Facial Rejuvenation with Open Technique After Previous Filler Injection

Daping Yang, MD

KEYWORDS

• Facelift • Facial rejuvenation • Polyacrylamide hydrogel • Removal of injected material

KEY POINTS

- Complications arising from polyacrylamide hydrogel are well-documented in the literature.
- Complete removal of injected material is seldom possible.
- Patients who underwent removal of injected material were significantly more likely to express interest in facelift surgery.
- An open surgical technique with facelift incision to manage removal of polyacrylamide hydrogel and complication due to volume deflation and tissue descent is described.

INTRODUCTION

Polyacrylamide hydrogel (PAAG: Amazingel; Nan-Feng Medical Science and Technology Development Co., Ltd., Shijiazhuang, People's Republic of China) was used in breast augmentation and facial soft-tissue augmentation in China in 1999. Because complications of PAAG injections for breast augmentation were continuously reported,[1–3] the products were banned in China in 2006.[4] However, illegal use in facial augmentation continued. Because of illegal PAAG injections in cosmetic clinics, there have been more complications than previously reported in China.

The complications associated with PAAG injection including tissue infection, nodular formation, and migration along tissue planes have been well-documented.[5–8] Patients with complications in site of injected area came to our hospital for removal surgery. Complete removal of injected material is seldom possible. It is possible to perform excision together with local tissue such as partial mastectomy in the case of breast injection, when dealing with the complication of injection for breast augmentation. A major concern on polyacrylamide hydrogel injection in facial augmentation is that the injected material is not readily removable once complication arises because facial structure is very complex, and more severe local complications such as facial nerve injury should be controlled. Therefore, facial lift with open technique for the removal of injected material in cheek and temporal regions has been used in our practice, which has not been reported in the literature. This article presents 22 cases of severe complications associated with PAAG injection in facial augmentation and provides an open surgical technique to manage the complication due to volume deflation and tissue descent.

Indications and Contraindications

For patients who have received injection filling in cheek and temporal regions with clinical symptoms, we recommend that patients receive aggressive procedure for surgical removal.

If patients with moderate or severe aging such as malar fat pad descent with nasolabial folds, jowls, and cervical skin laxity, we recommend that patients receive aggressive procedure for surgical removal and facelift simultaneously (**Fig. 1**).

Contraindications are including patients with high risk, such as those with advancing age, extrinsic skin damage (eg, sun exposure, cigarette smoke), and history of massive weight loss.

First Beijing BCC Plastic Surgery Hospital, No. 37, Guangqu Road, Chaoyang District, Beijing 100022, China
E-mail address: dapingyang@outlook.com

