Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 08, 2023

Original research article

40% lactic acid peel versus 40% mandelic acid peel in periorbital melanosis: Side effects

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Abstract

Mandelic acid is called 'German mandel-almond'. It is a natural alphahydroxy acid, derived from amygdalin, a glycoside which is found in peaches, bitter almonds & apricots. It has a phenyl group as a side chain in its chemical structure, which changes its solubility profile, making it more lipophilic compared to the other conventional water-soluble alphahydroxy acids. All the patients attending the dermatology OPD were screened for periorbital melanosis. Detailed history was taken and clinical examination was performed in the patients with periorbital melanosis. Dermatological examination of the periorbital area was also done to determine the type of periorbital melanosis (vascular and structural type were excluded by a stretch test). 30 patients who fulfilled the inclusion and exclusion criteria were enrolled for the study after explaining the study requirement in the language they understand and written informed consent was taken. Test peel was done in the retroauricular area skin before starting the treatment. In the study, there was no significant difference in mild burning sensation, frosting, dryness and pruritus between the two sides treated with 40% mandelic acid and 40% lactic acid peels. There was significant difference in severe burning sensation between the two sides. On right side treated with 40% mandelic acid peel, 10% had severe burning sensation and on left side treated with 40% lactic acid peel, 33.3% had severe burning sensation.

Keywords: 40% lactic acid peel, 40% mandelic acid peel, side effects

Introduction

Lactic acid is a alphahydroxy acid which is mild & is obtained from yogurt, sour milk & tomato juice [1].
Lactic acid possesses both antimicrobial & anti-inflammatory properties. It acts by dissolution of intercellular desmosomes thereby promoting desquamation of the stratum corneum. It also increases the content of hyaluronic acid in the skin & thereby acting as a part of natural moisturizing factor of the skin. Therefore, it helps in improving skin texture & smoothening of the skin. Lactic acid is a comparatively larger molecule, hence its penetration is slow & therefore there is reduced risk of treatment-induced inflammation & irritation [2, 3].
Lactic acid with pH more than 3.5 is used as moisturizer in cosmetics. Lactic acid with pH less than 3.5 & in higher concentrations is used as a peeling agent. Along with resorcinol & salicylic acid, lactic acid is a component of Jessner's peel. Lactic acid in varying concentrations have been used in combination with other peeling agents. It has been used in the concentrations of 30%, 40%, 50% & 92% [4].
Mandelic acid is called 'German mandel-almond'. It is a natural alphahydroxy acid, derived from amygdalin, a glycoside which is found in peaches, bitter almonds & apricots. It has a phenyl group as a side chain in its chemical structure, which changes its solubility profile, making it more lipophilic compared to the other conventional water-soluble alphahydroxy acids. Hence, it can be used to treat oily & acne prone skin [5].
Mandelic acid has antiseborrheic & keratolytic properties. It also inhibits melanogenesis & stimulates collagen synthesis. It is freely soluble in ethyl alcohol & isopropyl alcohol, but partially soluble in water. pKa of mandelic acid is 3.41 when compared to pKa of 3.83 of glycolic acid & hence mandelic acid is stronger than glycolic acid. Mandelic acid in higher concentrations (20%, 40%, 50%) is used as peeling agent. Lower concentration of 2% mandelic acid is used as a face wash [6].

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 08, 2023

Methodology

Inclusion criteria

1. Patients presenting with periorbital melanosis.
2. Age > 18 years.

Exclusion criteria

1. Patients who have not given consent.
2. Patients on topical depigmenting agents in the previous 2 weeks.
3. Pregnancy & lactation.
4. Patients with chronic debilitating disease.
5. Patients with generalized pigmentation of the face.
6. Patients with active bacterial, viral, fungal infection.
7. Patients with keloidal tendency.
8. Patients with known allergy to peeling agents (lactic acid, mandelic acid).
9. Patients who develop allergy or untoward reactions on test peel.
10. Patients with vascular type and structural type of periorbital melanosis.

All the patients attending the dermatology OPD were screened for periorbital melanosis. Detailed history was taken and clinical examination was performed in the patients with periorbital melanosis. Dermatological examination of the periorbital area was also done to determine the type of periorbital melanosis (vascular and structural type were excluded by a stretch test). 30 patients who fulfilled the inclusion and exclusion criteria were enrolled for the study after explaining the study requirement in the language they understand and written informed consent was taken. Test peel was done in the retroauricular area skin before starting the treatment.

