VITILIGO AND SURGICAL TREATMENT

Tran Van Anh, Vu Quang Vinh
Le Huu Trac National Burn Hospital

ABSTRACT

Objective: *Initial comments on the effectiveness of surgical treatment of vitiligo*

Research subjects and methods: *A prospective study on 12 cases of vitiligo that were successfully treated with autologous pigment cell transplant surgery. Research period from September 2018 to October 2022 at the Center for Plastic Surgery, Surgery & Regeneration - Le Huu Trac National Burn Hospital*

Results: *12 patients with an average age of 29, with vitiligo in several locations on the body, received pigment-containing cell transplant surgery. The graft adheres well, ensuring good coverage and assimilating the color of the vitiligo skin area with the surrounding healthy skin after about 12 months.*

Conclusion*: Pigment graft surgery is one of the effective methods of treating vitiligo and can be applied to large areas of the diseased skin.*

Keywords: *Vitiligo, pigment grafting*

1. BACKGROUND

Vitiligo is an autoimmune skin disease that targets melanocytes and causes depigmented patches visible as white spots. Like other autoimmune diseases, vitiligo has a very complex pathogenesis, including genetic, environmental, and random factors. Vitiligo is not only a devastating disease that affects appearance but also affects the patient's quality of life. Visible cosmetic defects often lead to psychological problems such as depression and anxiety, and cause low self-esteem and social isolation. The face and neck are areas where vitiligo is common, affecting the patient's aesthetics and psychology.

Treating vitiligo is quite difficult, many methods have been applied from internal medicine to surgery, but so far no method has brought optimal results because many other factors affect the results of treatment.

Surgical techniques often aim to provide melanocytes to previously depigmented areas [1] by dividing them into grafts and cell grafts (cultured melanocytes and cell grafts uncultured epidermis) [2, 3, 4]. Among them, the autologous culture-free melanin-keratinocyte transplantation (MKTP) procedure is one of the simplest cell transplantation techniques and is currently the most popular among dermatologists [5].

[1]Chịu trách nhiệm: Trần Vân Anh, Bệnh viện Bỏng Quốc gia Lê Hữu Trác
Email: vananhvb@gmail.com
Ngày nhận bài: 05/12/2023; Ngày nhận xét: 21/12/2023; Ngày duyệt bài: 30/12/2023
https://doi.org/10.54804/yhthvb.6.2023.277

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

It provides repigmentation rates of 50 - 100% with a donor-to-recipient ratio between 1:3 and 1:10, showing acceptable color matching in most treated cases [6]. Since it was first developed by Gauthier and Surleve-Bazeille in 1992 [7], several studies have been performed on the effectiveness of MKTP in the treatment of stable vitiligo [2]. However, studies with large databases and long-term follow-up, especially organ transplant outcomes after 6 years or longer, are rare.

Based on the above reasons, we conducted research with 12 cases of vitiligo on the face and neck using small thin autologous skin grafts, in order to achieve the goal of treating vitiligo, bringing the highest aesthetics to the patients. Research results and surgical methods will be presented in our report.

2. RESEARCH OBJECTS AND METHODS

2.1. Objects

12 cases of vitiligo were treated at the Center for Plastic Surgery, & Reconstruction - Le Huu Trac National Burn Hospital between September 2018 and October 2022.

2.2. Research Methods

The surgeries are monitored and evaluated for near and far post-operative results through the following criteria: Survival of the graft, healing of the surgical wound, complications if any, compatibility, and pigmentation development in the diseased area. physical.

- Prepare the patient:

+ Patients are examined and prescribed according to selection criteria.

+ Check pre-operative tests: X-ray of bones and joints, heart and lungs, basic blood tests, urine, electrocardiogram...

+ Prepare the donor area based on the size of the vitiligo skin area.

+ Take photos of the damage before, during and after surgery

- Surgical method:

+ Steps: Prepare the graft base: remove the dermis and dermis of the vitiligo skin area, and create a good graft base.

Skin is taken from the outer surface of the thigh, the area of skin to be removed is the area of vitiligo skin. The thickness of the skin piece is 0.15mm, skin removal tool: Padget knife. The skin removal area is covered with pig skin dermis and lightly compressed with a bandage.

+ The obtained piece of skin will be cut into many small pieces, an area of about 0.5 - 1cm in diameter.

+ Prepare the graft base: The vitiligo skin area is surgically removed from the epidermis and dermis in many small cells, the diameter of the cells is about 0.3 - 0.5cm, and these cells are about 1 - 1.5cm apart. (according to the space ratio 1:3), surgical tools: regular scalpel (Figure 4).

