

Activating a Protocol for Prevention, Management and Follow up of Dermal Filler Injection Related Vascular Occlusion (A Clinical Audit)

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Abstract

With the increased demand for dermal filler injections, more complications and adverse events are reported. Vascular occlusion is one of the most serious complications. The need urges to adopt a powerful protocol to manage such cases. The private practice I am working for has six branches in the middle east. I tried to investigate if there were any vascular occlusion incidences through the last three years. Four cases without sufficient details were found. A protocol was adopted from a scientific reference to deal with similar cases properly. A re-audit was done after six months to test the efficiency of the suggested protocol.

Keywords

Dermal, Filler, Vascular, Occlusion, Code: Pale

1. Introduction

With the increased demand for dermal filler injections, more complications and adverse events are reported. Vascular occlusion is one of the most serious complications. The need urges to adopt a powerful protocol to manage such cases. The private practice I am working for has six branches in the middle east. I tried to investigate if there were any vascular occlusion incidences through the last three years. Four cases without sufficient details were found. A protocol was adopted from a scientific reference to deal with similar cases properly. A re-audit was done after six months to test the efficiency of the suggested protocol.

2. Audit Methodology

With the increased demand for dermal filler injections, more complications and adverse events are reported. Vascular occlusion is one of the most serious complications that can lead to deformity, blindness and other catastrophic events. The need urges to adopt a powerful protocol to manage such cases.

Assessing current situation in our six practice branches, according our knowledge, there have been at least four cases of dermal filler associated vascular occlusion in the last three years. Management was individually variable from a doctor to another. Cases were not properly documented.

Current literature has been reviewed and a discussion started to establish a protocol for immediate management and follow up of filler injection induced vascular occlusion accidents. First audit was done in November, 2019. A re-audit has been done after six months.

Dominguez *et al.* [1] was chosen to be the main reference for our management protocol. Certain actions need to be taken to prevent filler injection induced vascular occlusion accidents.

3. Action Plan and Recommendations

3.1. Prevention

- 1) Informed consent including all possible complications
- 2) Proper explanation of all aspects of the procedure to the patient
- 3) Take history thoroughly
- 4) Always take photos before
- 5) Know your anatomy (dangerous zones) (**Figure 1**)
- 6) Use cannula when possible
- 7) Take your time while injecting
- 8) Always aspirate and wait

3.2. Management

- 1) Detect/diagnose the incidence (blanching, severe pain, vasovagal shock, ...)
- 2) Calm yourself and the patient down
- 3) Call colleagues for help by activating (code: pale) on the public address (PA) system.
- 4) Implement the protocol as detailed in the steps below and **Table 1, Table 2.**
- 5) Document and report the incidence as soon as your patient is stable.

3.3. Protocol Steps

- 1) Immediately stop the procedure and all injections.
- 2) For HA dermal fillers, inject hyaluronidase in and around the injection site.
- 3) Massage topical nitroglycerin paste 2% into the affected area.
- 4) Massage and apply warm compresses to affected area to increase vasodilation.
- 5) Start patient on a course of methylprednisolone.

