Nonscarring alopecia after temporal lifting technique with dermal fillers

Marina Landau, MD,[a] Ingrid Lopez-Gehrke, MD,[b] Windie Villarica-Hayano, MD,[c] Atchima Suwanchinda, MD,[d] and Hassan Galadari, MD[e]

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INTRODUCTION

Hyaluronic acid (HA) filler injections are one of the most popular nonsurgical cosmetic procedures worldwide.[1] Vascular embolism continues to be a major concern of this procedure, due to its potential to cause irreversible damage to the skin, subdermal soft tissues, and organs, such as an eye or brain. New injection areas and techniques in the use of dermal fillers are continuously introduced. Since facial anatomy is highly complex and individually variable, injections to relatively "unexplored" areas for filler placement, carry the potential of new complications. Alopecia following filler injection is a newly reported complication of dermal fillers, following the posterior temple lifting technique. According to this technique, a high G-prime filler is placed as a bolus into the subdermal plane of the posterior superior temple, increasing the tension within this tight superficial compartment.[2] This tension repositions up the soft tissues of the mid and lower face, but can eventually compromise the blood flow in the superficial temporal artery (STA), running in the same compartment. We present a case series of patients who developed alopecia after dermal filler injection using the posterior temple technique.

Abbreviations used:

HA: hyaluronic acid
PRP: platelet-rich plasma
STA: superficial temporal artery

CASE 1

A 61-year-old healthy woman, who had previous successful HA filler injections for >10 years, was treated using the posterior temple lifting technique to reduce the signs of age-related changes in the middle and lower face. A 22-gauge 70 mm blunt-tip cannula was inserted through a cutaneous access point located 1 cm anterior to the tragus into the subdermal plane and advanced vertically to its full length under the hairy temporal scalp. 1.0 ml of high G-prime HA was slowly administered as a bolus.

Twenty-four hours later, the patient contacted the office complaining on burning pain in the right parietal area of the scalp. A photo sent by her did not demonstrate any visible pathology. The patient was seen in the office in the next morning (36 hours after the injection). On examination, livedoid erythematous eruption was noticed on the right temporal and parietal parts of the hairy scalp with minimal findings in the upper right forehead (Fig 1, *A* and *B*). Fifteen hundred International Units of hyaluronidase in 5 ml of normal saline were injected into the palpable bolus of the HA above the right ear and generously infiltrated in all the livedoid areas. The procedure was repeated 3 times (1500 unitsX3) with 1-hour break in between the sessions. Since no improvement in the pain level was noticed, the procedure was repeated after 8 hours, and an additional session was performed after 24 hours. At this stage, a significant relief in pain level was reported by the patient.

Ten days later, the patient started to complain of scalp itching, accompanied by hair shedding. Despite biweekly platelet-rich plasma sessions,

From the Private Dermatology Practice, Herzliya, and Department of Plastic and Reconstructive Surgery, Hashamir Medical Center, Beer Yaakov, Israel[a]; Hout Klinik Dermatologica, Mexico City, Mexico[b]; The Skin Inc Dermatology and Laser Center, Makati, Philippines[c]; Department of Dermatology, Chulabhorn Hospital, Bangkok, Thailand[d]; and College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, UAE.[e]

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Correspondence to: Marina Landau, MD, 2 Hashunti Street, Herzliya, Israel. E-mail: dr.marinaclinic@gmail.com.

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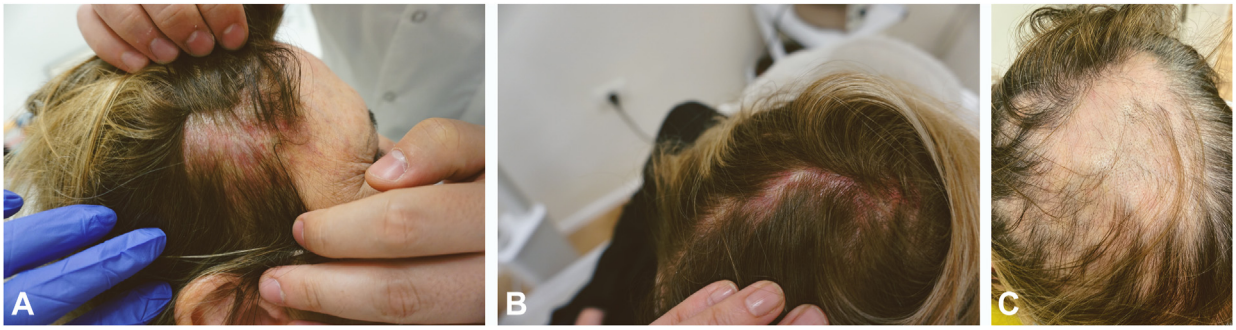

Fig 1. Patient 1: **A, B,** Livedoid rash in the right parietal area and central scalp on day 2; **C,** alopetic patch on day 21.

