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Ultrasound appearance of the silicone breast implants: two cases of implants margins folding

Breast implants were introduced in the 1960s for both augmentation and reconstruction after mastectomy (2,6,8). The psychological benefits of this procedure are widely acknowledged (8). Indications for breast implant surgery are either aesthetic or reconstructive, with cosmetic incentive accounting for 80% of all implantation procedures in US(9). In the United Kingdom approximately 60% are breast reconstruction following mastectomy (7). In aesthetic cases, implants are used to increase breast volume (augmentation) and/or correct ptosis, marked by sagging of the skin and breast parenchyma following postpartum involution. In reconstructive cases, implants are used to correct congenital breast asymmetry and to restore symmetry following mastectomy (9).

American manufacturers have created more than 240 different types of breast implants (9). Ultrasound evaluation of the breast tissue is best performed by the use of high-frequency linear hand-held transducers. The power should be as low as possible to allow the beam to penetrate the posterior wall of the implant and chest wall. This will usually be a 5- of 7-MHz transducer. The ultrasound examination begins by scanning the medial aspect of the breast with the patients in the supine position with their ipsilateral arm raised behind their head. Ultrasound evaluation of the breast to assess implant integrity consists of a complete study of the breast. Scanning is performed in a sagittal radial fashion with documentation of representative areas in a "clock-face" manner. Images of axilla in the transverse and sagittal planes are also obtained for detection of adenopathy or free silicone (6).

The aim of the study is to present normal ultrasound appearance of the silicone breast implants, and the two cases of mild folding of breast implants margins.



Fig. 1. Normal image of silicone breast implant. Hipocochoic silicone inside the hiperechoic capsule

The normal sonographic appearance is a triangular-shaped anechoic structure (Fig. 1) with a striking reverberation band anteriorly in the near field. Anterior to the implant is an echogenic line of variable thickness that represents the elastomer shell and the fibrous capsule (6). The margins of the capsule are regular, smooth.

CASE 1

Eight years after implantation of silicone breast implants due to cosmetic reasons, a 31-year-old woman came to see a doctor because of palpable irregularity in the surface of the implants. The irregularity of the implants appeared 3 months before examination, and the patient was seriously frightened by the findings. The ultrasonography revealed the mild folding of external margins of the implant, and on the wall adjacent to the chest (Fig. 2). No other implant pathology was revealed.

