BioZorb tissue marker as seen on multiple imaging modalities

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BioZorb® (Focal Therapeutics, Aliso Viejo, CA, USA) is an implantable 3-dimensional tissue marker that can be used in breast conservation surgery for breast cancer. The original device is comprised of six permanent titanium marking clips secured by a bioabsorbable helix that absorbs slowly over time, typically over the course of a year. The implant offers a standardized and reliable method for marking

FIGURE 1 (Left) Photograph of a 2.5 cm BioZorb® (Focal Therapeutics, Aliso Viejo, CA, USA) tissue marker. Note the six titanium clips (two of six marked by two yellow arrows) bound by the bioabsorbable spiral (red arrow). (Right) BioZorb® as seen on synthesized 2D mammogram from tomographic acquisition in the MLO projection. Again note the six titanium clips (yellow arrows) demarcating the surgical margins, an important aspect of imaging follow-up and targeted radiation planning [Color figure can be viewed at wileyonlinelibrary.com]

FIGURE 2 (Left) BioZorb® as seen on ultrasound. Note the bioabsorbable ring (red arrow) in the near-field connecting two of the six permanent titanium clips (yellow arrows) at the margin of the device with associated posterior acoustic shadowing. This ultrasound was performed for a palpable lump, which corresponded to the device. Note the bioabsorbable ring is just beneath the skin surface. (Right) BioZorb® as seen on MRI. This precontrast fat-suppressed T1-weighted image demonstrates the ring-like signal void (yellow arrows) in the medial right breast at middle depth, corresponding to the device. This MRI was performed to evaluate response to adjuvant chemotherapy following excision with close margins. Postcontrast images (data not shown) demonstrated focal nonmass enhancement at the margins suggestive of residual disease [Color figure can be viewed at wileyonlinelibrary.com]
the surgical bed and allows for enhanced visual confirmation in follow-up imaging surveillance and radiation treatment planning (eg, for accelerated partial breast irradiation). This particular device is being used with increasing frequency at our facility.

We present the appearance of a BioZorb™ tissue marker from one patient on multiple imaging modalities, including mammography, ultrasound, MRI, as well as chest radiography and CT. Breast imagers will frequently encounter this device on routine breast imaging, particularly mammography. Increasing awareness of its appearance on other imaging modalities may help avoid pitfalls when interpreting different imaging exams in isolation of relevant clinical history, which is a common scenario (Figures 1-4).

The following figures depict the patient’s course over six months following her original lumpectomy. The patient ultimately underwent re-excision for close margins with removal of the original BioZorb™ tissue marker and placement of a new one.

**FIGURE 3** (Left) BioZorb™ as seen on radiography. Note the characteristic appearance of the device demonstrated by the six radiopaque titanium marking clips (yellow arrow). The bioabsorbable helix is radiolucent and therefore not visualized on radiographs or mammography. This chest radiograph, performed for shortness of breath, was normal. (Right) BioZorb™ as seen on CT. Two of the six titanium marking clips (yellow arrows) are seen in the right breast of this image, while the bioabsorbable ring is barely perceptible as the density is similar to surrounding soft tissue (red arrow). This contrast-enhanced CT was performed after the preceding unremarkable chest radiograph and revealed a subsegmental pulmonary embolism (data not shown) [Color figure can be viewed at wileyonlinelibrary.com]

**FIGURE 4** (Left) BioZorb™ as seen on the same CT but with 3D surface rendering. The BioZorb™ device is seen in the upper inner right breast (yellow arrow). Note the patient’s chest port in the upper left chest. (Right) BioZorb™ as seen in the operating room for re-excision of close margins 6 months after her initial lumpectomy. The device (yellow arrow) was removed with additional margins. Note the periareolar incision, retractors, and suction device [Color figure can be viewed at wileyonlinelibrary.com]