+ Stop the bleeding carefully, place small pieces of prepared skin graft on the newly created graft base, apply Vaseline gauze, and apply a light-pressure bandage.

+ Change the bandage on the grafted skin area 5 days after surgery.

Evaluate surgical results:

- Short-term result (level: Good, fair, and poor): Based on survival of the skin graft,

wound healing, hematoma under the graft, surgical wound infection... Criteria Evaluation is similar to the evaluation criteria of the autologous thin skin grafting method.

- Long-term result: Follow-up time after 3 months, 6 months, 1 year, 2 years, and after each year.

+ Good: The pigment patches in the vitiligo skin area are > 75% uniform in color and flat. The area where the skin was removed has no scars or changes in skin pigmentation.

+ Moderate: Skin pigmentation in the vitiligo area is 30 - 75% uniform in color, or the graft is uneven with the surrounding area of the graft. The area where the skin was removed has slight changes in skin pigmentation.

- Bad: The skin pigmentation in the vitiligo area is less than 30%. The area where the skin was removed leaves bad scars.

A. Vitiligo in the pigmented area of the forehead and right temple/

B. 1 day after pigment grafting surgery

C. 2.5 months after pigment graft surgery

D. 2 years after pigment graft surgery

Figure 1. Image of pigment grafting in the treatment of frontal vitiligo

3. RESULT

We have operated on 12 cases of vitiligo in the stable stage, at least the patients did not see the development of vitiligo for about 2 years. Patients had long-term follow-up data (24 - 40 months; median: 32 months. 12 patients were followed for at least 2 years. Duration of vitiligo varies from 2 to 15 years, with a median duration of average 5.0 years. The maximum surgical area per patient is 100cm² and the minimum is 10cm². Three patients (3.4%) had a family history of vitiligo. Diseases all patients received surgery to treat vitiligo on the face and neck.

Table 3.1. Patient characteristics

Sex: + Male + Female	**4 (33.3%)** **8 (66.7%)**
Age (years), median	21.1 ± 5.1
Duration of illness (years)	5.0 ± 0.8
Stability time (months)	23.5 ± 39.3
Surface of treated area (cm^2)	56.3 ± 27.3
Family history of vitiligo, n (%)	3/12 (25%)
Monitoring time, n (%)	
2 years	6/12 (50%)
3 years	6/12 (50%)

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

Re-pigmentation results

Good re-pigmented lesions are considered successful (Figures 1, 2, 3, 4). Good repigmentation was achieved in 10/12 (83.3%), and 2/12 (16.7%) patients in the grafted area showed slight convexity of the graft, uneven surface, and not effective highly aesthetic (Figure 5).

Table 3.2. Complications

Complications	Quantity	Percentage (%)
None	11	91.67
Incision site hematoma	1	8.33
Bacterial infections	0	0
Total (n = 12)	12	100

Table 3.3 Surgical results

Results	Quantity	Percentage (%)
Good	10	83,3
Fair	2	16,7
Poor	0	0
Total (n = 12)	12	100

All patients in this study performed good and fair, with the graft covering the vitiligo skin adhering well to the first incision in 12 out of 12 cases. The area for the skin does not leave bad scars, does not cause sequelae of contracture.

A: Vitiligo on the left cheek, upper lip | B: 3 months after skin graft surgery | C: 2 years after skin graft surgery

Figure 2. Image of pigment grafting in the treatment of vitiligo in the cheek, upper lip

A: Vitiligo on the right cheek, upper lip | After 2 years of skin grafting | After 3 years of skin grafting

Figure 3. Image of pigment grafting in the treatment of vitiligo in the chin area of the lower lip

A: Vitiligo on the right cheek and upper lip

B: Prepare for pigment grafting

C: After pigmentation surgery

D: 13 months after skin grafting

E: 2 years after skin grafting

Figure 4. Image of pigment grafting in the treatment of vitiligo in the chin and lower lip area

A: Vitiligo at the lower chin

B: 2 years after pigment graft surgery.
Aesthetic results: the grafted area is uneven and rough

Figure 5: Image of pigment grafting in the treatment of vitiligo in the chin area of the left lower lip

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

4. DISCUSSION

Diagnosis: Vitiligo can occur at any age, clinical diagnosis is based on the use of Wood's lamp light, ultraviolet rays shining on the skin will reveal that the depigmented skin will appear more rosy under the light bright.

The only symptom of vitiligo is that one part of the skin is lighter in color than the rest of the skin. Vitiligo skin areas are usually areas of skin frequently exposed to sunlight such as the face, neck, and limbs.

But for the most part, vitiligo skin areas usually do not cause discomfort or pain.

