

The Role of Hair Restoration Surgery in Primary Cicatricial Alopecia

Maurice J. Dahdah^a Matilde Iorizzo^b

^aDepartment of Dermatology, Sacre Coeur Hospital, Beirut, Lebanon; ^bPrivate Dermatology Practice, Bellinzona, Switzerland

Key Words

Hair disorders · Cicatricial alopecia · Treatment · Hair transplant · Hair restoration surgery

Abstract

Primary scarring alopecias are a group of inflammatory conditions in which the main target of the inflammation is the hair follicle. They represent up to 7.3% of the hair loss cases presenting to specialty hair clinics. They are poorly understood, their pathogeneses are mostly unknown and their management is guided at best by the results of small case series and expert opinions. These alopecias are frequently referred to as a trichologic emergency as their progression can be rapid and the hair loss they induce is permanent. In view of the suboptimal solutions offered by the pharmacological treatments available and the significant emotional distress caused by these conditions, it is only normal for patients with scarring alopecias and their treating physicians alike to explore the prospects of surgical correction. This review attempts to summarize what is known about hair restoration surgery in scarring alopecia.

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Introduction

Primary cicatricial alopecias are a heterogeneous group of disorders in which the hair follicle is the target of an inflammatory response due to undefined triggers. They have been classified according to the type of inflammatory cell reaction that leads to the destruction of the hair follicle (lymphocytic, neutrophilic and mixed) and its replacement by fibrous tissue. Several excellent published reviews give a detailed overview of the classification and management of the various scarring alopecias even if the literature on this topic is sparse [1–3]. Regardless of the type of alopecia the patient is suffering from, the importance of early diagnosis and treatment cannot be overemphasized as scarring alopecias are considered trichologic emergencies [4].

With the pharmacological treatments available, one can only aim to halt the progression of the disease and prevent further hair loss, but the levels of evidence of these treatments are low and many of them are based only on personal experiences and are not supported by clinical trials. Pharmacological treatment cannot induce regrowth of hair in the patches of alopecia where the follicular ostia have disappeared, but regrowth of hair is what patients hope for when they walk into the clinic.

Many challenging questions arise when considering hair restoration surgery in scarring alopecia: what is the most appropriate surgical technique for the treatment of the primary scarring alopecia we are dealing with? What is the

Table 1. Advantages and disadvantages of surgical excision and hair transplant

	Advantages	Disadvantages
Excision	<p>can be performed in one session</p> <p>is not dependent on the donor area</p> <p>graft survival is not an issue</p> <p>can treat large areas (using expanders)</p>	<p>multiple linear scars</p> <p>may need multiple sessions (when using expanders)</p> <p>higher rate of complications</p>
Transplant	<p>one linear scar (strip)</p> <p>minimal scarring (FUE)</p> <p>lower rate of complications</p>	<p>requires a good donor area</p> <p>may induce koebnerization</p> <p>needs multiple sessions</p> <p>graft survival may be suboptimal</p>

goal we want to achieve: healing the condition or simply covering the alopecic defect? When is the optimal timing to perform the surgery? How do we make sure the disease is in remission? Can transplant surgery reactivate the disease process and lead to a relapse? Is graft survival negatively affected when transplanting into a scarred area? Can variations in the surgical technique improve graft survival?

There are no full answers to these questions yet, but in the paragraphs that follow, we review what is known and what remains elusive.

Surgical Techniques for the Treatment of Primary Scarring Alopecias

Surgical excision with or without the use of tissue expanders and hair transplant using the traditional strip technique or follicular unit extraction (FUE) are techniques the surgeon can make use of in order to correct the alopecic defects (table 1) [5]. The choice of the best surgical option depends not only on the type of alopecia we are facing but also on several other factors: size and location of alopecic areas, vascular supply, skin laxity, expected surgical scars, donor hair availability and the patient's wound healing characteristics.

Surgical Excision

Surgical excision is a simple way of removing scarred areas over the scalp. In its simplest form, used to treat small areas of scarring alopecia, this technique consists of making incisions, undermining the wound edges and bringing them together with as little tension as possible.

To treat larger areas (scars wider than 5 cm), tissue expanders may be inserted in the normal scalp adjacent to the scarred area and progressively filled with saline over 8–12 weeks. The stretched hair-bearing skin is then advanced, or rotated, to fill the surgical defects created by

excision of scarred areas. Making use of rotational advancement flaps and Z-plasties, surgeons can create natural looking hairlines and respect the hair growth direction for optimal cosmetic outcomes. Possible complications include infections, seroma formation and wound dehiscence. Although surgical excision is considered the preferred option when considering hair restoration in scarring alopecias, it is often necessary to combine it with hair transplant procedures. This is particularly the case of defects that are too large to be excised, too close to the hairline or to give a smooth transition from the excised area to the untreated areas of the scalp.

