

# A Review on Recent Advances in Management of Melasma

Kare Neha<sup>1</sup>, Veer Sujata<sup>2</sup>, Dr. Khedkar Amol<sup>3</sup>

<sup>1,2,3</sup> Dept of pharmacy

<sup>1,2,3</sup> Ghargaon Ahmednagar. University : DBATU lonere, Raigad, Maharashtra, India.

**Abstract-** Melasma is a common cosmetics problem and its severity ranges from minor pigmentation during pregnancy that resolves spontaneously, to a chronic, troublesome, disfiguring condition. Today, there are various treatment modalities for melasma, providing a different success rate. The need for an effective treatment for melasma is becoming more and more as hormone replacement therapy, as well as increasing esthetic demands. The mainstay of treatment is regular use of sunscreens along with topical medication suppressing melanogenesis.

**Keywords-** Melasma type, laser Therapy, Hyper pigmentation

## I. INTRODUCTION

Melasma is a common, therapeutically challenging, and universally relapsing sickness of hyperpigmentation that's most customarily located in girls and people with Fitzpatrick Skin Types III thru VI. The pathogenesis of melisma is complicated and protean. Contributing elements which can be frequently implicated with inside the etiopathogenesis of this circumstance encompass a genetic predisposition, excessive ultraviolet radiation exposure, and hormonal influences. Therapeutic interventions for melisma encompass a multimodality technique incorporating photoprotection agents, topical and oral pores and skin lighteners, and resurfacing procedures. Given our increasing understanding of the pathogenesis of melisma, new and powerful remedies are increasing our healing armamentarium. This article evaluation new and rising oral and topical melasma.

The skin, a protective organ critical in homeogenesis, is the site of numerous biochemical processes, including the generation of free radicals, namely reactive oxygen and nitrogen species. Patterns of distribution of melasma include a centro-facial, malar, and mandibular patterns with the centro-facial distribution as the most common. In some instances, the neck, extensor arms, and upper back also are affected.[1]



**EPIDEMIOLOGY** – Melasma is a common dyschromia that often motivates the search for dermatological care. Its population prevalence varies according to ethnic composition, skin photo type, and intensity of sun exposure. In a 2010 population – based study, 1500 adults from several Brazilian states were surveyed.

According to a survey of 57,343 diagnoses performed at dermatological consultation in Brazil that was conducted by the Brazilian Society of Dermatology (BSD) in 2006, melanodermas (among them, melasma) [5]

## TYPES OF MELASMA –

- **Epidermal Melasma:**

The light or dark brown colour

Melasma deposition in the basal and supra basal layer of epidermis

- **Dermal Melasma :**

Blue grey colour, deposition melanin granule in dermis

- **Mixed Melasma ( Epidermal and Dermal) :**

Face is most commonly affected

Rarely pigmentation on 5 of the neck or may be confined to forearm.

## Factors causing Melasma

1. Hormones
2. Sun exposure
3. Pregnancy
4. Certain medication
5. Hypothyroidism
6. Vitamin B12 deficiency

### Harmones:

Melasma is often associated with the lady hormone oestrogen and progesterone. It is common in Pregnant women. Women taking birth control pills (oral contraceptives )

Oestrogen also increases the quantity of a pigment – forming enzymes called tyrosinase in the body. Individuals with melasma have greater numbers of progesterone receptors in the affected areas of skin. This means that these individuals have skin that is particularly sensitive to increased progesterone levels.

Melasma has been discovered to aggravate during pregnancy. Because of an increase in the placental , ovarian, and pituitary hormones. Melasma is also common among women using oestrogen –containing oral contraceptive pills and hormone replacement therapy and among men using oestrogen derivatives in the remedies of prostatic cancer this is due to the presence of oestrogen receptors on melanocytes which stimulate the process of melanogenesis. This is mediated with the aid of using induction melanogenic enzymes such as tyrosinase, **TRP1,TRP2**, and **MITF** by oestrogen through cyclic **AMP**- protein kinase. Oestrogen also mediates upregulation of **PDZ** domain protein kinase **1 (PDZK1)** expression in the hyperpigmented skin of melasma patients. **PDZK 1** is a member of sodium –hydrogen exchanger regulatory factor family **NHERF3**. There occurs an increase in tyrosinase, cyclic **AMP**- responsive elements binding protein, and **MITF** in melanocyte and also an increase in melanosome transfer.

### Sun exposure :

#### Visible light and melasma

Ultraviolet radiations are taken in considered the selective causative factor of the relapse in melasma and a strict prevention of sun exposure is recommended.

When you divulge your skin to ultra violet light ,it triggers the body to produced greater pigments. Sometimes, this pigments seems unevenly, causing the blotchy patches and brown spots of radiation,whether ultraviolet,visible light ,or infrared (heat) light; Ultraviolet and

infrared radiation from the sun is key in making melasma worse UVA rays can cause to damage to your skin. Thermoremanent make your skin appearance darker or solar – tanned. Sometime the sun causes an uneven increased in melanin production, which produces abnormal colouring (pigmentation) of the pore and skin. The solar ray's can also cause a permanently stretching of small blood vessel,giving your skin a mottled , reddish appearance.

### Pregnancy :

Particularly the excess of oestrogen and progesterone, is the main cause of melasma During pregnancy . Sometimes melasma can be permanent but it usually fades after birth. Occurrence of melasma during pregnancy. Chloasma is derived from the Greek word colazine meaning to be green.

