Cystic breast lesions: Imaging evaluation and management. Sonographic-histopathological correlation: Our experience

Poster No.: C-0625
Congress: ECR 2016
Type: Scientific Exhibit
Authors: A. I. UTRERA GARCIA DE SALAZAR¹, C. Estrada¹, D. Gomez Campos², O. C. BENITEZ DUPIN¹, A. Tejerina¹; ¹Madrid/ES, ²Madrid, Ma/ES
Keywords: Cysts, Sampling, Outcomes analysis, Biopsy, Ultrasound, Breast
DOI: 10.1594/ecr2016/C-0625

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR’s endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method ist strictly prohibited.
You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys’ fees, arising from or related to your use of these pages.
Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.
www.myESR.org
Aims and objectives

- To describe the sonographic features of cystic lesions of the breast and to determine appropriate assessment in the BI-RADS® system.

- To establish management recommendations for these lesions founded on sonographic appearance and their risk of malignancy.

- To evaluate correlation between imaging findings and histological results.

Methods and materials

A retrospective study was designed for this purpose.

From our database of 500 image-guided procedures, a cohort of 126 patients was selected based on the identification of cystic lesions by sonographic examination.

Interventionist procedures were performed from June 2012 to May 2015.

Diagnosis was established with a linear-array transducer with a center frequency of 10MHz supplemented by a transducer with a center frequency of 7.5 MHz, as needed, to penetrate larger breasts.

Lesions were classified as simple cysts, complicated cysts, clustered microcysts, complex mixed cystic and solid masses (at least 50% cystic), or complex predominantly solid masses with eccentric cystic foci.

In every case we performed a fine-needle aspiration using an 18-20 gauge needle \( (n = 66) \) or a core needle biopsy using a 14-gauge automated biopsy gun \( (n = 60) \).

Imaging findings and the BI-RADS® category were correlated to histopathologic, cytological, and/or microbiologic findings.
Results

IMAGING AND INTERPRETATION

Anechoic masses with an imperceptible circumscribed border and acoustic enhancement were classified as simple cysts (Fig1). A sonographically simple cyst can be dismissed as benign. If the patient is symptomatic with pain or a very large cyst is noted, aspiration can be performed electively. BI-RADS® category 2.

Complicated cysts are defined as lesions with homogeneous low-level echoes that otherwise meet the criteria of a simple cyst.

They could present intracystic debris that may layer and shift with changes in patient position (Fig2).

The intracystic component within some complicated cysts may produce an appearance identical to that of a circumscribed solid mass.

The risk of malignancy among complicated breast cysts is less than 2%. These cysts generally can be managed with short-interval follow-up imaging or FNA. BI-RADS® category 3.

Lesions composed entirely of clusters of tiny (2-5mm) anechoic foci with no solid component were termed clustered microcysts. (Fig3). BI-RADS® category 2.

Complex mixed cystic and solid masses were the lesions showing intracystic masses with a discrete solid mural mass within a cyst, with at least 50% cystic component (Fig4). BI-RADS® category 4.

Complex predominantly solid masses present with at least 50% solid component (Fig5) BI-RADS® category 4.

In our practice, if a cystic lesion with a solid component is identified in ultrasound examination, a core-needle biopsy is performed.
RESULTS:

Of 126 cystic lesions analyzed, 18 were classified as simple cysts, 43 as complicated cysts, 8 as clustered microcysts, 35 as complex mixed cystic and solid masses, and 22 as mainly solid masses with eccentric cystic foci (Table 1 and 2).

Of the 126 lesions, 17 (13%) proved to be malignant.

• **Simple Cysts**

The 18 sonographically simple cysts were aspirated because they were tender and palpable. None of them proved malignancy. One lesion had the appearance of simple cyst and proved an abscess.

Two cases of atypical ductal hyperplasia were confirmed.

• **Complicated Cysts**

Of the 43 sonographically complicated cysts, FNA was performed in 41 lesions and CNB was warranted in two cases.

In some of these lesions an intracystic debris component that may shifted with changes in patient position was proven (Fig 6).

All cases yielded benign cytologic results: 8 abscess (Fig 7); 2 fat necrosis (Fig 8); 1 hemorrhagic cyst with fibrosis foci (Fig 9); 3 intraductal papilomas and 3 cases showing atypical ductal hyperplasia.

• **Clustered Microcysts**

Of 8 masses characterized as clusters of microcysts (Fig 10). None of them proved malignancy. One cluster of microcysts proved fibrosis and a fibroadenoma was noted.
• **Complex mixed cystic and solid masses (at least 50% cystic)**

Of 35 total intracystic or mixed cystic and solid at least 50% cystic masses, 24 (70%) proved benign. Of these: 2 hemorrhagic cyst, 1 abscess, 8 cases intraductal papilloma (one of them presented a twisted pedicle associating hemorrhagic cystic fluid) (**Fig11**), 3 fat necrosis, 1 fibroadenoma (**Fig12**) and 1 galactocele was demonstrated (**Fig13**).

In 10 cases (30%) proved to be malignant, including 5 intraductal carcinoma (IDC) (**Fig14**) and 5 intracystic papillary carcinoma (**Fig 15**).

• **Complex Solid Masses with Eccentric Cystic Foci**

Of 22 predominantly solid masses with eccentric cystic foci, 15 (68%) proved benign. Of these 2 cases of intraductal papilloma, 1 fibroadenoma and 2 fat necrosis were demonstrated.

