

## **Point of care high resolution ultrasound in the evaluation of Bangladeshi women presenting to a breast care center**

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### **Abstract**

**Background:** Mammography and ultrasound examinations for diagnosis and staging of breast problems have been traditionally performed in specialized facilities, which circumstances are associated with increased costs and inconvenience for patients. Point of care or clinical office provision of high resolution ultrasound may allow addressing these equity barriers to health services, but there are limited data in Bangladesh about such practice and the associated quality of care.

**Objective:** To ascertain the advantage of ultrasonogram in the diagnosis of breast disease and screening of breast cancer.

**Methods:** From February through November 2014, 1085 women presented to the Amader Gram Breast Care Center in Khulna. In each of these women in addition to standard history and physical examination, a high resolution ultrasound scan was performed of both breasts. Standard clinical and ultrasound practice definitions of breast conditions were applied to each case by an specialist surgeon trained in breast sonology.

**Results:** Two thirds of women had history, physical examination and ultrasound findings consistent with fibrocystic conditions. 12% had fibro adenomas, 5% inflammatory infectious conditions, 2% obvious or strongly suspected breast malignancy, and 1% had masses of uncertain nature. 3% had more than one abnormal breast condition and 3% had no breast abnormalities at all. The overwhelming majority of women benefitted from having ultrasound examination which contributed to prompt, definitive characterization of their breast conditions and which pictorial demonstration contributed to patient education about the clinical diagnosis.

**Conclusion:** Point of care high resolution breast ultrasound can contribute favorably to quality and equity of care for Bangladeshi women with breast problems.

**Key words:** Ultrasonogram, Breast diseases, Breast cancer.

### **Introduction**

The demand for medical diagnostic services has been increasing substantially in Bangladesh. This is also true for women for whom acknowledgement of breast problems in the southern Khulna division has markedly increased from negligibly low levels to 15% over recent years (Data from Amader Gram, unpublished, 2013). Usual breast problem diagnostic technologies and practice are however not well adapted to meeting women's needs and some of the consequences are that women with serious problems do not get rapid or any clinical diagnosis. In a consecutive series of 238 women with newly diagnosed breast cancer seen at Khulna Medial College Hospital in 2007-8, only 9% of patients had potentially curable

disease; one quarter of women had been seen in the previous 6 months and had undergone a biopsy by a non allopathic practitioner.<sup>1</sup> Cost of imaging studies and inconvenience of obtaining these were associated with many women not having a definitive or strongly suspected and shared clinical diagnosis when they first sought care for a breast problem.

Point of care (POC) high resolution breast ultrasound examination (that is ultra sonography performed and interpreted by the clinician at the site of examination - the concept of an "ultrasound stethoscope") offers particular advantages in care of women presenting with breast problems.<sup>2</sup> There are not the radiation hazards, equipment, supplies

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and operator and reader expense issues associated with mammography which make use of this technology so specialized facility and interpreter dependent, and relatively expensive. In many years of ultrasound use in obstetrics, no harmful effects have been observed.<sup>3</sup> Additionally as a tool for imaging benign and malignant breast conditions, real time ultrasound may reduce medical errors because it provides immediate correlation of signs and symptoms with images and condition characteristic, precise, and three dimensional pictorial images that are often much more diagnostic than those provided by mammography. Fibrocystic conditions, fibro adenomas, and masses of uncertain etiology can be well recognized and characterized by ultrasound when these are poorly imaged by mammography.

Recently ultrasound equipment has become more compact, capable of generating high quality images, and less expensive. In high income countries there has been increasing use by specialists in imaging specific organs, and some medical schools are training all physician in hand carried ultrasound equipment use.<sup>4</sup> The WHO estimates that two thirds of general imaging needs in low and middle income countries can be met with use of plain radiography and ultrasound.<sup>5</sup>

In these contexts however there is a specific need to define the benefits of point of care ultrasound most importantly patient-centered outcomes associated with this technology. Our main object is to popularize the use of high resolution ultrasonogram in diagnosis of breast diseases and to screening breast cancer in different primary level health center.

## Methods

Using a GE high resolution breast ultrasound Logic scanner, an specialized surgeon, an obstetrics and gynecology advanced level trainee physician, two medical officers and a nurse were given didactic training over 10 hours and then over 20 hours of hands on training by an experienced, American certified breast ultrasonographer surgeon. Subsequently the local surgeon and physician nurse team performed over 4000 breast ultrasound studies prior to those done in the series reported here. For this communication all patients seen in the Amader Gram Breast Care Center in Khulna from February 2012 through November 2014 were studied, and their breast conditions were characterized and labeled or diagnosed according to the clinical and sonological definitions mentioned below:

Fibrocystic condition, changes or disease: localized tenderness and lumpiness in one or both breasts, associated with honeycomb appearance on ultrasound examination.

