# Incidence of Vascular Obstruction After Filler Injections

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Aesthetic Surgery Journal
2020, Vol 40(8) NP457–NP460

DOI: 10.1093/asj/sjaa086
www.aestheticsurgeryjournal.com
OXFORD
UNIVERSITY PRESS

Editorial Decision date: March 30, 2020; online publish-ahead-of-print June 15, 2020.



An intravascular injection leading to skin necrosis or blindness is one of the most alarming complications in filler treatment.[1-4] A proper calculation on the risk of vascular occlusion has, to our knowledge, never been performed because odds are low and total numbers of injections are generally unknown. In medical literature, frequencies of vascular adverse events (VAEs) are not detailed but estimated to be 1:2000 to 1:10,000 (0.05–0.01%).[3,4]

At the Department of Dermatology at Erasmus University Hospital, we have had a specialized clinic for filler complications since 2011. There are no barriers for patients to visit, because the city of Rotterdam can be reached by train in a maximum of 3.5 hours from every part of the Netherlands. Most physicians in cosmetic medicine in the Netherlands are aware of the problem of vascular occlusion and our competencies, because we have published several papers on filler complications in Dutch as in international journals[5,6] and in the lay press. In the complications debate of the Dutch Society for Cosmetic Medicine, our group has been actively engaged since its foundation. All medical specialties refer patients to our hospital, in particular in acute situations and also after office hours and in weekends.

Recently, we calculated the total number of filler treatments performed in the Netherlands in 2016.[7] For this purpose, we searched Google , the Dutch Archive Data Care Register, and membership lists of professional specialty associations to assess the number of doctors performing such treatments and sent them questionnaires to inquire how many filler injections they had conducted in 2016. The response rate was 37% (n = 122). The total number of filler treatments was calculated to be 138,496 (min-max. margins: 129,866-147,126).[7] With this information and the knowledge that virtually every patient with an VAE is referred to us, we were able to calculate the incidence of vascular occlusion filler treatments quite accurately.

## METHODS

From January 2018 to January 2020 (25 months), we prospectively included patients consecutively referred to our out-patient clinic for filler-induced vascular occlusions. The diagnosis was confirmed by clinical presentation (reticulated bluish pattern with/without pustules and wounds) and doppler-ultrasound images (hypervascular turbulent artery with/without detectable filler blockage).

The reported data consisted of the type of filler product employed, the assessed skin changes and area of the face involved, the artery involved, and whether needle or canula had been utilized. Our treatment for hyaluronic acid filler obstruction is given elsewhere.[5] In calcium hydroxyapatite-related vascular blockages, sodium-thiosulphate injections (250 mg/mL-0.2 mL per $cm^2$) were utilized.[8] All patients provided written consent for the treatment procedure. The

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**Table 1.** Patients Referred With Vascular Obstruction

| Product utilized | Artery involved (DUS identified) | Location(s) of skin changes | No. of treatments with cannula[a] | No. of patients |
|---|---|---|---|---|
| HA | Inferior labial | Chin + lower lip | | 7 |
| | Superior labial + columellar | Upper lip | | 6 |
| | Angular | Nose | | 4 |
| | Superior labial | Upper lip | | 3 |
| | Submental | Chin | | 4 |
| | Superficial temporal | Temple | | 3 |
| | Dorsal nasal | Nose tip | 1 | 2 |
| | Supratrochlear | Forehead | | 2 |
| | Submental | Tongue | | 1 |
| | Facial | Nasolabial fold | | 1 |
| | Facial + angular | Nasolabial fold | | 1 |
| | Angular + superior labial | Nose | | 1 |
| | Columellar | Nose | | 1 |
| | Columellar | Upper lip | | 1 |
| | Transverse facial | Cheek | 1 | 1 |
| | Infraorbital | Midface | | 1 |
| | Zygomaticoorbital | Lat corner eye | | 1 |
| CaHA | Submental | Chin | | 2 |
| | Transverse facial | Cheek | 1 | 2 |
| | | Totals | 3 | 44 |

[a]All cases where no cannulas are reported were treated by needle. Details on a number of these cases were published earlier.[5] CaHA = calcium hydroxyapatite filler; DUS = doppler ultrasound; HA = hyaluronic acid filler.

study was conducted in accordance with guidelines of the Declaration of Helsinki.

## RESULTS

A total of 44 patients (3 male, 41 female) with a VAE due to hyaluronic acid or calcium hydroxylapatite fillers were referred to our outpatient clinic (Table 1). The age range of the patients was 18 to 49 years (mean age, 34 years), and the involved areas and arteries of the face are mentioned in Table 2. In some cases, more than one artery was involved. In 3 cases, a canula 25G had been employed. After doppler ultrasound-guided injections of hyaluronidase, all patients fully recovered. The calculation of the risk of vascular occlusion in filler treatments in given in Table 3.