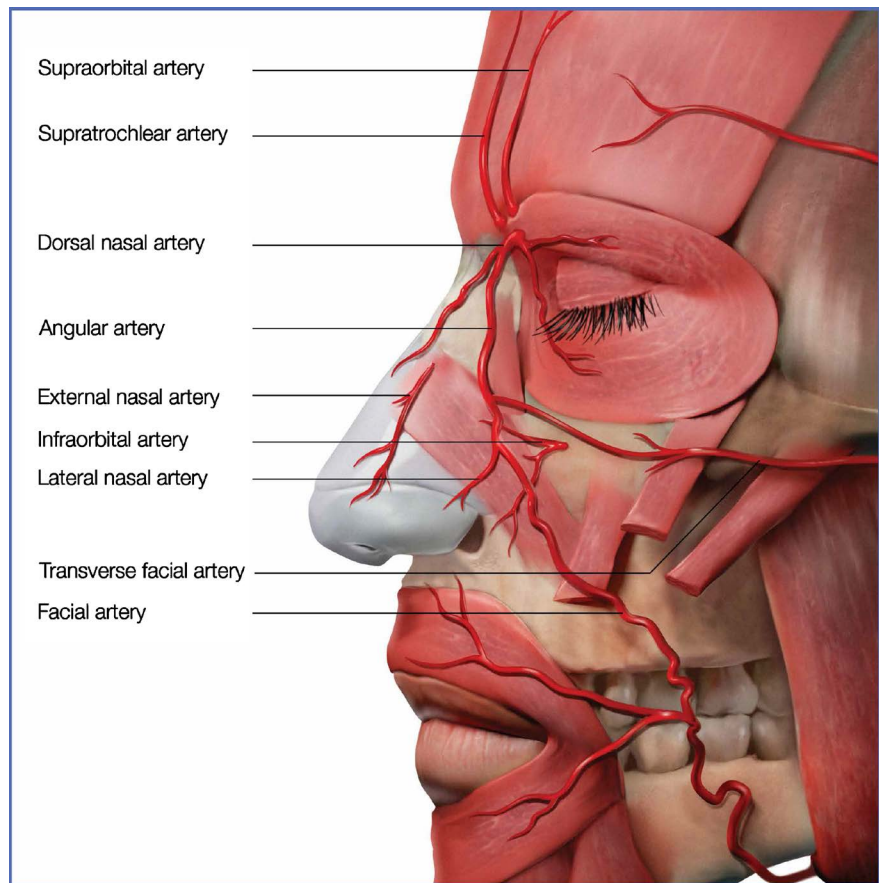


Figure 1. Dangerous zones for accidental dermal filler injection associated vascular occlusion [1].

Table 1. Suggested treatment protocol for acute facial volumization-related arterial occlusion [1].

Therapy	Dose, Route, and Duration of Therapy
Antibiotics and Antivirals	Penicillin 500 mg twice daily, cephalosporin 500 mg four times daily, or clindamycin 150 mg four times daily. Acyclovir 800 mg five times daily. Continue until area has epithelialized.
Nitroglycerin paste 2%	Apply immediately around injection site and zone of ischemia for 5 minutes. Reapply for 5 minutes every 1 - 2 h while in the ED, but for no longer than 24 h due to development of drug tolerance.
Corticosteroids	Oral prednisone 60 mg daily for 4 d, or methylprednisolone dose pack for 6 d.
Enoxaparin	30 mg subcutaneously every 12 h for 7 - 14 d or until area has normal arterial blood flow; do not give in combination with acetylsalicylic acid aspirin.
Acetylsalicylic acid aspirin	325 mg orally once daily for 7 - 14 d; do not give in combination with enoxaparin.
Esomeprazole	40 mg daily for 5 d.
Phosphodiesterase type 5 inhibitors	Oral sildenafil 100 mg, tadalafil 20 mg, or vardenafil 100 mg daily for 7 - 14 d or until area has normal arterial blood flow.
Hyperbaric oxygen	Begin treatment daily as soon as possible, with continued treatment at 3 atmospheres for 45 minutes daily until the area has epithelialized.

- 6) Administer subcutaneous enoxaparin (if not giving acetylsalicylic acid aspirin [ASA]).
- 7) Administer ASA (unless contraindications exist and if not giving enoxaparin).
- 8) When giving ASA, administer an antacid to prevent gastritis/esophagitis.
- 9) Administer a phosphodiesterase type 5 inhibitor.
- 10) Administer prophylactic antibiotic and antiviral therapy.
- 11) Consult plastic surgery, ophthalmology, and neurology services.
- 12) Initiate hyperbaric oxygen therapy, when indicated [1].

A box/container containing the protocol hard copy and the medications will be available in each clinic for any possible incidents. A nurse will be responsible for its availability and checking the expiry dates.

A correspondence will be started with the purchasing department to supply the box/container components. We will provide them with the generic and suggested brand names available in the national pharmaceutical market (**Table 3**).

3.4. Pitfalls

- 1) Don't give Low Molecular Weight Heparin (LMWH) and Acetylsalicylic Acid (ASA) together

Table 2. Consultations to consider for patients with acute facial volumization-related arterial occlusion [1].

Signs and Symptoms	Recommendation
Ophthalmic/ocular	Consult ophthalmology services immediately if patient has any ocular pain, visual defects or disturbances.
Neurological	Consult neurology services immediately if patient has any signs or symptoms of cerebral ischemia.
Plastic/dermatological	Consult plastic surgery services for continued care.

Table 3. Generic and brand names examples available in Saudi pharmaceutical market of the medications enlisted in the suggested protocol.

Generic name	Brand name example (in Saudi market according to SFDA website)
Hyaluronidase	PBSerum Drain Plus (Hyaluronidase PB3000) (300 units/ml)
Amoxicillin/Clavulanic acid	Klavox/Augmentin 1000 mg (tablet)
Acyclovir	Zovirax 800 mg (tablet)
Glyceryl Trinitrite	Nitroderm TTS-10 System 50 mg/patch (patch)
Prednisone	Predone 20 mg (tablet)
Enoxaparin Sodium	Clexane 60 MG\0.6ML (Inj)
Acetylsalicylic acid	ALKA-SELTZER 324 mg (tablet)
Esomeprazole	Nexium 40 mg (tablet)
Phosphodiesterase type 5 inhibitor (Sildenafil Citrate)	Viagra 100 mg (tablet)
Sodium Thiosulfate	Marketed as a generic. Can be used to dissolve Calcium Hydroxyapatite dermal filler [2] [3] [4].