Clin Plastic Surg 50 (2023) 61–69
https://doi.org/10.1016/j.cps.2022.07.005

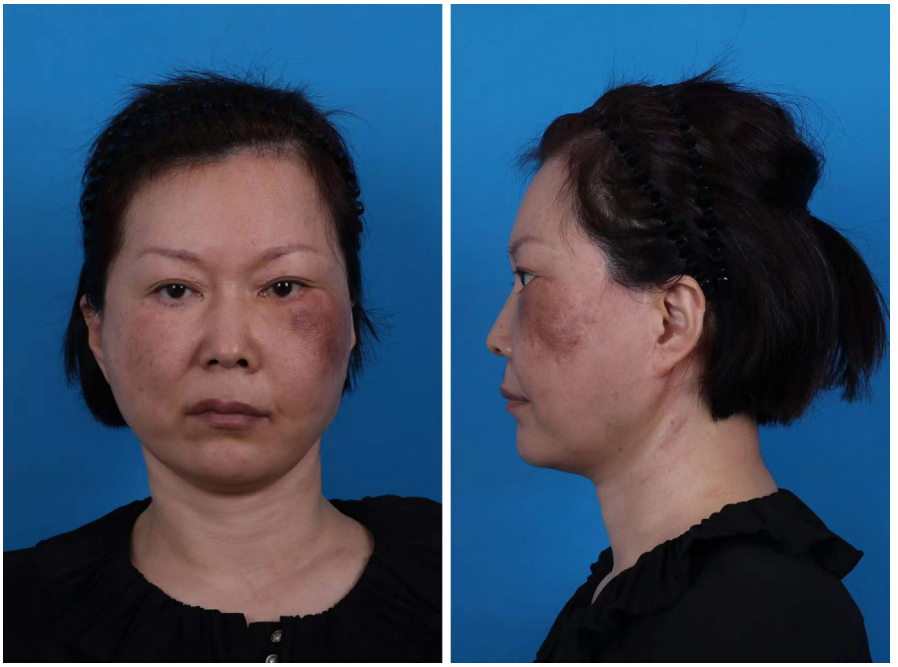

Fig. 1. Patient with moderate aging.

Preoperative Evaluation and Special Considerations

Preoperative discussion about what to expect not only helps prepare the patient but also facilitates postsurgical communication. Surgeons should communicate with the patient as to what to expect and what areas may be more difficult to fully correct.

Patients who have received injection filling in cheek and temporal regions with clinical symptoms seek improvement on both removal of injected material and face aging. They have a range of options available to them depending on the problems present; the degree of improvement they seek; and the time, trouble, and expense they are willing to undergo to obtain the improvement they desire. Although it is essential to discuss these options and the advantages and disadvantages of each, patients are also seeking our guidance as to what is possible, what is practical, and what is really best.

The important structures of the injection site, such as the facial nerve and the difficulty of the operation, should be considered, as well as the change of the local facial shape after removal because this type of injection is mostly performed on the facial deep plane, and the change of shape after the removal can cause new psychological trauma to the patient. Iatrogenic jowling can be an unintended consequence of removal of injected material in cheek due to volume deflation and tissue descent.

The removal of injected material can lead to a redundant and deflated soft tissue envelope, requiring a facelift to address jowling, cervicofacial laxity, and/or lower facial rhytids.

Patients who underwent the removal of injected material were significantly more likely to express interest in facelift. Before removal, the authors recommend comprehensive patient counseling that includes a discussion need for a facelift. When performing a facelift after removal, technical considerations include the mechanism of jowling (different from normal facial aging). The authors thought that these considerations can set more realistic expectations for patients.

Surgical Procedures

Surgical removal involves simultaneous facelift procedure. Facelift procedure that we performed includes lateral SMASectomy technique (Baker's technique)[9] and high-SMAS suspension technique (Barton's technique).[10] We have patients agree to allow us to option which technique we use during surgery, depending on the degree of facial tissue damage from injected material, such as tissue infection, nodular formation, and migration along tissue planes.

Lateral SMASectomy Technique

As Baker described, the outline of SMASectomy was marked on a tangent from the lateral aspect

of the malar eminence to the angle of the mandible, essentially in the region along the anterior edge of the parotid gland. The deep fascia along the SMASectomy line was exposed to keep the dissection superficial to the deep fascia and avoid dissection into the parotid parenchyma. Then, a strip of the superficial musculoaponeurotic system (SMAS), 2 to 3 cm in width, was usually excised, depending on the degree of SMAS laxity and site of injectables. The SMAS flap was raised in the same plane parallel to the nasolabial fold, to explore gel masses and injected material, along a trajectory toward the lateral canthus and overlying the anterior portion of the parotid gland. Continuous with the lateral SMASectomy was the resection of a strip of posterior platysma muscle several centimeters long over the tail of the parotid and anterior border of the sternocleidomastoid. The malar fat pad dissection was performed with 1 to 2 cm undermining on the deep plane to explore and remove injected material. We performed two interrupted sutures in oblique vector at the deep temporal fascia to suspender the malar fat pad, and other wo interrupted sutures in vertical vector at near the front of the earlobe when closing the SMAS, then, 5 to 6 interrupted sutures were used to close the SMAS overlying the parotid which vectors were perpendicular to the nasolabial fold. The last 2 sutures advanced the platysma at the angle of the mandible to the retroauricular area in a posterosuperior direction to lift the cervical platysma postauricularly and to fix it to the mastoid fascia.[11–13]

