

## Woman feels breast lump – surgeon cannot: the role of ultrasound in arbitration

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### Abstract

The role of ultrasound scanning (USS) in patients complaining of a breast lump where the clinical examination (CE) is normal is not clearly defined. To determine this in greater detail, all patients complaining of a breast lump underwent CE. Where no lump could be found, but was still reported by the patient, an USS was performed. All lesions underwent biopsy and/or aspiration, as well as mammography in suspicious cases or those over 40 years of age. This cohort represented 5% of all referrals in the study period. Four hundred and twenty women were prospectively studied in this way. Median follow up is 3.4 years (range 2.5–4.2 years). Twenty two had solid lumps (of which 3 were cancers) and 48 had cysts. Nineteen patients re-presented with symptoms in the same breast (median time = 12 months (range 4.5–20 months), all of which were imaged on USS: 15 cysts and 4 further cancers (3 in the same quadrant as the original lump, one contralateral) were identified. Women with symptomatic breast lumps and a normal CE can be considered a reliable indication that cancer is very unlikely to be present (negative predictive value = 0.98). Ultrasound may be a suitable complimentary investigation, which will relieve symptoms in those with cysts and can detect small clinically – and sometimes mammographically – occult breast cancers.

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**Keywords:** Breast cancer; Ultrasound; Clinical examination; Breast lump

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### 1. Introduction

Ultrasound of the breast is an established adjunct to mammography and clinical examination in the further assessment of breast lumps at all ages [1], and is the imaging method of choice for assessing symptomatic breast lumps in young women [2]. However, it has not been shown to be of value in screening asymptomatic women [3] and it is not normally performed in symptomatic patients when no clinical abnormality is found. The role of ultrasound in this latter scenario was the subject of this study.

### 2. Patients and methods

Experienced clinicians examine all women referred to the Nottingham Breast Unit complaining of a breast

lump using a standard technique [4]. Briefly, this initially involves observation of the breasts with the woman sitting upright on the edge of the examination couch facing the examiner, her hands placed on her hips and then raised above her head. The hands are then placed on the hips again and pectoral muscles tensed. With the woman then lying at an angle of approximately 30–40° with her hands rested on top of her head, palpation of both breasts and axillas is performed. Certain areas of concern/uncertainty are also palpated with the woman sitting up. If a lump is not palpable, women are asked to locate it with one finger. If they can locate it, this particular area is then re-examined. In this study, women for whom clinical examination remained normal were submitted for ultrasound of the breast performed by a breast radiologist using a high frequency broad-band probe (7.5 MHz and use of a 13 MHz probe when required). If a solid mass was found on ultrasound, guided core-biopsy or fine needle aspiration (FNA) was

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performed. A 14G needle core biopsy was performed on all solid lesions independent of radiological suspicion of malignancy, unless the lesion was <5 mm in which case FNA was performed. The aim was to pass through the lesion at least twice. Women over 40 years of age and those with suspicious ultrasound findings also underwent mammography. Four hundred and twenty women were prospectively studied in this way between July 1999 and April 2001. This represented 5% of all new referrals during this period. Women who re-presented with further breast problems were reassessed as new patients with clinical examination and imaging. Events were prospectively recorded. It was assumed that all women with further breast problems would re-present to the Nottingham Breast Unit.

### 3. Results

Three hundred and fifty women (83%, mean age = 36.6 years: range 14–69 years, standard deviation (SD) = 10.60) had no abnormality on ultrasound and were discharged. The remaining 70 women (17%, mean age = 42.4 years: range 18–66 years, SD = 10.08 years) were significantly older (mean age difference = 5.85, 95% confidence interval (CI) = 3.2–8.4,  $P < 0.001$ ) and had cysts (48 women) or solid lumps (22 women). 2/3 of women with cysts were over 40 years of age; aspiration resolved symptoms and these women were also discharged. Solid lumps (median size = 9 mm; range 3–25 mm) were classified on ultrasound as benign (17), indeterminate (4), suspicious (1) or malignant (none). The final diagnosis was fibroadenoma (5), other benign (14) and malignant (3).

Median follow-up of the whole study cohort is 3.4 years (range 2.5–4.2 years, mean = 3.7 years). Nineteen women have re-presented: 15 with cysts, 4 with can-

cer, none with benign solid lumps. These women were assessed clinically and radiologically in the same way as at their initial presentation. Of the four cancers found at representation three had a clinically palpable breast lump in the same region where previous clinical examination and ultrasound were normal, whereas one other presented with a palpable breast lump in the opposite breast; median time to re-presentation was 12 months (range 4.5–20 months, mean = 14.6 months). Patient and tumour characteristics for all seven cancers detected in this study are described Table 1. These cancers represent 0.57% of all cancers presenting to the Nottingham Breast Institute during the period of this study and 0.79% of all symptomatic cancers.

### 4. Discussion

This study shows that in the situation where a woman presents with a breast lump, which she is able to point to, but in whom the clinical examination is normal, 83% of cases have no abnormality on ultrasound. In 17% of cases, ultrasound detected cysts and solid lesions of which 0.7% (3/420) were breast cancer. Each cancer was very small ( $\leq 7$  mm) and one was occult on mammography. With a minimum follow-up of 2.5 years, a time within which any missed cancers would be expected to re-present, a further 1% of women (4/420) have returned to the clinic with a breast cancer. These other cancers were larger and/or had a less favourable prognosis.

Mammography contributed useful information in those with a breast cancer, but did not add anything over ultrasound in improving the cancer detection rate. As such, its role in investigating such women when the clinical examination is normal is questionable.

Table 1  
Pathological features of cancers detected

	Interval/ months	Pathological size (mm)	Type	Site	Grade	ER status	VI	NPI
<i>Cancers at original presentation</i>								
1		6	NST	RUIQ	2	Positive	Negative	3.12
2		7	Tubular mix	R Cent.	2	Positive	Positive	3.14
3		7	Tubular mix	RUOQ	1	Negative	Negative	2.14
<i>Cancers at re-presentation</i>								
4	11	13	NST	RUOQ same quadrant palpable lump	3	Positive	Positive	4.26
5	10	4	NST	LUOQ same quadrant palpable lump	3	Positive	Negative	4.08
6	20	12	DCIS	Contralateral breast impalpable/ microcalcifications				
7	13	50	Ductal	LUIQ same quadrant palpable lump	3	Negative	Positive	7

NST, non specific type; DCIS, Ductal carcinoma *in situ*; R/L UIQ; right/left upper inner quadrant; R/L UOQ; right/left upper out quadrant.

This study shows that in women with symptomatic breast lumps, a normal clinical examination by experienced breast surgeons performing a breast examination in a standard way can be considered a reliable indication that cancer is very unlikely to be present (negative predictive value=0.98). For women who represented, all (apart from a contralateral cancer) had clinically palpable lumps in the same quadrant as the original symptomatic quadrant. It is of course possible that this association is coincidental in a proportion of cases. This study has shown that ultrasound is a worthwhile complimentary investigation, particularly in women over 40 years of age and with a normal clinical breast examination and normal ultrasound has a negative predictive value of 0.99. Ultrasound will also relieve symptoms in those with cysts and will

detect small clinically – and sometimes mammographically – occult breast cancers in 0.7–1.6%.

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