

**A COMPARATIVE STUDY ON 100% TCA VERSUS 88% PHENOL FOR THE TREATMENT OF VITILIGO****BADANIE PORÓWNAWCZE 100% TCA W STOSUNKU DO 88% FENOLU W LECZENIU BIELACTWA**

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**Abstract**

There are various medical and surgical modalities for the treatment of vitiligo. Surgical modalities are used in the patients who fail to respond to medical therapy. We selected thirty patients of stable vitiligo from the department of dermatology for the study. The patients were divided into two groups of 15 patients each. In Group I patients application of 100% TCA was done on the vitiliginous sites and in Group II patients 88% phenol was applied on the affected sites. Comparing the results of repigmentation in both the groups it was seen that marked pigmentation was seen in 66.6% patients in the TCA group and 80% in the Phenol group. Moderate pigmentation was seen in 13.3% patients in both the groups and mild pigmentation was seen in 20% patients in the TCA group and 6.6% in the Phenol group.

**Streszczenie**

Istnieją różne medyczne i chirurgiczne sposoby leczenia bielactwa. Chirurgiczne sposoby są stosowane u pacjentów, którzy nie reagują na leczenie. Wybraliśmy do badania trzydziestu pacjentów ze stabilnym bielactwem z Kliniki Dermatologii. Chorych podzielono na dwie grupy po 15 osób każda. W grupie I u pacjentów aplikowano 100% TCA na bielactwe plamy, a w grupie II 88% fenol był stosowany w dotkniętych chorobą miejscach. Porównując wyniki repigmentacji w obu grupach okazało się, że znaczną pigmentację odnotowano u 66,6% pacjentów w grupie TCA i 80% w grupie z fenolem. Umiarkowaną pigmentację odnotowano u 13,3% chorych w obu grupach a pigmentację łagodną zaobserwowano u 20% pacjentów w grupie TCA i 6,6% w grupie z fenolem.

**Key words:** vitiligo; repigmentation; melanocytes; pigment; TCA; phenol**Słowa kluczowe:** bielactwo; repigmentacja; melanocyty, pigment; TCA; fenol**Introduction**

Vitiligo is an acquired pigment disturbance which affects the melanocyte, a dendritic cell producing melanin pigment and which is derived from the neural crest. In the skin, it is located at the basal layer and follicular sheath [1]. The patients refractory to medical therapy are treated by surgical modalities provided that their disease is stable for at least 2 years. Various surgical methods that are being practiced, but in our study we did spot chemical wounding with TCA and Phenol [2].

Phenol or carbolic acid is one of the oldest antiseptic and antipruritic agents. It also acts as a local anaesthetic. Liquefied phenol (88%) and TCA have been used for medium depth chemical peeling for facial rejuvenation [3]. In the present study, both TCA and phenol have been successfully used as a medium depth chemical peelant which causes wounding, to treat stable vitiliginous areas and patches of alopecia areata.

**Materials and Methods**

We selected thirty patients of stable vitiligo from the department of dermatology for the study. The patients were divided into two groups of 15 patients each. In Group I patients application of 100% TCA was done on the vitiliginous sites and in Group II patients 88% phenol was applied on the affected sites. Informed consent was taken from all the patients before the study. Prior approval of hospital ethical was taken. All the patients were photographed before the treatment. Most of the cases had received local or oral steroids or PUVA/PUVASOL prior to the therapy with limited or no improvement. The grading of the pigmentation was done starting from grade 0 to grade 3 as follows:

No pigmentation - Grade 0

Minimal pigmentation - Grade 1

Moderate pigmentation - Grade 2 (Up to 50% of 2x2 cm<sup>2</sup> patches)Marked pigmentation - Grade 3 (>50% of the 2x2 cm<sup>2</sup> patches)

