Gossypiboma of the Breast: Imaging Findings

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ABSTRACT

We report a case of retained surgical sponge in the breast with its sonographic and magnetic resonance (MR) imaging findings. Striped and spotted low signal intensity structures seen within the lesion on T2 weighted MR imaging was characteristic. Sonographic examination also was helpful with the appearance of strong posterior acoustic shadowing at the lesion. It is extremely rare, to see a gossypiboma in the breast. A high degree of suspicion and imaging findings are very important for the diagnosis.

CASE REPORT

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A 38-year-old female presented to our University Hospital with a palpable mass and non-purulent discharge from the surgical wound in the upper outer quadrant of her right breast. Four months ago, she had operated from both of her breasts for augmentation in a public hospital. Ultrasound and MR imaging of her right breast was requested from our department of Radiology.

At gray-scale ultrasound (Siemens, Antares) a 22x42 mm mass lesion showing thin anterior hyperechoic area with a strong posterior shadowing was found at the side of palpable abnormality and color Doppler ultrasound showed no detectable blood flow within or around the lesion (Figure 1). MR imaging was performed on a 1.5-T MR unit (Magnetom, Symphony; Siemens, Erlangen, Germany) with the use of dedicated double breast coil. Patient was placed in the prone position and both breasts were imaged simultaneously. Imaging protocol included T2-weighted turbo spin-echo sequence (TR/TE, 4500/97; matrix, 384x512; slice thickness, 3 mm), pre and post-contrast fat-suppressed three-dimensional (3D) T1-weighted fast low angle shot (FLASH) sequence, in the axial plane. T1-weighted sequence parameters were TR/TE, 4.3/1.4; flip angle, 12º; field of view, 320x320; matrix, 307x512; signal average, 1; slice thickness, 1.5 mm. Gadobutrol (Gadovist; Shering) of 0.1 mmol/kg body weight was administered intravenously at a rate of 2 ml/sec with a power injector followed by a 20 ml of saline flash for contrast-enhancement. Post-contrast image acquisition was started immediately at the end of saline injection. The sequence was repeated six times without time gaps in between. MR images revealed a well-defined, encapsulated, ovoid mass of 25x35 mm size. The mass was hypointense on T1 weighted images (Figure 2), and heterogeneous hyperintense on T2 weighted images. On T2 weighted images low signal intensity tortuous stripes and spots were seen within the mass (Figure 3). On contrast-enhanced images, the mass showed strong and progressive capsular enhancement without central enhancement. Enhancement was of intermediate thickness (4mm) (Figure 4).

Surgical excision revealed retained gauze sponge with no evidence of malignancy.

DISCUSSION

Gossypiboma is an iatrogenic mass lesion caused by retained surgical sponge. It is mostly seen in abdomen after emergency surgery. Involvement of the superficial body sites

such as breast is extremely rare. Because, there is no a potential space for surgical material to left behind. It can mimic true neoplasm, abscess or hematoma and may cause diagnostic difficulty [1, 2] A high degree of suspicion is important for appropriate diagnosis. We report a case of gossypiboma in the breast and describe the MR and ultrasound imaging features.

Clinical manifestations depend on the type of reaction induced by the foreign material in the body and are very variable. Aseptic fibrinous reaction leads to the formation of clinically occult aseptic granulomatosis, whereas, exudative reaction leads to the formation of abscess either sterile or infected and fistula formation [3-4]. These later ones present early as in our case.

Roentgenograms are useful if retained sponge contains radio-opaque marker. But such sponges are not routinely used in practice and also especially in late presentations the radio-opaque marker of the sponge may be fragmented and disintegrated [5]. At sonography, retained surgical sponge most commonly is seen as echogenic anterior stripe and a sharply delineated posterior acoustic shadowing as in our case. Other sonographic appearances reported in the literature are cystic, hypoechoic and complex masses which are quite nonspecific [6]. On CT and MR imaging scans, retained sponges are demonstrated as well-marginated round or oval mass lesions and can mimic tumor, abscess, seroma cavity or hematoma. Contrast enhanced images show strong rim enhancement commonly. But inner with peripheral enhancement or mild enhancement patterns are also reported [6]. At MR imaging, like abscess or seroma cavity, gossypibomas show low signal intensity at T1 and high signal intensity at T2 weighted images. However, wavy, low signal intensity stripes seen on T2 weighted images which represent the gauze fibers are characteristic of gossypiboma [4, 7, 8]. This appearance also was present in our case and was suggestive of gossypiboma rather than abscess, hematoma or seroma cavity.

