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CORRESPONDENCE AND COMMUNICATION

Capsular calcification may be an important factor for the failure of breast implant

Nowadays, breast augmentation is one of the most common aesthetic surgical procedures in plastic surgery practice, but is not entirely free of complications, such as haematoma, seroma, implant displacement or rotation, capsular contracture, rippling, disfigurement, perforation and calsification in both early and late implantation period. Perforation of the implant by way of tears or leakage, namely bleed, may be considered as an end point of all complications, leading to end of the life span of the prosthesis *in vivo* and subsequently needing explantation.

Implant rupture is commonly caused by manufacturing defects in the product, deterioration of the implant shell with time and trauma; however, other reasons investigated in many studies have also been claimed to lead to rupture, including severity of the fibrous capsule around the implant according to the Baker's score, closed capsulotomy or other surgical procedures, implant generation, mammography, manufacturer, location, filler material, texture, size and massage.[1—5] Presented here is a possible new reason for implant failure with a ruptured breast implant involving severe calcification, suggesting that calcification of either implant shell or fibrous capsule is capable of developing implant failure with tears or leakage in the older implants over time.

A 39-year-old patient presented with a left breast deformation affecting the symmetry between her breasts. On attending the clinic, she wanted symmetric breasts with complete correction of the left breast deformation. For her breast asymmetry, she had undergone an operation 19 years earlier for correction of mastopexy in the right breast and augmentation in the left, which recieved a 250-cc, gel-filled implant. On examination of the left breast, which was previously augmented subpectorally with gel implant, significant capsular contractures, namely Baker's score 3; deformation of the projection of the breast and displacement of the implant laterally and inferiorly, were observed, suggesting a rupture or bleeding of the implant (Figure 1a).

A surgical dissection was performed using an intra-areolar incision to the implant capsule after passing through the pectoral muscle by blunt separation of its fibres, without cutting. Then, massive and extensive calcification of the capsule and perforation of the implant at the anterior surface was encountered, clearly showing an intracapsular breast implant rupture, which led to leakage of its gel into the capsule (Figure 1b). After removing the implant, capsulectomy was a mandatory procedure to cleanse both, the gel spreading into the capsular cavity and extensive calcific plaques and particles which adhered to the capsular tissue. Both, the ruptured implant and the capsulectomy material, were carefully assessed macroscopically to reveal mechanical properties of calcific plaques and particles as well as the shell of the implant.

A tear had caused the implant to rupture at the anterior surface, which resulted in spreading of the gel through the intracapsular cavity. No signs of gross calsification, such as plaques or particles over the shell, were found; however, a little opaque view of the shell was observed, which might indicate microscopic calcification. Implant shell was easly torn by manipulation; therefore, during explantation, the original tear lenghtened rapidly (Figure 1c). When surgical dissection reached up to the capsule next to the anterior surface of the implant, severe calcification involving plaques and particles appeared, both in the capsular tissue and over the inner surface, which seemed capable of damaging the shell (Figure 1b). After explantation, such calcifications also became clearly apparent at the posterior surface of the capsule over the chest wall back to the implant (Figure 1d). On examination of the capsulectomy material, many hard plaques and particles of different sizes and shapes were found over the capsule, and some of them with sharp edges. The largest plaque in the capsule was of 19×17 mm diameter, in addition to four other plaques of length >10 mm (Figure 2).

As is well known, perforation of the gel-filled implants facilitates the calcification process around the capsular tissue, sometimes resulting in large calcific plaques and particles, and also in some instances bone formation, which can be seen microscopically; however, periprosthetic calcification either over the implant or its capsule without any signs of tear or bleed can develop in

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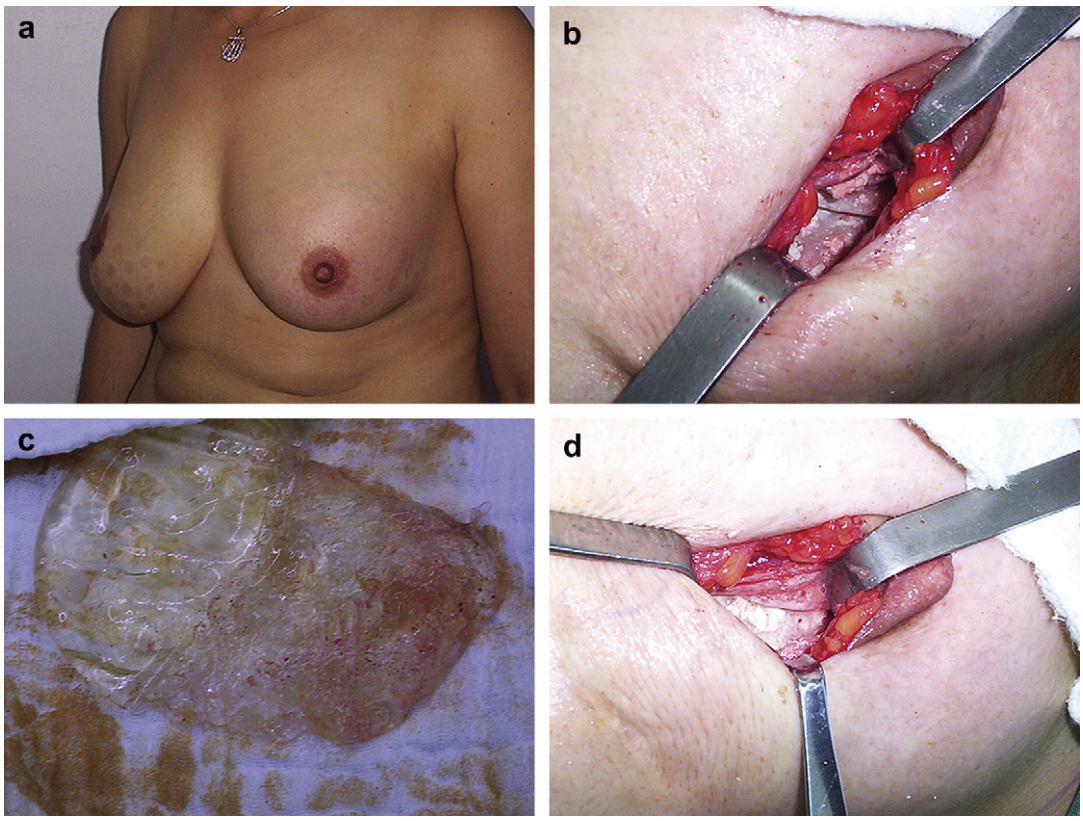

