Acknowledgements

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Appropriateness of MRI scanning in the detection of ruptured implants used for breast reconstruction

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SUMMARY. This case report highlights the problems associated with ruptured silicone breast implants used for breast reconstructive purposes. The patient originally presented with vague symptoms and signs to her GP and was extensively investigated over a period of years for left-sided chest/abdominal pain. Two separate scanning modalities were used prior to her being seen by either of the main authors and although none were employed specifically to assess for implant rupture, neither detected any free silicone around the hemithorax. The authors suggest that patients who have undergone breast reconstruction with a silicone implant may present in a manner not suggestive of implant damage. In such cases, where the silicone can extend over larger anatomical distances and where side-effects can be damaging the investigation of choice should be MRI scanning which has a greater accuracy for detecting free silicone and defining the extent of spread. © 2003 Published by Elsevier Science Ltd on behalf of The British Association of Plastic Surgeons

Keywords: silicone implants, breast reconstruction, implant rupture, scanning modalities, accuracy.

Introduction

The management of ruptured silicone breast implants has been discussed in the literature and although MRI scanning is the gold standard for identifying free silicone exteriorised from an implant,[1] the cost and in some instances the wait for such an investigation may be prohibitive. As a consequence ultrasound scanning has been advocated as the most cost effective technique of determining whether or not an implant has ruptured whilst acknowledging reduced sensitivity and specificity.[2] The authors present a case of a ruptured silicone implant in a patient who had undergone breast reconstruction with a pedicled latissimus dorsi myocutaneous flap and implant. Suspicion of implant rupture is advised, even with apparently unrelated clinical manifestations. The authors advocate the use of MRI scanning as the first line of investigation in patients who have undergone a breast reconstructive procedure. The technique has been shown to be more accurate for determining the presence and extent of silicone leakage so aiding surgical removal and potentially reducing patient morbidity.

Case report

The patient with carcinoma of the left breast at the age of 32 underwent a radical (Halstead) mastectomy in 1975. Ten years later she underwent a left latissimus dorsi myocutaneous flap with silicone breast implant reconstruction and made an

uncomplicated recovery. Several years later she developed vague left sided chest pain not associated with any particular event and intermittent in nature which had not abated up to her outpatient appointment with the senior author. Referrals had previously been made to two different physicians who had each investigated the patient with ultrasound scanning and CT imaging of the chest and abdomen, in addition to myocardial investigations including exercise ECG testing. All investigations detected no abnormality. The pain became more intense approximately two months before her referral to the senior author's clinic resulting in her GP requesting an MRI scan of the chest and abdomen to exclude splenic pathology.

The first MRI scan was an axial scan performed using conventional T1 and T2 weighted sequences in conjunction with fat-saturation sequences. This detected a plastic artefact, which was the true capsule of the implant, but nothing else remarkable. A further scan using a T2 fast inversion recovery sequence for silicone was then undertaken. In this sequence, the fat signal is suppressed by using the inversion recovery sequence and the water signal is suppressed by means of chemical saturations. This results in silicone having a higher signal than surrounding tissues, making it easy to determine the anatomical extent of its spread. Figures 1–3 show a sequence of images taken from the MRI scan demonstrating its ability to detect the silicone easily. Figure 1 shows that implant has migrated postero-laterally around the left hemithorax. Figures 2 and 3 show free silicone extending as far posteriorly as the erector spinae muscle with the latter slice taken just superior to the iliac crest. The free silicone appeared contained within the space created after the surgical reconstruction. These findings prompted the referral to the senior author.

When the patient was first seen, examination revealed a left-sided breast reconstruction which was soft and with no palpable implant. In the light of that MRI findings and after discussion with the patient, a decision was made to remove the implant and the free silicone, which seemed the most plausible reason for the patients discomfort.

The implant and its extruded silicone were removed (Figs 4 and 5). The original scar from the latissimus dorsi skin paddle donor site was excised and entry gained to the anatomical plane where the implant and free silicone lay. The implant was removed with the extruded silicone. The patient made an uncomplicated recovery and is now symptom-free one year post-surgery.

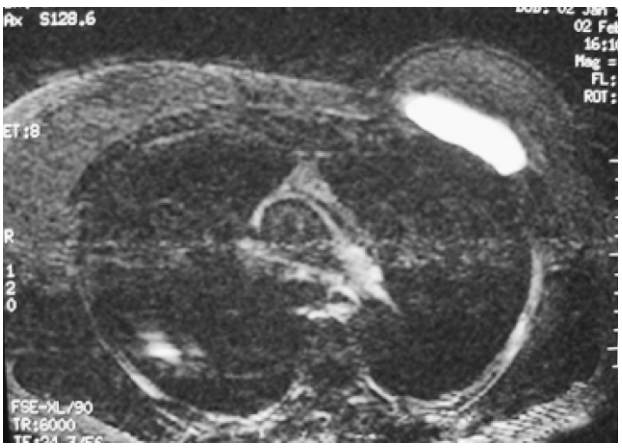

Figure 1—MRI scan of the thorax showing the silicone implant present on the left chest wall and having migrated postero-laterally.

