skin[24]. The epidermis contains high levels of enzymes such as cytochrome P450s, esterases, and glucuronyltransferases. These enzymes can modify compounds by processes such as oxidation, hydrolysis, glucuronidation,
and sulfation, which can either activate or deactivate the compounds, depending on their structure and the metabolic pathways involved. Skin penetration can be achieved by hydration, anatomical location, lipid solubility and temperature regulation[25]. The dermis contains a rich supply of blood vessels, nerve endings, and lymphatics. The dermal component is also where lipophilic (fat-soluble) compounds can accumulate, which may impact the rate and extent of absorption. Damaged or inflamed skin may have increased permeability, allowing for greater absorption of drugs. Well-hydrated skin is more likely to absorb topically applied compounds, and hydration can influence enzyme activity, which in turn affects the metabolism of substances. Varnyagana group contains drug which helps in tyrosinase inhibition by interfering in melanogensis pathway[26].Reduction in quantitative values in MASI score also substantiate the result. Thus with the milk based Varnya gana formulation used for local sudation procedure (Avagundana) make a conducive atmosphere for the mode of action of this therapy over vyanga.

CONCLUSION

Vyanga is more than just a cosmetic concern; it reflects an imbalance within the body. By understanding its causes and adopting a holistic approach to treatment, individuals can work towards restoring balance and improving their skin health. Integrating Ayurvedic practices with a viable diet regulation can lead to effective management of this condition, promoting not only clearer skin but also overall well-being.

REFERENCE

[1] Vaidya Jadavaji Trikanji edited,Agnivesa, Charaka Samhitha revised bycharaka and Dridhabala, with the Ayurveda-Dipika Commentary. Edition reprint 2013. Varanasi: Chaukambha Prakashan: 2013. P. 107
[2] Vaidya Jadavji Trikamji edited, Susrutha Samhitha with Nibandha Sangraha commentary by Dalhana. 7th. Varanasi:Chaukhambha Orientalia; 2002. P. 324
[3] Kaviraja Ambikadatta shastri, Sushruta Samhita, Chikitsa sthana, Ksudraroga chikitsa adhyaya 20/33, Choukamba Sanskrit samsthan, Varanasi, 2003, 14th Edition, P-44
[4] Pdt. Harish shastri, Astanga Hrudaya, Uttara tantra, 13/29, Krishnadas Ayurveda series, Varanasi, 2000, 2nd edition, P- 889

[5] Bijita Majumder, Sukalyan Ray, Studies on functions of vata dosha- a novel approach, Int. J. Ayur. Pharma Research, 2022;10(Suppl 2):117-124

[6] Dr. Abhijit Ankush Nikam , Dr. Nilesh Dileeprao Deshmukh ,Dr. Vikram Shelak, physiological and pathological role of doshas and their combinations, wjpmr, 2022, 8(2), 129 – 131.

[7] Vaidya Jadavaji Trikamaji Acharya, Sushruta Samhita of Sushruta with Nibandhasamgraha Commentary 9th edition 2007, Choukhamba Orientalia, Varanasi, p106.

[8] Acharya Yadavaji Trikamaji Suśŗta Samhitā with Dallaṇa Tīkā, (ed), Chaukhamba Prakashana, Varanasi; 2004. Chapter no.13, Nidansthana, Verse no.43-45.

[9] Basit H, Godse KV, Al Aboud AM. Melasma. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459271/

[10] Basit H, Godse KV, Al Aboud AM. Melasma. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan

[11] Al Aboud DM, Gossman W. Wood's Light. [Updated 2023 Aug 28]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan

[12] Amit G. Pandya, Linda S. Hynan, Rafia Bhore, Fransell Copeland Riley, Ian L. Guevara, Pearl Grimes, James J. Nordlund, Marta Rendon, Susan Taylor, Ronald W. Gottschalk, Nnenna G. Agim, Jean-Paul Ortonne, Reliability assessment and validation of the Melasma Area and Severity Index (MASI) and a new modified MASI scoring method,Journal of the American Academy of Dermatology,Volume 64, Issue 1,2011,Pages 78-83.e2 ISSN 0190-9622,https://doi.org/10.1016/j.jaad.2009.10.051.

