

**Presenter:**

**Stamatia Destounis, MD**

**Co-Authors:**

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**Session: Breast Imaging (Ultrasound)**

**Presentation: Wednesday, November 29, 2006**

**Start time: 10:50 AM, End time: 11:00 AM**

**Location: Arie Crown Theater**

**Topic code: SSK01-03**

**Title: Initial Experience of Automated Breast Ultrasound Screening Trial in the Setting of a Community Based Private Practice**

**PURPOSE:** To evaluate automated breast ultrasound (ABUS) as an adjunct to screening mammography in patients with dense breast tissue.

**METHOD AND MATERIALS:** Screening breast ultrasound was performed on 285 breasts in 143 patients in addition to mammography. Three study views using automated scanning parameters were taken of each breast by trained mammography technologists using the SonoVu scanstation (U-Systems, San Jose, CA). Results (soft-copy) were interpreted and reviewed with mammography (hard-copy). Prior hand-held ultrasound (HHUS), when available, was reviewed subsequent to interpretation of the ABUS. Patient age, mammographic BIRADS<sup>®</sup> density, BIRADS<sup>®</sup> assessment [mammography alone, mammography and ABUS, mammography and HHUS (for patients recalled for handheld ultrasound after interpretation of ABUS)], 7 point malignancy score, description of any ABUS findings, whether findings were previously documented, and interpretation time were recorded.

**RESULTS:** In 143 patients, 6/285 breasts were categorized with heterogeneously dense tissue and 279/285 as dense. Median patient age was 49 years (range 26 – 76). Median ABUS interpretation time was 8 minutes (range 2 – 25). Findings (86/285) were recorded as 77/86 cysts (41/77 new findings), 6/86 masses (3/6 new), 2/86 duct ectasia (2/2 new), 1/86 complicated cyst (1/1 new). BIRADS<sup>®</sup> assessment and 7 point malignancy scale scores upgraded in 79/285 cases. Upgrades were attributed to cystic findings (64/79), benign masses (5/79), detection of previously documented benign findings (9/79), and one instance of duct ectasia. Five patients were recalled based on the results of the ABUS. One recall was a false positive due to shadowing caused by Coopers ligaments, 2/5 findings were benign at HHUS, 2/5 patients underwent needle biopsy where benign pathology was documented.

**CONCLUSION:** In this cohort of dense breasts, automated screening ultrasound has demonstrated concordance with known benign breast conditions and the capability to provide documentation of new benign findings. Continued evaluation is necessary to determine its efficacy as a screening tool in the detection of mammographically occult breast cancer.

**Clinical Relevance/Application:** Screening Breast Ultrasound

**Presenter:**

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James Youker, MD

**Session: Breast Imaging (Ultrasound)**

**Presentation: Wednesday, November 29, 2006**

**Start time: 10:40 AM, End time: 10:50 AM**

**Location: Arie Crown Theater**

**Topic code: SSK01-02**

**Title: Evaluation of the SonoVu™ by U-Systems in Diagnostic Patients**

**PURPOSE:**

To evaluate the performance of an automated breast ultrasound system (SonoVu™) versus conventional hand-held ultrasonography by comparing lesion visibility and BIRADS Assessment.

**METHOD AND MATERIALS:**

Patients presenting for diagnostic ultrasound were recruited and signed an IRB-approved informed consent. Lesions were imaged using mammography, hand-held ultrasonography (HHUS), and the SonoVu. Visibility of lesions using the SonoVu was compared with visibility of these same lesions using HHUS. BIRADS assessment using mammography plus HHUS was compared to BIRADS assessment using mammography plus SonoVu.

**RESULTS:**

A total of 177 breasts in 165 patients were scanned. In these patients 96% of lesions visible on HHUS were also visible on SonoVu. SonoVu performed best in dense breasts (BIRADS Density 3 or 4), where 98.6% of lesions were visualized. The BIRADS assessment derived from mammography plus SonoVu was in agreement with the BIRADS assessment derived from mammography plus HHUS in 94% of breasts analyzed. Lesions successfully visualized with the SonoVu included cancers (DCIS, invasive ductal, invasive lobular) as well as a number of benign findings, including cysts, fibroadenomas, fibrocystic changes, lymph nodes, papillomas, and scars. Observed cancers ranged from 0.4 cm to 3.8 cm in their longest dimension.