High-SMAS Suspension Technique

The subcutaneous dissection above the zygomatic arch in the lateral orbital area was performed to release the cutaneous attachments of the crow's feet and to facilitate a smooth redraping of the temporal skin. A transverse SMAS fasciotomy above the zygomatic arch was performed. Using Barton's technique, the main SMAS flap was suspended to the deep temporal fascia vertically above the zygomatic arch to elevate the

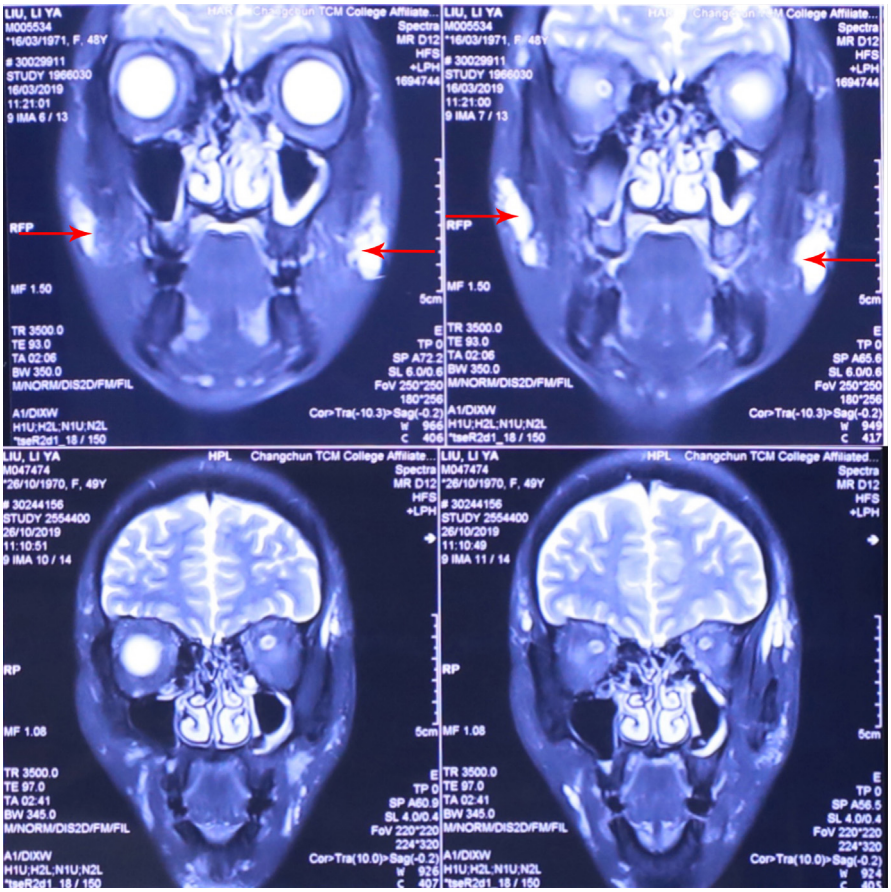

Fig. 2. (*Above*) Facial coronal T2 W slices of MRI showed infiltration of the filler material in the subcutaneous and SMAS layers (*arrows*). (*Below*) Six months after removal surgery with simultaneous facelift procedure.

malar and zygomatic soft tissues and an SMAS transposition flap from the SMAS flap was incised posteriorly, with the preauricular strip suspended superolaterally to the mastoid fascia to improve neck and jaw contour.

Postoperative Care and Expected Outcome

Drains are usually removed on the second day after surgery, and sutures are removed 7 days after surgery. If healing is progressing well, drain output is minimal, and no fluid collections are present, and if it seems that the patient is following dietary and other instructions, drains are removed at that time.

When sutures are removed will vary depending on the type of procedure performed. If a "short scar" facelift has been performed, a submental incision only will be present, and sutures are removed on the fifth day. If a facelift has been performed, 6-0 nylon sutures are removed on the seventh day. Half-buried vertical mattress sutures of 4-0 nylon with the knots tied on the scalp side are removed on the seventh to ninth day.

