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Common Complications of Dermal Fillers: A Brief Literature Review

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ABSTRACT

Dermal fillers have gained widespread popularity over the past few decades as nonsurgical cosmetic treatments worldwide, at times even super ceding surgical procedures. Common dermal filler types include calcium hydroxyapatite, polylactic acid, and hyaluronic acid (HA). However, HA has quickly become recognized as the most acceptable filler for facial balancing and contouring, due to its affordability compared to plastic surgical procedures. Additionally, HA offers superior cosmetic outcomes and is generally well tolerated by dermal tissues. The safety profile of HA has been extensively studied with impressive outcomes, and its ease of reversibility makes it the dermal filler of choice for today's population. Dermal filler injections have become one of the most widespread cosmetic procedures in the United States to date. Despite the prevalence of use and popularity of HA fillers particularly, adverse events have been associated with their administration.

While most reported complications are considered mild and self-resolve, there are rare instances of severe complications that can be irreversible. Clinicians must continue to be educated on these risks, as some can affect the patient's quality of life. As with all cosmetic procedures, dermal fillers do come with risks. Correct technique aids in decreasing the adverse effects of dermal fillers but cannot guarantee perfect outcomes. Adverse effects of dermal fillers can include mild outcomes such as bruising, redness, pruritis, edema and subcutaneous nodular formation. More severe adverse effects include infections, formation of granulomas, vascular occlusions and nerve palsies, all of which are extremely rare. As with any cosmetic procedure, the administration of dermal fillers requires identification of elements which contribute to adverse effects and diligent work to minimize their occurrence.

Keywords: Dermal Filler; Hyaluronic Acid; Plastic Surgery; Cosmetic Procedure; Filler Complications

Introduction

Soft tissue dermal fillers containing HA are primarily used in the correction of fine lines and wrinkles. However, popularity has been gained for the restoration of general volume loss, typically caused by aging and in some cases, medical conditions, like thyroid disease and menopause. Dermal filler use has skyrocketed in recent years, showing a 53% increase between 2012 and 2019, and has been ranked one of the most popular non-surgical cosmetic procedures in the United States, second only to neurotoxin administration (Saad, et al. [1]). While HA dermal fillers have an excellent safety profile, complications have been on the rise in congruence with the influx of administration. Adverse effects range from mild complications such as bruising, nodule formation, swelling and asymmetry, to more severe outcomes such as vascular occlusions and infections. The increase in the administration of dermal filler injections has compatibly increased the incidences and occurrence of associated side effects. Originally, loose procedure practices led to side effects like infections, foreign body responses, and granuloma formation. However, more severe events like vascular complications emerged as potential risks including but not limited to tissue necrosis and blindness (Hong, et al. [2,3]). Google Scholar was utilized to search keywords, "Dermal Filler", "Hyaluron-

ic Acid", "Filler Complications", "Cosmetic Procedure", "Non-Surgical Cosmetic Procedure", and "Adverse Effects" for this literature review. The literature search was last performed on 20th July 2025 and was limited to English manuscripts published anytime from 2023 to present. Of importance to note, current published data on common complications of dermal fillers, include literature reviews, meta-analyses, case reports, and systematic reviews.

Dermal Filler Adverse Effect Categorization

Adverse effects associated with HA dermal fillers are typically divided into two categories: early onset which includes those issues arising in the first month of administration and late onset which includes problems that arise months to years following administration (Saad, et al. [1]).

Mild to Moderate Adverse Effects of Dermal Fillers

Mild adverse effects typically include non-vascular complications which may encompass subcutaneous nodules, swelling, and biofilm formation (Turczynowicz, et al. [4]).

Post-Treatment Volume Distribution Irregularities (Lumpiness & Unevenness)

Volume distribution irregularities (VDIs) are the most reported complications associated with HA fillers. VDIs can range from temporary lumpiness related to swelling immediately following injection, to unevenness related to insufficient volume injection. Fortunately, such events are easily corrected with a dissolving enzyme if HA filler was administered. The hydrophilic or "water loving" nature of HA often leads to post-injection swelling and can pose a risk of VDIs in delicate area such as the tear trough and periorbital regions of the face. VDI management necessitates a thorough understanding of facial anatomy and appropriate injection techniques (Hong, et al. [2,3]).

Bruising

Bruising is the most prevalent early side effect of HA filler treatments and occurs immediately after or within a few days following the procedure. If blood vessels are deep and become compromised, bruising can be delayed by days and even weeks. It is recommended that adequate compression is applied to any area of injection to prevent bruising and/or hematoma formation. Clients who take blood thinners should be advised to discontinue therapy several days prior to dermal filler injections (Hong, et al. [2,3]).

Pain & Tenderness

Colon (2023) reports in one study that 41% of a studied population experienced pain and tenderness at the injection site and surrounding tissue for the immediate days following dermal filler administration, making it an almost expected initial outcome. The same study concluded that based on patient reports, the pain experienced was during site administration, meaning the actual penetration of the needle into the skin along with pressure from volume augmentation (Colon, et al. [5]).

Severe Adverse Effects of Dermal Fillers

Severe adverse events typically encompass vascular complications such as ischemia/necrosis and visual impairments (Turczynowicz, et al. [4]).

Granuloma Formation

Firm HA fillers used in large quantities to enhance facial contours and volume, can sometimes compromise adjacent tissues which can inadvertently alter blood flow and can potentiate an inflammatory response. Prolonged inflammation can lead to foreign body reactions, which can ultimately result in granuloma formation. Early-stage granulomas can lead to scarring, broken blood vessels and immune responses causing lumps or nodules. Advanced stage granulomas typically present as cystic lesions and cyanotic nodules and are very rare occurrences.

Tissue Necrosis

Vascular complications related to dermal filler administration may include skin and tissue necrosis (death). Early signs can include mild pain and tissue pallor. These issues can progress to notable swelling and intense pain. If tissue necrosis continues into advanced stages, tissue death will occur and is marked by severe pain and dark or blackened skin, which increases the risk of infection. Timely recognition and intervention can prevent irreversible damage and ensure patient safety (Hong, et al. [2,3]). One retrospective case study determined the incidence of severe complications to be a mere 0.0041%, out of more than a quarter million HA injections. These complications were mostly related to vascular embolization of areas known for small vasculature, such as the forehead and nasolabial folds (Tamura, et al. [6]).

Conclusion

As with all medical procedures, dermal filler injections do come with the potential for adverse effects and authors collectively stress the importance of prevention, early detection, and proper management. A general consensus exists that, although there is potential for complications, dermal fillers are considered safe. This does not negate the necessity of scrupulous preparation, strict observance of established guidelines, and continuous education for healthcare professionals, as these actions can profoundly minimize the occurrence of adverse effects, and ultimately improve patient outcomes (Turczynowicz, et al. [4]). There is a broad range of side effects affiliated with dermal filler injections and are typically managed very adequately with time conscious identification and intercession. There continues to be a need for ongoing research, protocol development and intense study of biological mechanisms (Hong, et al. [2,3]). However, HA filler does have a high safety profile, and although some risk exists for ad-

verse events, the majority of them are easily managed and should not discourage the general population from seeking dermal filler treatments [7].

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

Ethic Statement

This article does not contain any studies involving human participants performed by the authors.

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