

# Treatment of Vitiligo with 5-Fluorouracil after Microneedling of the Lesion

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## Abstract

**Background:** Vitiligo is a chronic acquired disorder characterized by the development of depigmented macules which slowly enlarges with the concurrent appearance of new lesions.

**Aim:** The aim is to study the efficacy of treating vitiligo by microneedling followed by application of 5-fluorouracil on vitiligo patches.

**Materials and Methods:** This study was conducted in a tertiary hospital from March 2017 to August 2017. For this study, we selected about 50 patients in the age group of 10–50 years who had been taking treatment for vitiligo for 2–3 years without much improvement. We suggested them about needling with 5-fluorouracil application over vitiligo patches. The procedure was performed at a gap of 2 weeks on vitiligo patches of various patients for about 3 months.

**Result:** After about 1 month of this procedure, we noticed an improvement in about 40% of patients with some erythema and hyperpigmentation developing on the margins of vitiligo patches. Gradually more than 50% of patients had similar improvement by the end of 2 months. After 3 months, about 60% of patients had hyperpigmentation in the vitiligo lesions with almost complete pigmentation in very small patches; larger ones had less pigmentation and 40% did not have any pigmentation from the previous state.

**Conclusion:** 5-fluorouracil is a simple and effective method for treating small vitiligo patches (< 5 cm diameter generally) with no major side effects. It is a cost-effective procedure in treating a very resistant disease, i.e., vitiligo, especially for small lesions.

**Key words:** 5-fluorouracil, Microneedling, Pigmentation, Vitiligo

## INTRODUCTION

Vitiligo is a common form of localized depigmentation. It is an acquired condition resulting from the progressive loss of melanocytes. It is characterized by milky white sharply demarcated macules. According to a recent Vitiligo Global Issues Consensus Conference, the term “vitiligo” can be used as an umbrella term for all non-segmental forms of vitiligo (including acrofacial, mucosal, generalized, universal, mixed, and rare variants of vitiligo).<sup>[1]</sup>

It is stated that vitiligo affects 0.5–1 % of the world's population.

It can begin at any age, and the prevalence is probably the same in sexes.

Various theories have been suggested for the etiology of vitiligo; the autoimmune theory is currently the leading hypothesis and is supported by strong evidence. It is based on the clinical association of vitiligo with a number of disorders also considered to be autoimmune or autoinflammatory.<sup>[1]</sup> Among autoimmune diseases, the strongest association is with thyroid disease.

Histochemical studies show a lack of dopa-positive melanocytes in the basal layer of the epidermis. Electron microscopic studies confirm the loss of melanocytes. In inflammatory vitiligo, where there is raised erythematous border, there is an infiltrate of lymphocytes and histiocytes.

Medical treatment is the primary mode of therapy to achieve repigmentation. However, in patients recalcitrant to medical treatment alone, various surgical therapies can be used either alone or in conjunction with medical treatment to achieve

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regimentation provided that the disease is stable. Needling followed by topical application of 5% 5-fluorouracil is a recent advancement to the treatment modality of vitiligo. In the present case series, we report some cases of vitiligo who had no or minimal regimentation of the achromic patches with conventional therapy and responded to addition of needling with the application of topical 5-fluorouracil treatment leading to significant repigmentation.

## MATERIALS AND METHODS

This study was conducted at Baba Raghav Das Medical College, Gorakhpur, Uttar Pradesh, from March 2017 to August 2017.

For this study, we selected about 50 patients in the age group of 10–50 years who had been taking treatment for vitiligo for 2–3 years without much improvement. Some were taking NBUBV therapy also along with oral and topical medication. Their disease was stable for 3–4 months on an average. We suggested them about needling with 5-fluorouracil application over vitiligo patches. The procedure was performed at a gap of 2 weeks on vitiligo patches of various patients for about 3 months. They were explained about the side effects which might occur and asked to sign on the consent form for the procedure. We tried to take those patients only who had small patches of vitiligo to avoid discomfort and better assessment.

5-fluorouracil, available in cream form, is needed along with 26G needle and gloves. Under aseptic precautions, microneedling was done on the patch followed by application of 5-fluorouracil in minor operation theatre (OT). The patients were made to sit for 1 h after application so as to check for any side effects.

## RESULT

After about 1 month of this procedure, we noticed an improvement in about 40% of patients (20) with some erythema and hyperpigmentation developing on the margins of vitiligo patches. Gradually more than 50% of patients (25) had similar improvement by the end of 2 months. After 3 months, about 60% of patients (30) had hyperpigmentation in the vitiligo lesions with almost complete pigmentation in very small patches; larger ones had less pigmentation and 40% (20) did not have any pigmentation from the previous state. We can see in Figure 1, a male patient having a small vitiligo patch on wrist has gradual hyperpigmentation after 2 months of treatment. Similarly a girl shown in Figure 2 had vitiligo patches on face that responded well to 5-fluorouracil application after 3 months of treatment

When these patients were followed up after 3 months, their pigmentation was still persistent and no progression of the disease was noted.

Duration of treatment (months)	Response in patients (%)
1	40 (20 patients)
2	50 (25 patients)
3	60 (30 patients)

## DISCUSSION

More than 90% of patients had pain during the procedure; only a few had burning and erythema; no serious side effect was observed. This study shows that for small lesions of vitiligo, 5-fluorouracil application after needling is a cost-effective, safe, and easy method of treatment with minimal



**Figure 1: Repigmentation in a small vitiligo patch on the wrist in a male patient after 2 months of treatment with 5-fluorouracil**



**Figure 2: Repigmentation in vitiligo patch over face in a girl after 3 months of 5-fluorouracil application**

side effects although it is not reasonable for larger patches of vitiligo. It is comparable to a study by Sethi *et al.* in which dermabrasion was combined with 5- fluorouracil where erythema and serous discharge were noted in all patients.<sup>[2]</sup>

A similar study was reported by Shashikiran *et al.* Efficacy of topical 5% fluorouracil needling in vitiligo. where more than 75% repigmentation was noted in 49% of the patches, 50–75% repigmentation was seen in 26% of the patches 25–50% repigmentation in 11% of the patches, whereas 14% of the patches responded poorly with less than 25% repigmentation<sup>[4]</sup> (their study considered the number of patches and not the number of patients for assessment).

Application of 5-fluorouracil after therapeutic wounding, as a treatment for vitiligo, was introduced by Tsuji and Hamada in 1983.<sup>[4,5]</sup>

A strong inflammatory reaction is seen after needling followed immediately by application of topical 5-fluorouracil. Due to this, there is local edema, which increases the intercellular spaces of the basal layer for a long time. Active melanocytes with frequently vacuolated cytoplasm are found migrating from the pigmented to the achromic epidermis through these enlarged intercellular spaces.

Further, the inflammatory mediators such as leukotrienes C4 and D4 are locally released, which would

stimulate melanocyte proliferation and migration. The metalloproteinase-2 synthesized by the keratinocytes during the epidermis remodeling process has been found to help in melanocyte migration. This favorable milieu, which persists for a long time, could explain the successful migration of melanocytes from the pigmented area to the achromic area.<sup>[6]</sup>

In conclusion, we can say that 5-fluorouracil is a cost-effective way of treating vitiligo in patients with resistant patches of long duration.

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