Figure 1 a: Preoperative appearance of the breast, which was augmented with a gel implant 19 years earlier and had significant capsular contracture, namely Baker's score 3, deformation of the projection of the breast and displacement of the implant laterally and inferiorly, suggesting a rupture of the implant. The red marks seen on the lower half of each breast are due to the compression of the texture of brassiere. b: Appearance of the fibrous capsule just over the implant while the surgical dissection reached up to the capsule. Note that calcific plaques and particles are visible in the capsular tissue. c: View of the ruptured implant after explantation. d: Appearance of the capsular calcifications at the front of the chest wall after removing the prosthesis.

both saline-filled and gel-filled prosthesis. Many of the factors have been demonstrated to be associated with implant rupture, including sub-glandular position, duration, capsular contracture, local symptoms, generation of implants, closed capsulotomy, capsulectomy or other surgeries, mammography, type of implant and filler material. Among them, implant duration is likely to be one of the most important factors causing implant rupture, with degradation of mechanical properties of the shell as a result of swelling of the silicone elastomer shell by silicone fluid.[3–5] This degradation begins once the implant is inserted into the breast, and rapidly increases with time; therefore, implants older than 10 years have a thinner and weaker shell susceptible to any trauma, which was not previously capable of damaging the shell. In addition, some calcifications can develop over either the shell or capsule at that time, resulting in hard plaques and particles with sharp edges, thus threatening the shell integrity.

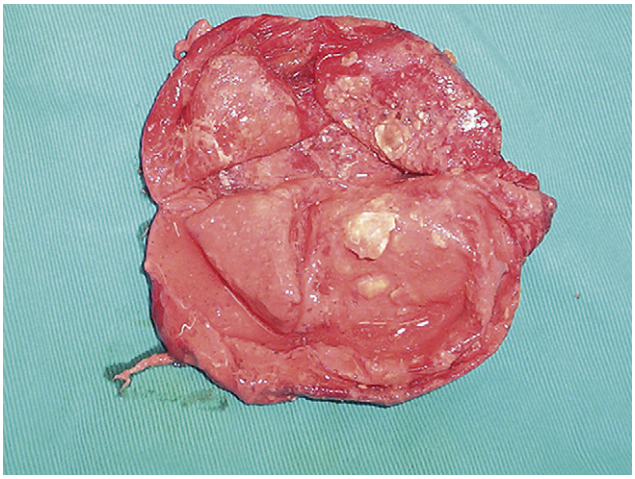

Figure 2 View of the inner surface of the entire capsule including some hard, sharp and big calcific plaques which may damage the shell. Note the biggest plaque is of a 19 × 17-mm diameter.

When dealing with this case having severe calcifications around the capsule, it may be easily apparent that such plaques and particles can injure the shell, leading to implant failure by way of tear or bleed due to the mechanical properties of the calcifications. Once the implant gel leaks from the shell and spreads over both the surface of implant and capsule, calcification process progresses rapidly with time. When severe calcifications such as hard plaques and particles take place, large tears possibly cause clinically evident breast deformations.

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None.

References

1. Barbosa MV, Nahas FX, Ferreira LM. Capsulectomy: a mandatory procedure in the presence of capsular calcification. *Plast Reconstr Surg* 2006; 15;**117**:1654—5.
2. Tark KC, Jeong HS, Roh TS, et al. Analysis of 30 breast implant rupture cases. *Aesthetic Plast Surg* 2005;**29**:460—9.
3. Embrey M, Adams EE, Cunningham B, et al. Factors associated with breast implant rupture: pilot of a retrospective analysis. *Aesthetic Plast Surg* 1999;**23**:207—12.
4. Raso DS, Greene WB, Kalasinsky VF, et al. Elemental analysis and clinical implications of calcification deposits associated with silicone breast implants. *Ann Plast Surg* 1999;**42**:117—23.
5. Peters W, Pritzker K, Smith D, et al. Capsular calcification associated with silicone breast implants: incidence, determinants, and characterization. *Ann Plast Surg* 1998;**41**: 348—60.

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