ORIGINAL CONTRIBUTION

Recalcitrant Sterile Abscesses by Volux®: A New Therapeutic Approach

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ABSTRACT

The number of patients developing sterile abscesses because of hyaluronic acid (HA) filler procedures has increased for unknown reasons. We described this adverse reaction after filling with Juvederm Volux®, the latest innovative product in the Vycross range of technology. We presented five patients with recalcitrant sterile abscesses after filling with Juvederm Volux® who did not respond to the traditional therapy but whose lesions were resolved with the "Munhoz–Cavallieri lavage protocol" developed and recently published by the present authors. (*SKINmed*. 2023;21:27–33)

In recent years, hyaluronic acid (HA) fillers have increasingly become a popular aesthetic procedure.[1] Despite its relative safety for being biologically compatible with endogenous HA, an exponential incidence of complications prevail.[2] More than 100 products are approved for clinical use with specific physiochemical features; however, they are being injected by physicians and other medical professionals with varying backgrounds and training.[3,4] Several publications have discussed the complications attributed to immunologic origin of HA.[5–7]

Sterile abscesses because of HA have been reported increasingly.[8,9] We describe five patients with recalcitrant sterile abscesses after filling with Juvederm Volux®. They had similar clinical, laboratory, and ultrasound findings and were unresponsive to the usual therapy;[6] however, all lesions resolved with the modified Munhoz–Cavallieri lavage protocol developed by the present authors.

PATIENTS AND METHODS

We report five patients with recalcitrant facial sterile abscesses after filling with Juvederm Volux®. Demographic and clinical data of the patients treated by the authors from 2020 to 2022 are presented in Table 1.

All patients were healthy without comorbidities, and the maximum amount of the product used according to the instructions of the manufacturer (Allergan, Dublin, Ireland) was 4 mL.[10] Volux® (Vyc-25L) was the latest innovation used in the Vycross range of technology.[11]

Our clinical findings were confirmed by ultrasound imaging performed according to the guide for material aspiration and the modified "lavage protocol performance." EPIQ7 equipment (Philips Medical Systems, Bothell, WA, USA), with two high-frequency transducers (7–15 MHz and 4–18 MHz), was used.

Aspirated fluid was obtained with an aseptic technique and sent immediately for microbiologic analysis, including microscopy of a thin smear stained with Gram and Ziehl–Neelsen stains and culture for typical and atypical bacteria as well as for mycobacteria. Only one inpatient was receiving intravenous antimicrobials at the time of collection.

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Figure 1. The modified Munhoz–Cavallieri lavage protocol with high doses of hyaluronidase (at least three times the dose prescribed in the original solution).

Each patient was then treated with high doses of hyaluronidase (at least three times more than in the original solution) according to the modified "Munhoz–Cavallieri lavage" protocol (Figure 1).[6]

RESULTS

All five recalcitrant sterile abscesses occurred in women aged 27–59 years. They had received HA Juvederm Volux® for filling the lower third aspect of the face: the mandibular arch, gonion, and/or chin. During the same procedure, four out of the five patients were also injected with HA Voluma (Allergan) into the middle third aspect of their face. Each patient had developed facial edema at the site of Volux® injection, with mild or no fever (Figure 2).

Three patients had a recent onset, 30 days after the injection, and two patients had developed abscesses 30 days after receiving the filler. All patients had partial and transient improvement following repeated drainage and receiving oral antimicrobials and corticosteroids. Some patients required up to four antimicrobials. Each patient had an increased erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) with discrete leukocytosis. All were scanned with ultrasound, revealing a thickened liquid collection, confirming the formation of abscess at the edematous area.

Two patients had already received blind hyaluronidase infiltration to dissolve the product without success. Two patients underwent successive ultrasound-guided drainages with the outflow of purulent material but with recurrences. In one patient, hyaluronidase was applied blindly, subsequently having ultrasound-guided drainage, with a discharge of pus and viscous material compatible with HA but with no improvement. The hospitalized patient had a skin biopsy of the chin, which revealed a suppurative inflammation with a multinucleated giant cell reaction associated with positive Alcian Blue basophilic material.