When patients return to work will depend on their tolerance for surgery, their capacity for healing, the type of work they do, the activities they enjoy, and how they feel overall about their appearance. Patients are asked to set aside 7 to 10 days to recover depending on the extent of their surgery, and additional time off is recommended if a facelift and related procedures are simultaneously performed.

Patients are advised to avoid all strenuous activity during the first 2 weeks after surgery. Two weeks after surgery, patients are allowed to begin light exercise and gradually work up to their presurgical level of activity. Four weeks after surgery, they are allowed to engage in more vigorous activities.

Chinese women are increasingly requesting procedures with minimal recovery, minimal cost, minimal risk, and maximal benefit with a natural-appearing and long-lasting result. We feel that procedures must be individually determined. Patients who have received injection filling in cheek

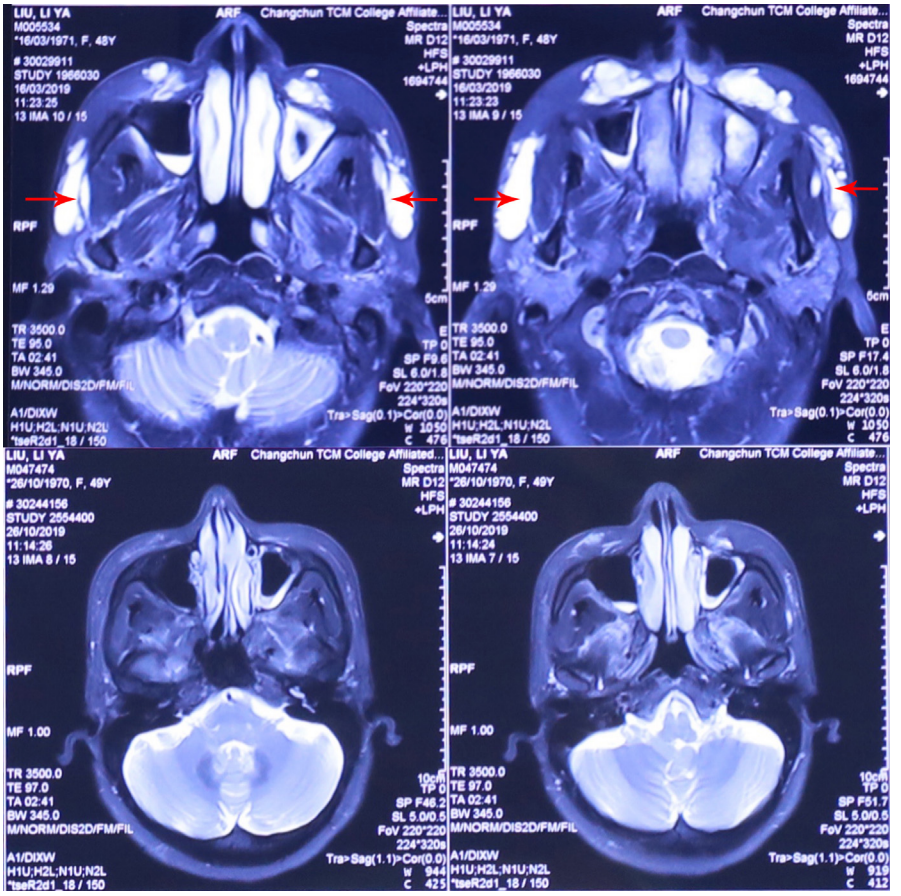

Fig. 3. (*Above*) Axial T2 W slices of MRI showed a mass lesion of injected material in the NLF and cheek regions (*arrows*). (*Below*) Six months after removal surgery with simultaneous facelift procedure.

and temporal regions with clinical symptoms seek improvement on both removal of injected material and face aging. We provide an open surgical technique with facelift incision and the deep plan dissection to explore and remove injected material. Complications of PAAG (such as granuloma formation, unsatisfactory contours, and gel migration), and complications after surgical removal (such as volume deflation, tissue descent) can be improved with the open surgical technique.

