Augmentation Rhinoplasty with Silicone Implant

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Abstract

Augmentation rhinoplasty in the Asian patient requires an understanding of his or her aesthetic goals which often differ from that of a Caucasian patient. Asian Patients frequently desire dorsal augmentation and tip projection. To accomplish these changes, the surgeon must take into account the typical characteristic of the Asian nose, these include thick skin, abundant subcutaneous soft tissue, weak lower lateral cartilage, and a relative paucity of septal cartilage. Because the Asian nose has relatively weak underlying structural support and a thick overlying soft tissue skin envelope, the surgeon may find a structural approach to Asian rhinoplasty useful to achieve a refined dorsum and tip. While various autologous and alloplastic materials are available for use in this procedure, there remains controversy regarding which material is best. A number of materials, both biologic and alloplastic, have been used for nasal augmentation. Although biologic bone and cartilage grafts are associated with lower infection rates, they are also associated with long-term resorption and donor-site morbidity. Silicone nasal augmentation is a safe and effective procedure when used for moderate increases in nasal height. Contrary to previous reports, this series showed no associated infection. If the implant is shaped appropriately to the patient's nasal phenotype, the risk of extrusion may be reduced. Improved reporting of silicone implant failures and follow-up times in future studies are needed to better define specific guidelines for the use of these materials.

Key words : Rhinoplasty, Augmentation, Silicone, Implant
Introduction

The popularity of augmentation rhinoplasty is increasing among the Asian populations. While various autologous and alloplastic materials are available for use in this procedure, there remains controversy regarding which material is best. It is generally agreed that autologous cartilage is the best graft material in most cases, there is an insufficient amount of septal and conchal cartilages for dorsal augmentation of the Asian nose and rib cartilage grafts are associated with significant potential donor site morbidity and warping. Although Gore-Tex has a long history in vascular surgery, with millions of grafts placed with remarkably good biocompatibility, it may be associated with delayed infection, sarcoma and persistent swelling in augmentation rhinoplasty. AlloDerm has the definite disadvantage of partial absorption over the bony dorsum in a thin-skinned patient, it is, therefore, imperative to overcorrect the nasal dorsum. Nasal dorsal augmentation with silicone implant is popular in Eastern Asia. Although silicones are bioinert, they have been known to have a number of adverse outcomes after implantation such as extrusion, displacement and infection. Despite these side effects, silicone implants remain the most popular augmentation material. We have used silicone implant rather than prefabricated silicone rubber for nasal dorsal augmentation. A silicone implant is less bulky than conventional silicone rubber, is easily shaped, and is easier to remove than Gore-Tex in cases of complication. In use avoids the morbidity issues associated with autologous tissue harvesting. In addition, the ease of sculpting silicone implant can reduce surgery times. In this study, we retrospectively reviewed the results of silicone implant nasal augmentation in order to determine the safety and efficacy of silicone implant as an implant in rhinoplasty.

Materials and methods

A retrospective review was undertaken of 25 patients who underwent augmentation rhinoplasty using silicone implant at the department of plastic and reconstructive Surgery, Soonchunhyang university hospital, Bucheon, from January 2008 to October 2008. The postoperative outcome in terms of dorsal augmentation was classified as excellent, good, and no change. The decision to use silicone implant was based on a lack of sufficient septal cartilage due to the previous flat nose, or patient's unwillingness to harvest autologous conchal and costal cartilage. All surgical procedures were performed by corresponding author. The silicone was used for dorsal and/or radix augmentation.

A. Surgical techniques:

Twenty-five patients were treated under a general anesthesia with additional local anesthesia (mixture of 2% lidocaine with 1: 100,000), and under local anesthesia, 2% lidocaine with 1: 100,000 epinephrine with intravenous sedation (Dormicom 1 ampoule 5 mg). Implant placement involved an open approach via transcolumellar and bilateral marginal incisions, or an endonasal approach via intercartilaginous incisions. Sharp angular scissors were inserted through the marginal incisions to dissect the dorsum up to the rhinion in the supraperichondrial plane. Then a sharp periostreal elevator was used to dissect a subperiosteal tunnel over the nasal bones. The size of the created pocket was nearly same as the size of the implant in order to prevent displacement. When it is required, osteotomies and other components of rhinoplasty (tip projection or hump reduction) were performed prior to implant placement. The length and width of silicone implant were adjusted during the operation. Carving of the implant was readily accomplished in less than 5 minutes. The
incisions were then closed using 6-0 nylon sutures, and the nose taped and splinted. The aqua splint remained in place for 1 week.