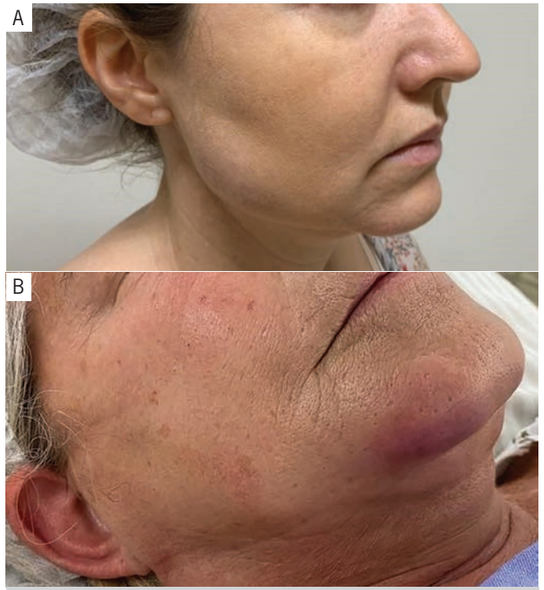

Figure 2. (A and B) Facial edema was observed at the location of Volux® injection (in this patient, in the mandibular arch), with few or no association with fever.

Because of therapeutic failures, the patients were referred for specialized evaluation, after which the present authors used the modified Munhoz–Cavallieri lavage protocol (with high doses of hyaluronidase, sterile saline solution, and injectable corticosteroids).

MUNHOZ–CAVALLIERI LAVAGE PROTOCOL

The protocol begins with facial ultrasound (1) to identify the applied filling material and (2) to assess the presence of a collection. The diagnosis of thickened liquid collection by ultrasound is made when an anechoic formation with debris in suspension was revealed, with the isoechoic mass varying according to the protein content of the collection (the higher the protein content, the more the isoechoic mass). During compression and dynamic evaluation with a transducer, it is possible to visualize the fluid contained n the collection.

The color Doppler study highlights the collection's peripheral vascularization, not in the middle or inside the image. Some patients had surrounding subcutaneous tissue panniculitis. Collections were found in the Juvederm Volux® injection plane (Figure 3). An ultrasound-guided removal was performed on the collections, whose contents varied between serosanguineous, viscous,

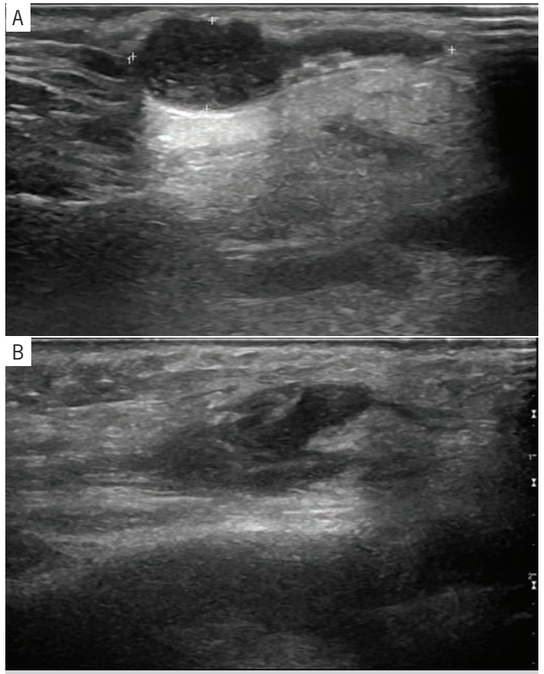

Figure 3. (A and B) Ultrasound reveals an anechoic well-defined thickened liquid formation with debris in suspension. In some patients, panniculitis of the surrounding subcutaneous tissue was observed. The collections were located in the Juvederm Volux® injection plane.