Management of Complications

Complications after PAAG injections including infection, inflammation, granuloma formation, uneven contours, abnormal skin sensations, and gel migration still occur. Patients with complications at the site of the injected area came to our hospital for removal surgery.

Due to the lack of a unified national treatment method, many doctors use needle aspiration to deal with it. It is difficult to completely aspirate PAAG due to the presence of separate capsules of gel. However, this method of aspiration may make things even worse, due to spreading gel into surrounding normal tissue.

Because aspiration fails to remove the PAAG, incision is needed. The incision directly on the skin at the site of the injection mass is the last choice because most patients are worried about visible scars. Intranasal incision, intraoral incision, hairline incision, or conjunctival incision can usually be used for local injected gel. However, due to the complex structure of the cheeks, the small incisions mentioned above cannot adequately explore gel masses in the deep plant of face. Complete removal of PAAG is almost impossible. Therefore, we provide an open surgical technique with facelift incision to deal with the removal of polyacrylamide hydrogel and complication due to volume deflation and tissue descent.

Revision or Subsequent Procedures

PAAG mingle with the local tissue. Therefore, when a complication arises, local tissue has to be excised together with the injected material, which results in significant morbidity to the injection site, such as volume deflation, tissue descent. Fat grafting can provide significant improvement for the correction of face deficiencies. More studies are required to support

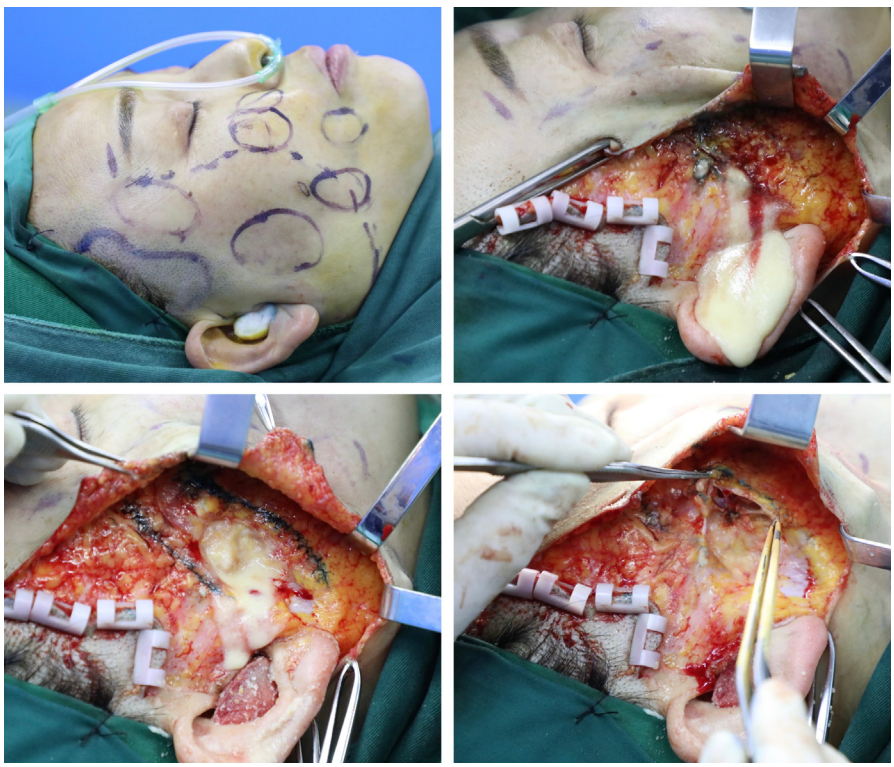

Fig. 4. Intraoperative view showing the extirpation of the injected polyacrylamide hydrogel.

Fig. 5. A 48-year-old woman who underwent PAAG injected into her bilateral NLF and cheek regions for augmentation purpose 18 years ago. Preoperative photograph (*left*) and postoperative photograph of 6 months after removal surgery with simultaneous facelift procedure (*right*). The appearance of the lower two-thirds of her face had been improved.

the safety of management of complications after PAAG removal.