Some common causes: 20% of people with vitiligo have parents, siblings, or siblings with vitiligo. In some people, the disease is related to immune factors, leading to the body's immune system attacking and destroying melanocytes.

Maybe a few people get sick due to sudden stress, or an imbalance in oxygen molecules and antioxidants in the body. In addition, environmental factors: sunburn, chemical exposure, and unstable mental health can also be the cause of vitiligo.

4.1. Types of vitiligo

4.1.1. Non-segmental vitiligo

Non-segmental vitiligo is the more common type. If the first white patches are symmetrical, this suggests a type of vitiligo called non-segmental vitiligo. Growth will be slower if the patches are only one anatomical region of the body. The patches usually appear equally on both sides of the body, often appearing on areas of frequently exposed skin to the sun like the face, neck, and hands.

4.1.2. Segmental vitiligo

This type of disease is much less common and only affects about 5-16% of people with vitiligo, usually appearing between the ages of 4 and 10 years and affecting only one area of the body. Segmental vitiligo typically affects areas of skin attached to nerves that arise at the posterior roots of the spine, responding well to topical treatments.

4.1.3. Surgical treatment of vitiligo

Vitiligo is a difficult disease to treat. Many factors affect the treatment results such as: Location, extent of the diseased area, duration of the disease, combined treatment measures, and overall medical condition close...

In this study, with a rather modest number, we only give some initial comments on the pigment grafting method in the treatment of vitiligo, a method that many authors around the world believe is highly efficient.

Several surgical methods have been applied in the treatment of vitiligo, each method has its advantages and disadvantages. In all 12 patients in this study, we used pigment grafting. The grafts were only a little larger than the size of a punch, so it was similar to the miniature punch grafting method.

4.2. The mechanism of spreading of pigment cells after transplantation is as follows

Spread and accumulation: After pigment cells are transplanted into damaged skin, they will begin to spread and accumulate in the surrounding area.

Melanocytes can self-locate and develop into new skin cells. They will divide and duplicate to create many new pigment cells, thereby creating new skin and replacing skin areas damaged by vitiligo.

Recovery and regeneration: When new pigment cells have spread and accumulated enough in the damaged skin area, the process of skin recovery and regeneration will take place. The new melanocytes will provide pigment to surrounding skin cells and help regenerate the skin's natural structure and color. The result is that the damaged skin will be restored and have an appearance similar to the original healthy skin.

Surgical methods often aim to provide melanocytes to previously depigmented areas by dividing them into grafts and cell grafts (cultured melanocytes and non-melanocytes graft culture). Among them, the autologous non-cultured melanin-keratinocyte transplantation (MKTP) procedure is one of the simplest cell transplantation techniques and is currently the most popular among dermatologists. It provides repigmentation rates of 50 - 100% with a donor-to-recipient ratio between 1:3 and 1:10, showing acceptable color matching in most cases treated. Since it was first developed by Gauthier and Surleve-Bazeille in 1992 [7], several studies have been performed on the effectiveness of MKTP in the treatment of stable vitiligo.

Surgical Therapy

In the last decades, the surgical options for vitiligo underwent a lot of advances. The main basic methods for melanocyte transplantation are essentially five: punch grafting; suction blister grafting, thin dermo-epidermal grafts, non-cultured epidermal suspensions, and in vitro cultured epidermis with melanocytes or pure melanocytes suspensions [12].

4.3. Some factors related to treatment results

- Patient's age: The influence of age at surgery on treatment results is still unclear. Chen et al showed that patients under 40 years of age had better outcomes. However, according to some other authors, the influence of age is insignificant. In this study, we found that age was not a statistically significant covariate related to treatment success.

- Pathological location: According to Huggins with colleagues, more than 70% of patients with vitiligo in the perioral area have poor pigmentation regeneration [4]. However, patients with vitiligo skin around the mouth all have good results after colorectal graft surgery. In this study, there were 5/12 patients with vitiligo patches in the perioral area. All patients had good results after surgery.

- Treatment measures before surgery: Many authors show that patients receive medical treatment such as using UVB, UVA phototherapy, or other products. As a result, pigment regeneration is improved thanks to phototherapy before MKTP was not surprising. Zeng suggested that the combination with UVB phototherapy also increased the effectiveness of cultured autologous melanocyte transplantation [8]. Over the years, several studies have used post-transplant phototherapy to enhance repigmentation, although no studies have been performed to evaluate the role of phototherapy before surgery.

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

Most of the 12 patients above said they did not use standard interventions of topical corticosteroids/calcineurin and phototherapy before surgery.

