Bilateral breast implant rupture following elective electrical cardioversion: a case report and review.

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ABSTRACT
We present the case of a patient that suffered bilateral breast implant rupture following elective electrical cardioversion for atrial fibrillation. In general, breast implant rupture is extraordinarily rare. Capsular formation with dense muscular attachments, however, is common. Sudden and massive muscular contraction, as occurs during electrical cardioversion, can cause rupture of breast implants with significant health and cosmetic consequences. The incidence of this complication will certainly increase as the population of patients with breast implants and concomitant atrial fibrillation increases. Thus, particular caution is warranted among this patient population.

CASE REPORT
An 87 year-old female with a history of breast augmentation some 30 years ago presented to the out-patient office of a plastic surgeon complaining of pain, anatomic distortion and purple discoloration of her breasts. She related that she had undergone elective electrical cardioversion for new-onset trial fibrillation immediately prior to symptom presentation.
On physical exam the patient demonstrated severe bilateral capsular contracture with gross deformity of both breasts. Due to the extended time since the prostheses were placed surgical records were unavailable however she had what appeared to be implants placed in the subglandular position. There appeared to be gross distortion of the shape and size of the implant as well as asymmetrical positioning of the nipple areolar complex on the breast mound. There was also frank blue-purple discoloration of both breasts. Work-up included magnetic resonance imaging with T1, short tau inversion recovery (STIR), and T2 sequences, which confirmed bilateral intracapsular implant rupture with diffuse hematoma and concern for extravasation of silicone material.
The patient was subsequently taken to the operating room for a planned two-stage procedure. The first procedure involved bilateral debridement of chest wall hematomas, removal of the silicone gel implants and complete capsulectomy. Upon exploration a dense fibrous capsule was encountered surrounding both implants, which firmly adhered the devices to the underlying muscle tissue, as well as gross contamination of the wound with free silicone gel. Explantation and examination of the prosthetic devices demonstrated course tears in the outer membrane with direct communication and seepage of silicone gel.
Reconstruction was carried out in a second procedure several months later without complication.

DISCUSSION

Capsule formation appears to be a normal physiologic response to the foreign body. Though the exact mechanism of capsular formation is unknown, histologic studies have demonstrated that inflammatory cells quickly engulf the implant soon after implantation. Macrophages predominate in this response secrete substances that promote chemoattraction and proliferation of fibroblasts. These fibroblasts then produce collagen, which encases the breast implant in a dense fibrous capsule (1). Capsular contraction occurs when the capsule tightens and squeezes the implant, resulting in pain and deformity of the surrounding tissues. This is widely considered the most serious side effect associated with breast implants and one of the most predominant reasons for reoperation (2, 3). The incidence of capsular contracture reported in the literature varies anywhere from 3-5% (4, 5) to as much as 17% (3). Complications of capsule contraction include pain and tenderness, tissue deformity and other pathologic problems (1).

Several factors have been shown to decrease the incidence of capsular contracture. A meta-analysis performed in 2013 by Steven et. al. identified the two most significant contributing factors to capsular contracture was position of prosthetic placement and texture of the prosthesis itself (2). Submuscular versus subglandular placement of the breast prosthesis has been shown to decrease the incidence of capsular contraction by over 50% (6). Textured versus smooth implants have also been of the implant also has a significant impact on decreasing the rate of contracture (1, 3). Other factors leading to decreased contracture include inframammary incisions and larger breast implants (2).

In the case we presented here, dense capsular formation and subclinical contraction only became evident following elective electrical cardioversion for new-onset atrial fibrillation. The most logical explanation is that the sudden and massive muscular contraction associated with the cardioversion created sufficient traction forces on the implant capsule to shear the outer membrane and permit extravasation of silicone gel into the surrounding tissue. This appears to represent the first reported incidence of breast implant rupture following electrical cardioversion.

In terms of broad clinical relevance, this case demonstrates that in patients with a history of breast implant placement, consideration must be given to the potential for capsular formation and possible unintended consequences related to medical and surgical therapies. In this particular case, the complication may have been avoided by electing for chemical versus electrical cardioversion. Alternatively, deep sedation with the assistance of anesthesia may have allowed for electrical cardioversion without the typical intense muscular contraction.

This case has broader implications as well, such as the potential contraindication of breast implants in patients with severe or refractory seizure disorders. To our knowledge this topic has not been explored to date and no reported incidents of this have been reported. However, given the similar etiology of these conditions, caution may be warranted in implanting these devices in this patient population.

In conclusion, capsular formation following breast prosthesis implantation is a common occurrence. Capsular contraction remains a dreaded complication of breast augmentation and reconstruction surgery. Modifications to implant structure and composition as well as surgical technique and post-operative care have reduced the frequency of this complication though it remains a significant problem. Knowledge of this potential complication and consideration when planning medical and surgical therapies is recommended to avoid similar issues of morbidity in the future.

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