CASE DEMONSTRATIONS

Case 1

A 48-year-old woman had PAAG injected into her bilateral nasolabial folds (NLF) and cheek regions for augmentation purpose 18 years ago. She complained of nodularity and local inflammation in the injected site. MRI of the NLF and cheek regions showed a mass lesion of injected material. MRI showed infiltration of the filler material in the subcutaneous and SMAS layers in cheeks. The mass was hyperintense in T2 images, which was suggestive of inflammatory changes (**Figs. 2** and **3**). Debridement was performed with facelift incision. Removal surgery involves simultaneous facelift procedure (**Figs. 4** and **5**).

Case 2

A 39-year-old woman presented with lower face sagging due to history of heavy-filler injections using PAAG 10 years ago. The descent of the fillers in combination with laxity of facial tissues resulted in jowl formation. After filler removal (**Fig. 6**) and facelift, the appearance of the lower two-thirds of her face had been improved (**Fig. 7**).

DISCUSSION

Due to the lack of a unified national treatment method, many doctors use needle aspiration to deal with it. It is difficult to completely aspirate PAAG due to the presence of separate capsules of gel. However, this method of aspiration may

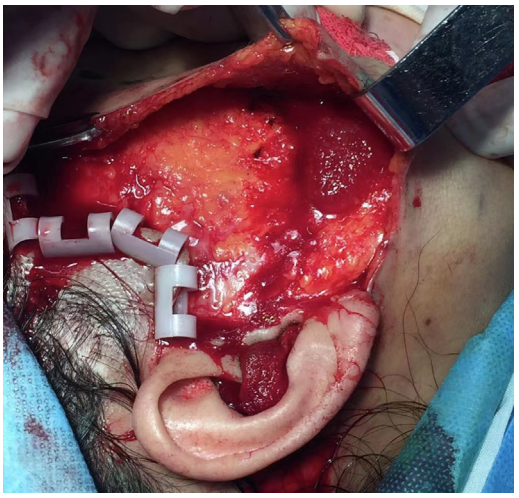

Fig. 6. Intraoperative view showing the injected polyacrylamide hydrogel was removed surgically.

Fig. 7. A 39-year-old woman presented with lower face sagging due to history of injection with polyacrylamide hydrogel 10 years ago. Photographs obtained preoperatively (*left*), 3 months postoperatively (*center*), and 6 months (*right*) after removal surgery with simultaneous facelift procedure, demonstrating improvement in cheek and jowling.

make things even worse, due to spreading gel into surrounding normal tissue.

It is difficult to completely aspirate polyacrylamide hydrogel due to the presence of separate capsules of gel. Since aspiration fails to remove the polyacrylamide hydrogel, incision is needed. However, due to the complex structure of the cheeks, the small incisions mentioned above cannot adequately explore gel masses in the deep plant of face. Complete removal of polyacrylamide hydrogel is almost impossible. Therefore, we provide an open surgical technique with face lift incision to deal with removal of polyacrylamide hydrogel and complication due to volume deflation and tissue descent.

It is common knowledge that ideal soft tissue filler should be safe and should achieve a cosmetic effect that is sustainable and correctable. To be a safe material, the filler should be inert, noncarcinogenic, and readily removable once complication arises. To achieve a good cosmetic effect, the filler should be confined to the site into which it was injected (ie, migration-free). The material should also be readily removable on the patient's wish. Complications arising from PAAG are well-documented in the literature in which migration of material and local inflammation is commonly reported. Complete removal of injected material is seldom possible and excision together with local tissue (ie, mastectomy in the case of breast injection) is almost always required for the control of severe local complications.

We describe our armamentarium of facelift techniques for addressing the specific concerns of the aging Chinese face. We feel that each facelift must be individually determined. The adjustments necessitated by each patient's unique anatomy are the key factors to a natural-appearing result. We advocate a fresh and natural look after the facelift procedure and a reasonably fast recovery.