Recently, Erdem et al reported [9] the diffusion weighted imaging feature of a gossypiboma at the lumbar region. As they described gossypiboma show increased diffusion which might also be helpful to distinguish this pathology from an abscess.

In conclusion, although rarely seen, gossypibomas should be included in the differential diagnosis of breast masses in patients with previous history of breast surgery. MR imaging is currently widely used for the evaluation of breast masses and to be aware of the imaging features of gossypibomas is important for successful diagnosis. Ultrasound is also valuable in the differential diagnosis, if sharply demarcated acoustic shadowing is seen.

TEACHING POINT

Gossypibomas should be included in the differential diagnosis of breast masses in patients with previous history of breast surgery. It is characteristically seen as curvilinear echogenic area with strong posterior acoustic shadowing on ultrasound and as encapsulated hyperintense lesion containing striped and spotted low signal intensity structures on T2-weighted MR images.

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FIGURES

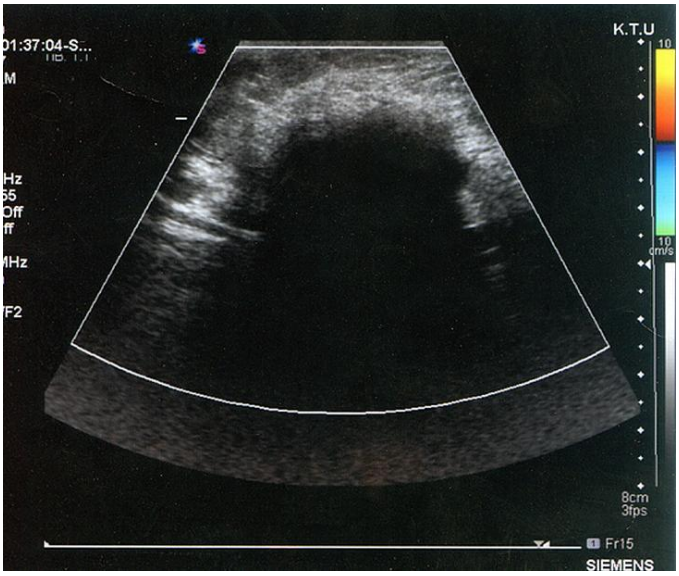

Figure 1: 38-year-old female with breast mass belong to retained surgical sponge. Color Doppler ultrasound scan (5-10 MHz linear array transducer) of the right breast shows 22x42 mm mass lesion with curvilinear anterior echogenic area and sharply demarcated posterior acoustic shadowing without any detectable blood flow within or around the lesion.

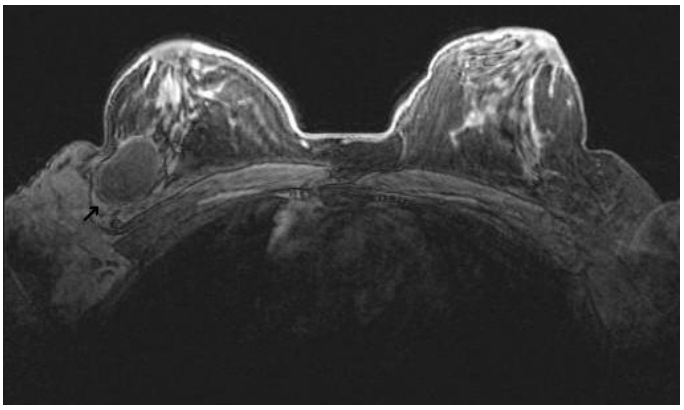

Figure 2: 38-year-old female with breast gossypiboma. Axial pre-contrast T1-weighted MR image (1.5 Tesla magnet, TR/TE, 4.3/1.4; slice thickness, 1.5 mm) show encapsulated hypointense mass lesion in the outer quadrant of the right breast.

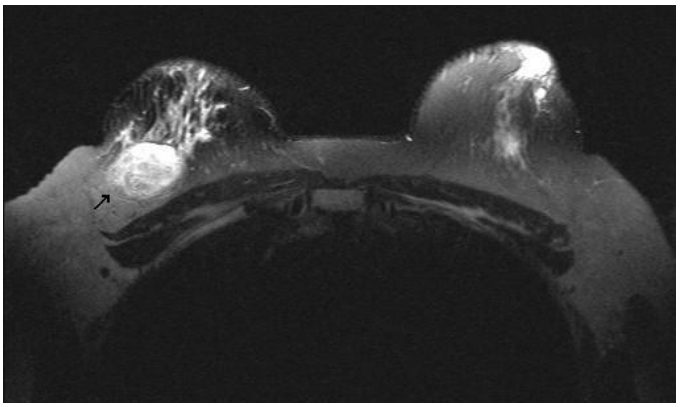

Figure 3: 38-year-old female with breast gossypiboma. Axial fat-suppressed T2-weighted image (1.5 Tesla magnet, TR/TE, 4500/97; slice thickness, 3mm) shows well-demarcated ovoid hyperintense mass lesion with characteristic internal striped and spotted low signal intensity areas.