[13] Mahesh S,Praveen Kumar K S, A comprehensive review of Murivenna, an Ayurveda formulation, June 2023 European Chemical Bulletin·12(5):5527-34, DOI: 10.31838/ecb/2023.12.5.4262023.06/06/2023

[14] Agnivesha, Caraka Saṁhita, revised by Caraka and Dridhabala with the Āyurvēda Dipika commentary of Chakrapanidatta, edited by Vaidya JadavajiTrikamji Acharya, ChaukhambhaPrakashan, Varanasi, Reprint edition,2010, Sutrasthana, Chapter 4, Verse 10

[15] KavirajAmbikaDuttaShastri (part1st) SushrutaSamhita with elaborated Ayurveda TatvaSandipika Sutra SthanVranprashnamAdhyay; Varanasi Chaukhambha Sanskrit Sansthan, 2004; 21(10): 89

[16] Manohar Ananda Shetty et al: Study on kesha shareera w.s.r to khalitya (male pattern baldness) in relation with daihika prakruti, IAMJ January 2024. https://doi.org/10.46607/iamj0412012024

[17] Nisha Jakhar et al: The Physiology Study Of Bhrajak Pitta W.S.R Skin Coloration, IAMJ January 2022, https://doi.org/10.46607/iamj2510012022

[18] Acharya YT, Narayan Ram Acharya, Nibandha Sangraha commentary of Sri Dalhanacharya, Nyaya Chandrika Panjika commentary of Sri Gayadasacharya. Sushruta Samhita of Sushruta, Sutra Sthana; Vranalepanabandha Vidhi Adhyayam: chapter 18, Verse 4. Varanasi: Chaukambha Orientalia; 2014. p. 85

[19] DR. PANDHARI UTTAMRAO INGLE AND DR. RAKHI RAM KULKARNI BIOLOGICAL SIGNIFICANCE OF AYURVEDA CONCEPT OF RASA, GUNA, VIRYA AND VIPAKA SIDDHANT: A REVIEW, International Journal of AYUSH; 2021: 10 (6); 25-30

[20] Rath SK, Panja AK, Nagar L, Shinde A. The scientific basis of rasa (taste) of a substance as a tool to explore its pharmacological behavior. Anc Sci Life. 2014 Apr-Jun;33(4):198-202. doi: 10.4103/0257-7941.147419.

[21] https://vedotpatti.in/samhita/Vag/ehrudayam/?mod=read, Sutrasthana, Chapter 1, Sloka 15-16

[22] Acharya YT. 8th ed. Ch.9, Ver. 9. Varanasi: Chaukhamba Orientalia; 2005. Sushruta Samhita of Sushruta, Sharira Sthana; p. 385

[23] Sampada et al, Study the incidence of vyanga according to prakruti and effect of vatapatradi lepa on it, wjpmr, 2017,3(2), 156-161

[24] Kalbitz J, Neubert R, Wohlrab W. Modulation der Wirkstoffpenetration in die Haut [Modulation of drug penetration in the skin]. Pharmazie. 1996 Sep;51(9):619-37. German. PMID: 9011873.
Y. Kim, Occupational Toxicology, https://doi.org/10.1016/B978-0-12-801238-3.00212-9

[25] Y. Kim, Occupational Toxicology, https://doi.org/10.1016/B978-0-12-801238-3.00212-9

[26] Sharma, Khemchand; Joshi, Namrata; Goyal, Chinky. Critical review of Ayurvedic Varnya herbs and their tyrosinase inhibition effect. Ancient Science of Life 35(1):p 18-25, Jul–Sep 2015. | DOI: 10.4103/0257-7941.165627

Annexure :

Pic 1: Pre test photograph of front, right lateral and left lateral sides of face

Pic 2: Post test photograph of front, left lateral and right laterl sides of face