2) Don't give Acetylsalicylic Acid (ASA) without Proton Pump Inhibitor (PPI) coverage.

3) Check warm compresses on your own skin first. Patient may get burned without feeling under topical anesthesia.

4. First Re-Audit and Closure after 6 Months (June, 2020)

Case Presentation

Introduction

During the last six months, two incidences of dermal filler injection related vascular occlusion occurred.

The previously suggested protocol was followed immediately. Code: pale was activated and the case was managed accordingly. Cases made full recovery as seen in diagram 2, 3 and 4.

Case 1

1) Present History

27-year-old female sought our clinical advice for filler injection on the nose. 0.6 cc of Hyaluronic acid dermal filler was injected on the dorsum and tip. Aspiration was done during injection: negative. Patient did not produce any signs or symptoms immediately e.g. blanching, collapse or pain. However, she contacted the clinic after 48 hours complaining of severe redness and pain. Blisters started to show after 4 days of injection. Protocol was applied and code: pale was activated as previously shown in the main audit.

2) Outcome

Progress of the case till full recovery was achieved (**Figure 2**).

Case 2

1) Present History

28-year-old female sought our clinical advice for filler injection on the chin. 1.5 cc of Calcium Hydroxyapatite dermal filler was injected on the chin mixed with 0.5 cc Lidocaine 2%. Aspiration was done during injection: negative. Patient did not produce any signs or symptoms immediately e.g. blanching, collapse or pain. However, she contacted the clinic after less than 48 hours complaining of severe pain and blisters. Protocol was applied and code: pale was activated as previously shown in the main audit.

2) Outcome

Progress of the case till full recovery was achieved (**Figure 3** and **Figure 4**).

5. Discussion

With the increased demand for dermal filler injections, more complications and adverse events are reported. Vascular occlusion is one of the most serious complications. The need urges to adopt a powerful protocol to manage such cases. Precautions can be taken to minimize dermal filler injection associated vascular occlusion incidences. However, they are still not uncommon. Proper and prompt



Figure 2. An example of post dermal filler injection vascular occlusion. 0.6 cc of Hyaluronic acid dermal filler was injected on the dorsum and tip of the nose. 1: 4 days post injection. 2, 3: 6 days post injection. Hyaluronidase injected, 4: 8 days post injection. 5: 10 days post injection. 6: 12 days post injection. 7: 14 days post injection. 8, 9: full recovery 3 weeks post injection.

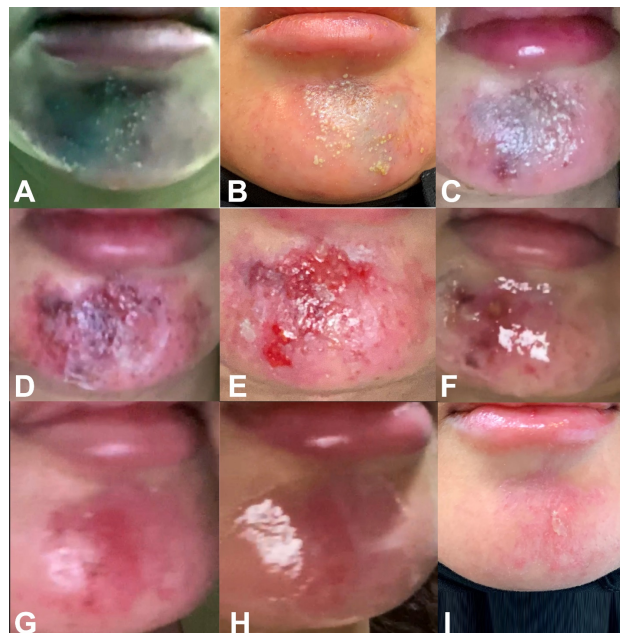


Figure 3. An example of post dermal filler injection vascular occlusion. 1.5 cc of Calcium Hydroxyapatite dermal filler was injected on the chin mixed with 0.5 cc Lidocaine 2%. (A) (B) 2 days after procedure, Hyaluronidase injected, ((C), (D)) 3 days after procedure, Hyaluronidase injected again, (E) 4 days after procedure, (F) 5 days after procedure, (G) 6 days after procedure, (H) 7 days after procedure, (I) 8 days after procedure.



Figure 4. Full recovery 11 days after procedure.

management is crucial to handle such cases aiming at full recovery. In both cases detailed before, vascular occlusion happened, on the nose in case 1 and on the chin in case 2, despite taking all precautions. Immediate response using the treatment protocol led to full recovery in both cases.

6. Conclusion

The protocol showed efficiency in dealing with one case that was recorded during the first six months after starting the audit. Our future plan is to review, embed, sustain and spread the protocol, then re-audit again after 6 months.

Informed Consent

The author certifies that informed consents were properly taken from both patients involved in the series to use their photos anonymously.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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