Fibro adenoma: mobile, painless, chronic lump in the breast which on ultrasound appears as a hypo echoic, round, encapsulated lesion with posterior enhancement.

Cyclical mastalgia: discomfort in both breasts in the days preceding menstruation.

Abscess: an acute, sub-acute painful breast lump with overlying skin inflammation. Ultrasound shows a hypo echoic lesion with irregular margins.

Nipple fungal infection: complaint of nipple itchiness, often in lactating mother with associated limited evidence of nipple/areolar inflammation and on ultrasound no specific findings or some evidence of duct dilatation.

Mastitis (presumed bacterial): complaint of acute sub acute, localized, painful inflammatory changes in one breast, usually in a lactating woman, with associated ill defined area of mixed echogenicity on ultrasound.

Mastitis (presumed granulomatous): chronic painful hard mass clinically with a distinct area of mixed echogenicity on ultrasound.

Cancer: chronic, irregular often hard mass with or without associated overlying skin changes and hypo echoic irregular mass findings on ultrasonography.

Mass (strongly suspected to be cancer): chronic, usually hard mass, immobile, painless with hypoechoic changes and irregular, angulated borders on ultrasound.

Mass (etiology and nature uncertain): chronic, usually firm mass with uncertain borders, often associated with some discomfort, with mixed echogenic features on ultrasound and ill defined borders.

Mass with fibrocystic condition (presumed benign): painful localized mass in the presence of fibrocystic condition with uncertain characteristics on ultrasound.

Lipoma: chronic, painless, often soft mass with a rounded, regular, iso echogenic lesion with a shadow similar to that of fatty tissue of breast on ultrasound.

Sebaceous cyst: a small chronic lump in the skin with a dark surface center point and an ultrasound defined superficial hypo-echoic small mass.

Ductal ectasia: usually in peri or postmenopausal women, chronic inflammatory changes of the nipple or sub areolar areas with associated nipple discharge of watery substance. Ultrasound may show ductal enlargement.

Lymphadenitis: complaint of painful, lump or lumps in axilla with ultrasonic hypo-echoic lesion(s) in axilla of normal architecture.

Hypertrophy: bilateral breast size disproportionately large compared to the frame of the individual.

**Results**

During a nine month period, 1085 women were seen in the Amader Gram Breast Care Center in Khulna. Seventeen different breast conditions were diagnosed clinically and ultrasonically among these women (Table 1).

**Table I**

Clinical diagnoses following physical and ultrasound examination (n=1085).

Name of Diseases	No. of patient (n=1085)	Percent
Fibrocystic changes	733	67.56
Fibro-adenoma	128	11.8
Cyclical a mastalgia	81	7.46
Inflammatory-infectious conditions	18	1.66
Abscess		
Nipple fungal infection	15	1.38
Mastitis, presumed bacterial	14	1.29
Mastitis, presumed granulomatous	10	0.92
Obvious cancer	6	0.55
Mass, strongly suspected to be cancer	16	1.47
Mass, etiology and nature uncertain	14	1.29
Mass with fibrocystic condition, presumed benign	20	1.84
Lipoma	18	1.66
Sebaceous cyst	7	0.64
Ductal ectasia	6	0.55
Lymphadenitis	2	0.184
Hypertrophy	1	0.092
Normal	31	2.86

Thirty five women (3%) were identified as having more than one condition. As the figures in the table show, the commonest problems were fibrocystic conditions in two thirds of women, fibro adenomas in 12% (Fig 1), cystic mastalgia in 7%



Fig-1. Fibroadenoma breast

(Fig 3) and inflammatory infectious conditions (abscess, nipple fungal infection, ranulomatous

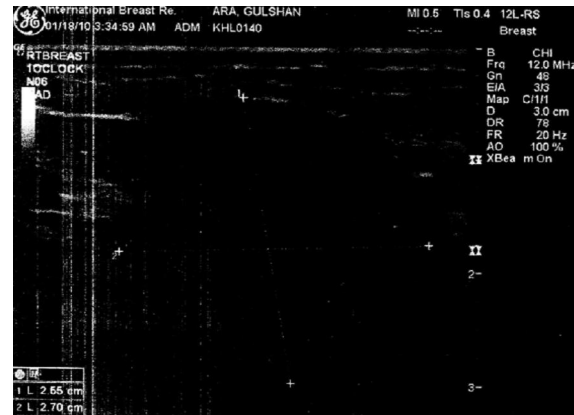


Fig. 2: Sonologically suspected carcinoma

mastitis and bacterial mastitis) and Galactocele in 5% (Fig 4). Thirty six women (33%) had or were suspected to have malignant disease 6 with advanced cancer, 16 with a mass strongly suspected of being cancer (Fig 2) and 14 with a

