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Evaluation of the Effect of Topical Picolinamide on Epidermal Melasma

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Melasma is an acquired increase of pigmentation of the skin. Hydroquinone is an effective treatment which has mutagenic effect. Picolinamide prevents the synthesis of melanin by inhibiting the peroxides. Therefore, the aim of this study is to evaluate the effect of anti-epidermal melasma of Picolinamide. 30 patients with epidermal melasma and non-pregnant or resistant to anti-stain cream were selected. By colorimeter the amount of melanin of both sides of the face was measured. After taking photos of the face, Picolinamide cream 5% was given to each patient for night use for the right side and hydroquinone 2% for the left side. Patients at the end of the treatment period came for measuring the amount of epidermal and also having a photo taken at the end of the treatment period. The average amount of the epidermal layer of melanin at the end of the eighth week was significantly (P£000/0) reduced in patients who used Picolinamide 5% on the right side of the face and hydroquinone 2% on the left side, but the difference between the two sides was not significant at P=/568. Also, patients who used the creams on the right and left side of their face have no significant differences on the average amount of skin erythema at the end of the eighth week of treatment and also to each other. In observing and also evaluating the before and after treatment photos, no considerable differences were detected in terms of improvement of melasma by a dermatologist and supervisor and patients were not suitably satisfied with their improvement, but at the end of the eighth week of treatment, the average amount of melanin in both sides was reduced to 20%. These findings indicate that the Picolinamide 5% cream, like hydroquinone cream 2% has the ability of de-pigmentation.

Key words: Epidermal melasma, Hydroquinone, Picolinamide.

Melasma is an acquired increase of the skin pigmentation and is due to different reasons such as exposure to sunlight, pregnancy, oral contraceptive pill and some anti-epileptic drugs, disruption in the order of endocrine glands discharge, genetic factors, undernutrition and disruption of the liver function[1]. Melasma can be seen in the epidermis and, in case of irritation, inflammation. Moreover, creating a gap between the epidermis and dermis, pigment-producing cells enters the dermis simulating it andcreating a dermal melasma that is difficult to treat.

Melasma involves many parts of central region of the faces' skin such as forehead, cheeks, nose and chin. Hydroquinone is the most effective topical treatment for melasma and by inhibiting the conversion of tyrosine to melanin, inhibiting melanosomes formation and increased degradation of melanosomes as well as by inhibiting DNA and RNA synthesis in melanocytes and decreased pigmentation of the epidermis[1].

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Picolinamide is derived from vitamin B (Niacinamide). This substance is currently on the list of European and American cosmetics and is being used as an anti-aging drug and has topical effect[2, 3].

Although the best treatment for epidermal melasma is the use of hydroquinone and also kojic acid, due to the toxic effect on the cells (cytotoxic) and mutagenic effect, it has been prohibited by the FDA and also the Food and Drug Administration of Europe. At present, no safe and effective drug exists which can be applied like the hydroquinone for treatment of these diseases[4, 5]. Pursuant to the previous investigation of the researcher which was performed for the first time in animal model by in vivo method on the skin of black Hindi pigs, it was determined that the Picolinamide by inhibiting peroxidase which is required for the synthesis of melanin prevents the synthesis of melanin[6,7]. So investigating the effect of anti-epidermal melasma in the human will be studied. It might be a good alternative to hydroquinone.

METHOD

With the collaboration of clinical dermatologists, thirty epidermal melasma patients were selected for the study who referred to the clinic were their epidermal was determined by Wood lamp and a dermatologist. Further, none of the patients was pregnant and did not have a history of resistance to anti-stain cream, especially hydroquinone. At the beginning, the amount of melanin of each side of the face was measured with a colorimeter. First, the device, using a white card and the device indicating the white dimension is set to zero and calibrated, then at least ten points were selected and each point is measured three times and numbers that might be an indication of the amount of pigment of the face were between the white dimension which was zero, and the black dimension which was a thousand, were recorded by mentioning study area and patient characteristics. When these numbers are high, high skin pigment is indicated and darker skin and when these numbers are low and closer to zero, low skin pigment and whiter skin is indicated. Standard photos of the patients' face were taken by camera (one photo from left side of the face, one photo from right side of the face and one photo from all of the face) in the photographic studio, without a flash and appropriate and equal light for all patients. For homogenization of required conditions in all photos, by Photoshop integration it was necessary to use an index; to do so, before taking a photo , a piece of cardboard the size of a two squared centimeter half of which was completely white and the other half was completely black was prepared and attached on the forehead of the patient; after taking photo, two creams were given to the patient, one containing five per cent Picolinamide and the other containing the usual two per cent hydroquinone (the agreement of dermatologist for collaboration was the use of cream containing hydroquinone instead of base cream (placebo) for the other side of the face to compare Picolinamide effect with hydroquinone effect). The patients were asked to use creams for 8 weeks (first it was 6 weeks and then it was continued for 8 weeks for greater effect of drug) and selectively and without being informed of the type of cream, a cream (e.g., number 1) for the right side, and the other (e.g., number 2) for the left side of the face every night, after the patient selected the cream, the usage location on the left or on the right were written on the cream so that the patient did not use the same cream by mistake and only the pharmacist knew which cream number contained Picolinamide and which cream number contained hydroquinone. The patients were asked to notify the researcher and dermatologist if they observed any change in the face and also consider the recovery process and note the observed significant improvement. Patients at the end of treatment returned to have the amount of melanin in the epidermis measured with colorimeter and also to have a photo of the face taken at the end of the treatment period. Patients were asked about their satisfaction with the drugs and their answers were recorded, this information and the obtained information about the pigment measured using a colorimeter and any related information to the taken photos were entered into a computer and analyzed using statistical tools.

