

Ultrasonography in the screening of augmented breasts' cancer

Abstract

In recent years the number of breast augmentation surgical procedures increased and the presence of breast implant makes difficult the early detection of breast cancer. In the case of dense breasts with implant, regardless of the patient's age, ultrasonography is the first recommended method for screening. The present review reveals the fact that ultrasonography plays an important role not only in verifying the integrity of the implant capsule, but also in the assessment of the lesions of the native breast tissue.

Keywords: ultrasonography, breast cancer, breast implant

Introduction

In 2012, in the 27 countries of the European Union, there were an estimated 2.6 million new cases of cancer and 1.26 million deaths by cancer. The most common form of cancer was breast cancer (364,000 cases, 13.8% of all cancers). Breast cancer was the leading cancer site in women across Europe and the first cause of death by cancer in women in Europe. In Romania, in 2012, the incidence rate for breast cancer was 66 per 100000 and the range of mortality was 22 per 100000⁽¹⁾. In recent years the number of breast augmentation surgical procedures increased, becoming one of the top five aesthetic procedures worldwide. Although a causal relationship between breast cancer and the presence or type of breast implant could not have been demonstrated, it is certain that the presence of breast implant makes difficult the early detection of breast cancer.

Imaging Diagnosis

Although routine screening mammography is recommended by all national medical societies for women between 50-69 years, the same consensus does not apply for women between 40-49 years. The imaging diagnosis is even more complicated in women with augmented dense breasts. The clinical breast examination or breast self-examination have little importance in the presence of breast implants and may lead to a delayed diagnosis.

Women with breast implants need routine screening mammography, but the presence of implants makes mammography more difficult. The sensitivity of a screening mammography in asymptomatic women is lower in women with breast augmentation in comparison to those without (45.0% versus 66.8%) and the specificity is slightly higher in women with augmentation (97.7% versus 96.7%)⁽²⁾. The implant makes harder to assess all parts of the breast, the compression could be difficult to obtain and the radio-opaque aspect on mammography can obscure small lesions. Breast ultrasonography is the preferred technique for follow-up of an abnormal aspect detected at screening mammography in pre or postmenopausal women, for differentiating a solid mass from a cyst, for evaluating the asymmetry or blood supply

(by color Doppler). Ultrasonography has also an important role in verifying the integrity of the implant capsule.

Intracapsular or extracapsular implant rupture is important in silicone implant. The silicone granuloma is clinically detectable as a palpable lump and it has a snow storm appearance with dense acoustic shadow at ultrasonography.

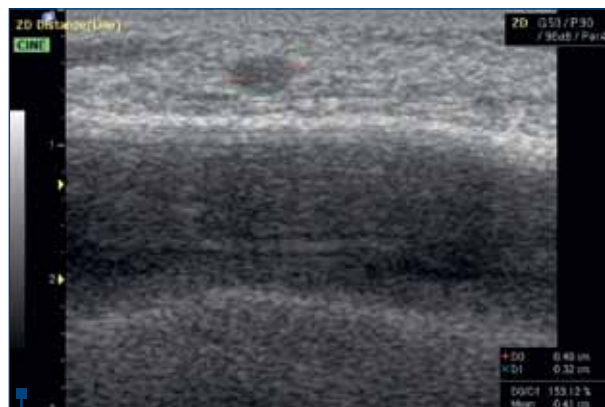


Figure 1. Ultrasound aspect of a solid mass, homogenous, with regular shape, oval, with long axis parallel to the skin, well defined (benign lesion, located above the implant)

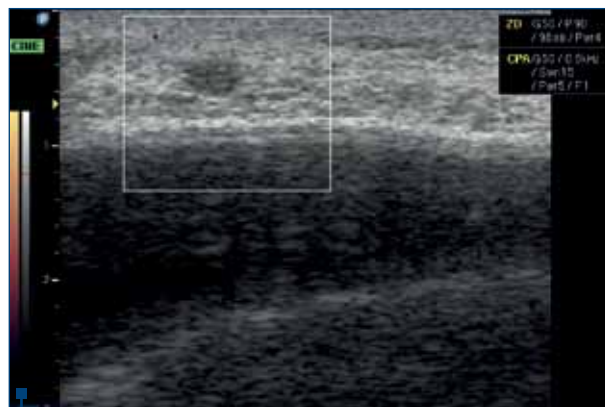


Figure 2. Color Doppler ultrasound revealed no internal vessels

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Silicone can migrate into more distant sites as axillary lymph nodes, that became enlarged, with the same snow storm appearance as the silicone granuloma⁽³⁾.

Implant-associated Mesenchymal Tumors of the Breast

There are a lot of lesions more or less related to implant. The examiner must be cautious in the presence of late seroma or tumefaction near the implant, despite the fact that there is no certain correlation between the implant and anaplastic T lymphoma⁽⁴⁾. Different cases with implant-associated mesenchymal tumors of the breast, like fibromas and sarcomas, are described in the literature. Fibromatosis is related to surgical trauma, probably in patients with predisposition to develop desmoid tumors. Sarcomas are rare tumors, some of them being previously radiation-related, without sufficient evidence to be biomaterial related⁽⁵⁾. Breast cancer can develop in or adjacent to an implant capsule. Capsular vascularity may provide a unique model of local tumor invasion that can explain the unusual presentation of multifocal and extensive disease⁽⁶⁾. Whereas mammography is the first-line method before surgery, ultrasound became the first-line postprocedural imaging method. Cancer screening in augmented breast generally follows the same guidelines as for non-augmented breasts⁽⁷⁾.

All solid masses detected at ultrasonography are evaluated for characters of malignancy: irregular shape, ill-defined margins, lobulation, spiculation, taller than wider, inhomogenous content, distal attenuation, intraductal extension, calcification. (Figures 1 and 3). Color Doppler and spectral Doppler bring additional information for malignancy. Tumoral neoangiogenesis has a rich vascular network, anarchic, with tortuous vessels who penetrate deeply into the tumor mass, with high values of the pulsatility and resistance indices (Figure 2 and 4). However, the absence of the flow does not exclude the possibility of malignancy. Ultrasonography contrast agents, like intravenously microbubbles, can help differentiate between benign and malign lesions. Reduced sensitivity of mammography in younger women is partially related to increased mammographic density. Women with dense breast parenchyma have an increased risk for breast cancer. Women who have breast tissue augmented with implants require routine screening mammography to assess the native breast tissue. The presence of implants makes mammography more difficult, because the implants contents are radiopaque and can obscure the small lesions. Furthermore, the presence of implants makes it harder to evaluate all parts of the breast and makes compression difficult. For these reasons women with cosmetic breast implants have more advanced stage tumors at diagnosis than women without implants⁽⁷⁾. Ultrasound is appropriate in the follow-up of implanted breasts, because it is often more readily obtained, in evaluating implants in a woman with contraindications to MRI or where MRI is not available.

Conclusions and Future Remarks

There is no evidence that cosmetic breast implants are associated with increased risk of breast cancer, knowing that the diagnosis of breast cancer in early stages is more



Figure 3. Ultrasound aspect of a solid mass, with irregular shape, ill-defined margins, microlobulation, inhomogenous content, distal attenuation, suggestive of malignant lesion, located above the implant



Figure 4. Color Doppler ultrasound revealed internal vessels into the irregular hypoechoic lesion, suggestive for malignancy

difficult in patients with implants. Ultrasonography could play an important role in early detection and subsequently could improve the prognosis in augmented breast's cancer. The present review reveals the fact that ultrasonography plays an important role not only in verifying the integrity of the implant capsule, but also in the assessment of the lesions of the native breast tissue. ■

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