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Complications of Hair Transplantation

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<http://dx.doi.org/10.5772/66838>

Abstract

Recently, hair transplantation has been frequently commonly applied for aesthetic surgical procedures. Hair transplantation has a low complication rate compared to other aesthetic surgical procedures. However, it can cause serious complications if proper attention is not given. But there are a wide range of possible complications that are less severe and manageable. Common postoperative complications include pain, edema, asymmetry, bleeding, visible scarring, folliculitis, crusting, graft dislodgement, hiccups, effluvium, pruritus, and hypoesthesia. Other less common postoperative complications include hypertrophic scarring and keloid, arteriovenous fistula, infection, cobblestoning, syncope, pigment alteration, necrosis, granulomatous reaction, pyogenic granuloma, and Kaposi's varicelliform eruptions. The most serious complication of hair transplantation is necrosis.

Keywords: complications of hair transplantation, necrosis, hair surgery

1. Introduction

Recently, hair transplantation has been frequently commonly applied for aesthetic surgical procedures. Hair transplantation has a low complication rate according to other aesthetic surgical procedures. However, it can lead to serious complications if proper attention is not given. But there are a wide range of possible complications that are less severe and manageable. Common postoperative complications of hair transplantation are listed in **Table 1**.

Common postoperative complications

Pain
 Edema
 Asymmetry
 Bleeding
 Visible scarring
 Folliculitis
 Crusting
 Graft dislodgement
 Hiccups
 Effluvium
 Pruritus
 Hypoesthesia

Table 1. Common postoperative complications of hair transplantation.

2. Pain

Postoperative pain in most of the patients occurs after hair transplantation surgery. This pain occurs especially in hair transplantation performed with FUT (follicular unit transplant). Because due to the transection of peripheral nerves during strip harvesting. In FUE (follicular unit extraction) method, an average of 3000 graft transplantation procedures lasts for 6–8 h. Muscle pain can occur depending on the lying position during this period. Small breaks need to be given during the process, intraoperative analgesic injection and postoperative NSAID (nonsteroidal anti-inflammatory drugs) use to prevent and reduce pain [1].

3. Edema

Postoperative edema is the most common complication in hair transplantation. The average incidence of postoperative edema in hair transplantations varies from 40 to 50%. Edema can develop due to tumescent anesthesia and trauma during processing. Tissue edema begins at the time of surgery, but it is only evident 3–5 days later when it descends over the forehead. Occasionally, edematous fluid travels into the periorbital tissues and causes periorbital ecchymosis. Additionally, in some cases, this edema is so severe that patients cannot open his/her eyes.

To prevent and minimize edema, patients should be explained in the lying position during the postoperative period. The use of massage, cold pack, systemic steroids, infiltrative steroids, and NSAID can reduce edema.

4. Asymmetry

Attentive planning and marking of the recipient site will minimize the risk of asymmetry. Causes of asymmetry include the design of false frontal hairline, density difference between

the right and left frequency, and previously deformed head. Always check your design markings in a mirror, viewed from behind the patient's head and at his eye level and get his approval as well. You will frequently be surprised how different it looks in the mirror than when you are standing in front and 2 m away [2].

5. Hemorrhage bleeding

The scalp, whether hair bearing or bald, has an abundant blood supply, but the incidence of hemorrhage is surprisingly small. Less often, bleeding occurs after the patient leaves the clinic. Applying pressure for 15 minutes with a clean gauze is very effective for reducing the risk of hemorrhage.

During the preoperative evaluation, patients should be screened for history of bleeding diathesis, for intake of aspirin, nonsteroidal anti-inflammatory agents, vitamin E, alcohol, anabolic steroids, or other anticoagulative agents. Topical minoxidil and smoking must be stopped at least 2 weeks prior to the surgery. Intraoperative recipient-site bleeding is not uncommon and can, usually, be minimized by injection with epinephrine-containing tumescent solutions [3–5].

