

Calcified Silicone Granulomas after Breast Augmentation; an Increased Risk of Rupture?

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Abstract The formation and consequences of capsular silicone granulomas related to breast implants are not well described in the literature but leakage of silicone is perceived to play an essential role. Studies have suggested rupture rates varying from 8-55% at year 10 after implantation. We describe two cases where women were referred to our department for removal of silicone breast implants due to rupture. At both surgeries, the patients presented with hard, brittle plaques on the inside of the fibrous capsule formed around the implants. A plaque was removed from the capsule of the first patient and histopathological examination confirmed it to be a calcified silicone granuloma. During surgery on the second patient, a similar plaque was excised and the sharp edges were seen to easily cut through the surface of the freshly removed implant. Procedural statistics from the American Society of Plastic Surgeons (ASPS) show a considerable increase in cosmetic breast augmentations performed, as well as a growing tendency for operations performed on younger patients. Consequently it is probable that an increasing number of patients in the future will need operation to change implants. With this commentary we wish to draw attention to the possible detrimental effect of calcified silicone granulomas on silicone implants when left in a breast after changing of implants. Further studies on the incidence and potential side effects of calcified silicone granulomas are needed.

Keywords: breast augmentation, breast implants, cosmetic surgery, silicone granuloma, implant rupture

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1. Background

The local formation of calcified silicone granulomas (CSG) and the consequences following are not well described in the literature and the mechanisms behind are not fully understood. There are theories that silicone leakage combined with chronic low-grade infection may play a role or that granuloma formation is the result of the foreign body response [1,2]. The biodegradability of silicone implants are not known but studies have suggested rupture rates varying from 8-55% at year 10 after implantation [3,4,5]. Studies have shown a varying number of causes of implant rupture including closed capsulotomy, breast compression during mammography and rupture secondary to trauma (motor-vehicle accidents, falls etc.). Most often though implant ruptures have no known cause [6].

If a low-grade infection combined with rupture of implants causes granuloma formation, these granulomas may in time become calcified and could possibly cause damage to any new implants inserted. To our knowledge, nothing has been described as to the potential side effects of calcified silicone granuloma (CSG) formation due to breast implants.

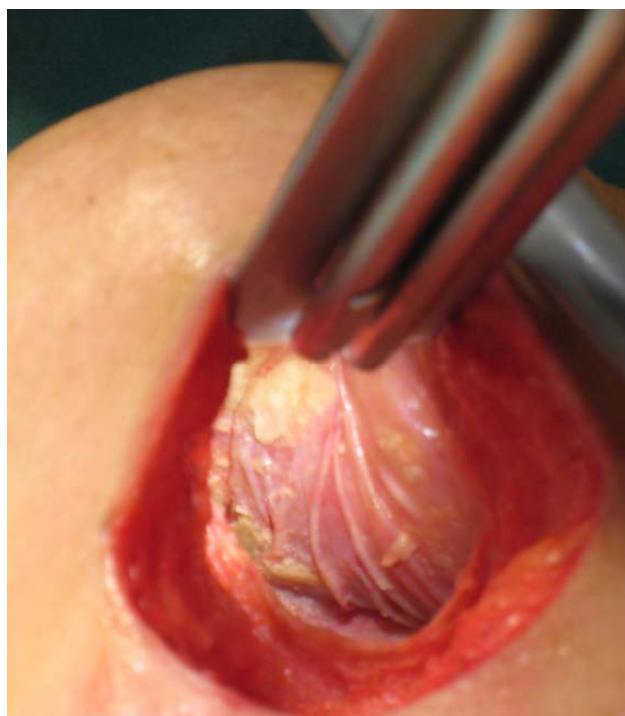


Figure 1. Multiple brittle calcifications seen on the inside of the fibrous capsule

2. Case 1

A 59-year old woman was referred to our department for removal of bilaterally ruptured silicone breast implants. Medical history included a cerebral thrombus 7 years previously without significant sequelae but otherwise healthy. The patient had no reported intake of prescription medicine or dietary supplements, but smoked 10-15 cigarettes daily. The breast augmentation surgery had been performed 25 years prior for cosmetic reasons and the patient had not previous had breast implants. The patient had symptoms in the form of pain and the feeling of liquid moving in her breasts. The implant ruptures had been confirmed by ultrasound. When surgically removed the implants were found to be ruptured with considerable silicone leakage. On the inside of the fibrous capsule formed around the implants, circular hard plaques were noticed, see [Figure 1](#). One of the plaques was removed and sent to histopathological examination. This examination included chemical fixation with formaldehyde and decalcification prior to embedding in paraffin wax. The material was then sectioned and assessed by light microscopy. The analysis identified the plaque as a calcified silicone granuloma. The textures of the granulomas were hard, brittle and decidedly sharp at the ends, see [Figure 2](#). As the operation was performed in the Danish National Health Care System, new implants were not considered. Recovery was uneventful.



Figure 2. The brittle calcification after removal from the fibrous capsule



Figure 3. The brittle calcification cuts easily into the old implant and silicone leaks out

3. Case 2

A 52-year old female was also referred for removal of bilaterally ruptured silicone breast implants. This patient had a medical history of well-controlled hypertension and was a nonsmoker. The breast augmentation had been performed 22 years prior for cosmetic reasons and the patient were carrying first implants. In this case the implant rupture was a coincidental finding during a routine screening for breast cancer and was later confirmed by ultrasound. Like the first patient, considerable silicone leakage was found during surgery. One of the plaques was excised and it proved to easily cut into the removed implant with resulting silicone leakage, see [Figure 3](#). This patient also underwent surgery without insertion of new implants and had an uneventful recovery.

4. Discussion

Result from the American Society of Plastic Surgeons procedural statistics show a 45% increase in cosmetic breast augmentation operation from 2001 to 2011 [7]. The results from 2011 also show a 4% increase over one year in surgeries performed on girls under the age of 19 [8].

As stated above, though the exact biodurability of silicone implants are not known, studies suggest up to as much as 55% implant rupture after 10 years. With that in mind, it is likely that an increasing number of patients having breast augmentations performed will need an exchange of implants one or several times during their lifespan.

As described in this commentary, both women presented calcified granulomas in the fibrous capsule formed around the old implants. In both cases the patients had not had breast implants prior to the ones removed at our department and the source of the CSG is believed to have been implant rupture [2].

When tested, the sharp edges of the calcified granuloma were easily able to cut into the implants. This made us question whether CSG could play a role in implant rupture? Thus; if left in a breast after an exchange of implants could CSG potentially damage and ultimately rupture a new implant? When comparing with other causes of implant rupture, CSG potentially damaging effect may most likely only play a minor role in implant rupture but is surgically preventable. Even with the advances in durability of implants, rupture and granuloma formation is still a concern. A case report by Lahiri et al describes locoregional silicone spread after high cohesive gel implant rupture with silicone granuloma formation in capsule [9].

With this case report, we seek to raise awareness of this potential complication and the possible benefits of capsulectomy including all calcified elements when replacing silicone breast implants. We suggest that further studies be made to shed light upon this potential complication in order to improve surgical techniques as well as patient information.

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