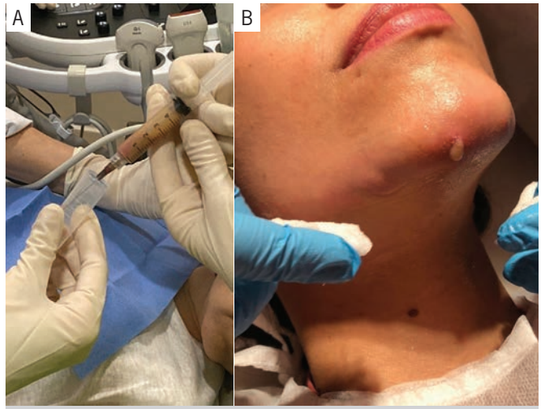

Figure 4. (A and B) Contents of collection varied between serosanguinolent, viscous, purulent, and even gelatinous consistency.

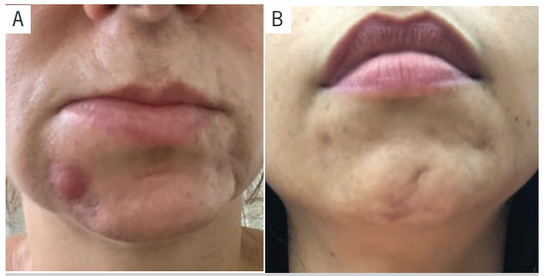

Figure 5. (A and B) Two patients who presented sterile abscesses in the chin evolved with atrophies following resolution.

purulent, or gelatinous exudate (Figure 4). Neither a growth nor a direct observation of microorganisms on microscopy was discovered in any of the patients, thus confirming the diagnosis of recalcitrant sterile abscess.

The modified Munhoz–Cavallieri lavage protocol was used, and all patients required two or more lavages for resolution, with a minimum interval of 1 week. In two patients, sterile abscesses in the chin developed atrophy following resolution (Figure 5). Antimicrobials were continued even after initiation of the protocol (Table 1).

One patient received Juvederm Voluma® filling in the chin 12 months after the resolution of a sterile abscess. At 4 months, she had no adverse development.

DISCUSSION

In our daily practice, complications are observed following filling with HA. While an increasing number of publications have described early and late complications, no standardization is available for their management.[12–14] Ultrasound imaging has proven an excellent complementary method for these complications. It allows the physician to identify the cosmetic filler used[15–17] to classify and track complications as they evolve,[18–20] and to guide therapeutic interventions.[6,21]

If a patient presents with facial edema with few phlogistic manifestations at the site treated with HA in the past, the management proposed by the authors comprises an initial ultrasound to evaluate the presence of collection. Ultrasound scan identifies the best approachable site for acquiring diagnostic sample and the subsequent lavage, and allows full resolution with complete emptying of the group(s).[6] The authors proposed the modified Munhoz–Cavallieri lavage protocol for resolving recalcitrant

Table 1. Demographic and Clinical Data of Five Patients with Facial Recalcitrant Sterile Abscesses after a Filling Procedure with Juvederm Volux® Treated by the Authors from 2020 to 2022