**CONCLUSION:**

Images made with SonoVu and HHUS have similar visibility and lead to similar BIRADS assessments in greater than 90% of breasts examined. SonoVu is most sensitive in dense breasts, where mammography is less sensitive.

**CLINICAL RELEVANCE/APPLICATION**

The SonoVu is an automated alternative to hand-held ultrasonography of the breast.

**Presenter:**

Yi Hong Chou, MD

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**Session: Breast Imaging (Ultrasound)**

**Presentation: Wednesday, November 29, 2006**

**Start time: 11:10 AM, End time: 11:20 AM**

**Location: Arie Crown Theater**

**Topic code: SSK01-05**

**Title: Ultrasound ACR BI-RADS Categories Applied in an Automated Breast Ultrasound System: Diagnostic Reliability**

**PURPOSE:**

To determine the diagnostic reliability of ultrasound (US) features based on an automated full-breast ultrasound system (ABUS) and final assessment categories using ACR BI-RADS US category for breast lesions.

**METHOD AND MATERIALS:**

182 ABUS-studied breast lesions were histologically proved by either percutaneous biopsy or surgery. They were retrospectively assessed by 2 experienced radiologists who are unaware of the clinical information and diagnosis. All lesions were classified according to BI-RADS descriptors and categories. The diagnostic reliability including sensitivity, specificity, positive and negative predictive values (PPV and NPV) of the ABUS features and categories were calculated. Findings were previously documented, and interpretation time were recorded.

**RESULTS:**

There were 47 carcinomas and 135 benign lesions. 89 lesions were assigned to class II (all were benign lesions), 27 to class III (1 malignant and 26 benign lesions), 25 to class IV (10 malignant and 15 benign lesions), 41 to class V (36 malignant and 5 benign lesions). ACR BI-RADS US category showed an accuracy of 0.88, sensitivity 0.98, specificity 0.85, PPV 0.70 and NPV 0.99. Irregular shape, nonparallel orientation, noncircumscribed margin, and shadowing were the major signs of malignancy. The most common causes of false positive results were focal fibrosis, papillomas, scar tissues, and echogenic cysts.

**CONCLUSION:**

The ACR BI-RADS US categories can be applied in an ABUS study for quantification of the likelihood of carcinoma. The diagnostic reliability of ABUS in differentiating benign from malignant breast lesions should be based on the sonomorphological information obtained from all the images.

**CLINICAL RELEVANCE/APPLICATION:**

The ACR BI-RADS US categories can be applied in an ABUS study for quantification of the likelihood of carcinoma. The diagnostic reliability of ABUS in differentiating benign from malignant breast lesions should be based on the sonomorphological information obtained from all the images.

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**Location: Lakeside Learning Center**

**Topic code: LL-BR5203**

**Title: Atlas of Automated Full Breast Ultrasound**

**PURPOSE:**

1. Review the technical aspects of automated full breast ultrasound (US) on the basis of a recently developed automated breast US system (ABUS).
2. Illustrate the ABUS features of breast pathologies including malignant and benign tumors, inflammatory disorders, post-surgical changes, and miscellaneous conditions.

**Content Organization:**

Of the 260 breasts evaluated with ABUS, 99 breasts (38.1%) showed simple cysts (96) or chronic abscesses (3). Solid lesions were detected in 71 breasts (27.3%), 10 breasts (3.8%) of them were found to have both solid and cystic lesions. All solid lesions were proved histologically or histopathologically by US-guided biopsy and/or surgery. They included carcinomas (25), fibroadenomas (26), peripheral papillomas (9), focal fibrosis (5), hamartoma (1), phyllodes tumor (1), and post-surgical scars (4).

**CONCLUSION:**

ABUS can systemically demonstrate breast lesions, either cystic or solid, including carcinomas. ABUS provides multiplanar anatomical information of focal breast pathologies. Because all the cancers demonstrated on hand-held US were also detected on ABUS, ABUS is considered of potential to screen cancers in dense breasts.