Statistical analysis

Results were expressed as mean ± SD. Mean was compared by using SPSS software, one-way ANOVA test and Duncan's post-hoc test, and differences were significant at P >/05.

Findings

Results based on obtained data analysis by

using the colorimeter and observance of the doctor and observer are as follows (Tables 1 and 2):

1. Those who use Picolinamide 5% cream on the skin of the right side of their faces experienced reduction in the average amount of melanin in the epidermal layer at the end of the eighth week of treatment than the first day (579/6 ± 398/206compared to 229/7 009/ 253). Significant difference was P≤0/000.
2. Those who used hydroquinone 2% cream on the skin of the left side of their faces experienced reduction in the average amount of melanin in the epidermal layer at the end of the eighth week of treatment than the first day (049/5 194/209compared to 873/4 889/ 257).Significant difference was P≤0/000.
3. After the end of the eighth week of treatment, the melanin average of epidermal layer of the skin on the right side of faces of patients who used Picolinamide 5% cream was reduced compared to the left side where hydroquinone cream 2% was used (579/6 398/206 compared to 049/5 194/209), but the difference between these two variables was like the first day and were not significant at P = /568.
4. People who used Picolinamide 5% cream on the skin of the right side of their faces, experienced a slight difference in the average amount of skin Erythema at the end of the eighth week of treatment than the first day (97/072/406 compared to 87/0 80/405) and the difference between these two variables was not significant at P= /426.
5. People who used hydroquinone 2% cream on the skin of the left side of their faces, experienced a slight difference in the average amount of skin Erythema at the end of the eighth week of treatment than the first day (01/1 24 /409 compared to22/1 89/ 409) and the difference between these two variables was not significant at P=0 /621.
6. After the eighth week of treatment, the average amount of skin Erythema showed reduction in patients who used Picolinamide

Table 1. Comparison of mean and standard deviation of melanin and Erythema of the skin epidermal layer treated of face by Picolinamide 5% on the right side and also left side treated by hydroquinone 2% at the end of eighth week (after the test) than the first day (before the test) in patients with epidermal melasma

Parameters	Right Side		Left Side	
	After test	Before Test	After test	Before Test
Melanin	206.40± 6.58*	253.017.23	209.195.05*	257.894.87
Erythema	406.72.97	405.8.87	409.241.02	409.901.22

* Significant differences between the parameter after the test compared to the parameters before the test and can be seen on each side (P <0 /05).

Table 2. Comparison of mean and standard deviation of melanin and Erythema of the skin epidermal layer of face on the right side (treated by Picolinamide 5%) compared to the left side (treated by hydroquinone 2%) at the first day(before the test) and the end of eighth week (after the test) in patients with epidermal melasma

Parameters	Before Side		After Side	
	After test	Before Test	After test	Before Test
Melanin	257.89±4.87	253.01±7.23	209.19±5.05	206.40±6.58
Erythema	409.90±1.22	405.8±.87*	409.24±1.02	406.72±.97*

* Significant differences between the parameter after the test compared to the parameters before the test and can be seen on each side (P <0 /05).

5% cream on the right side compared to the left side of patients who used hydroquinone 2% cream (97/0 72/406 compared to 01/1 24/409). The difference between these two variables was significant at P= /006.

7. The melanin average of epidermal layer of both sides of each individual at the end of the the eighth week of the treatment compared to the first day showed a decrease and the difference between the variables was significant at P= /003. Also, because melanin of the left side compared to the right side in the first day were significant or not, at the end of the eighth week it was shown to be the same as the first day and mostly not significant.
8. In viewing and investigating the taken photos of before and after treatment of two sides of the face of patients, no significant differences were observed in terms of improvement of melasma by a dermatologist and observer and patients did not have acceptable satisfaction with their improvement.

DISCUSSION

After eight weeks of treatment, according to information obtained by the Swiss colorimeter, the average amount of melanin of epidermal layer 20% was reduced from the right and left sides' of facial skin on those who respectively used Picolinamide 5% cream and hydroquinone 2% and no differences were observed between the two sides of the face and both halves were similar considering the facial skin redness and sensitivity. Moreover, there was no significant difference compared to the first day and the patients confirmed it. But the severity of facial melasma of patients after treatment was not considerable and patients were not satisfied. These findings indicate that the Picolinamide 5% cream like hydroquinone 2% cream has de-pigmentation ability and also does not cause redness and sensitivity. Also, considering the effects of hydroquinone about destroying melanocytes and its absence in Picolinamide deserves further research with more time and higher dose, and perhaps dissatisfaction of patients was due to low period usage or low-dose of ointment.

CONCLUSION

Creams like Picolinamide 5% cream which was used in this study are currently used as an anti-aging cosmetic and according to reports did not have a significant disadvantagewhile Picolinamide 5% cream after two months of usage caused de-pigmentation like hydrodynamic 2% cream and its non-toxicity on melanocytes have been identified in previous research of the researcher, therefore, it is necessary to conduct another research over a longer period and higher dose in order to obtain complete information. Maybe this Picolinamide 5% cream could be a good alternative to hydroquinone cream.

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