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Gender	Woman	Woman	Woman	Woman	Woman
Age (years)	53	42	35	57	59
Brand, ha amount, and local treated	Juverdem Volux® 1 mL, the chin, Juvederm Voluma® 2 mL, malar	Juverdem Volux® 2 mL, the jawline and mandibular angle, Juvederm Voluma® 3 mL, malar	Juverdem Volux® 2 mL, the chin, jawline, and mandibular angle Juvederm Voluma® 3 mL, malar	Juverdem Volux® 2 mL, the chin, jawline, and mandibular angle Juvederm Voluma® 5 mL, malar	Juverdem Volux® 2 mL, the jawline and mandibular angle
Local of complication	Chin (Volux®)	Bilateral jawline and mandibular angle (Volux®)	Bilateral chin, jawline, and mandibular angle (Volux®) malar (VOLUMA®)	Unilateral chin and jawline (Volux®)	Left mandibular angle (Volux®)
Ultrasound findings	Collection	Collection	Inflammation/panniculitis and multiple collections	Abscess within 10-mL collection	2 abscesses, well-defined collections
Signs and Clinical Manifestations	Mild erythema and edema	Painful and firm edema and lockjaw	Mild erythema, heat, painful, and firm edema	Firm edema, pain, malaise, and cervical lymphadenomegaly	Mild erythema and edema
Trigger	Urinary tract infection	Flu	COVID-19	–	–
Onset of clinical manifestations after ha injection	7 days	70 days	70 days	15 days	21 days
Laboratory examination	Normal examination	Normal examination	Normal examination	Normal leukocyte; increased ESR and CRP	Lymphocytosis and increased ESR
Microbiology	Negative	Negative	Negative	Negative	Negative
Cytology	Leukocytosis	Leukocytosis with neutrophilia	Histiocytes and polymorphonuclear cells (chronic inflammatory process)	Macrophages and neutrophils	–
atbs prior to cleaning protocol	2	2	3	5	2
Hyaluronidase prior to lavage	Biometil manipulation	–	–	–	Biometil manipulation
Drugs prescribed prior to cleaning protocol	Antibiotics and corticosteroid	Antibiotics and corticosteroid	Antibiotics, corticosteroid, lisinopril, and omeprazole	Corticosteroid, non-steroidal, anti-inflammatory drugs	Corticosteroid
Microbiology analysis	Sterile	Sterile	Sterile	Sterile	–
Recidiva and munhoz–cavallieri lavage protocol	3	4	4	4	2
Outcome	Resolution with atrophic scar	Resolution	Resolution with atrophic scar	Resolution	Resolution
Follow-up	New injection of Volux® without manifestations	5 months without recidiva	3 months without recidiva	6 months without recidiva	2 months without recidiva

ATBS: antibiotics; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein

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abscesses unresponsive to antimicrobials and oral corticosteroids, simple drainage, and hyaluronidase usage.[6]

Concerning the Vycross/Allergan line of treatment, the dose of hyaluronidase must be increased or even doubled.[22–24] In this series of five patients, we proposed to triple or even quadruple the hyaluronidase dose. In our practice, Juvederm Volux® recalcitrant abscess has been a challenging job to dissolve (unpublished data by the third author and colleagues).

We ponder whether the atrophy occurring in two patients happened because of the steroid used in the lavage solution and/or entailed by the healing process related to the intense inflammatory reaction and demonstrated by the outflow of a large quantity of pus (Figure 6).

A recent report has described a patient with late and recalcitrant inflammatory reaction to Volux® on the chin; the patient was simultaneously injected with Voluma on the cheeks but with no response. The complete resolution occurred after application of hyaluronidase, as practiced in our findings.[25]

Figure 6. Intense inflammatory reaction demonstrated by the outflow of large quantity of pus.

Volux® has specific characteristics of having greater G prime, greater elasticity, and the highest cohesiveness among the fillers available with Vycross technology.[26] Such properties may potentially confer higher immunogenicity, representing a high degree of inflammation observed in our case series.

CONCLUSIONS

The sterile abscess in our patients is a poorly known and underreported problem among HA filling developments.[6] Many of these patients are treated as if they have infectious abscesses solely because of the presence of purulent exudate.

Intense immune-mediated reactions to sterile agents can produce purulent material not because of infections, but because cellular and molecular mechanisms are not entirely understood.

Laboratory tests for inflammatory activity and microbiologic screening also support this hypothesis, as they rule out the presence of infection and confirm inflammatory reaction.

Ultrasound is a fundamental complementary method for the management of such patients.

We know that dealing with developments after injection procedures for aesthetic purposes is complex process, and many patients are challenging because of a lack of knowledge of physician injectors.

This case series aims to report unusual HA sterile abscess, especially after Volux®, a product dissolved with greater difficulty and perhaps with greater immunogenicity.

Additionally, a new treatment approach is proposed based on the modified Munhoz–Cavallieri lavage protocol, aiming to reduce recurrence of this development.

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