Hair Transplant

Hair transplant consists of harvesting hair from a donor area (usually the occipital and posteroparietal scalp) using a single strip excision or small punch excisions used to harvest individual follicular units (FUE) and grafting them into the recipient site. The availability of donor hair is sometimes a limiting factor, but FUE offers the added advantage of harvesting hair from other body areas such as the beard when need be (when the density of the scalp donor area is inadequate or when the donor area is affected by the disease process) [6, 7].

Hair transplant into a scarred area is not as straightforward as transplant into a healthy scalp, mainly because of poor vascular supply of the recipient area, and for this reason, some adjustments have to be made as detailed below.

Timing of the Surgery, Remission and Relapse

Other than a loose recommendation not to attempt hair transplant in patients suffering from scarring alopecia before 1–2 years of complete remission, no guidelines have been established for this category of patients.

Primary scarring alopecias have been labeled as unstable by Unger et al. [5] because of their unpredictable course and their tendency to relapse. The authors advised contemplating surgical correction only after having confirmed at least 1 year of quiescence. That is because if the disease is active, the transplanted follicles will be the target of the same inflammatory reaction as the follicles they are replacing and may suffer the same fate. However, monitoring disease activity in patients with scarring alopecia is not as straightforward as one would hope. Most clinicians rely on the severity of the symptoms and the findings on physical examination in order to monitor disease activity in scarring alopecia, as repeated biopsies are not always well accepted by the patients. Unfortunately, the absence of symptoms and of any sign of inflammation on physical examination for a prolonged period of time does not necessarily imply the disease is in remission as hair loss may still be taking place insidiously [3]. Even if the patients did agree to be biopsied and rebiopsied, sampling one or even a few areas of the scalp, although very informative, may not be representative of the overall situation. At times, sampling errors and poor clinicopathologic correlation may limit the usefulness of biopsies.

To make the situation even more complex, it is well known that lichen planopilaris (LPP) and other scarring alopecias can go through periods of activity and remission for many years and that in pseudopelade of Brocq, the hair loss is not associated with any apparent inflammation.

Therefore, if the surgeon cannot reliably depend on his clinical examination, or on the results of scalp biopsies, to decide whether the scarring alopecia is burned-out or smoldering, and if relapses may occur after years of quiescence, the recommendation of waiting for 1 year of remission before attempting transplant becomes irrelevant.

That said, conditions such as central centrifugal alopecia that tend to burn out with time and in which triggering factors are known, transplant can be carried out successfully when selecting patients committed to avoid practices such as hot combing [8].

On the other hand, hair transplant surgery may induce scarring alopecia and cases of new-onset LPP following hair transplant have been reported in the literature [9]. Moreover, when discussing graft survival with the patient with scarring alopecia due to LPP, the possibility that the transplant surgery might trigger LPP through koebnerization has to be mentioned, and this could happen in spite of the fact that the disease may have been quiescent for years before surgery.

The fact that surgery might induce a relapse should not deter physicians from pursuing hair transplantation in patients with scarring alopecia and deny these patients their only chance to correct the alopecic defect. This only stresses the importance of proper counseling in order to set realistic expectations and mentally prepare these patients for unexpected turns of events before embarking on the surgery.

Graft Survival and Variation in Surgical Technique

When performing hair transplant in scarring alopecia patients, many of the factors influencing graft survival such as transection, dehydration, crushing injury, storage injury, etc. are no different than with transplants for other indications such as androgenetic alopecia. However, some factors such as scalp oxygenation and blood supply in the recipient bed clearly play a bigger role when transplanting into areas affected by primary scarring alopecia. Atrophy, hypertrophy and fibrosis in such areas predispose to inadequate perfusion, and if transplanted grafts are not revascularized within a few days after surgery, they will not survive [10, 11]. Revascularization of the grafts is established through sprouting of new vessels in the recipient bed, which anastomose with the graft vessels. Therefore, grafts that are distant from a good blood supply, as the ones in the center of large scars, are most susceptible for poor graft survival. Another factor, which determines the rate of graft survival, is the number of grafts/cm². Assuming that there is an acceptable blood perfusion, it is recommended that this number does not exceed 30 grafts/cm² when performing hair transplant in primary scarring alopecia [5]. If too many grafts are transplanted in a small area, they compete for the reduced blood flow through the scar issue. For this reason, it is better to operate in stages than running the risk of complications. Inadequate perfusion of densely packed grafts will not only lead to poor graft survival but may also predispose to infections and result in skin necrosis.