**The carving procedure of the Implant:**
Although many types of silicone implants exist on the market today, few of them are ideal for augmentation rhinoplasty of the Asian nose. But the carving of this implant is not a technically demanding or time-consuming endeavor. Because each implant size varies in length, width, and depth, maintaining inventory of all the different sizes truly facilitates the time needed to carve the implant to any marked extent at the time of operation (Fig. 1).

All principal carving should be completed during a separate session so that the various implants are ready for use at the time of operation. Carving of the implant can be accomplished easily in less than 10 minutes with some experience. The primary objectives in implant carving are to reduce the dorsal height, reconfigure the dorsal shape, and minimize the proximal, lobular component. A no. 15 Bard-Parker blade is used to remove the posterior aspect of the dorsal component in a rounded
Fig. 2A. Marginal incision to insert implant.

Fig. 2B. Design of pocket where to insert silicone implant.

Fig. 2C. The degree of carving on fourth points of carving methods: Radix: 2-4 mm (according to the Nasofrontal angle), Hump: 1-2 mm, Supranasal tip: 2-3 mm, Nasal tip: 2-3 mm.

Fig. 2D. Postoperative view of augmentation rhinoplasty with carved silicone implant.
fashion to reproduce the convex contour of the nasal dorsum. The remaining thickness of the dorsal portion of the implant should be approximately 3 mm. The area of the rhinion, located approximately at the upper one third of the dorsal component, should be thinned additionally to accommodate the more attenuated skin in this region. This new configuration permits better apposition of the implant to the nasal dorsum for improved fixation. In addition, the lower degree of augmentation is better tolerated, making extrusion of the implant unknown in this series. The increased pliability of the dorsal component enhances the safety profile by permitting the implant to conform to the dorsal contour (Fig. 2).

The lobular segment overlying the nasal tip should also be reduced because the majority of extrusion typically arises in this proximal portion a complication, as mentioned earlier, which has never been encountered with this style implant. The lobular region is trimmed so that the posterior aspect is removed in continuity with that of the dorsal component. When trimming of the posterior aspect of the lobule, a small ridge of silicone should be left in the midline to rest in the cleft between the medial crura. In addition, the length of the columellar portion is resected so that only a small, tapered projection remains, resembling a bird’s beak.

The internal (posterior) aspect of the implant will exhibit jagged edges after carving despite the most skilled efforts. The no. 15 blade can then be used to scrape these irregularities to a smoother, albeit still rough, contour. Clearly, the slightly uneven terrain of the posterior aspect of the implant will not translate into any noticeable aesthetic compromise. The implant should be steam or gas sterilized so that it will be ready at the time of surgery, the implant may be safely sterilized several times without material injury to implant integrity.

Results

Dorsal augmentation was performed on 25 patients, with simultaneous radix augmentation. There were 10 male and 15 female patients. The age of patients ranged from 14 to 45 years (mean 30 years). Twenty (80%) patients underwent an open rhinoplasty and the remaining 5 (20%) an endonasal approach. Twenty-three (92%) patients presented for primary rhinoplasty, while the remaining 2 (8%) presented for revision surgery. Surgery was solely for cosmetic purposes in 20 patients, and was for deviated noses in 5 patients. 25 patients received dorsal augmentation with only silicone implant. Twenty-five patients received silicone implant to the dorsum. We used silicone implant radix in these cases. During postoperative follow-up, which ranged from 3 to 10 months (mean 6 months), complications were observed, in only one patient. Of this one case is involved the implant becoming visible 3 months postoperatively, the complication were managed with silicone implant removal and oral antibiotics. In this case, the implants were easily removed under local anesthesia in the operating room and the wound healed well. The remaining 24 patients (96%) had satisfactory outcomes (excellent or good), with none complaining of the position or feel of the silicone implant (Fig. 3, 4).