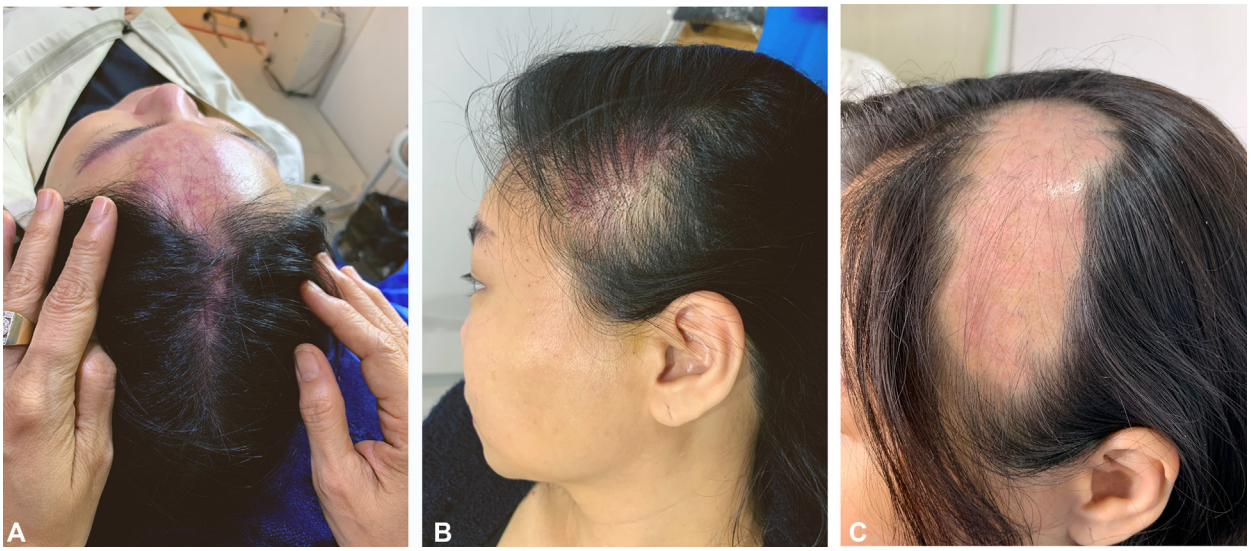

Fig 2. Patient 2: **A, B,** Livedoid rash on the upper left forehead and parietal scalp on day 4; **C,** Hair depletion in the left temporoparietal area on day 9.

extensive baldness developed (Fig 1, *C*). Three months after the event, regrowth of the hair started.

CASE 2

A 44-year-old female Asian patient with polycystic ovary syndrome was injected using a temporal lifting technique. A bolus of 0.5 ml of HA-based filler was injected to each side. Two days after the procedure, during routine follow-up phone call with the patient, she described mild headache and tenderness of the left temple. No abnormal clinical findings were visible on the photo received.

Four days after the procedure, on physical examination, reticulated erythematous patches on the left forehead extending, temple, and parietal scalp were seen (Fig 2, *A* and *B*). A delayed capillary refill was found. Three thousand units of hyaluronidase were injected using a cannula following the original delivery path of HA. All the affected areas were also heavily infiltrated using a needle. A total of 43,500 units of hyaluronidase were injected followed by additional 25,500 units on the following day. After a second round of injections, she reported a significant reduction in pain.

CT Angiography was performed on day 7 and demonstrated absence of visualization of the left frontal branch of STA. On day 9, despite complete normalization of the skin, the patient started to complain of hair shedding. Alopetic patch 5 cmx15 cm developed after 2 weeks (Fig 2, *C*). Four months later hair regrowth started.

During the 1-year period, the authors treated 6 patients, in whom alopecia appeared as a complication of the temporal lifting technique. Clinical data on the patients are presented in Table I.

Alopecia developing after dermal filler injection used to be a rare complication, with only 4 cases published before 2019, and an additional 2 after.[3-8] In

Table I. Clinical data on six patients, injected using temporal lifting technique and developed alopecia

