Section: DVL

Original Research Article

A STUDY ON EVALUATION OF EFFICACY OF DERMABRASION ALONG WITH TOPICAL APPLICATION OF 1% 5- FLUOROURACIL IN MANAGEMENT OF PATIENTS WITH VITILIGO PRESENTING TO THE TERTIARY CARE CENTRE

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ABSTRACT

Background: Vitiligo is a chronic skin disorder marked by depigmented patches due to the destruction of melanocytes, influenced by genetic, environmental, and autoimmune factors. Treatments include medical options like corticosteroids and 5-fluorouracil (5-FU), which has shown promise in repigmentation, especially when combined with dermabrasion or microneedling. Although initial studies are encouraging, further research is needed to refine treatment protocols and improve outcomes for patients with resistant vitiligo.

Materials and Methods: This one-year study, conducted from July 2023 to June 2024, enrolled 35 patients with stable vitiligo of more than two years' duration and excluded those with mucosal, actively spreading, or facial vitiligo, among other criteria. The procedure involved dermabrasion followed by the application of 1% 5-fluorouracil cream, with follow-up visits over six months to monitor repigmentation and record any adverse effects.

Results: In the study of 35 vitiligo patients, the majority (60%) had vitiligo vulgaris, with 57.1% being female and the mean age of the group was 34.5 years. Most patients (71.4%) achieved complete repigmentation, while 28.57% had partial repigmentation. The most common side effect was pain at the abraded site (91.4%), and other effects included darker repigmentation (45.7%), superficial scarring (11.4%), and secondary infection (5.7%).

Conclusion: This study highlights the effectiveness of dermabrasion combined with 1% 5-FU for treating vitiligo, but further research is needed to optimize protocols, assess long-term outcomes, and consider patient-reported measures for comprehensive evaluation.

Keywords: Vitiligo, 5- fluoro-uracil, dermabrasion, micro-needling, pigmentation.

INTRODUCTION

Vitiligo is a chronic skin disorder characterized by the progressive loss of melanocytes, leading to depigmented patches on the skin. In India, the prevalence of vitiligo varies significantly, with estimates ranging from 0.46% to as high as 8.8%, particularly in regions like Gujarat and Rajasthan.[1] 2 This condition affects individuals across all age groups and genders, although it is often noted to have a higher incidence among women.[2,3] The pathogenesis of vitiligo is complex and multifactorial, involving genetic predisposition, environmental factors, and autoimmune responses that lead to melanocyte destruction.[4,5]

Treatment options for vitiligo encompass both medical and surgical modalities. Medical treatments include topical corticosteroids, calcineurin inhibitors, phototherapy, and immunomodulators. Surgical interventions may involve skin grafting or

dermabrasion.[5] 6Among these therapies, 5-fluorouracil (5-FU) has gained attention for its potential efficacy in promoting repigmentation. Originally used for treating premalignant skin lesions, 5-FU's mechanism in vitiligo involves stimulating melanocyte activity and increasing melanosome production in keratinocytes.[6,7]

Recent studies have demonstrated the effectiveness of 1% 5-FU in treating vitiligo, particularly when combined with dermabrasion or microneedling techniques. For instance, one study reported that nearly 40% of patients achieved excellent repigmentation (over 75%) after treatment with laser dermabrasion followed by 5-FU application.[9] Another study indicated that patients treated with microneedling combined with 5% 5-FU showed significant repigmentation within the first month, outperforming those receiving standard treatment alone.[8]

Despite these promising results, there remains a pressing need for further research to evaluate the efficacy of combining 1% 5-FU with dermabrasion comprehensively. Such studies could provide valuable insights into optimizing treatment protocols for patients with resistant vitiligo lesions, ultimately improving therapeutic outcomes and quality of life for affected individuals.

MATERIALS AND METHODS

This one-year open, prospective study was conducted at the Department of Dermatology, _____college name, from July 2023 to June 2024. The study enrolled 35 patients, both male and female, above 18 years of age with a clinical diagnosis of stable vitiligo lasting more than two years.

Exclusion criteria included patients with mucosal or actively spreading vitiligo, vitiligo of less than two years' duration, children under 18 years old, pregnant or lactating women, patients with diabetes, those undergoing other treatments for vitiligo, individuals prone to keloid formation, those with bleeding disorders, and those with a history of Koebner phenomenon. Patients with vitiligo involving the face were also excluded.

A detailed medical history was recorded, including information on the onset, duration, and progression of vitiligo, any precipitating factors, family history, associated systemic or skin conditions, and previous treatments and their outcomes. Dermatological assessments focused on identifying white hairs in the depigmented areas. Once the patients met the inclusion criteria, informed written consent was obtained after thoroughly explaining the procedure, possible side effects, and post-procedure care. Routine preoperative investigations included screening for HIV, a complete hemogram, blood sugar levels, and clotting profiles. Patients were also asked for consent to document the treatment process through photographs.