6. Visible scarring

Visible scarring in the donor area is the most common patient complication encountered in hair transplantation. Hair transplant performed with FUT can leave linear scar at donor region. In the hair transplantation with FUE, visible scarring may occur due to the frequent and abreast entrance of the punch. To avoid this situation, frequent and side-by-side entered punch should not be performed. The treatment for patients with scar includes visible scar revision, hair transplantation, and micro-pigmentations.

7. Folliculitis

Folliculitis is the term used to describe hair follicle inflammation in response to infection, physical injury, or chemical exposure. The reported incidence of postoperative folliculitis in hair transplantations varies from 1.1 to 20% and the severity ranges from a mild, superficial inflammation with mild erythema, and scattered pustules. The infection can occur in either the recipient or the donor area. The treatment of folliculitis depends on the underlying cause. When a mild folliculitis begins 2–3 months postoperatively, hair growth is the probable cause. In such cases, the initial treatment includes warm compresses for 15 min three times daily, and a topical antibiotic ointment such as mupirocin [6].

8. Crusting

Crusting occurs on dry to superficial epidermis of the surrounding graft and bleeding after 24–48 h of hair transplant. Crusting disappears after an average of 7–10 days.

The crusts do not affect the graft survival or the healing process unless they persist for a long period. A first washing is recommended after 48 h to dissolve early crusts. Applying a moisturizer or an emollient is recommended before 30–45 min of washing for softening of crusts. If crusts are still present after postoperative 9–10 days, wet compress or vapor is applied.

9. Graft dislodgement

Graft dislodgement usually occurs in the initial 3 days after hair transplant operation. Direct trauma is the main cause of graft dislodgement. Grafts do not survive long time in the external environment. When trauma or similar reasons occur, graft dislodgement should be replaced as quickly as possible. Patients can store graft dislodgement for a short period in lens solution, saline, or brackish liquid, thereby preventing drying of grafts.

10. Hiccups

Hiccups are an uncommon complication of hair transplantation. The reported incidence of hiccups in hair transplantations is 4.11%. Hiccups are found intraoperatively or shortly after the operation. Usually, it lasts for 2–3 days in the absence of treatment. They can also result from excessive air aspiration consequent to the stimulation of diaphragmatic muscle movements by very excited or vocal patients [7].

11. Postoperative effluvium/shock loss

Postoperative effluvium of preexisting recipient area hair occurs after hair transplant, but significant effluvium is far less common. Postoperative effluvium causes recipient site creation, vascular disruption, or edema. It usually presents 2–4 weeks after surgery. However, the majority of the affected hairs begin to regrow after 2–3 months. To reduce postoperative effluvium, protection of existing hair during the recipient site creation should be noted, limiting recipient site size and density to prevent excessive vascular disruption and reducing postoperative edema. Postoperative minoxidil may reduce the incidence of this problem [8].

12. Donor hair effluvium

Hair effluvium is a relatively common occurrence in recipients, especially in females, whereas in donors, it is significantly less common. It usually presents within 6 weeks of surgery as

temporary hair loss along the inferior and superior margins of linear wounds, or as diffuse hair loss in the case of FUE. Most likely, it is a consequence of anagen effluvium, in response to interrupted blood supply. Patients should be reassured that the problem spontaneously resolves within 3–4 months, but minoxidil can hasten hair regrowth.

13. Pruritus

Pruritus can be seen after hair transplantation in the donor and the recipient areas. Wound healing process may be the cause. Other reasons may be the use of minoxidil after hair transplantation. Scalp irritation can be caused depending on the frequency of use and the concentration of minoxidil. Topical steroids or and antihistamines are recommended for the treatment of many patients.

14. Loss of sensation

Temporary loss of sensation nearly always occurs in the donor and recipient areas, and is the result of the severing of nerves by the punch as it bores out donor and recipient sites. Patients usually notice this, but rarely complain about it. Sensation returns over a period of 6–12 months after the procedure is completed [9]. Less common complications of hair transplantation are listed in **Table 2**.

