

Removal of Aquafilling Using Body-jet: A Waterjet-assisted Lipsuction Device

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Aquafilling was developed in 2005 as a soft-tissue filler for facial contouring. Its manufacturer has declared that it is composed of 98% water and 2% copolyimide.¹ It is currently increasingly being used for breast augmentation in several countries, but there is little evidence that suggests it is effective and safe in the long-term for this indication.¹ One study, namely that of Shin et al on two cases,² did suggest in 2015 that Aquafilling may be a new option for correcting minor problems after breast-augmentation surgery with implants, but this report was vastly outweighed by numerous contemporary and earlier reports on complications after breast augmentation with Aquafilling: these complications include pain, inflammation, infection, filler migration, and abnormal skin sensations.^{3,4} As a result, the Korean Academic Society of Aesthetic and Reconstructive Breast Surgery prohibited the use of Aquafilling for breast augmentation surgery in 2016.¹ This position has since been further bolstered by multiple new case and case-series reports describing the complications of Aquafilling for breast augmentation.⁵⁻⁹

Our specialist hospital regularly sees patients who had breast augmentation with Aquafilling injections and subsequently developed complications. Most of these patients request removal of the filler. However, because many are also reluctant to undergo significant surgery, the most common initial approach is keyhole surgery, where a cannula is inserted into a small ~5-mm incision (ie, the keyhole) and the area below is washed with physiological saline.^{3,4,8,10,11} However, although this approach leaves negligible incisional scars, it is often very difficult in our experience to remove all implants. Indeed, in many of the cases we see, keyhole surgery had been performed in another hospital, but our imaging analyses showed significant Aquafilling remnants. This reflects the fact that Aquafilling is not easily liquefied by saline postinjection. Moreover, in many cases, the filler is surrounded by a thick and resistant multilocular capsule with a septal structure

and has become a gel-like substance that has a thick and viscous consistency. In addition, some of the worst cases exhibit filler infiltration of the submammary fascia and pectoralis major (Fig. 1) and/or migration of the filler to the axilla, back, or abdominal wall. These cases are caused by roughly performed injections that were not guided by imaging. Such poor techniques can injure the local tissue and disrupt the normal encapsulation process, thereby inducing infiltration and migration, respectively. These changes associate with serious complications, including biofilm growth on the residual material and inflammatory responses to these microorganisms and the capsule components. Another common problem that we encountered when performing salvage surgery after keyhole surgery in other institutions was the presence of large amounts of the saline wash, which could not be removed through a small incision; in such cases, we had to use a large incision line to remove most of the saline.

To overcome these barriers, we devised a novel Aquafilling-removal method that involves placing a small incision near the accumulated filler and then inserting the lipsuction cannula of Body-jet (Human Med AG, Schwerin, Germany), which is a waterjet-assisted lipsuction device with a small cannula tip that is used for treating lipoedema. This efficient and relatively atraumatic and painless device produces a jet stream of tumescent fluid that gently separates adipocytes and then suctions them up.¹²

Video 1 shows that the lipsuction-cannula tip bears a port that injects a fan-shaped jet of saline at an angle of 30 degrees. (See Video 1 [online], which displays the cannula of the Body-jet device spraying a fan-shaped jet stream of liquid from its tip at an angle of 30 degrees. The water pressure of the jet disrupts the capsule surrounding the filler, mobilizes the filler, and aids drainage.) The water pressure and degree of pulse can be adjusted on the LCD screen of the main unit. Videos 2 and 3 show respectively how the cannula should be inserted and then moved in a case where Aquafilling has formed a capsule.

(See Video 2 [online], which demonstrates that before using the Body-jet device in a patient with encapsulated Aquafilling in the breast, the surgeon should confirm with the naked eye that the capsule is present and that the cannula can be inserted between the layers.) (See Video 3 [online],

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Fig. 1. Photograph showing infiltration of Aquafilling into the fibers of the pectoralis major muscle.

which demonstrates how the tumescent liquid-injection function of the Body-jet device is then turned on (the suction function is not used) and the cannula is slowly advanced into the lumen. This step must be performed under ultrasonic guidance. Washing with saline should continue until the waste liquid is clean.)

Thus, the cannula should not be inserted blindly; rather, the capsule should be first confirmed by direct vision, after which the cannula tip should be inserted surely into the capsule. Once the presence of filler is confirmed visually, the tumescent liquid-injection function is turned on (the suction function is not used) and the cannula is slowly advanced into the lumen. The washing operation is then carefully performed under ultrasonic guidance to avoid damaging the fascia, blood vessels, and nerves. It is important not to let the tip enter the subcutaneous fat. In the case shown in Videos 2 and 3, the tumescent liquid did not have to be mixed with local anesthetic, and physiological saline was sufficient to remove the filler.

To date, we have used this technique to treat three patients with complications after breast augmentation with Aquafilling injections. It effectively ruptured the capsules

with little damage to healthy tissues. Postoperative imaging showed that it efficiently removed Aquafilling, although it was less effective in cases where Aquafilling had infiltrated the muscle/mammary gland (data not shown). In such cases, a wider incision may be needed. Another advantage of this technique is that it uses only a small incision, which can significantly reduce the operation/anesthesia time and scarring, thereby minimizing the burden on the patient. Plastic surgeons may find this effective and relatively painless method of removing Aquafilling useful. One disadvantage of the technique is the cost of Body-jet. We are currently searching for a more inexpensive but equally effective alternative.

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