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Late complications of nasal augmentation using silicone implants

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Abstract
Alloplastic nasal augmentation with silicone elastomer (Silastic) is popular in areas of Asia. Although the silicones are bio-inert, they have been implicated in a number of adverse reactions after implantation. We report our experience of three patients who presented with late complications after nasal augmentation using Silastic implants. The mechanisms of implant failure are proposed. It is advised that this material should only be used on an individual basis in carefully selected cases.

Key words: Implants, artificial; Rhinoplasty; Post-operative complications

Introduction

Nasal augmentation is usually achieved by implantation of autogenous and/or alloplastic materials in order to alter contour and achieve improved aesthetic form. It is estimated that about one-fourth of all rhinoplasties involve augmentation to correct a disproportionately low radix, insufficient dorsal nasal profile, inadequate projection of the nasal tip, alar collapse or columellar recession (Tardy *et al.*, 1985; Sheen, 1987).

Alloplastic materials are popular and readily available for use in nasal augmentation. However, there is evidence to indicate that, compared to autologous materials, alloplasts have a higher rate of extrusion and infection, possibly due to repeated trauma and rubbing of the nose (Juri *et al.*, 1980). Alloplastic nasal augmentation is reportedly more successful in non-Caucasians, supposedly because of their thicker nasal skin which provides better protection against trauma (Khoo, 1964). Hence, nasal augmentation with the silicone elastomer (Silastic) is popular in certain areas of Asia including Korea and mainland China (Ham *et al.*, 1983; Wang, 1987). Although the silicones are bio-inert, they have been implicated in a number of adverse reactions after implantation. Some of these complications may even occur a few decades after the implantation. In this series we report three cases of late complications following nasal augmentation using Silastic implants.

Case reports

Case 1

A 62-year-old Chinese lady presented with a one-month history of progressive painful swelling over the nasal dorsum. Twenty years previously, she had undergone cosmetic augmentation rhinoplasty to correct a low dorsum using a Silastic implant in mainland China. She was noted to have a 1.5 cm tender swelling on the dorsum of the nose. A mobile prosthesis was palpable within the swelling. Fasting blood glucose revealed diabetes mellitus which had not been previously diagnosed. X-rays of the nose were normal. A computerized tomography (CT) scan of the area showed a subcutaneous soft tissue swelling superficial to the radio-opaque prosthesis situated over the nasal bridge. There was no sign of abscess nor osteitis (Figure 1). The

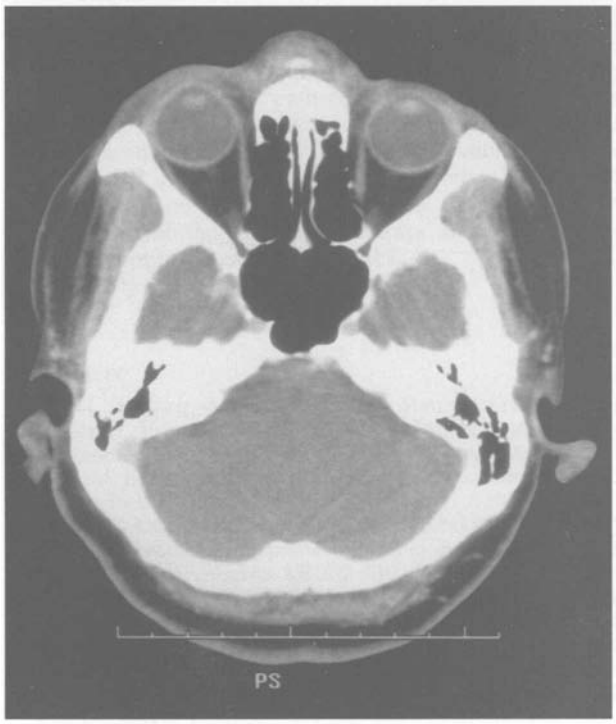

FIG. 1
CT scan showing a soft tissue mass superficial to a densely opaque Silastic implant.

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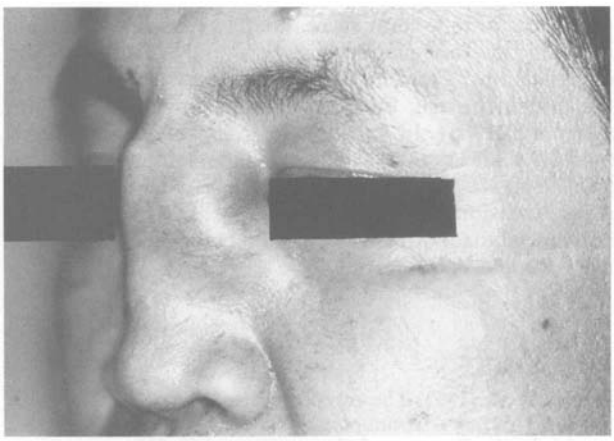


FIG. 2
Pre-operative picture showing a cystic swelling on the dorsum of the nose.