The anatomy of Chinese face does not necessitate substantial modification of the surgical techniques for successful facial rejuvenation. In our practice, various facelift techniques can produce excellent results.[11,12] It is impossible for each surgeon to be proficient in all procedures but it is necessary to adopt a technique that serves patients well and is, ideally, safe, consistent, easily reproducible, and applicable to various anatomic problems. In addition, every surgery is customized to the patient's anatomy and concerns. Therefore, the surgeon must have the versatility to individualize the technique according to the needs and desires of each patient. Our large case series of 1026 patients demonstrate consistent safety and effective esthetic results.[13]

SUMMARY

Complications arising from polyacrylamide hydrogel are well-documented in the literature. Long-term complications after PAAG injections in facial correction including infection, inflammation, granuloma formation, unsatisfactory contours, abnormal skin sensations, and gel migration still occur. Complete removal of injected material is seldom possible. Patients who underwent removal of injected material were significantly more likely to express interest in facelift. We provide an open surgical technique with facelift incision to deal with the removal of polyacrylamide hydrogel and complication due to volume deflation and tissue descent.

CLINICS CARE POINTS

- Ideal soft tissue filler should be safe and should achieve a cosmetic effect that is sustainable and correctable.
- The material should also be readily removable on the patient's wish.
- Complete removal of polyacrylamide hydrogel is seldom possible and excision together with local tissue is almost always required for the control of severe local complications.

PATIENT CONSENT

Patients provided written consent for use of their images.

REFERENCES

1. Cheng NX, Wang YL, Wang JH, et al. Complications of breast augmentation with injected hydrophilic polyacrylamide gel. Aesthet Plast Surg 2002;26:375–82.
2. Wang X, Qiao Q, Sun J, et al. The periareolar approach management of postoperative complications of breast augmentation by injected polyacrylamide hydrogel (in Chinese). Zhonghua Zheng Xing Wai Ke Za Zhi 2005;21:332–4.
3. Yue Y, Luan J, Qiao Q, et al. Retrospective analysis of complications of breast augmentation with injected polyacrylamide hydrophilic gel in 90 cases (in Chinese). Zhonghua Zheng Xing Wai Ke Za Zhi 2007;23:221–3.
4. State Food and Drug Administration (Web site) Available at: http://www.sda.gov.cn/WS01/CL0493/53328.html. Accessed June 26, 2012.

5. Ono S, Ogawa R, Hyakusoku H. Complications after polyacrylamide hydrogel injection for soft-tissue augmentation. Plast Reconstr Surg 2010;126:1349–57.
6. Liu HL, Cheung WY. Complications of polyacrylamide hydrogel (PAAG) injection in facial augmentation. J Plast Reconstr Aesthet Surg 2010;63:E9–12.
7. Qiao Q, Wang X, Sun J, et al. Management for postoperative complications of breast augmentation by injected polyacrylamide hydrogel. Aesthet Plast Surg 2005;29:156–61 [discussion: 162].
8. Shen H, Lv Y, Xu J, et al. Complications after polyacrylamide hydrogel injection for facial soft-tissue augmentation in China: Twenty-Four cases and their surgical management. Plast Reconstr Surg 2012;130:340e.
9. Baker DC. Lateral SMASectomy. Plast Reconstr Surg 1997;100:509–13.
10. Barton FE Jr, Hunt J. The high-superficial musculoaponeurotic system technique in facial rejuvenation: an update. Plast Reconstr Surg 2003;112:1910–7.
11. Zhang P, Sui B, Ren L, et al. The individualized facelift technique in improving facial asymmetry for Asian patients. Ophthalmic Plast Reconstr Surg 2018;34:516–21.
12. Gong M, Yu L, Ren L, et al. Lateral superficial muscular aponeurotic system stacking/superficial muscular aponeurotic systemectomy with orbicularis-malar fat repositioning: a procedure tailored for female Asian Patients. Dermatol Surg 2020;46:934–41.
13. Yang D, Yang J. Special considerations in Chinese face-lift procedure. Insights from a 15-year Experience of 1026 cases. Ann Plast Surg 2021;86.S244–S25.