Melas , also Greek means black Because the pigmentation is never green in appearance.[7]

### Certain medications :

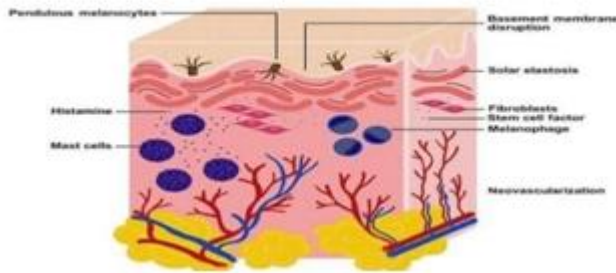
Antibiotics , nonsteroidal anti – inflammatory drugs (**NSAIDs**) , diuretics , retinoid , hypoglycaemic , antipsychotics,targeted therapies and some drugs . The great common culprits are non – steroidal anti –inflammatory drugs. (**NSAIDs**), tetracycline, and psychotropic drugs.

### Hypothyroid :

Several studies had shown association between melasma and thyroid disorders, especially hypothyroidism and thyroid are postulated that can be due to impact of these hormones on inducing the production of inflammatory cytokines. Higher circulating levels of pro- inflammatory cytokines have been seen in patients with hyperthyroidism. It thus reinforces that melasma can be triggered by conditions associated with skin inflammation.[8]

### Vitamin B12 deficiency :

Deficiency of vitamin B -9 ( folic acid ) and B-12 ( cobalamin) can cause pigmentation troubles leading to patchy skin. Deficiencies of vitamins that take place due to reduced intake of vegetables and fresh fruits can therefore make you skin appear dull and darkish.

**Dermal pathology in melasma****Treatments for melasma –**

There are several treatments for the cure melasma

- Topical Hypo pigmenting
- Physical Therapy
- Laser Therapy
- Herbal Therapy

**TOPICAL THERAPIES****Hydroquinone :**

Hydroquinone , or , 1-4-dihydroxybenzene , lighten skin by stopping tyrosinase activity , which leads to a reduction in the transfer of melanosomes within keratinocytes and increased melanosome destruction is commonly used in topical concentration of 2% to 4 % but can be compounded to reach higher concentrations. Although these higher concentration may be more efficacious, there is also an increased risk of side effects, including irritant dermatitis, which can lead to subsequent hyperpigmentation. Long –term use , specially of high concentration ,has the potential to cause exogenous ochronotic. Hydroquinone reduces melanin pigment manufacturing through inhibition of the tyrosinase enzyme ,which is involved in the initial step of the melanin pigment biosynthesis pathway. Hydroquinone takes several months to take impact. [9]

**Retinoids :**

Topical Retinoids have demonstrated advantage in the treatment of melasma by promoting keratinocyte turnover , reducing melanosome transfer , and decreasing melanin levels via epidermoptids. When blended with other topical treatments , retinoids can help to facilitate penetration into the epidermis and increase local drug bioavailability , which enhances overall blighting capabilities . High concentrations should be used with caution because of irritation and further dyspigmentation.[12]

**Azelaic acid :**

Azelaic acid (AZA) is a naturally occurring by the product of the metabolism of *Pityrosporum oval* and is Associated with hypo melanosis seen in *tinea versicolor*. In vitro, azelaic acid reversibly inhibits tyrosinase Activity and may also interfere with activity. A recent study suggests that 20 % azelaic acid cream applied twice daily may be More effective than hydroquinone 4% in reducing mild melasma.

**Triple Combination Creams :**

The gold standard TCC is the Klugman formula , which is a combination of a retinoid , hydroquinone , and cortico- steroid . In a study of 120 patients with facial melasma who applied either TCC cream, consisting of Hydroquinone 4% , tretinoin 0.05% ,and fluocinolone Acetonide 0.01% , once daily , or hydroquinone 4% cream Twice daily for 8 weeks , an improvement of more than 75 % was achieved by 73% of those using TCC compared with 49% of those using hydroquinone cream .[2]

**Antioxidant Therapy in Melasma****Vitamin C :**

Vitamin C ,or ascorbic acid , is a potent antioxidant with a myriad of research on its function in various diseases. It is a ROS scavenger and regenerate various other antioxidants . Vitamin C and magnesium ascorbic phosphate ( MAP ) , a vitamin C derivative , have been investigated for their role in treating melasma.

Oral vitamin C supplementation has been studied for treatment of hyperpigmentation issues.

Vitamin C cream has been investigated as a topical treatment for melasma , by both direct skin and ultrasound software. [6]

**Laser therapy :****Switched Nd : YAG Laser – Tissue Interaction :**

The Q- switched Nd: YAG laser is the laser of choice for dealing with dermal and mixed epidermal –dermal pigmented lesions, especially in darkish pore and skin. The laser's ability to specially target melanosomes in melanocytes, keratinocytes and melanophores , its ultra – short pulse width ( in nanoseconds) and adjustable spot size are key factors that allow effective targeting of dermal pigment . Depth of penetration and selectivity are function of the wavelength of a laser. The Q- switched Nd: YAG laser has

two wavelengths – extended wavelength of 1064 nm is ideal for dermal lesions due to its deeper penetration and bad absorption in epidermal melanin. These laser have large spot size up to 10 nm, which also permit deep penetration of the laser beam. Depth of penetration is directly proportional to the spot size of the beam, as greater photons are possible to remain within the space. The mechanism of movement of those laser includes both a photothermal impact and photomechanical/ photo acoustic phenomenon that is based on the principle of selective photo thermolysis. To achieve successful effect and minimum side effects, it is necessary to do laser therapy.

## II. CONCLUSION

At present, there's no universally powerful remedy for melasma. The mainstay of remedy is located of sunscreens at the side of topical medicines that Suppress melanogenesis . Topical hydroquinone on my own or in strong fixed – dose triple aggregate topical Therapy is the primary line of remedy; chemical peels are taken into consideration second-line Treatment.

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