DOI: 10.5603/OJ.2023.0003

Infraorbital nerve disturbance secondary to long-term cosmetic filler nodule migration at the lower eyelid

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ABSTRACT

BACKGROUND: Injectable fillers are widespread for antiaging non-invasive treatment. Whereas complications are difficult to manage, basically those of permanent fillers such as Bio-Alcamid. These complications could occur years later and far from the injected site, such as nodule migration. This article aims to highlight the delayed one-set nodules migration diagnosis for each patient with periorbital complaints when a history of cosmetic treatment such as polyalkylimide (Bio-Alcamid®) injection was reported. We also emphasize the knowledge of the product, sometimes given by the patient or predictable on ultrasound findings, to perform effective and efficient treatment.

CASE PRESENTATION: A 32-year-old woman had presented for paresthesia of the right cheek. The clinical examination revealed a palpable but not visible painless nodular and firm mass at the level of the infraorbital nerve emergence, and it was mobile and not pulsatile. A thorough medical history detected a malar injection about four years ago with polyalkylimid. Surgical treatment was performed to extract a well-encapsulated transilluminated lesion located beneath the orbicularis muscle without any adherence to adjacent structures, mainly the infraorbital nerve. Histopathological findings corroborated with a migrated nodule.

CONCLUSION: Polyalkylimide injection in the cheek may give rise to leakage of hydrogel droplets in the lower eyelid, leading to nodule formation in the long term. The hardness of the capsule surrounding the hydrogel and the existence of these nodules between the infraorbital nerve and the orbicular muscle could lead to intolerable paresthesia. Corticosteroid injections are widely administered to manage delayed non-inflammatory granuloma related to filler injections. However, they are inefficient on polyalkylimide nodules where surgical excision remains the mainstay approach.

KEY WORDS: Bio-Alcamid®; polyalkylimide; non-inflammatory granuloma; eyelids, paresthesia; dermal fillers; complications; delayed onset nodule

Ophthalmol J 2023; Vol. 8, 29–32

INTRODUCTION

Post-injection complications of polyalkylimide (Bio-Alcamid® Polymekon, Brindisi, Italy) have been reported years after cosmetic treatment. Most short-term side effects are related to the procedure, while delayed side effects usually are related to the filler product and/or the body reaction. Nodule migration at the lower eyelid can be misdiagno-

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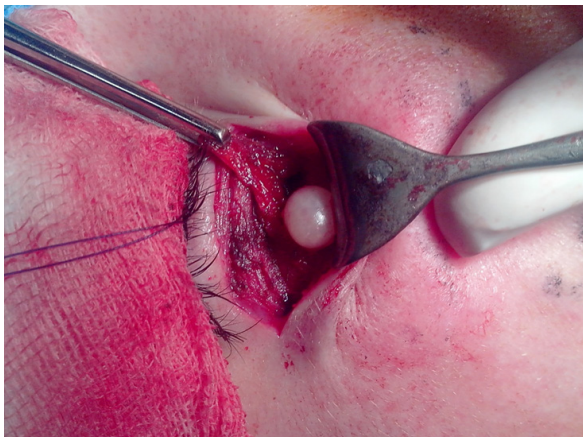

FIGURE 1. Perioperative photo showing an encapsulated mass under the orbicularis muscle, at the level of the infraorbital nerve

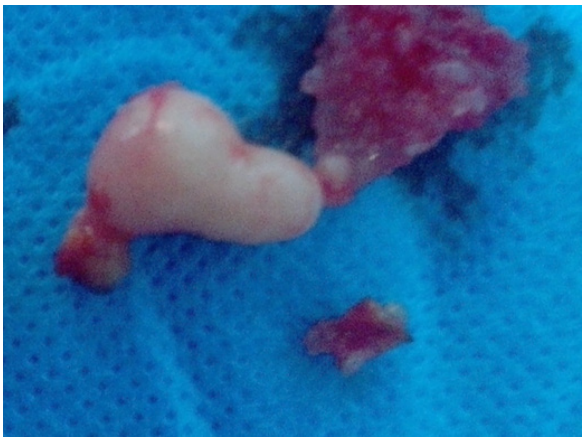

FIGURE 2.THE extracted material with an ovoid shape

sis since the site of the complication is distant from the injection site. Although silicone and polyalkylimide are permanent fillers, related nodules require different therapeutic management [1, 2].

Paresthesia is rarely reported as a delayed complication, and it has been reported following a traumatic or inappropriate procedure and after aggressive product modeling [3]. This article describes paresthesia revealing an unremarkable nodule migration of polyalkylimide four years after malar injection.

CASE PRESENTATION

A 32-year-old woman had presented for paresthesia of the right cheek. The clinical examination revealed a palpable but not visible painless nodular and firm mass at the level of the infraorbital nerve emergence. It was mobile and not pulsatile. The overlying skin had a normal texture. Ultrasound examination confirmed a well-encapsulated lesion with anechoic images and showed no capsular or internal vascularity. A thorough medical history detected a malar injection with polyalkylimid hydrogel dermal filler about four years ago. This injection was performed by a dermatologist. Otherwise, any history of facial trauma nor inflammatory and infection episodes had happened. According to these features, soft tissue benign tumors such as schwannoma or neurofibroma and a nodular filler migration were suspected.