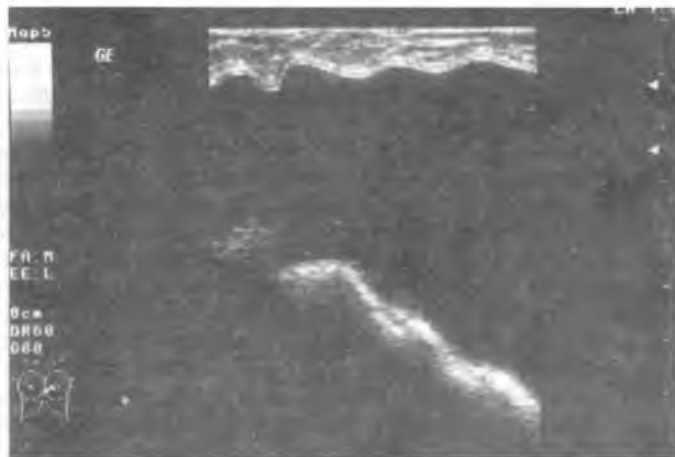


Fig. 2. Folding of the anterior and posterior wall of the implant capsule

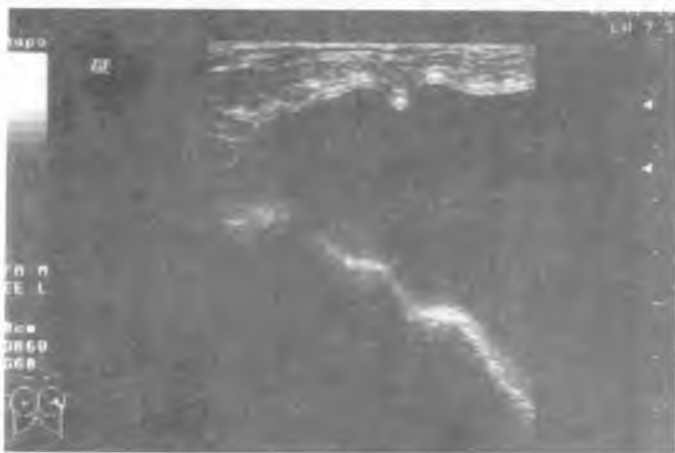


Fig. 3. Folding of the silicone implant margin

CASE 2

Three months after implantation of the silicone breast implants due to cosmetic reasons, a 27-year-old woman reported for control examination after implantation. The folding of the implant margins were found, especially on the lateral margin (Fig. 3). The folds were not palpable, and the patient was not aware of their presence.

DISCUSSION

Different imaging methods can identify the integrity of the breast implants and also the extent of possible silicone leakage going to the glands and adjacent tissues. Mammography, ultrasonography, computerized tomography and magnetic resonance imaging have been used to evaluate the integrity of breast implants (8).

MR imaging of the breast with implants is best performed by using high resolution MR imaging with a 1.5 Tesla system. Silicone breast implants are reliably imaged by MR because they provide an excellent overview of the breast, implant, axilla and chest wall. (6,7,5) MRM is valuable in detecting tumor recurrence after breast conservation and in patients with breast implants (4). The normal mammographic appearance of a breast implants depends on the implant type and its location. The silicone gel implant should appear as a radio-opaque oval mass with smooth, well-defined borders. The silicone should have a homogenous appearance (6,1). About 73% of women experience at least one of the more common complications such as capsular contracture, deflation, or rupture that require additional surgeries (9). In the presented cases the mild folding of the implant capsule was detected in ultrasound examination. In the case 1, the presence of implant irregularity was detected by the patient herself. The frightened patient came to US examination. Capsular contracture occurs most frequently in approximately 20% of recipients. Capsule contracture is a condition in which the periprosthetic capsule of scar tissue that envelops the implant hardens, compressing and distorting the implant to the point that it can cause the recipient discomfort or pain. Other possible long-term problems are wrinkling or puckering of the overlying skin, which occurs in approximately 14% of recipients, worsening asymmetry, which occurs in approximately 10% of recipients due to a shifting implant with or without contracture, and calcium deposits in the tissue surrounding an implant, which occurs in 2% of recipients (9).

Implants rupture is suggested by disorderly echoes present in a typically anechoic structure. Echogenic lines of varying lengths are probably the most useful sign of implant rupture. These are often seen as two parallel lines representing portions of the ruptured elastomer shell. The extruded silicone is the most specific sign for implant rupture when it is present. This is a unique sonographic pattern that has been described as an echogenic area associated with a distal echogenic noise analogous in appearance to that of a snow storm. Another appearance of free silicone are hypoechoic/anechoic collections that are similar to cyst but strongly associated with this noise (2,6,7). Ultrasonography has been used in breast implant integrity evaluation for several years. A great variety of ultrasound signs suggesting rupture have been described. The most useful of these signs is the "echodense noise" or snowstorm appearance, which shows the occurrence of diffusely increased free silicone echogenicity in the mammary tissues. Another ultrasound sign, called the stepladder, has been described as predictive of rupture. This sign corresponds to the linguine sign found in magnetic resonance imaging and is shown in ultrasonography images as a series of parallel horizontal or curved echogenic lines beyond the interior of the implant that correspond to ruptured elastomer (8).

Although implant rupture with silicone extravasations is the most well-known complication of implant use, other implant-related disorders do exist and can be detected.

Peri-implant fluid collections are seen in specific clinical situations. For example, fluid collections adjacent to implants may be seen in different clinical settings, such as infections or malignant effusions (6).

Magnetic Resonance Imaging (MRI) gives the best images of an implant with excellent tissue contrast and one can image the entire implant' but it is extremely expensive with long waiting times and limited availability. It has the advantage over ultrasound that one can distinguish between normal folding and rupture and between intra- and extracapsular rupture consistently (5,7).