## CONCLUSIONS

We calculated the incidence of VAEs after filler injections to be 1:6558 (or 0.015%). We realize that this calculated measurement of incidence raises some question marks. The number of 41 referrals in 24 months might be an underreport of the real number. Some physicians may not recognize the problem in their patient, and others may feel reluctant to refer them or prefer to treat the VAEs themselves. However, because of the awareness created in our country by many different channels and the upsetting clinical picture, we are confident the vast majority of cases have been referred to our outpatient clinic. Also, in 2018 to 2019, the total number of filler treatments performed was probably higher than in 2016. Yet underreporting has a larger effect on the outcome than increased treatment numbers. To include under- and overestimation of numbers, we estimated a calculated ±20% as

**Table 2.** Consecutive Patients Referred With Vascular Obstruction

| Patient | Gender | Location | Artery involved (DUS identified) | Delay in treatment time | No. of treatments | Product |
|---|---|---|---|---|---|---|
| 1 | F | Nose | Angular | 1 day | 1 | HA |
| 2 | F | Nose | Angular | 4 hours | 1 | HA |
| 3 | F | Nose | Angular | 1.5 days | 2 | HA |
| 4 | M | Nasolabial | Facial + superior labial | 1 day | 2 | HA |
| 5 | F | Lip | Superior labial + columellar | 3 hours | 1 | HA |
| 6 | F | Lip | Superior labial | 4 hours | 1 | HA |
| 7 | F | Lip | Superior labial | 3 days | 1 | HA |
| 8 | F | Lip | Superior labial | 1 day | 2 | HA |
| 9 | F | Lip | Superior labial + columella | 1 day | 1 | HA |
| 10 | F | Forehead | Supratrochlear | 8 hours | 1 | HA |
| 11 | F | Forehead | Supratrochlear | 2.5 days | 1 | HA |
| 12 | F | Chin | Submental | 1 day | 1 | HA |
| 13 | M | Chin | Inferior labial | 1.5 days | 1 | HA |
| 14 | F | Chin | Inferior labial | 8 weeks | 1 | HA |
| 15 | F | Parietal area | Superficial temporal | 3 weeks | 2 | HA |
| 16 | F | Lip | Superior labial +columellar | 3 days | 2 | HA |
| 17 | F | Mandibula | Transverse facial | 3 days | 2 | HA |
| 18 | F | Lip | Superior labial + columellar | 3 days | 2 | HA/C |
| 19 | F | Chin | Submental | 1 day | 3 | HA |
| 20 | F | Lip | Supralabial | 3 days | 2 | HA |
| 21 | F | Nose tip | Columella | 4 hours | 1 | HA |
| 22 | F | Infraorbital notch | Infraorbital | 8 months | 1 | HA |
| 23 | F | Nose tip | Angularis | 8 months | 2 | HA |
| 24 | F | Nasolabial | Facialis + angularis | 3 days | 2 | HA |
| 25 | F | Underlip | Infralabial | 1 day | 1 | HA |
| 26 | F | Cheek re | Transversal facial | 4 hours | 2 | CaHA/C |
| 27 | F | Cheek li | Transverse facial | 1 day | 2 | CaHA |
| 28 | F | Tongue | Submental | 1 day | 2 | CaHA |
| 29 | F | Forehead | Superficial temporal | 3 days | 1 | HA |
| 30 | M | Chin | Submental | 1 day | 1 | HA |
| 31 | F | Nose tip | Dorsal nasal | 4 days | 1 | HA |
| 32 | F | Underlip | Infralabial | 1 day | 1 | HA |
| 33 | F | Upper lip | Columella | 5 hours | 1 | HA |
| 34 | F | Nose tip | Dorsal nasal | 15 days | 1 | HA/C |

**Table 2.** Continued

| Patient | Gender | Location | Artery involved (DUS identified) | Delay in treatment time | No. of treatments | Product |
|---|---|---|---|---|---|---|
| 35 | F | Chin | Submental | 3 days | 1 | HA |
| 36 | F | Underlip | Infralab art | 1 day | 1 | HA |
| 37 | F | Temples | Supratemp | 3 days | 1 | HA |
| 38 | F | Underlip | Infralabial | 1 day | 1 | HA |
| 39 | F | Underlip | Infralabial | 5 hours | 1 | HA |
| 40 | F | Nasolabial | Facial | 14 days | 1 | HA |
| 41 | F | Lat corner eye | Zygomaticoorbital | 1.5 days | 1 | HA |
| 42 | F | Nose | Dorsal nasal | 5 hours | 1 | HA |
| 43 | F | Chin | Infralabial | 1 day | 1 | CaHA |
| 44 | F | Chin | Submental | 1 day | 1 | HA |

/C = 25G canula used; CaHA = calcium hydroxyapatite filler; DUS = doppler ultrasound; HA = hyaluronic acid filler. All cases where no cannulas are reported were treated by needle. Details on a number of these cases were published earlier.[5]

**Table 3.** Calculation on the Risk of Vascular Occlusion in Filler Treatments

| | |
|---|---|
| No. of patients referred in 25 mo | 44 |
| Patients referred per month | 1.76 |
| Patients referred per year | 21.12 |
| Odds per treatment 21.12/138,496 | 1:6558 (0.015%) |

a credible range for a lower and upper estimate of the incidence. We therefore conclude that the chance for VAE is 1:6600 (1:5300-1:8000, rounded to the nearest hundred).

Several referrals were from doctors who have practiced cosmetic medicine for more than a decade and are widely recognized as excellent physicians. With a risk of 1:6800 treatments, many physicians will encounter this event more than once during their career.

## Disclosures

Drs Schelke and Velthuis are trainers for Cutaneous. Dr Kadouch is a consultant for Merz Pharma. Dr Decates declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

## Funding

The authors received no financial support for the research, authorship, and publication of this article.

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