Patient	Gender, age, health status	Amount of HA injected	Timing of first symptom	Treatment	When hair shedding started	Treatment of alopecia
1 Fig. 1	Female, 61, healthy	1.0 ml per side	Scalp pain - 3 h after injection.	Hyaluronidase 7500 IU	10 d preceded by itching and desquamation	Biweekly PRP sessions. Regrowth started after 3 mo.
2 Fig. 2	Female, 44, polycystic ovary syndrome	0.5 per side	Scalp pain was reported on day 2. Livedoid rash on forehead and scalp on day 4.	Painkillers for the first 2 d. Hyaluronidase injection of 69,000 units and HA extraction on day 4	9 d	PRP sessions, topical and oral Minoxidil, topical Finasteride. After 4 mo hair regrowth started, and after 12 mo almost full regrowth except for a small alopetic patch.
3	Female, 41, healthy	1 ml per side	Central scalp pain 4 h after injection.	Painkillers for 3 d	14 d preceded by itching and skin desquamation	No treatment. Regrowth started after 3 mo. After 6 mo, still small bald patch.
4	Female, 71, controlled hypertension	1.0 ml Calcium hydroxyapatite mixed with 2% lidocaine	Pain in the right parietal and temporal scalp. Swelling of the right side of the face. Slight muscular weakness of the right side of the face.	Oral Prednisone 40 mg for 3 d with tapering	After 3 wk	Topical Minoxidil 5%. Ongoing alopecia
5	Female, 36, healthy	1 ml HA per side	Severe pain in left parietal area. Erythema of the skin diagnosed as Herpes Zoster.	Systemic Acyclovir on day 2. Hyaluronidase injection on day 4	15 d	Regrowth started after 6 wk.
6	Male, 52, hypertension	1.2 ml per side	Pain and bruising in right parietal area after few hours.	HA extraction, 300 units of hyaluronidase	14 d	Alopecia lasted 6 mo.

HA, Hyaluronic acid; *PRP*, platelet-rich plasma.

spite the versality of fillers used (fat, HA, calcium hydroxyapatite), in all cases alopecia developed after injection of the temples or parietal area (posterior temple).

In the last years, temples have been identified as one of the most compelling regions for dermal filler injections for aesthetic improvement of the face. This technique was first published in 2016.[9] It was popularized recently following an investigation of the regional anatomy and clinical validation studies.[2,10-12] Different injection approaches have been suggested for temple volumization, including the posterior temple lifting technique.[13]

To note, one patient out of 12 injected (8.3%) in one of the aforementioned studies, developed alopecia as a result of this procedure.[1] In another one, nonscarring alopecia is mentioned as a potential complication of this technique.[9]

The proposed explanation of the lifting effect of the bolus of a filler, placed subdermally in the posterior temple, is a change in the tension within the tight superficial system, causing repositioning of the soft tissues in the mid and lower face.[10] It has been shown that increased skin laxity, use of fanning technique instead of bolus injection, and massaging after the injection- all decrease the lifting effect when using this technique.[10,11] STA allegedly runs inside a loose areolar tissue between the superficial and the deep temporal fascia. Recently it has been demonstrated that the SMAS has bilayered structure in the temple, creating tight compartment precisely along the course of STA.[14]

Thus, STA can be compromised by the increased external pressure induced by the filler's bolus and the postprocedural edema. Indeed, filler material was not found in the arterial lumen of the STA or its branches by duplex ultrasound examination in one case and neither histologically in two others.[4,6,7] On the other hand, biopsy taken from the alopetic skin in another two cases, demonstrated filler material in the arterial lumen, making intraarterial injection another possible pathogenetic mechanism.[3,5]

Soft tissue ischemia is a rare, but well-known complication of dermal filler injections. Guidelines on how to identify and manage these cases have been repeatedly published.[15]

Three unique features challenge the diagnosis and treatment in cases of ischemia, induced by temporal lifting technique:

1. Skin color changes, seen during or immediately after filler-induced vascular compromise are not obvious since skin discoloration takes place in a hair-bearing skin and is partially concealed by it.
2. Ischemic pain occurs in allegedly unrelated to the injection, location. From the patient's perspective, while the injection was performed anteriorly to the ear, pain is experienced in the temple or parietal scalp. This misleads both the patient and the physician in interpretation of the complaint and delays the diagnosis and treatment.
3. Despite "aggressive" treatment, which rescues the skin from necrosis and scarring, significant and long-lasting alopecia cannot be prevented.

Our hypothesis is that vascular occlusion, even if short lasting, abruptly interrupts vital blood supply to the hair follicles and contributes to sudden termination of the anagen phase, inducing anagen effluvium. Subsequently, dystrophic catagen hair follicles are formed accompanied by rapid shedding, as demonstrated by trichoscopy.[5] Negative effect of short-lasting ischemia on the hair follicles was demonstrated in animal models.[16]

In summary, we present 6 patients, who developed nonscarring alopecia after using the temporal lifting technique. These cases add to the additional cases, already published in the literature.

Relatively high prevalence of a significant cosmetic complication, following newly popularized injection technique, raises a question regarding its adequacy. Since the tension, produced by a bolus, injected into the posterior temple, causes both soft tissue repositioning and the long-lasting alopecia, it seems that currently, there is no reasonable suggestion to decrease the risk of this procedure and yet keep its efficacy.

Conflicts of interest

None disclosed.

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