Seven cases proved malignant (32%) , including 4 IDCs and 3 intracystic papillary carcinoma.

**Images for this section:**
Fig. 1: Simple cyst. A sonographically simple cyst (anechoic with a well-defined imperceptible wall and posterior acoustic enhancement)

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 2: Complicated cyst in a 48-year-old woman. US image shows a well-defined mass with homogeneous mobile low-level internal echoes and posterior acoustic enhancement.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 3: Clustered microcysts in a 50 year-old woman.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
**Fig. 4:** Complex solid and cystic, with at least 50% cystic component.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
**Fig. 5:** Complex solid and cystic masses with predominantly solid mass with eccentric cystic spaces.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 6: Complicated cyst in a 48-year-old woman. US image shows dependent intracystic echoes. US image from a repeat examination with the patient in the left decubitus position shows mobility of the intracystic material.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 7: Breast abscess in a 19-year-old woman with a tender palpable area in the right breast and clinical signs and symptoms of an infection. Power Doppler US image shows a superficial fluid collection with debris and flow within the thick-walled component.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 8: Fat necrosis.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 9: Complicated cyst with hemorrhagic fluid and fibrosis foci in a 53-year-old woman.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 10: Clustered microcysts. US image obtained in a 50-year-old woman shows an incidental aggregate of tiny cystic foci without a discrete solid component

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 11: Intraductal papilloma that presented a twisted pedicle associating hemorrhagic cystic fluid. US image obtained a 77-year-old woman shows a complex mixed cystic and solid mass.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 12: US image obtained in a 18-year-old woman shows a complex cystic and solid mass. The lesion showed fibroadenoma.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
**Fig. 13:** Galactocele in a young lactating woman who presented with a palpable breast mass. US image shows a complex cystic mass with mixed cystic and solid component. US image from a repeat examination with the patient in the left decubitus position shows no mobility of the intracystic material.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES

---

**Fig. 14:** Intracystic papillary carcinoma in a 46 year-old patient. US findings show a complex cystic mass. US image from a repeat examination with the patient in the left decubitus position shows no mobility of the intracystic material.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Fig. 15: Intraductal papilloma. US image shows a complex cystic mass from a 45 year-old woman.

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES

<table>
<thead>
<tr>
<th>SONOGRAPHIC FINDINGS</th>
<th>Nº lesions</th>
<th>FNA</th>
<th>CNB</th>
<th>Malignancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Cysts</td>
<td>18</td>
<td>18</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Complicated Cysts</td>
<td>43</td>
<td>41</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>Clustered Cyst</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>0%</td>
</tr>
<tr>
<td>Complex mixed cystic and solid masses</td>
<td>35</td>
<td>0</td>
<td>35</td>
<td>28% (10/35)</td>
</tr>
<tr>
<td>Complex Cysts: Predominantly solid component</td>
<td>22</td>
<td>0</td>
<td>22</td>
<td>32% (7/22)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>126</td>
<td>60</td>
<td>66</td>
<td>13% (17/126)</td>
</tr>
</tbody>
</table>
**Fig. 16: Table 1**

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES

<table>
<thead>
<tr>
<th>SONOGRAPHIC FINDINGS</th>
<th>Simple Cysts</th>
<th>Complicated Cysts</th>
<th>Mixed cystic and solid masses</th>
<th>Clustered Cyst</th>
<th>Complex Cysts: Predominantly solid component</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HISTOPATHOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BENIGN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Benign findings</td>
<td>15</td>
<td>26</td>
<td>9</td>
<td>7</td>
<td>10</td>
<td>67 (54%)</td>
</tr>
<tr>
<td>- Abscess</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>10 (7%)</td>
</tr>
<tr>
<td>- Fibro adenoma</td>
<td>-</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>- Intraductal papilloma</td>
<td>-</td>
<td>3</td>
<td>8</td>
<td>-</td>
<td>2</td>
<td>13 (10%)</td>
</tr>
<tr>
<td>- Atypical ductal Hyperplasia</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>5 (3%)</td>
<td></td>
</tr>
<tr>
<td>- Fat necrosis</td>
<td>-</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>7 (5%)</td>
</tr>
<tr>
<td>- Hemorrhagic cyst</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>- Fibrocystic changes</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>- Galactocele</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>MALIGNANT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- IDC</td>
<td>-</td>
<td></td>
<td>5</td>
<td>-</td>
<td>4</td>
<td>9 (7%)</td>
</tr>
<tr>
<td>- Intracystic papillary carcinoma</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>3</td>
<td>8 (6%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18</td>
<td>43</td>
<td>35</td>
<td>8</td>
<td>22</td>
<td>126</td>
</tr>
</tbody>
</table>

**Fig. 17: Table 2**

© RADIOLOGY, HOSPITAL, L AFUNDACIÓN JIMÉNEZ DÍAZ - Madrid/ES
Conclusion

Sonographically simple cysts can be dismissed as benign.

Complicated cysts containing low-level echoes or uid-debris levels may be classed as probably benign, though further study is warranted and planned.

All clustered microcysts were benign.

Complex cystic masses showing solid components clearly require biopsy based on the results of this series.

Most of the cystic lesions identified in this series proved benign although appropriate categorization and thorough imaging characterization is important because the management and the risk of malignancy of each type are significantly different.

Personal information

References