Discussion

Silicone breast implants have been in use since 1962 and recent papers have shown their median life span to be 16.4 years, with 79.1% intact at 10 years and 48.7% at 15 years.[3] Recent hypotheses for rupture include lipid infiltration into the silicone elastomer leading to weakening of the outer shell, but this has not been proven.[4] It has been suggested that occult implant rupture is more common than was previously thought, as was discovered when a cohort of patients numbering 344 was examined by MR scanning.[5] This study found a median implant age at rupture of 10.8 years (95% confidence interval of 8.4–13.9 years).

The recent controversies regarding the leakage of silicone from implants and any association with connective tissue disorders has been recorded extensively in the literature.[6] Although high levels of silicone have been consistently noted within the serum of patients with silicone implants,[7] no association has been recorded between this and connective tissue disease.[8] However, it would seem prudent to diagnose rupture early so that action can be taken to remove the implant and extruded silicone. Whilst the cavity created for a cosmetic breast augmentation is well defined and limited to the size of the implant alone, the anatomical boundaries of the reconstructed breast mound using the latissimus dorsi myocutaneous flap are much greater and includes the majority of the external hemithorax. Free silicone may be hypothesized to cause problems under these circumstances by association with important anatomical structures such as the brachial plexus causing neuropathy and by exerting a foreign body tissue reaction within the cavity causing granuloma formation and fibrosis. This would inevitably make surgical removal more difficult with the potential for greater damage.[9]

There are four imaging modalities currently available for detecting ruptured silicone implants. These are mammography, ultrasound scanning, CT scanning and magnetic resonance imaging. MRI was advocated in the early 1990's for detecting free silicone from implants along with implant rupture as silicone has a unique MR

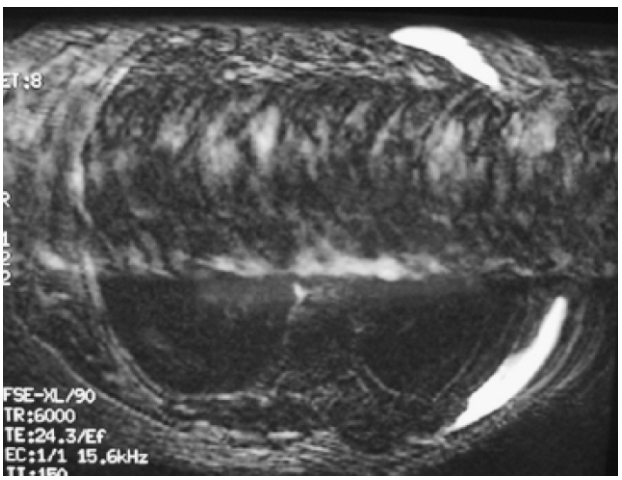

Figure 2—MRI scan of the thorax at a level more distal then that in Fig. 1 showing the silicone extending to the lateral borders of erector spinae.

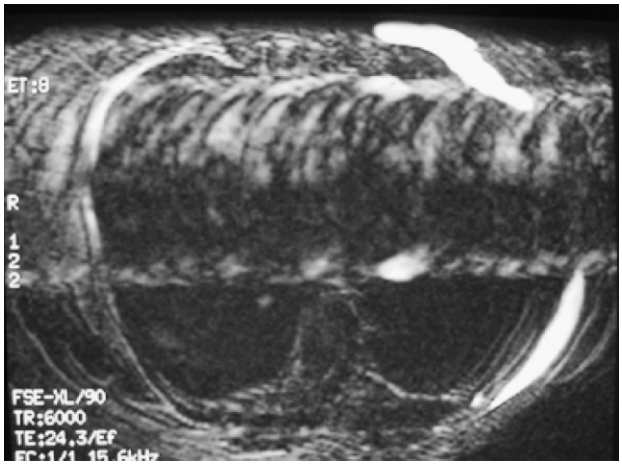

Figure 3—The most distal MRI scan at a level just superior to the iliac crest showing the extent of silicone spread around the left hemithorax.

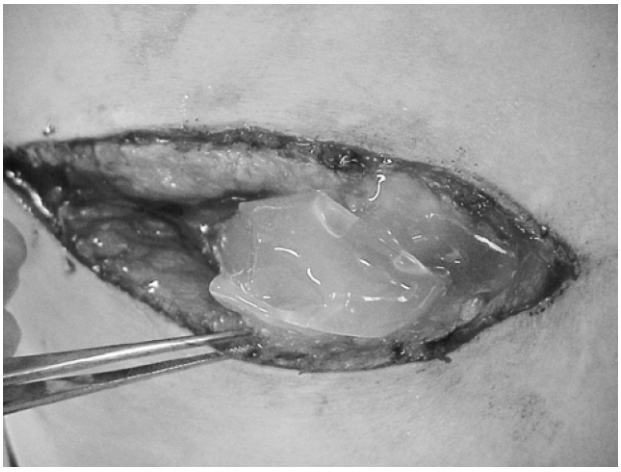

Figure 5—Old scar excised and the cavity opened showing the ruptured implant with exteriorised silicone extruding through the incision.