In the study of Park et al. (7) 6 patients whose diagnosis was uncertain after ultrasound were given an MRI scan. None of these patients had a rupture; all had severe folding of the implant.

From the results obtained from the evaluation of the efficacy of mammography, ultrasonography and magnetic resonance imaging in the detection of breast implant rupture among an asymptomatic population, it can be concluded that magnetic resonance imaging with a dedicated breast coil had the highest sensitivity, while the specificity was similar to the other methods. The statistically significant signs for rupture were the stepladder and snowstorm in ultrasonography and linguine in magnetic resonance imaging. In the evaluation of implant integrity, the presence of envelope folds seen in magnetic resonance imaging was a statistically significant sign (8).

CONCLUSIONS

The silicone breast implant is an anechoic structure, with thick, hyper-reflective capsule. The homogeneous structure of the silicone inside the implant and smooth, regular margins of the capsule are typical sonographic appearance of the implant. Ultrasound examination is a reliable method of evaluating breast implants complications, both trivial and severe. The implant complication may be quick and precisely assessed. According to literature some cases require more precise assessment using MR examination.

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SUMMARY

The aim of the study is to present normal ultrasound appearance of the silicone breast implants, and the two cases of mild folding of breast implants margins. Case one. A 31-year-old

woman came to see a doctor 8 years after implantation of silicone breast implants due to cosmetic reasons because of palpable irregularity in the surface of the implants. The irregularity of the implants appeared 3 months before examination, and the patient was seriously frightened by the findings. The ultrasonography revealed the mild folding of external margins of the implants, and on the wall adjacent to the chest. **C a s e t w o .** A 27-year-old woman came to control examinations 3 months after implantation of the silicone breast implants due to cosmetic reasons. The folding of the implant margins were found, especially on the lateral margin. The folds were not palpable, and the patient was not aware of their presence. **C o n c l u s i o n .** The silicone breast implant is an anechoic structure, with thick, hyper-reflective capsule. The homogenous structure of the silicone inside the implant and smooth, regular margins of the capsule are typical sonographic appearance of the implant. Ultrasound examination is a reliable method of evaluating breast implants complications, both trivial and severe. The implant complication may be quick and precisely assessed. According to the literature some cases require more precise assessment using MR examination.

Silikonowa proteza piersi w obrazie USG: dwa przypadki sfałdowania torebki protezy

Celem pracy jest przedstawienie obrazu USG prawidłowej protezy silikonowej piersi oraz przedstawienie dwóch przypadków łagodnego sfałdowania torebki protezy. **P r z y p a d e k p i e r w s z y .** 31-letnia pacjentka 8 lat po implantacji protezy silikonowej piersi ze względów kosmetycznych zgłosiła się do lekarza z powodu stwierdzenia wyczuwalnej dotykami nieregularności powierzchni implantów. Nieregularności te pojawiły się 3 miesiące wcześniej i poważnie zaniepokoiły pacjentkę. Badanie USG wykazało obecność sfałdowania brzegów zewnętrznych protez oraz powierzchni przyległej do ściany klp. **P r z y p a d e k d r u g i .** 27-letnia kobieta w 3 miesiące po implantacji silikonowej protezy z powodów kosmetycznych zgłosiła się na badanie kontrolne implantów. Sfałdowanie brzegów torebki implantów stwierdzono badaniem USG. Sfałdowania torebki nie były wyczuwalne palpacyjnie. **W n i o s k i .** W USG protezy silikonowe piersi tworzą bezechowe struktury, otoczone różnej grubości torebką. Jednorodna struktura oraz gładkie, regularne brzegi torebki tworzą typowe obrazy implantów. USG jest wiarygodną metodą oceny powikłań protez silikonowych piersi, zarówno łagodnych jak i poważnych. Powikłania implantacji protez mogą być szybko i wiarygodnie ocenione. Według literatury niektóre przypadki wymagają bardziej precyzyjnej oceny z wykorzystaniem obrazowania MR.