CASE REPORT

Management of a late breast implant rupture in the setting of previous radiation

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SUMMARY

Management of ruptured breast implants is scarcely discussed in the literature, especially in the setting of previous breast cancer and radiation. The authors present an uncommon presentation of late breast implant rupture with seroma and history of prior radiation. It is important to acknowledge the increased risk of wound healing complications in patients who are several years' postradiation therapy for breast cancer and should be an important factor when discussing treatment options with the patient.

BACKGROUND

Breast implant rupture is a serious complication, and this is commonly explained to patients during initial consultation for both breast reconstruction and breast augmentation. Implant-based reconstruction is one of the most common forms of reconstruction being offered and for the last five decades has been used successfully with minimal morbidity.¹ Most studies regarding implant shelf life have been led by the industry,^{2–6} but most recently, studies have suggested that risks of implant rupture significantly differ between models even from the same manufacturer.¹

Rupture rates for both saline and silicone implants were greater than 10% before the development of fifth generation implants.^{7, 8} For patients who have had breast augmentation or breast reconstruction prior to the advent of fifth generation implants who have previously received radiation therapy, there are no specific recommendations regarding follow-up aside from the current food and drug administration recommendations. More specifically, there is a paucity of literature with regard to the management and recommendations to make for patients who have had implant-based reconstruction in the setting of radiation. In this regard, we report a case of bilateral implant rupture in a patient whom had received unilateral radiation therapy in the distant past for breast cancer.

CASE PRESENTATION

A 74-year-old woman with a medical history of right breast cancer in 1987 treated with lumpectomy and adjuvant radiation at an outside institution. Subsequently, in 1988, she developed left breast cancer and thus was treated with a right simple mastectomy and left modified radical mastectomy with immediate subpectoral implant-based reconstruction. No further adjuvant chemotherapy or radiation was offered. In October 2016, the patient palpated an asymmetry in upper outer quadrant breast (figure 1).

INVESTIGATIONS

MRI was completed and demonstrated right subpectoral intracapsular rupture and seroma formation within the implant with no evidence of axillary adenopathy on the right (figure 2). She had left subpectoral intracapsular rupture without associated lymphadenopathy. A CT scan with silicone implant protocol was done in addition and noted a large seroma on right with intracapsular rupture, as well as on left, but also detected 1 cm irregular mass in medial left breast abutting the pectoralis major muscle. The CT scan measured the seroma as a 6.2×12×15 cm fluid collection displacing implant posterolaterally. The medial left breast superficial to pectoralis major muscle, an irregular mass measuring 1×1×0.7 cm was noted, and due to its speculated characteristics (figure 3), a second look ultrasound was recommended.

TREATMENT

We proceeded with removal of bilateral implants, in addition to wide local excision with seed localisation of the left mass with a breast surgical oncologist. At the time of removal, there was a dark brown cottage cheese-type appearance of the fluid when the breast capsule was entered (figure 4) which was sent for cultures and frozen section of the capsule in order to rule out anaplastic large cell lymphoma. Once the silicone was removed, the capsule was carefully dissected off the mastectomy flaps, but not from the anterior thoracic wall due to close proximity and adherence of the capsule to the intercostal muscles. Due to intraoperative findings and concerns for possible subclinical infection, direct exchange of implants was not completed. Both breast pockets were irrigated with hydrogen

Figure 1 Preoperative photos.

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Figure 2 MRI of breast.

peroxide, 3 L of normal saline via pulsed lavage and 500 cc of antibiotic solution.

OUTCOME AND FOLLOW-UP

Intraoperative cultures were negative for organisms, and final pathological resection of the left breast mass demonstrated an 8×6×4 mm fibrous capsule, negative for tumour. The patient was subsequently seen at 7 and 30 days postoperatively and did not have any complications. At that time, patient did not desire further reconstruction.

DISCUSSION

Previous studies have suggested that rupture rates can range from 7% to 10% at 3 and 10 years after insertion.⁷ With a woman's average life expectancy is 84.6 years, an implant will require replacement in more than 70% of patients during their lifetime.⁹ Patients who choose implant-based reconstruction during management of breast cancer should be adequately counselled and advised of this risk, including their additional risk of immediate and late complications if they are subjected to radiation therapy during their treatment, outside of the lifetime risk of replacement and rupture.