Chemical peeling with 88% phenol and 100% TCA was carried on various sites of stable vitiligo. After cleansing and defatting, 100%TCA in Group I and 88% Phenol in Group II was applied on the affected areas till a uniform frost appeared. A routine urine examination, and tests for serum creatinine, blood urea nitrogen, SGOT and SGPT were carried out on all patients prior to the peel. BCG scars or old scars were examined for keloidal tendency. An informed consent was obtained and their blood pressure, heart rate and pulse rate were monitored. The area to be treated was defatted by scrubbing with savlon, followed by spirit and acetone. Both TCA and Phenol were applied then applied gently with uniform smooth strokes so as to cover the entire lesion till an ivory white uniform frosting appeared. Feathering of the borders was done by painting from the

periphery of the lesion into the surrounding normal skin. All patients were monitored after half an hour for pulse rate and heart rate. They were asked to, apply mupirocin ointment twice in a day till the lesions healed. After 10-15 days (on completion of wound healing), all patients of vitiligo were started on PUVA/PUVASOL. All patients in both the groups were followed up at weekly intervals for 2 months, 15 days intervals for the next 4 months and at monthly intervals for one year. The procedure was repeated once in a month if required.

### Results (Tabl. I, II)

The data was tabulated and the results were analyzed statistically.

SR NO	Pigmentation	Group I (100% TCA)	Group II (88% Phenol)
1	MARKED(> 90%)	66.6%(10)	80%(12)
2	MODERATE(61-90%)	13.3%(2)	13.3%(2)
3	MILD(<60%)	20%(3)	6.6%(1)

Table I. Repigmentation in both the groups

SR NO	Complications	Group I	Group II
1	hyperpigmentation	3(20%)	2(13.3%)
2	hypopigmentation	2(13.3%)	1(6.6%)
3	persistent erythema	1(6.6%)	1(6.6%)
4	secondary bacterial infection	1(6.6%)	-
5	superficial scarring	1(6.6%)	-

Table II. Associations of diabetes mellitus

### Discussion

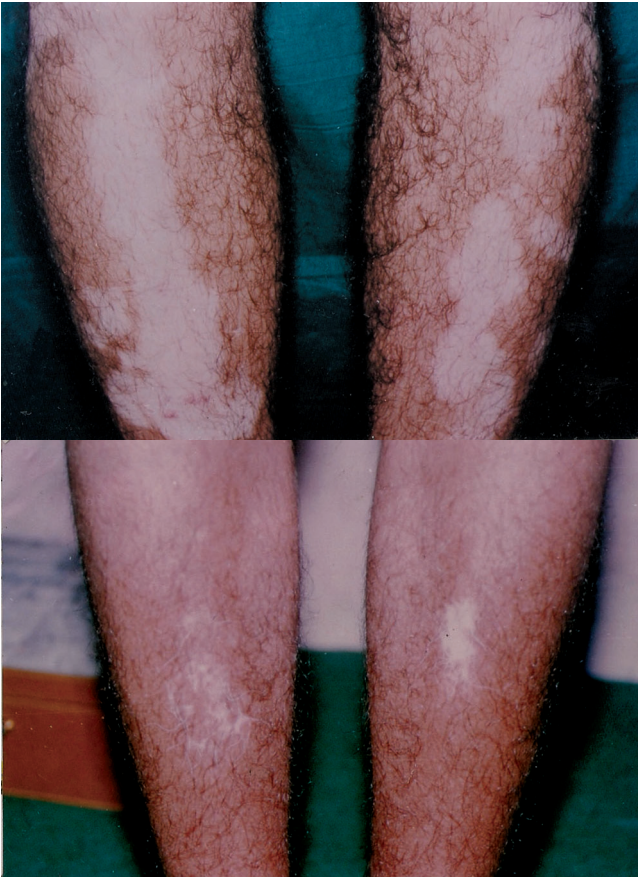
On healing, all the lesions of vitiligo showed perifollicular pigmentation in hairy areas and perilesional repigmentation in non hairy areas. These were further treated with PUVA/PUVASOL. Comparing the repigmentation in both the groups it was seen that marked pigmentation was seen in 66.6% patients in the TCA group (Fig. 1, 1a) and 80% in the Phenol group (Fig. 2, 2a), moderate pigmentation was seen in 13.3% patients in both the groups and mild pigmentation was seen in 20% patients in the TCA group and 6.6% in the Phenol group. Regarding the complications in both the groups, hyperpigmentation was seen in 20% patients in the TCA group and 13.3% patients in the Phenol group, hypopigmentation was seen in 13.3% patients in the TCA group and 6.6% patients in the Phenol group, persistent erythema was seen in 6.6% patients in both the groups, secondary bacterial infection and superficial scarring was seen in 6.6% patients each in the TCA group and in none of the patients in the Phenol group. After the crust fell off, all patients were given PUVA/PUVASOL treatment for the next 2-3 months. Gradually the perifollicular hyperpigmentation started enlarging in size and coalesced together to cover the entire patch. In cases of non hairy sites, the pigment spread slowly from the border of the lesions for a small distance towards the centre. Hypopigmentation seen after TCA and Phenol application was seen in 19.9% patients occurs because the melanin synthesis is impaired temporarily