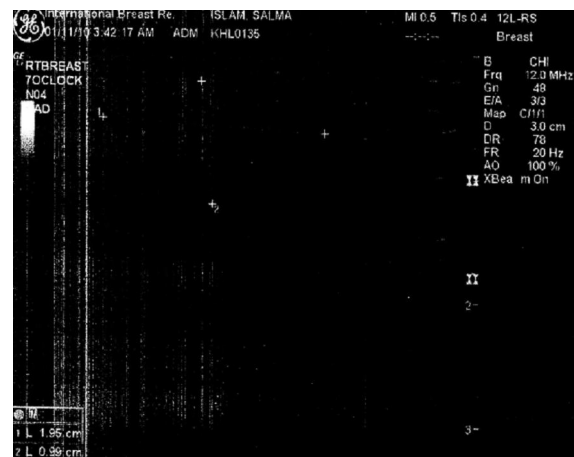


Fig. 3: Breast cyst

mass whose nature was uncertain and for whom a biopsy was recommended for definitive diagnosis. Of the 16 patients with suspected cancer, biopsies

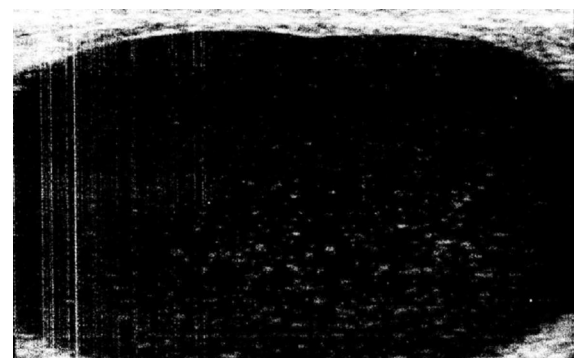


Fig. 4: Galactocele

were done showing malignancy in 11; 2 had biopsies with uncertain findings, and three patients were lost to follow up. Of the 14 patients with indeterminate masses, 5 were found to be cancer, in four the results were uncertain, in four the patients were lost to follow up, and in one patient, no biopsy was done and no change was appreciated in the ensuing months.

## Discussion

In this large consecutive series women seeking care for breast problems were almost always found to have abnormal breast conditions. POC Ultrasound can complement and supplement clinical impressions, rule out other underlying non visible or impalpable breast problems, provide prompt real time data supporting physical diagnostic findings, and reassure patients of the diagnosis visually. In cases of suspected malignancy, ultrasound can put that option on the table at the first visit and should contribute to prompt diagnosis and perhaps more successful treatment. In our hands now, the readings of suspected malignancy associated with pathology confirmation in 11/16 cases and mass of uncertain nature associated with pathology confirmation of malignancy in 5/14 cases and an uncertain pathological diagnosis in another 4/14 cases, lead to strong recommendations for prompt biopsy in all such cases. For fibrocystic conditions (fully 2/3rds of all patients in this report) and patients with masses benign (14%) fibro adenoma, and lipoma and malignant or suspicious (another 3%) ultrasound findings contributed importantly to the most highly likely clinical diagnoses. This has very practical implications when fibro adenomas are clearly demonstrated: ultrasound findings can essentially rule out malignancy which mammography often does not do, and therefore make excisional biopsy unnecessary. The value of reassurance from ultrasound examinations for patients with benign conditions is difficult to estimate. These conclusions are consistent with reports about use of this technology from several countries.<sup>6-10</sup>

There are then two issues about encouraging more widespread use of P-O-C breast ultrasound: clinical operator training and development of competence and cost. In high income countries, ultrasound certification is required for both quality assurance and billing purposes; certification varies with the discipline involved e.g. it is different for surgeons and radiologists. Basic training must include an understanding of the physics of ultrasound coupled with hands on experience with a certified P-O-C clinician participating in over 500 examinations over a period of at least 4 weeks. The complete clinical information which the P-O-C ultrasound service

provider has perhaps counters the more detailed interpretive skills of a radiology specialist.

A high resolution breast ultrasound scanner was used in this study. This new machine costs \$32,000. Similar machines in Bangladesh are priced at \$13,000. The ultrasound examinations in our center were provided as part of a "bundle " of first visit services: creation of a comprehensive EMR, physical examination and bilateral breast ultrasound for which the center charges 500 Taka. Bilateral breast ultrasound examination in our community usually costs 2000 Taka; bilateral mammography costs 5600 Taka.

## Conclusion

The routine use of high resolution breast ultrasound scanning in a large consecutive series of Bangladeshi women presenting with breast problems appeared to contribute significantly to immediate and definitive clinical diagnoses in the overwhelming majority of cases. Patient satisfaction was high. It constitutes adequate operator/clinician training and the cost efficacy of P-O-C ultrasound versus specialized facility ultrasound and or mammography in evaluation of routine breast problems in clinical practice deserve further investigation.

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