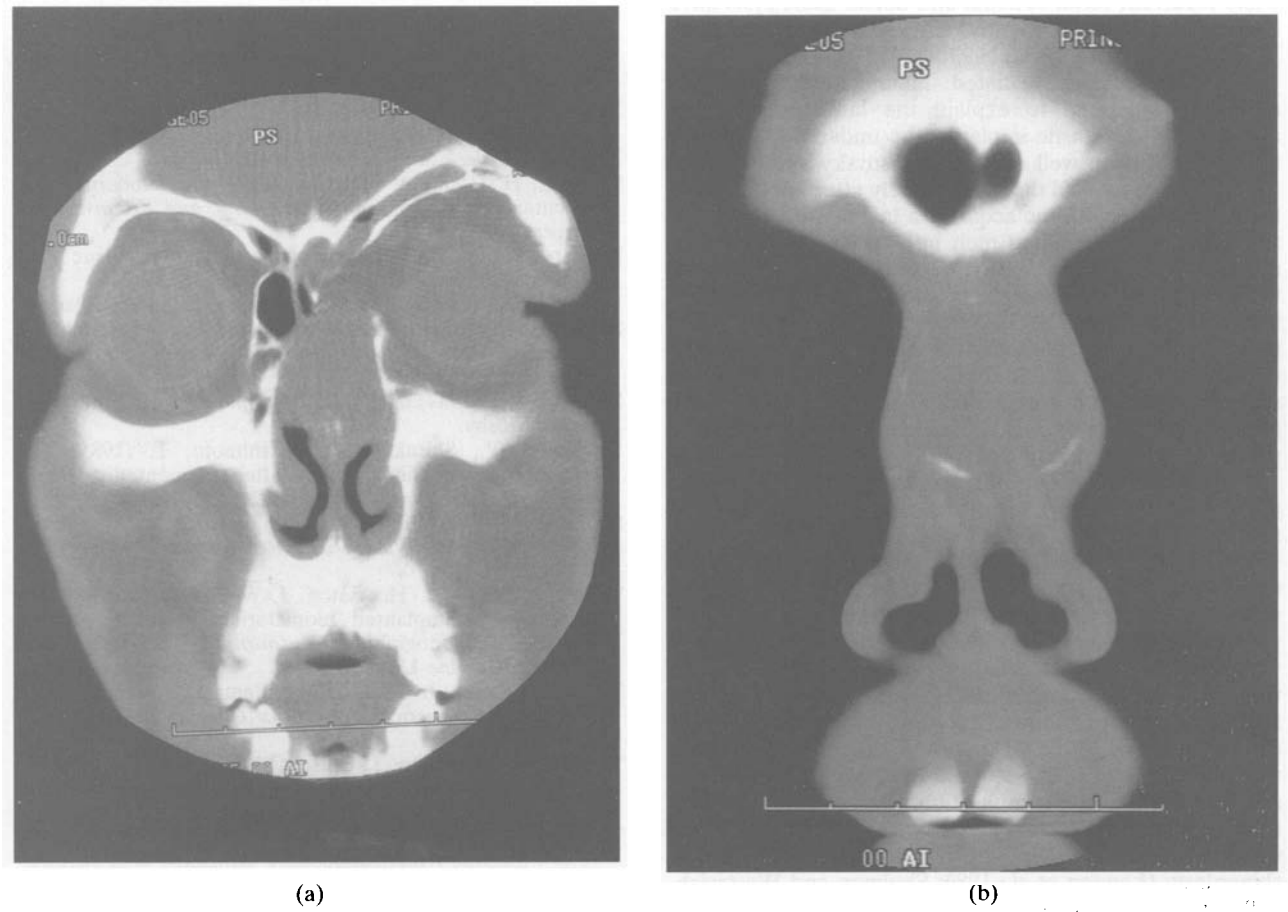
patient was treated with ceftazidime and analgesics. The diabetes was well controlled by diet and oral hypoglycaemic drugs. Ten days later, the swelling had substantially subsided. For cosmetic reasons, she declined the offer of revision rhinoplasty together with removal of the prosthesis. There was no sign of recurrence two years later.

Case 2

A 40-year-old Chinese male construction worker presented with a painful swelling over the nasal dorsum which had slowly enlarged over two months. Twenty-six years earlier, he had sustained a nasal injury which resulted in a deviated septum and a depression of the bony nasal dorsum. In the same year, he underwent a septoplasty and seven years later an augmentation of the dorsum with a Silastic implant in mainland China. Pre-operative examination revealed a 3 cm tender cystic swelling on the dorsum deep to a mobile nasal prosthesis (Figure 2). CT scan of the nose showed that deep to the prosthesis, a well demarcated cystic mass had expanded through the nasal bone and extended to the left ethmoid bulla (Figure 3). The feature was compatible with an infected dorsal nasal cyst. Fine needle aspiration of the swelling yielded 10 ml of altered blood. To avoid an external scar, the cyst together with the prosthesis was removed via an intercartilaginous incision. No recurrence was noted 18 months after the procedure.