Limiting the use of epinephrine in the recipient site allows the surgeon to continuously assess the vascular supply by monitoring the amount of bleeding and decide on the number of grafts accordingly. The graft density in an area with poor blood supply should not exceed 15–20 grafts/cm². Opting for follicular unit grafts increases the chances of adequate perfusion because of the smaller size of the grafts. Follicular units usually contain 1–5 hairs and are small enough to fit into 18-G and 19-G recipient site

incisions. The optimal size of the recipient sites is the size small enough to prevent grafts from slipping out but large enough for the grafts to be inserted without crushing them. This size is a function of the skin laxity and the dermal recoil of the recipient area. The depth and angle of the recipient sites depends on the extent of fibrosis in the recipient area. In atrophic areas, the recipient sites are created at a more acute angle, and in hypertrophic areas, the recipient sites are made deeper [5]. The use of minoxidil to induce vasodilation in the period preceding and/or following surgery may improve oxygenation of the grafts.

Conclusion

The amount of literature dealing with the topic of hair transplant in scarring alopecia is scarce and does not allow us to draw definitive conclusions. The unpredictable behavior of scarring alopecias, their relative low incidence and the marked psychological impact they have on patients [12] make it difficult to design clinical studies to investigate this group of disorders.

Nevertheless, documenting the exact type of scarring alopecia, starting the patient on pharmacological treatment early on, making sure the patient is in remission before considering hair transplant and monitoring the

patient closely after surgery to check for signs of relapse are all necessary parts of the management.

Whether or not the institution of prophylactic pharmacological treatment at the time of transplant helps diminish the chances of a relapse is yet to be determined. Some authors have recently recommended the institution of such treatment immediately after transplant in patients with frontal fibrosing alopecia, trying to protect the transplanted hair and to avoid alopecia in previously uninvolved areas [13]. This is usually a rule in hair transplant for androgenetic alopecia, and we believe this could be done in all forms of primary scarring alopecia as well.

In conclusion, patients undergoing hair restoration surgery to treat scarring alopecia should be educated about the general complications that may follow surgery and the possibility of androgenetic alopecia arising in a transplanted area, just like any hair restoration patient. More importantly though, the possibility of disease reactivation taking place any time after surgery has to be made very clear to the patients, and the option of starting them on pharmacologic treatment immediately after surgery has to be discussed.

Disclosure Statement

The authors have no conflicts of interest to disclose.

References

- 1 Rongioletti F, Christana K: Cicatricial (scarring) alopecias: an overview of pathogenesis, classification, diagnosis, and treatment. *Am J Clin Dermatol* 2012;1:247–260.
- 2 Filbrandt R, Rufaut N, Jones L, Sinclair R: Primary cicatricial alopecia: diagnosis and treatment. *CMAJ* 2013;185:1579–1585.
- 3 Harries MJ, Sinclair RD, Macdonald-Hull S, et al: Management of primary cicatricial alopecias: options for treatment. *Br J Dermatol* 2008;159:1–22.
- 4 Siah TW, Shapiro J: Scarring alopecias: a trichologic emergency. *Semin Cutan Med Surg* 2015;34:76–80.
- 5 Unger W, Unger R, Wesley C: The surgical treatment of cicatricial alopecia. *Dermatol Ther* 2008;21:295–311.
- 6 Meyer-Gonzalez T, Bisanga C: Body-hair transplant for cicatricial alopecia. *Actas Dermosifiliogr* 2012;103:163–165.
- 7 Saxena K, Saxena DK, Savant SS: Successful hair transplant outcome in cicatricial lichen planus of the scalp by combining scalp and beard hair along with platelet rich plasma. *J Cutan Aesthet Surg* 2016;9:51–55.
- 8 Callender VD, Lawson CN, Onwudiwe OC: Hair transplantation in the surgical treatment of central centrifugal cicatricial alopecia. *Dermatol Surg* 2014;40:1125–1131.
- 9 Donovan J: Lichen planopilaris after hair transplantation: report of 17 cases. *Dermatol Surg* 2012;38:1998–2004.
- 10 Cooley JE: Optimal graft growth. *Facial Plast Surg Clin North Am* 2013;21:449–455.
- 11 Parsley WM, Perez-Meza D: Review of factors affecting the growth and survival of follicular grafts. *J Cutan Aesthet Surg* 2010;3:69–75.
- 12 Chiang YZ, Bundy C, Griffiths CE, Paus R, Harries MJ: The role of beliefs: lessons from a pilot study on illness perception, psychological distress and quality of life in patients with primary cicatricial alopecia. *Br J Dermatol* 2015;172:130–137.
- 13 Mendes Bastos P, Camps Fresneda A: Hair transplantation for frontal fibrosing alopecia: part of the solution? *Actas Dermosifiliogr* 2016;107:3–4.