Discussion

The Asian nose is characterized by a broad, flat dorsum, decreased tip projection, a thick skin/soft tissue envelope, and a small, weak osteo-cortilaginous framework. Thus, most Asian patients presenting for rhinoplasty require augmentation rather than reduction. For augmentation of the nasal dorsum, autologous cartilage is the material of choice as it is easily manipulated. In addition, infection or resorption of autologous cartilage is extremely rare. However, the amount of septal or conchal cartilage graft material
Fig. 3A. Before operative frontal view of a patient with a flat nose.

Fig. 3B. Before operative lateral view.

Fig. 3C. Frontal view after dorsal augmentation with a single silicone implant layer postoperatively.

Fig. 3D. Lateral view postoperatively.
Fig. 34A. Preoperative frontal view of a patient with short and flat nose.

Fig. 34B. Preoperative lateral view.

Fig. 34C. Frontal view after dorsal augmentation with a single silicone sheet layer and autologous conchal cartilage postoperatively.

Fig. 34D. Postoperatively lateral view.
available is often insufficient for an Asian nose augmentation. Various alloplastic materials are used for augmenting, including silicone, Gore-Tex, Medpor, AlloDerm. Of these, silicone rubber is a widely used graft material because of its ease of application and lack of associated donor morbidity. Although silicone implants are bio-inert, their porous structure may increase the risk of infection and eventual extrusion as a result of dead space between the graft and host tissues.

Also, bulk-Tex, Medpor rubber may be conspicuous in thin-skinned individuals. The report of bulk-Tex, Medpor for ex, Medpor rubber cone implant 5.6% are 6%, and the most likely-Tex, Medpor structure may include infection, displacement, extrusion and excess swelling. The present study reports 9. Al maAlzult of use of picuous in thin-skinmat whereunit mayas an inadequate amount of septal cartilage. In addition, picuous in thin-syas re bemon ult o patients who refused o a. Al conchal ficietl cartilage has 4% 0 1 of folar ma. One of for infectiwho e material choice as it islzult ofult of dead spans tasen the g. The lk-Tex, Medporas r may be ith implant removal and antibiotic coverage. Early infections can be prevented by using aseptic techniques and prophylactic antibiotics, while established infections can be managed via implant removal and antibiotic coverage. Ex- trusion of the implant can occur through the nasal skin or the nasal mucosa, Tension over the implant is the most common cause of extrusion. Therefore, prevention of extrusion can be accomplished by thinning of the implant. Displacement did not occur in the present population. The most likely cause of implant displacement is supraperiosteal placement of implants, which can be reduced by placing the implant immediately below the periosteum. The complication rate when using silicone implant in the present study was similar to that observed when using silicone rubber. However, a silicone implant is thinner than silicone rubber, and can be used for dorsal augmentation as a substitute for autologous septal cartilage. Difficulties can be encountered when correcting minor dorsal irregularities with silicone rubber, and when inserting silicone rubber into specific dorsal positions. In contrast, silicone implants have a number of advantages when used for correcting minor dorsal irregularities, and their use can reduce the amount of implant material. Silicone implant can be visible in thin-skinned individuals, and thus the edges should be carefully trimmed to prevent dorsal prominence. Although silicone rubber is widely used as a graft material due to its easy application and lack of associated donor morbidity, we have encountered difficulties when using it to correct minor dorsal irregularities. By contrast, silicone implant have advantages similar to septal cartilage when used to correct minor dorsal irregularities, and their use can also reduce the amount of implanted material. In selected cases, silicone implant can be used as a versatile graft material for patients with inadequate septal cartilage or who refuse conchal or costal cartilage harvesting. Conflict of Interest notification: neither author has any conflicts and financial relationships.

**Conclusion**

While the complication rate for silicone implant was similar to that reported for silicone rubber, there are several advantages to the use of silicone implant for correcting minor dorsal irregularities. Therefore, silicone implant can be used as a versatile graft material for dorsal augmentation in rhinoplasty for Asian noses.

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