It is well known that complications of postmastectomy radiotherapy (PMRT) include capsular contracture, infection and loss of prosthesis in implant-based reconstruction.¹⁰ Several studies have shown that radiation-induced fibrosis can present up to several years after radiotherapy,¹¹ and this long progression elucidates the importance of long-term follow-up in this patient population, as consequences may continue long after implant-based reconstruction. In the event of implant

Figure 4 Intraoperative photos (breast capsule brown and adherent to mastectomy flaps and chest wall).

rupture, the consequences of silicone on irradiated mastectomy flaps is unknown, and posed a dilemma when evaluating our patient, and making recommendations with regard to management. Initially, our patient desired implant exchange, but understood that based on the intraoperative appearance of concerns for viability of the right mastectomy flap which had been irradiated, we offered delayed exchange after pathology and cultures were finalised. However, at follow-up, she no longer desired exchange.

Although the cause of implant rupture in our patient remains unknown, it is very likely that delayed onset fibrosis and capsular contracture secondary to radiation therapy played a role and influenced our decision-making regarding the management of this case. Such complication, although rare, should be kept in mind when evaluating patients who underwent implant-based reconstruction with history of radiation. Several studies have evaluated the outcomes of immediate complications after PMRT^{12–14}; however, they do not offer long-term follow-up suggestions for these patients and most of the follow-up is restricted to a one period. Future studies that follow patients greater than 10 years from the time the final implant was placed would assist in management strategies, and prevention of future complications in this high risk reconstructive group.

Figure 3 CT scan delineating mass.

Learning points

- ▶ Breast implant rupture is more common with older generations of implants.
- ▶ Radiation injury can occur acutely or chronically with fibrosis being the hallmark of chronic radiation injury.
- ▶ Long-term follow-up in patients with older breast implants and radiation is essential as consequences may occur long after implant-based reconstruction.
- ▶ Long-term complications of implant-based reconstruction following radiation therapy are not well documented. Management decision should be personalised according to the patient's needs and expectations.

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REFERENCES

- Seigle-Murandi F, Lefebvre F, Bruant-Rodier C, *et al.* Incidence of breast implant rupture in a 12-year retrospective cohort: Evidence of quality discrepancy depending on the range. *J Plast Reconstr Aesthet Surg* 2017;70:42–6.
- Caterson SA, Orgill DP. Discussion: Natrelle round silicone breast implants: core study results at 10 years. *Plast Reconstr Surg* 2014;133:1362–3.
- Spear SL, D.K. Murphy, and U.S.C.C.S.G. Allergan Silicone Breast Implant, *Natrelle round silicone breast implants: Core Study results at 10 years. Plast Reconstr Surg* 2014;133:1354–61.
- Haws MJ, Schwartz MR, Berger LH, *et al.* Sientra portfolio of Silimed brand shaped implants with high-strength silicone gel: a 5-year primary augmentation clinical study experience and a postapproval experience—results from a single-surgeon 108-patient series. *Plast Reconstr Surg* 2014;134:385–46.
- Maxwell GP, Van Natta BW, Bengtson BP, *et al.* Ten-year results from the Natrelle 410 anatomical form-stable silicone breast implant core study. *Aesthet Surg J* 2015;35:145–55.
- Spear SL, Murphy DK, Slicton A, *et al.* Inamed silicone breast implant core study results at 6 years. *Plast Reconstr Surg* 2007;120:85–16.
- Walker PS, Walls B, Murphy DK. Natrelle saline-filled breast implants: a prospective 10-year study. *Aesthet Surg J* 2009;29:19–25.
- Hölmich LR, Friis S, Fryzek JP, *et al.* Incidence of silicone breast implant rupture. *Arch Surg* 2003;138:801–6.
- Yang S, Khang YH, Harper S, *et al.* Understanding the rapid increase in life expectancy in South Korea. *Am J Public Health* 2010;100:896–903.
- El-Sabawi B, Carey JN, Hagopian TM, *et al.* Radiation and breast reconstruction: Algorithmic approach and evidence-based outcomes. *J Surg Oncol* 2016;113:906–12.
- Bentzen SM, Thames HD, Overgaard M. Latent-time estimation for late cutaneous and subcutaneous radiation reactions in a single-follow-up clinical study. *Radiother Oncol* 1989;15:267–74.
- Peled AW, Stover AC, Foster RD, *et al.* Long-term reconstructive outcomes after expander-implant breast reconstruction with serious infectious or wound-healing complications. *Ann Plast Surg* 2012;68:369–73.
- Lentz R, Ng R, Higgins SA, *et al.* Radiation therapy and expander-implant breast reconstruction: an analysis of timing and comparison of complications. *Ann Plast Surg* 2013;71:269–73.
- Percec I, Bucky LP. Successful prosthetic breast reconstruction after radiation therapy. *Ann Plast Surg* 2008;60:527–31.

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