Case 3

A 24-year-old female, who had had an augmentation rhinoplasty with a silicone implant more than three years earlier noted a tender red area on the nasal tip two months prior to consultation. Examination revealed a mobile subcutaneous implant which had migrated to the left side of centre. The tip of the implant had almost eroded through the dorsal nasal skin. The implant was subsequently removed under local anaesthesia resulting in a post-operative saddle nose deformity. The patient declined the offer of secondary dorsal reconstruction.



(a) (b)

FIG. 3
(a) CT scan demonstrates a cystic mass extending to the left ethmoid sinus and (b) the expanded nasal bone demonstrated as a 'calcified' rim surrounding the cystic mass.

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Discussion

Since the 16th century, a wide variety of materials have been used for nasal implantation. In 1828 Roussett first advocated the use of gold and silver as support in nasal reconstruction (Roussett, 1904). Autogenous bone and cartilage were first used for nasal augmentation at the turn of this century (Gullane, 1980). Dermal and fat grafts have been used since 1920, but they have not gained wide popularity as a result of their unpredictable resorption rate. About thirty years later, the silicone elastomer (Silastic) was introduced in aesthetic rhinoplasty. Over the years, it has been used with varying degrees of success and on a worldwide basis, it remains the most popular material for nasal augmentation (Milward, 1962; Flowers, 1994).

Silastic is an implantable organosilicone polymer which has been widely used as the casing for implants in the body including mammary, pacemaker, cochlear implants and joint prostheses. Despite its inert nature, late complications have been recognized. Lymphadenopathy has been linked with silicone augmentation mammoplasty (Truong *et al.*, 1988). Furthermore, there is evidence to suggest that small silicone particles migrate to the surrounding tissues from the Silastic materials within the joint prostheses and their lymphatic spread has been associated with lymphadenopathy, fever, and even lymphoma (Digby, 1982). The convenience of nasal augmentation with Silastic has resulted in widespread use since its advent in the mid-fifties. Nevertheless adverse reactions have been reported. Apart from displacement and angulation, a number of long-term complications have been observed, the most common being delayed infection, erosion and extrusion while recurrent facial oedema and dorsal nasal cysts have been reported less frequently (Harley and Erdman, 1990; White *et al.*, 1991; Daniel, 1993).

Although silicone-mediated inflammatory responses have been invoked to explain the late complications associated with Silastic implants, the underlying mechanisms has not been well defined (Kossovsky and Frieman, 1994). It is recognized that immediately after implantation, the hydrophobic Silastic acquires a layer of host proteins which adhere closely and melt into its surface (Sevastianov, 1988). This fibrous layer prevents the host inflammatory cells and fibroblasts from contact with the implant material (Tang *et al.*, 1993). Nevertheless, after a period of time, a chronic inflammatory reaction is observed on the implant surface (Tang and Eaton, 1995). The adherence of coagulase negative staphylococci to the implant may facilitate the development of infection and promote the process resulting in implant failure (Wong *et al.*, 1987).

A spectrum of late complications associated with Silastic nasal implants being migration, infection, dorsal cyst formation and extrusion, is demonstrated in this report. We believe that in all three cases, the local infection was a manifestation of impending implant extrusion occurring many years after placement. As infection plays a central role in the vast majority of the complications associated with alloplasts, the mainstay of treatment should include the administration of board spectrum antibiotics and removal of the prosthesis if conservative treatment fails (Shirakabe *et al.*, 1985; Harley and Erdman, 1990). It is worth noting that a dorsal nasal cyst, as occurred in the second case, is a rare complication. It has been postulated that nasal cysts result from herniation or entrapment of the nasal mucosa along the pathway of osteotomies during rhinoplasty (Lawson *et al.*, 1983; Shulman and Westreich, 1983). However, the real association between dorsal nasal cysts and Silastic implantation still remains unclear.

Although there is evidence to suggest that alloplastic nasal implantation is associated with morbidity, the thousands of long-term successful cases undermine blame directed at the material as the only cause of the complications (Flowers, 1994). Human error in technique and judgment may be other reasons for implant failure (Lipshutz, 1966). In spite of the relatively low reported morbidity rate in alloplastic dorsal augmentation in Asian patients, it is advised that this material should only be used on an individual basis in carefully selected cases. Alternatively, autogenous grafts, including bone, cartilage, fat or fascia should be preferred.

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