The procedure involved selecting a stable vitiligo patch. After cleaning the patch and surrounding skin with spirit and povidone-iodine solution, local anesthesia was administered using 2% lignocaine injected intradermally. After 10 minutes, dermabrasion was performed using a hand-held manual metallic dermabrader in a to-and-fro motion, followed by horizontal and longitudinal criss-cross strokes until pinpoint bleeding was observed. The surrounding skin, extending 1 cm from the patch, was also dermabraded to prevent recurrence. A thin layer of 1% 5-fluorouracil cream was applied to the dermabraded area, and the site was dressed with gauze.

Patients were prescribed systemic antibiotics for seven days to prevent infection, and the dressing was removed on the third day post-procedure. Follow-up visits were scheduled monthly for six months to assess repigmentation. Photographs were taken before the procedure and during follow-up. Repigmentation was classified as complete if 100% pigmentation was achieved, while partial repigmentation referred to any pigmentation less than 100%. Adverse effects such as infection, pain, and scarring were recorded during the follow-up period.

RESULTS

A total of 35 patients with vitiligo were included in the study. The mean age of the study population was 34.5 years. Most of the patients belonged to 20-40 years of age group. There were 15 males (42.8%) and 20 females (57.1%) in the study. Majority of the patients (n = 21; 60%) had vitiligo vulgaris while the rest 40% had focal vitiligo. 14.2% of the patients had a positive family history for vitiligo (n = 5).

All the 35 patients were followed up regularly and no dropouts were reported.

Majority of the patients had complete re-pigmentation (71.4%). Pain at abraded site was the most common site-effect, which eventually subsided after 1 week to 10 days. [Table 1]

Table 1: Re-pigmentation

Repigmentation	No. of patients who had positive response
Complete	25 (71.4%)
Partial	10 (28.57%)

Table 2: Side-effects profile

Side effects	No. of patients
Darker repigmentation	16 (45.7%)
Superficial scar tissue formation	4 (11.4%)

Secondary infection	2 (5.7%)
Pain at surgical site	32 (91.4%)

DISCUSSION

Vitiligo is a chronic skin disorder characterized by the loss of melanocytes, leading to depigmented patches on the skin. It affects approximately 0.5% to 2% of the global population, with higher prevalence rates reported in certain regions, such as up to 8.8% in parts of India. This condition can significantly impact patients' quality of life, leading to psychological distress and social stigmatization.

In present study involving 35 patients with vitiligo, the mean age was 34.5 years, with the majority (60%) diagnosed with vitiligo vulgaris, while 40% had focal vitiligo. Notably, 14.2% of patients reported a positive family history of vitiligo. All patients were followed up regularly throughout the study, with no dropouts reported.

The treatment approach in this study involved dermabrasion combined with topical application of 1% 5-fluorouracil (5-FU). Dermabrasion is a surgical technique that mechanically removes the upper layers of skin to promote healing and stimulate repigmentation. When paired with topical 5-FU—a chemotherapeutic agent known for its ability to inhibit DNA synthesis in rapidly dividing cells—this combination has shown promising results. The efficacy of this treatment modality is theorized to stem from several mechanisms: dermabrasion creates micro-injuries that enhance the absorption of 5-FU into the skin, allowing for deeper penetration and more effective action on melanocytes. Additionally, 5-FU may stimulate melanocyte activity by promoting their migration from hair follicles to the epidermis during the healing process, thereby enhancing repigmentation.

In this study, results indicated that a significant majority of patients (71.4%) achieved complete repigmentation, while 28.57% experienced partial repigmentation. Pain at the abraded site was the most common side effect but subsided within one week to ten days. Other side effects included darker repigmentation (45.7%), superficial scar tissue formation (11.4%), and secondary infections (5.7%).

In a clinical trial by Asilianet al,[9] involving 36 patients with refractory vitiligo,significant improvements in both Vitiligo Area Severity Index (VASI) and repigmentation scores were demonstrated after treatment with dermabrasion plus 5-FU compared to suction blister techniques; however, no significant difference in outcomes was noted between the two methods.

In a study done by Desai et al,[10] thirty-three adult vitiligo patients were divided into two groups, with half receiving the 5-FU + microneedling treatment and the other half not. The group treated with 5-FU + microneedling showed earlier initiation of repigmentation and excellent improvement (>75% repigmentation) compared to the untreated group after a 6-month period thus concluding that needling with 5% 5-FU could be a safe and effective treatment, particularly for vitiligo patients who do not respond well to conventional therapy.

Furthermore, a study conducted by Abdelwahab et al,[11] reported that after laser dermabrasion followed by topical application of 5-FU for 15 days, nearly 40% of patients achieved excellent repigmentation (75-100%) within three months. These results emphasize the potential effectiveness of combining mechanical and chemical therapies in treating vitiligo.

CONCLUSION

Although this study demonstrates the effectiveness of dermabrasion combined with topical 1% 5-FU in treating vitiligo, further research is needed to refine treatment protocols and assess long-term outcomes. Exploring the impact of this combined approach could offer valuable insights into improving therapeutic strategies for vitiligo. Future studies should prioritize patient-reported outcomes and quality of life assessments in addition to clinical efficacy to provide a more comprehensive evaluation and management of this complex skin condition.

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