Under general anaesthesia, a subciliary approach revealed a well-encapsulated transilluminated lesion located beneath the orbicularis muscle without any adherence to adjacent structures, mainly the infraorbital nerve. This lesion was extracted, and histopathological findings highlighted the presence of deposits of acellular material with a few foreign body giant cell reactions and surrounding fibrosis. Hence the diagnosis of a migrated nodular filler was retained. The postoperative outcome was satisfying, and the patient no longer complained of nervous disorders. The lower eyelid snap test was excellent, with good eye closure and a well-hidden scar. Any recurrence was observed for more than five years.

DISCUSSION AND CONCLUSIONS

Polyalkylimide (Bio-Alcamid®), a non-resorbable polymeric dermal filler, consists of 96% pyrogen-free water (96%) and synthetic polymeric polyalkylimide (pH 6.8–7.2). Currently, it is not approved by the US Food and Drug Administration (FDA). Once injected Bio-Alcamid becomes encapsulated in a thin layer of host collagenous tissue, making it resistant to hydrolysis. This capsule formation starts within a few days following the injection and is completed within six weeks. Hence polyalkylimid is considered an endoprosthesis where the injected material is isolated from the surrounding tissue [4, 5]. Despite the apparent security regarding hydrogel migration, we think that migration of hydrogel may occur at three levels of its evolution as follows:

- the injection of too much material at a single point leads to extravasation of this material from its predicted site, as well as when injecting at high pressure letting the material overflow the expected limits. This inadvertence can lead to the spread of the hydrogel and later nodule migration [1];

- during the capsule formation, a hydrogel droplet leak may occur secondary to minor trauma or muscular activity and pressure. Therefore this phenomenon will be the origin of nodule migration;
- after capsular formation, as in breast implants, the capsule can disintegrate, crack secondary to trauma or muscle activity, and dislodge the polyalkylimide filler, which migrates in the surrounding area. It is worth noting that pulmonary embolus has been described as a dramatic complication of polyalkymide migration after body contouring [3, 6, 7]. In our report, it seems that inadequate injection of polyalkylimide in the malar region caused the migration of droplets at the inferior orbital rim adjacent to the infraorbital nerve. In addition, the hardening of the capsule might be more compressive and irritating.

Bio-Alcamid® is non-toxic, non-allergenic, non-reactive, biocompatible, and non-biodegradable. It seems to fulfil the main criteria of a non-absorbable filler product. The primary concern with this permanent filler or endoprosthesis is the long-term safety in terms of an allergic reaction, granuloma and nodule formation, and product stability [8]. However, for all types of permanent fillers, semi-permanent and resorbable fillers, delayed reactions with Bio-Alcamid® have also been described, such as inflammation, nodule formation, foreign body reaction with granuloma formation, hardening of the capsule, and nodule migration. An interesting study reported the nonstability of the product over time, leading to its degeneration, dehydration, and calcification formation [2, 9]. Paresthesia is a severe delayed onset. It is a troublesome condition that is difficult to assess, attributed to nerve injury, filler compression, or intraforaminal intrusion due to excessive massage for product shaping. The most frequent site of paresthesia is the infraorbital nerve [10], as seen in our patient, where the hardening of the capsule leads to pain and irritates the infraorbital nerve. In breast implants, the severity of the capsule formation is unpredictable and patient-dependent. Hence the polyalkylamide sphere changes shape and becomes hard and compressive for nerve branches. In most cases, no cause or trigger for the hardening of the capsule was reported. Autoimmune response and mico-inflammation due to a biofilm of bacteria could play a significant role [2, 11].

Ultrasound imaging may be a valuable tool to determine the nature of an unknown injectable product. The polyalkylimide pattern is characterized by a cystic image with the content of anechoic nature to a greater or lesser extent, surrounded by a capsule of variable thickness. There is also a posterior typical hyperechoic imaging. This pattern is also observed in hyaluronic acid-based fillers immediately after injection [12]. These imaging findings are helpful for therapeutic decisions. Usually, delayed onset nodule and foreign body granuloma, particularly after hyaluronic acid-based fillers and silicone liquid injections, are well managed with hyaluronidase and corticosteroid injections. Steroids, which are lipophilic, dissolve well in silicone, whereas steroids would not be effective on the hydrophilic polyalkylimide. So, surgical excision remains the mainstay in managing polyalkylimid nodule migration [7, 13]. The surgical excision was successfully performed on our patient, allowing her an aesthetic and hidden scar for a better outcome.

Bio-Alcamid® nodule migration of the lower eyelid must be considered the differential diagnosis for any patient with a history of injectable fillers which has developed non-inflammatory masses. Injectors need to have a thorough knowledge of various injectable products' biological and chemical characteristics, notably for managing such complications. Surgical excision of nodule migration at the lower eyelid remains an appropriate treatment, and it should be performed by competent surgeons.

Ethics approval and consent to participate

Institutional ethics committee was not obtained, as this is a single case report. The patient provided written consent.

Consent for publication

Written informed consent was obtained from the patient for publication and for the use of data and images.

Availability of data and materials

All data included in this published article are available from the corresponding author upon reasonable request.

Conflict of interests

The author declares that there are no competing interests.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author's contributions

I.M.T. — manuscript drafting, figures drafting, figure editing, clinical exam, revision, and approval of the final manuscript.

Acknowledgments

The author would sincerely like to thank the patient who has given written informed consent to publish its case details.

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