Polyacrylamide hydrogel (Aquamid) filler removal after a decade

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INTRODUCTION

Fillers for soft-tissue augmentation have been extensively investigated with respect to safety, efficacy, ease of use, longevity, cost, and the possibility of removal [1]. In particular, gel removal after injection is of concern, and many surgeons are deterred from using them by the possible need for extensive surgery should removal be required. Several studies have demonstrated the safety and efficacy of polyacrylamide hydrogel (Aquamid) gel, but to date no report has described its removal after 10 years. Here, we report a case of Aquamid removal. A 33-year-old woman, who had undergone forehead augmentation 12 years previously with an Aquamid injection, visited the department of plastic and reconstructive surgery of our medical center due to a severe forehead contour irregularity. Removal of 20 mL of excess gel was performed by direct incision and squeezing under local anesthesia. Our experience shows that Aquamid removal is possible, but should be performed with appropriate surgical precautions.

CASE REPORT

A 33-year-old woman with a forehead contour deformity presented at the Department of Plastic and Reconstructive Surgery of Dongguk University Hospital. She stated that this symptom had appeared 2 years before her visit. She had undergone forehead augmentation 12 years previously with an Aquamid injection, visited the department of plastic and reconstructive surgery of our medical center due to a severe forehead contour irregularity. Removal of 20 mL of excess gel was performed by direct incision and squeezing under local anesthesia. Our experience shows that Aquamid removal is possible, but should be performed with appropriate surgical precautions.
A small amount of filler (0.5 mL) was removed by 18-gauge needle aspiration and a small amount of filler leaked out through the puncture site. Manual squeezing through two 0.5-cm stab incisions under local anesthesia decompressed the forehead convexities (Fig. 2). Finally, 20 mL of Aquamid and blood were removed by squeezing (Fig. 3). The incision sites were repaired with Ethilon 6-0 after thorough saline irrigation. We then administered an oral antibiotic (Meiact, Meiji Seika Pharma, Tokyo, Japan; cefditoren pivoxil; a third-generation cephalosporin) at a dose of 100 mg three times a day to prevent postoperative infection for 5 days.

Sutures were completely removed on postoperative day 5. The patient's recovery was uneventful and no complications, such as contour deformities or margin irregularities, were evident at 1 month postoperatively (Fig. 4).

**DISCUSSION**

Aquamid is used as an injectable soft-tissue filler for facial soft-tissue augmentation and contour enhancement. This filler is a polyacrylamide hydrogel comprised of 2.5% cross-linked polymer and 97.5% sterile water. The gel is colorless and transparent [2] and is usually injected into the nasolabial and glabellar folds, depressed...
corners of the mouth, and perioral wrinkles. In addition, gel injection is also used for facial contouring, such as for lip augmentation and contouring of the chin, cheeks, nose, and vermilion border [2]. The gel is administered first in the deeper planes of subcutaneous tissues, and then to more superficial layers. Injections directly administered underneath the dermal plane are avoided [2,3].

Aquamid is thought to cause few foreign body reactions because of its physical and chemical properties. The polymer is highly cross-linked and forms strong non-covalent bonds with water, which results in a smooth surface [2]. Nonetheless, Aquamid mediated facial augmentation can have short-term complications of swelling, hematoma, pain, redness, and itching [2], and long-term complications of contour deformation, depression of the operated area, and migration [3]. The causes of polyacrylamide hydrogel migration are various. Gravity can move the gel downward and cause contour deformities, and the fibrous capsules that usually develop around the filler are too flimsy to prevent migration. In addition, facial muscle movements may cause capsule rupture and gel migration [5].

As mentioned above, because of its chemical properties, Aquamid is considered to have few side effects, and filler displacement appears to occur roughly 4 years after injection. To the best of our knowledge, this is the first reported case involving the removal of a large volume of gel (20 mL) that had been implanted more than 10 years previously. No consensus has been reached on the treatment of permanent filler–associated complications. Not enough time has passed to assess the long-term efficacy of Aquamid as a clinically safe filling material for soft tissue due to its unstable localization in implant regions and its tendency to move easily in response to gravity and muscle activity [5].

A large number of other synthetic fillers are available in various parts of the world, but it is difficult to comment on the effectiveness and safety of these products because of a lack of published information. Aquamid is a non-FDA approved synthetic filler that has been approved in Europe and in 40 countries [6]. The ideal characteristics of a filler are that it be non-toxic, biocompatible, long-lasting, reversible, autologous, safe, predictable, and not be discernible by touch or by eye, with minimal downtime. Aquamid offers satisfactory permanence, but as with other synthetic fillers, its use has been associated with complications such as granuloma, acute and delayed infections, migration, displacement, and deformities [1-4,6].

In the Korea, the Ministry of Food and Drug Safety provides information on various fillers that have been authorized. This information includes the side effects of synthetic fillers like Aquamid. It is noted that Aquamid is long-lasting but hard to remove, and the Ministry of Food and Drug Safety therefore limits the use of this filler except for improvement of facial wrinkles [7]. It can be helpful for patients to search for information on specific fillers before undergoing procedures.

The development of numerous fillers has provided plastic surgeons with invaluable means of conducting minimally invasive facial rejuvenation. Properly performing procedures and using suitable fillers are the keystones for achieving a natural appearance and avoiding iatrogenic problems. Nevertheless, all fillers have possible side effects, and if a side effect is encountered, a proper work-up and diagnosis followed by appropriate management are essential. In our patient, a large amount of Aquamid was removed with adequate surgical precautions, more than a decade after administration. We have included clinical photographs of the entire procedure. If the filler remains present and contour irregularity persists, an additional imaging work-up for localization followed by surgical removal or needle aspiration can be recommended.

NOTES

Conflict of interest
No potential conflict of interest relevant to this article was reported.

Ethical approval
The study was performed in accordance with the principles of the Declaration of Helsinki.

Patient consent
The patient provided written informed consent for the publication and the use of her images.

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