Less common postoperative complications

Hypertrophic scarring and keloid
Arteriovenous fistula
Infection
Cobblestoning
Syncope
Pigment alteration
Necrosis
Granulomatous reaction
Pyogenic granuloma
Kaposi's varicelliform eruption

Table 2. Less common complications of hair transplantation.

15. Hypertrophic scar or keloid

Keloid and hypertrophic scarring are rare occurrences in hair transplant complications. The reported incidence of keloid and hypertrophic scarring in hair transplantations is 0.1%. They represent an abnormal response to dermal injury, characterized by exuberant collagen deposition. Keloid scarring usually develops months or years after surgery and persists indefinitely. Individuals with a history of keloid scarring are not candidates for hair restoration surgery. Those

with a high risk of developing keloids, due to ethnicity and age, or with a personal history of hypertrophic scarring, should be informed of the potential for abnormal scarring [9, 10].

16. Arteriovenous fistula

The postoperative complication of arteriovenous fistula is a rare complication of punch-graft hair transplantation. This complication has been observed after large punch-graft hair transplantation is done especially to the temporal region in the 1970s.

A pulsatile subcutaneous mass with an associated thrill or bruit and symptoms including pain or headache is a common presentation. Angiography is required for complete diagnostic evaluation.

Clinical findings usually resolve spontaneously within 6 months, but superficial vessels can be ligated if the surgeon is concerned about vessel rupture or cosmetic appearance [11–13].

17. Infections

Infections of the scalp are very rare because it is well vascularized. Serious infections occur in less than 1% of cases and are, usually, associated with poor hygiene, excessive crust formation, or preexisting medical risk factors. There are several measures to be followed for prevention and infection control after hair transplantation: clean and decontaminated operating room, use of sterilized material, donor area asepsis, use of disposable instruments, and antibiotic prophylaxis [14, 15].

18. Cobblestone appearance

The cobblestoning occurs when follicular units are implanted into hole or slits that are too small or implanted at the incorrect depth.

19. Syncope

Occasionally, very nervous patients faint or feel faint during the procedure, but this can be managed by simple measures such as lowering the head between the knees or laying the patient in a prone position [16].

20. Pigment alteration

Pigment alterations of the skin can appear after a hair transplant. The transplanted area should not be subjected to the sun for at least 1 month after hair transplant procedure. A hat (men) or a scarf (for women) is recommended.

21. Necrosis

Recipient area necrosis is a rare but dangerous complication that arises when an increased number of recipient grafts are utilized and de-vascularization of the scalp occurs as a result of dense splitting of the recipient skin that results in large wound areas.

Predisposing factors of skin necrosis: Recipient-site necrosis is a result of vascular compromise. Predisposing influences composed of patient's factors and technical factors are as follows:

- Patient's factors: Smoking, atrophic skin damage, diabetes mellitus, scarring of the recipient site, or a history of scalp surgery.
- Technical factors: Dense packing, megasessions, large openings, use of anesthetic or tumescent solutions with high epinephrine concentration, and deep recipient incisions.

The treatment of central recipient area necrosis focuses on wound debridement and the cultivation of a viable wound base. Extensive sharp debridement is not recommended, and limited sharp debridement of the hyperkeratotic edge of the wound will stimulate reepithelialization. The application of mupirocin ointment is recommended twice daily. Occasionally, for extensive areas of necrosis, scalp expansion may be required for repair. In the treatment of tissue necrosis, hair transplantation can be performed after recovering tissue necrosis [16].

Other less common postoperative complications include granulomatous reaction [17], pyogenic granuloma [18], epidermoid cysts or cysts, and Kaposi's varicelliform eruption [19].