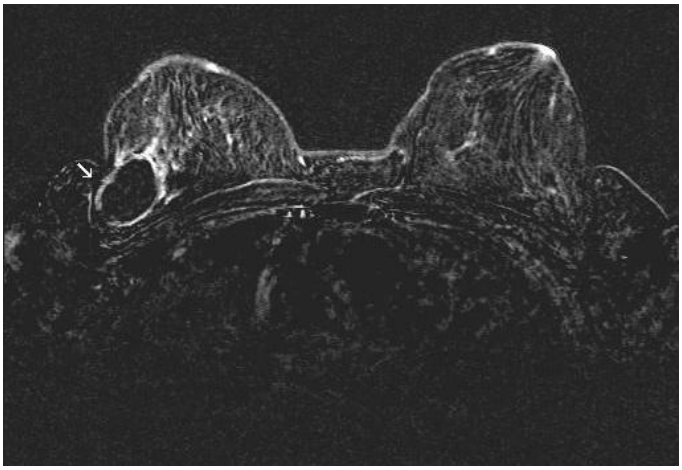

Figure 4: 38-year-old female with breast gossypiboma. Axial contrast-enhanced subtracted MR image obtained from the dynamic series with the subtraction of the pre-contrast T1-weighted images from the second series of post-contrast T1-weighted images (1.5 Tesla magnet, TR/TE, 4.3/1.4; slice thickness, 1.5 mm, IV. Gadobutrol 0.1mmol/kg of body weight) shows regular strong rim enhancement around the lesion at the site of surgery.

	X-Ray	Ultrasound	CT	MRI
Gossypiboma	Radio opaque marker could be seen within the lesion if retained surgical sponge contains radio-opaque marker and if it is not fragmented and disintegrated.	curvilinear echogenic area with strong posterior acoustic shadowing is seen	Air trapping into a surgical sponge results in the characteristic spongiform pattern. It could be seen as a low-density, high-density, or complex mass. Calcification and enhancement of the wall of the fluid collection may also occur especially in long-standing cases.	T1: hypointense T2: hyperintense lesion containing hypointense striped and spotted structures DWI: increased diffusion Pattern of contrast enhancement: rim enhancement
Benign neoplasms such as fibroadenomas	radio opaque well-marginated round or oval mass, calcification could be seen in fibrotic fibroadenomas	well-marginated round or oval mass, mostly hypoechoic relative to fatty tissue, acoustic enhancement could be seen		T1: hypointense T2: hyperintense DWI: increased diffusion Pattern of contrast enhancement: none, homogeneous or heterogeneous. But non-enhancing internal septations if present are very characteristic for fibroadenomas.
Abscess	radio opaque	thick walled cystic mass with internal echoes and acoustic enhancement		T1: hypointense T2: hyperintense DWI: restricted diffusion Pattern of contrast enhancement: strong rim enhancement
Hematoma	radio opaque	cystic mass with internal echoes		T1: could be seen hyper, iso or hypointense T2: hyper or hypointense Pattern of contrast enhancement: none

Table 1: Differential diagnosis table for Gossypiboma

Etiology:	Retained surgical sponge
Incidence:	1/1000- 1/15000
Gender ratio:	Especially in female, M/F=1/2
Risk factors:	Operation performed of emergency basis, unexpected change in operation, more than 1 surgical team involved, change in nursing staff during procedure, high body mass index, large volume of blood lost, counts of sponges and instrument not performed, female sex
Treatment:	Re-operation
Prognosis:	Well
Findings on imaging:	Sonographic examination shows curvilinear echogenic area with strong posterior acoustic shadowing. It seen hypointense on T1-weighted images. T2-weighted MR images shows striped and spotted low signal intensity structures within the lesion. Shows strong rim enhancement commonly. On DWI shows increased diffusion.

Table 2: Summary table for Gossypiboma

ABBREVIATIONS

3D = three-dimensional
FLASH = fast low angle shot
MR = magnetic resonance

KEYWORDS

Breast, gossypiboma, magnetic resonance imaging, MRI, ultrasound