resonance frequency.[10] Subsequent studies have supported this, reporting greater sensitivity and specificity using this modality. Figures of 95% sensitivity and 93% specificity,[11] 94% and 97%,[12] 72% and 82%[13] and 88% and 100%[1] have subsequently been published. The figures vary and probably manifest operator dependence. However, in general, the results are more favourable when compared with the other modalitites. For instance, mammography has been reported as having a 23% sensitivity with 98% specificity[11] and, in a separate study, 55% sensitivity with a 69% specificity.[13] Ultrasonography has been quoted as having a 59% sensitivity and 79% specificity[11] and 44% sensitivity and 87% specificity, respectively,[1] whilst only one study has looked at CT scanning recording a sensitivity of 82% and 88% specificity.[11] Although these results would appear to show that MRI scanning is the most favourable investigation of choice, one paper interestingly has reported that neither ultrasound nor MRI should be used as a screening tool for implant rupture due to their apparent inaccuracy.[3] With the current results available it would seem fair to say that the gold standard at present for detecting implant rupture is MRI scanning.[1] Nevertheless, pricing and availability also play their part. And it has been suggested that the most cost-effective method for detecting implant rupture is to use both mammography and ultrasound scanning.[2] The efficacy of ultrasound scanning for implant rupture has been stated as being reduced in the presence of capsular contraction.[14] In addition, the ultrasound scan may not detect the free silicone.

The important messages this paper wishes to convey are that patients can present with vague, unreliable symptoms that would not be obviously attributable to implant damage. A history of discomfort localised to the side where an implant has been placed should prompt early assessment for implant rupture. This investigation should preferably be MRI scanning, particularly where the implant has been used for breast reconstruction. Using MR imaging would help to establish rupture and the extent of the surgery required for implant removal preferably at an earlier stage so reducing patient morbidity.

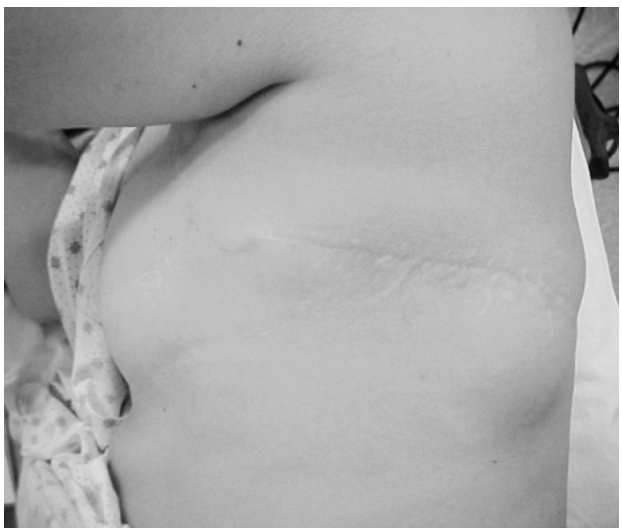

Figure 4—Site of the previous scar produced during the original reconstructive procedure.

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Haematoma as a late complication after breast reconstruction with implant

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SUMMARY. We report a patient who, $3\frac{1}{2}$ years after mastectomy and breast reconstruction using a Becker implant, developed haematoma around the implant. We believe this is the first description of late haematoma formation in association with tissue expander (Becker implant), the differential diagnosis of which includes infection, recurrent cancer and implant rupture. © 2003 The British Association of Plastic Surgeons. Published by Elsevier Science Ltd. All rights reserved.

Keywords: chronic haematoma, breast implant.

Introduction

Women who have had breast implantation frequently experience local complications that require additional surgical procedures. The most frequent complication is capsular contracture followed by implant rupture, haematoma and wound infection.[1] However, late spontaneous haematoma formation is rare after breast augmentation or reconstruction with an implant. We report a case of late haematoma formation in a patient who underwent breast reconstruction with Becker implant.

Case report

A 54 year old woman presented with a complaint of reddish blue discoloration of skin of left breast associated with swelling and discomfort in January 2003. She had undergone a left modified radical mastectomy for cancer and immediate placement of a tissue expander (300cc Becker) in a subpectoral pocket in 1997. She underwent capsulotomy and replacement of the tissue expander with a new Becker's prostheses in 1999. Steroids were not placed within the pocket. The patient denied a history of trauma to the chest. She did not take aspirin or nonsteroidal anti-inflammatory agents and did not have a coagulopathy.

Physical examination revealed a swollen, firm, minimally tender left breast mound with reddish blue discoloration of skin of the medial half of the breast. The discoloured skin was necrotic in two areas and had few sinuses discharging blood stained fluid (Fig. 1). Clinical considerations included infection, recurrent cancer, haematoma or implant rupture. Ultrasound scan revealed a large haematoma surrounding the implant. The implant appeared intact.

She was taken to the operating room with a plan of exploration and evacuation of haematoma under general anaesthetic.