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References

- [1] Parsley WM, Waldman MA. Postoperative phase. In: Unger WP, Shapiro R, Unger R, Unger M, eds. *Hair Transplantation*, 5th edn. New York, NY: Informa Healthcare, 2011: 416–27.
- [2] Shiffman MA, Shiell RC, Lam SM. Managing complications in hair restoration. In: Lam S, eds. *Hair Transplant 360 Advances, Techniques, Business Development Global Perspectives*, Vol 3. New Delhi: Jaypee, 2014: 357–74.
- [3] Unger WP. Hair transplantation in male-pattern alopecia. *Can Med Assoc J.* 1971; 105: 177–81.

- [4] Lam SM. Complications in hair restoration. *Facial Plast Surg Clin North Am.* 2013; 21: 675–80. DOI: 10.1016/j.fsc.2013.07.010.
- [5] Coleman WP, Klein JA. Use of the tumescent technique for scalp surgery, dermabrasion, and soft tissue reconstruction. *J Dermatol Surg Oncol.* 1992; 18: 130–5.
- [6] Sandro S, Gonçalves AJ, Américo HJ, Flavia HJ. Surgical complications in hair transplantation a series of 533 procedures. *Aesthet Surg J.* 2009; 29: 72–6. DOI: 10.1016/j.asj.2008.11.005
- [7] Loganathan E, Sarvajnamurthy S, Gorur D, Suresh DH, Siddaraju MN, Narasimhan RT. Complications of hair restoration surgery: a retrospective analysis. *Int J Trichology.* 2014; 6: 168–72. DOI: 10.4103/0974-7753.142861
- [8] True RH, Dorin RJ. A protocol to prevent shock loss. *Hair Transplant Forum Int.* 2005; 15: 197.
- [9] Juckett G. Management of keloids and hypertrophic scars. *Am Fam Physician.* 2009; 80: 253–60.
- [10] Brown MD, Johnson T, Swanson NA. Extensive keloids following hair transplantation. *J Dermatol Surg Oncol.* 1990; 16: 867–9.
- [11] Barros d'Sa AA, Heard CE. Arteriovenous fistula after hair transplantation. *Br Med J.* 1978; 11: 340–1.
- [12] Semashko DC, Schwartz ME, Kaynan A, Harrington EB. Arteriovenous fistula following punch-graft hair transplantation. *J Dermatol Surg Oncol.* 1989; 15: 754–5.
- [13] Davis AJ, Nelson PK. Arteriovenous fistula of the scalp secondary to punch autograft hair transplantation: angioarchitecture, histopathology, and endovascular and surgical therapy. *Plast Reconstr Surg.* 1997; 100: 242–9.
- [14] Farjo N. Infection control and policy development in hair restoration. *Hair Transplant Forum Int.* 2008; 18: 141–4.
- [15] David PM. Complications in hair restoration surgery. *Oral Maxillofac Surg Clin North Am.* 2009; 21: 119–48. DOI: 10.1016/j.coms.2008.10.010
- [16] Feily A, Moeineddin F. Feily's method as new mode of hair grafting in prevention of scalp necrosis even in dense hair transplantation. *Dermatol Pract Concept.* 2015; 5: 41–6. DOI: 10.5826/dpc.0503a10
- [17] Altchek DD, Pearlstein HH. Granulomatous reaction to autologous hairs incarcerated during hair transplantation. *J Dermatol Surg Oncol.* 1978; 4: 928–9.
- [18] Sarnoff DS, Goldberg DJ, Greenspan AH, Albom MJ. Multiple pyogenic granuloma-like lesions following hair transplantation. *J Dermatol Surg Oncol.* 1985; 11: 32–4.
- [19] Mansur AT, Demirci GT, Uzunismail MA, Yildiz S. A rare complication of follicular hair unit extraction: Kaposi's varicelliform eruption. *Dermatol Pract Concept.* 2016; 6: 15–7. DOI: 10.5826/dpc.0601a05