resulting in hypopigmentation. Hyperpigmentation seen in 33.3% patients is due to the fact that skin diseases induce post inflammatory hyperpigmentation. The inciting inflammatory process causes an increase in both melanogenesis and the transferring of melanin granules to the surrounding keratinocytes. Post peel erythema was seen in 13.2% patients and it represents angiogenesis in response to re-epithelialisation and occurs during wound healing initially. Secondary bacterial infection occurred as a complication in 6.6% patients due to improper wound care on the part of the patients. All of them reported early and their smear examination revealed Staphylococcus aureus which responded to cephalosporins. Superficial scarring was seen in % patients and this could be because of penetration of the chemical agents which could have seeped in deeper.

Liquified phenol consists of 88% solution of phenol in water and causes kerato coagulation by precipitating the surface proteins [4]. At this concentration, phenol causes medium depth wounding which creates changes through necrosis of the epidermis and part or all of the papillary dermis with an inflammatory reaction in the upper reticular dermis [5]. Re-epithelialisation starts from the 3rd day and is continued till 10th-15th day. The initial event in this process is the migration of keratinocytes from the residual adnexal epithelium at the base of the wound (pilosebaceous follicles and eccrine glands) and also from the wound margin.



**Figure 1, 1a. Pre and post treatment photograph of a 35 year old patient treated with TCA**



**Figure 2, 2a. Pre and post treatment photograph in a 28 year old patient treated with Phenol**

Phenol when used for facial rejuvenation, is known to cause cardiac arrhythmias, if the quantum of phenol exceeds 3 ml, the duration of application is less than 60 min or when applied to large cutaneous surface areas [6]. This was not seen in any of our patients since precautions were taken not to exceed 1/2- 1 ml in one session. Phenol is also known to be hepatotoxic and nephrotoxic. Diuresis is known to promote metabolism and excretion of phenol. Hence in this study all patients were asked to take plenty of water after the peel. In cases of vitiligo, spot or regional dermabrasion has been used to repigment the hairy areas. It is also known that sometimes topical psoralens with UVA gives rise to blister formation resulting in post inflammatory pigmentation. Both TCA and

Phenol in this study have been used for repigmentation on the same principles of wounding [7]. During wounding, there is acute inflammation which is known to induce melanogenesis. During the re-epithelialisation process, melanocytes migrate from the remnants of hair follicles, eccrine glands and also from the surrounding normal skin [8]. In the hair follicles, the inactive melanocytes in the middle and/or lower parts of the outer root sheath divide, proliferate and migrate upwards to near by epidermis [9]. The melanocytes continue to migrate radially to form the pigmented island which is seen as perifollicular pigmentation. Also, the melanocytes from the perilesional normal epidermis migrate towards the centre of the lesions along the border in both hairy and non-hairy areas thus causing perilesional pigmentation. These findings of pigmenting perifollicularly and perilesionally was observed in our study also. During wound healing, various growth factors are released like endothelial growth factors and fibroblast growth factors which are mitogenic for the melanocytes [10]. Moreover the inflammatory mediators like leukotriene C4 and D4 stimulate the melanocyte proliferation. It is possible that these factors could also have stimulated the pigmentation after a phenol peel wound [11]. Combining the wounding procedure with medical lines of treatment is known to enhance the rate of pigmentation.

### Conclusions

TCA and Phenol peel, as seen in this study is a simple office procedure with no complicated surgery or anaesthesia involved and also needs no expertised training. Discomfort and pain are minimum and hospitalisation or dressings are not required. It can be considered as one of the alternate method to repigment stable vitiligo. Repeat peels can be done on these areas if required. One can cover large areas in multiple sittings.

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