After a test peel, patients were treated with 40% lactic acid peel on left side and with 40% mandelic acid peel on right side once in 2 weeks for 3 months. Clinical improvement was assessed by serial photographic evaluation using digital camera every fortnight, by visual anologue scale. Assessment was done by 2 dermatologists and the average of their score was taken.

Patients were observed for side effects of lactic acid & mandelic acid peels like erythema, burning sensation, pruritus, dryness, frosting, hyperpigmentation, etc.

Results

Table 1: Side Effects with 40% Mandelic Acid Peel

Side effects	No.	%
Erythema	0	0.0%
Mild burning sensation	11	36.7%
Severe burning sensation	3	10.0%
Frosting	0	0.0%
Dryness	3	10.0%
Pruritus	0	0.0%
Hyper pigmentation	0	0.0%
Others	0	0.0%

On right side treated with 40% mandelic acid peel, 36.7% had mild burning sensation, 10% had severe burning sensation.

Table 2: Side effects with 40% lactic acid peel

Side effects	No.	%
Erythema	0	0.0%
Mild burning sensation	14	46.7%
Severe burning sensation	10	33.3%
Frosting	2	6.7%
Dryness	3	10%
Pruritus	2	6.7%
Hyper pigmentation	0	0.0%
Others	0	0.0%

On the left side treated with 40% lactic acid peel, 46.7% had mild burning sensation, 33.3% had severe burning sensation, 10% had dryness, 6.7% had frosting and 6.7% had pruritus as side effects.

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Table 3: Side effects comparison between two sides

Side effects	Side				P value
	Right side treated with 40% mandelic acid peel		Left side treated with 40% lactic acid peel		
	No.	%	No.	%	
Erythema	0	0.0%	0	0.0%	-
Mild burning sensation	11	36.7%	14	46.7%	0.432
Severe burning sensation	3	10.0%	10	33.3%	0.028*
Frosting	0	0.0%	2	6.7%	0.150
Dryness	3	10.0%	3	10.0%	1
Pruritus	0	0.0%	2	6.7%	0.150
Hyper pigmentation	0	0.0%	0	0.0%	-
Others	0	0.0%	0	0.0%	-

In the study, there was no significant difference in mild burning sensation, frosting, dryness and pruritus between the two sides treated with 40% mandelic acid and 40% lactic acid peels.
There was significant difference in severe burning sensation between the two sides. On right side treated with 40% mandelic acid peel, 10% had severe burning sensation and on left side treated with 40% lactic acid peel, 33.3% had severe burning sensation.

Discussion

Side effects with 40% mandelic acid peel

On the right side treated with 40% mandelic acid peel, 36.7% had mild burning sensation, 10% had severe burning sensation and 10% had dryness as side effects. Burning sensation decreased in few minutes after the procedure. Dryness decreased with the use of moisturizers. None of them necessitated the discontinuation of treatment.

Side effects with 40% lactic acid peel

On the left side treated with 40% lactic acid peel, 46.7% had mild burning sensation, 33.3% had severe burning sensation, 10% had dryness, 6.7% had frosting and 6.7% had pruritus as side effects. Burning sensation decreased in few minutes after the procedure. Dryness was taken care of by moisturizers. None of the side effects required discontinuation of treatment.

Side effects comparison between two sides

In the study, there was no significant difference in mild burning sensation, frosting, dryness and pruritus between the two sides treated with 40% mandelic acid and 40% lactic acid peels.
Severe burning sensation was significantly higher on the left side treated with 40% lactic acid peel when compared to the right side treated with 40% mandelic acid peel.

Conclusion

- The most common side effect seen with 40% mandelic acid peel was mild burning sensation (36.7%), followed by severe burning sensation (10%) and dryness (10%).
- The most common side effect seen with 40% lactic acid peel was mild burning sensation (46.7%), followed by severe burning sensation (33.3%), dryness (10%), pruritus (6.7%) and frosting (6.7%).
- Severe burning sensation was significantly higher with 40% lactic acid peel when compared to 40% mandelic acid peel.

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