- Vitiligo stabilization time: The stability of vitiligo is considered an important parameter before considering any melanocyte transplantation technique. We found that different periods of disease stability were used as criteria for surgical indications. Some authors believe that 6 months of disease stabilization is sufficient, while others require 1 year for disease stabilization [9, 10]. Olsson even suggested that patients with stable vitiligo for less than 2 years should not be candidates for surgery [11]. Recurrence: Gang and colleagues showed a recurrence rate of 11% out of 177 patients. MKTP shows therapeutic promise and has been proven to be a safe and effective treatment for patients. Further improvements in implantation techniques may yield better results even in difficult-to-treat areas.

- A family history of vitiligo can significantly affect treatment results. Dimin Zhang's 2021 announcement showed that 79/2283 patients with a positive family history responded worse than other patients without a family history. People with a first-degree relative with vitiligo have a higher risk of developing the disease: nearly 6% compared with 1% or less in the general population [8].

Surgical results: Many authors around the world believe that surgical results are more stable and better with an evaluation period longer than 12 months. Our patients are no exception. Within 12 months, the studied patients were periodically re-examined, and usually after 12 months, the grafted skin had better results in terms of color uniformity in the white skin area (table 1 & 3).

5. CONCLUSION

Vitiligo is a difficult disease to treat. Many methods have been applied, including medical and surgical treatment. Pigment grafting is one of the promising treatment measures and is preferred by many doctors. However, to achieve high effectiveness, it is necessary to study a large number of patients to provide the most accurate indications for the treatment. This method is because many related factors affect treatment results.

In initial research with 12 patients, we found this to be a simple but quite effective treatment method for vitiligo, opening the door for further research with a larger number of samples.

REFERENCES

1. **Nahhas AF, Braunberger TL, Hamzavi IH**. Update on the management of vitiligo. Skin Therapy Lett. 2019; 24:1-6.
2. **Mulekar SV, Isedeh P.** Surgical interventions for vitiligo: an evidence-based review. Br J Dermatol. 2013. (Suppl 3); 169:57-66.
3. **Felsten LM, Alikhan A, Petronic-Rosic V.** Vitiligo: A comprehensive overview part II: treatment options and approach to treatment. J Am Acad Dermatol. 2011; 65:493–514. 4. Huggins RH, Henderson MD, Mulekar SV, Ozog DM, Kerr HA, Jabobsen G, Lim HW, Hamzavi IH. Melanocyte-keratinocyte transplantation procedure in the treatment of vitiligo: the experience of an academic medical center in the United States. J Am Acad Dermatol. 2012; 66:785-93.

4. **Bassiouny D, Esmat S.** Autologous non-cultured melanocyte-keratinocyte transplantation in the treatment of vitiligo: patient selection and perspectives. Clin Cosmet Investig Dermatol. 2018; 11:521-40.
5. **Van Geel N, Wallaeys E, Goh BK, De Mil M, Lambert J.** Long-term results of noncultured epidermal cellular grafting in vitiligo, halo naevi, piebaldism and naevus depigmentosus. Br J Dermatol. 2010; 163:1186-93.
6. **Gauthier Y, Surleve-Bazeille JE.** Autologous grafting with noncultured melanocytes: a simplified method for treatment of depigmented lesions. J Am Acad Dermatol. 1992; 26:191–94.
7. **Zhang DM, Hong WS, Fu LF, Wei XD, Xu AE.** A randomized controlled study of the effects of different modalities of narrow-band ultraviolet B therapy on the outcome of cultured autologous melanocytes transplantation in treating vitiligo. Dermatol Surg. 2014; 40:420-26.
8. **Mulekar SV.** Long-term follow-up study of 142 patients with vitiligo vulgaris treated by autologous, non-cultured melanocyte-keratinocyte cell transplantation. Int J Dermatol. 2005; 44:841-45.
9. **Pandya V, Parmar KS, Shah BJ, Bilimoria FE.** A study of autologous melanocyte transfer in treatment of stable vitiligo. Indian J Dermatol Venereol Leprol. 2005; 71:393-97.
10. **Olsson MJ, Juhlin L.** Long-term follow-up of leucoderma patients treated with transplants of autologous cultured melanocytes, ultrathin epidermal sheets and basal cell layer suspension. Br J Dermatol. 2002; 147:893-904.
11. **C Cortelazzi, G Pellacani, E Raposio, S Di Nuzzo.** Vitiligo management: Combination of surgical treatment and phototherapy under reflectance confocal microscopy monitoring. Eur Rev Med Pharmacol Sci. 2020 Jul;24(13):7366-7371. DOI: 10.26355/eurrev_202007_21904.