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ORIGINAL ARTICLE

Breast screening in symptomatic women over 35 years of age: improvements in service efficiency

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Abstract

Introduction The rationalization of cancer services in Ireland saw all women with symptomatic breast problems referred to one of the eight regional cancer centers. A pilot triaging system was introduced in St Vincent's University Hospital to streamline these services. Women over 35 years who do not meet urgent referral criteria are referred for a mammogram prior to a clinic appointment ("image first"). The aim of this study was to retrospectively determine the recall rates, biopsy rates, and rate of breast cancer identification within this cohort of patients. This was compared to a screening population of patients.

Methods Patients triaged into the "image first" group within a one-year period were identified. Results of the initial mammogram, further imaging and subsequent biopsies were recorded. Data relating to number of recalls, number of patients biopsied and number of cancers identified within the Merrion Unit of the National Breastcheck Screening Program was obtained for comparison.

Results One thousand six hundred eighty-eight referrals were triaged as "image first" over this period. 185 (11%) of patients required a biopsy of an identified lesion. Breast cancer was diagnosed in 65 patients (3.9%). During the same study period, of the 42,099 women who were screened for breast cancer, 496 (1.8%) underwent biopsy and 267 (0.63%) were diagnosed with breast cancer.

Conclusion Image first patients, who represent a cohort of "symptomatic" non-urgent women, have a greater rate of breast cancer detection than an asymptomatic screening population. This may have an impact on the appropriate triaging of symptomatic women in a national cancer center.

Keywords Breast cancer · Mammography · Screening · Symptomatic

Introduction

The centralization of breast services in Ireland to eight specialist units combined with an increased public awareness of breast cancer has meant that breast units are dealing with an ever increasing volume of referrals [1]. Typically, each cancer center unit receives approximately 4000 new referrals to the symptomatic breast clinic every year [1]. To streamline services, national guidelines recommend that referrals are triaged into urgent, over 35 years of age which must be seen within 2 weeks, and routine over 35 years and those under 35 who should be seen within 12 weeks. To improve the service within our individual unit, those patients who are over 35 years of age and are deemed non-urgent or routine are triaged into an "image first" category. These patients receive a mammogram prior to a clinical appointment, thereby reducing the overall work load and improving the efficiency of the symptomatic breast unit. It also allows women to be recalled, if necessary, within a shorter time frame then the 12-week waiting times.

The aim of this study was to retrospectively analyze patients who received a mammogram prior to a clinical appointment ("image first patients") over a 1-year period. We aimed to identify the number of patients who underwent additional investigations and biopsies (either radiologically guided or surgical excision) and the number of patients who were ultimately diagnosed with breast cancer. These results were compared to an asymptomatic cohort of patients who were screened through the auspices of the BreastCheck—The National Breast Screening Program.

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Methods

All patients who were triaged into the "image first" category between January and December 2016 were identified from a prospectively maintained database. General practitioners' referral letters were triaged by a consultant breast surgeon as urgent or routine based on the contact of the referral to determine which patients were suitable for the "image first" clinic. Demographic data and initial mammographic findings of all women were recorded. The number of women who were recalled for further radiological imaging or an image guided biopsy were identified. Pathology records were analyzed and outcomes, no intervention required, surgical diagnostic biopsy, or a diagnosis of breast cancer was recorded. This was subsequently compared with the number of women screened through a single national breast cancer screening center (Merrion Center) who were recalled for further imaging, the number of biopsies performed and the number of cancers detected.

Results

A total of 1688 women were triaged into the "image first" category during 2015. Of these, 86% ($n = 1453$) of patients had normal imaging (R2). The mammogram was reported as R3 in 11% ($n = 177$) of cases, 2% ($n = 39$) had R4 findings and 1% ($n = 18$) had an R5 reported. In total, 25% ($n = 424$) women were recalled for further imaging; 55% ($n = 233$) were recalled directly from the radiology department for additional mammographic views and/or ultrasound, while the remaining 45% ($n = 190$) were referred for further imaging based on clinical findings. In total, 11% ($n = 185$) patients underwent a biopsy of an identified lesion. Of these, 4.9% ($n = 9$) were B1, 48.6% ($n = 90$) were B2, 6.5% ($n = 12$) were B3, 1.1% ($n = 2$) were B4 and 38.9% ($n = 72$) were B5. A total of 10 patients (0.6%) proceeded to diagnostic excisional biopsy (4 patients following a B2 biopsy result and 6 patients following a B3 biopsy result). No patients who underwent diagnostic excisional biopsy required further treatment. Breast cancer was diagnosed in 65 patients (3.9%) (Table 1).

Patients who would have been eligible for the National Breast Screening Program, that is patients aged between 50 and 64, were analyzed separately. This subset of patients consisted of 345 patients. Within this group, a greater proportion of patients proceeded to undergo a biopsy (14.5%; $n = 50$) and 0.9% ($n = 3$) underwent an excisional diagnostic biopsy. Similarly, a greater proportion of patients were subsequently diagnosed with breast cancer (5.8%; $n = 20$) when compared to the total image first study cohort (Table 2).

With regard to the screening population, a total of 42,099 women were screened in the Merrion Unit between January and December 2015 inclusive. One thousand four hundred twenty-nine (3.39%) were recalled for additional imaging. Four hundred ninety-six (1.8%) underwent biopsy. The total number of patients diagnosed with breast cancer was 267 (0.63%). This equated to a cancer detection rate of approximated 6 per 1000 patients screened (Table 3).

Table 1 Result codes of initial mammogram for all patients triaged to "image first" clinic and for those suitable for breast cancer screening (aged 50–64)

	Total image first patients $N = 1688$	Patients aged 50–64 $N = 345$
R1	0	0
R2	1453(86.10%)	279(80.9%)
R3	177(10.50%)	50(14.5%)
R4	39(2.3%)	9(2.6%)
R5	18(1.10%)	7(2.0%)

Discussion

Symptomatic breast clinics are a key facet of breast services in Ireland. Approximately two thirds of breast cancers are diagnosed through symptomatic clinics, with the remainder diagnosed in the National Breast Screening Programme [2]. In 2007, breast cancer care in Ireland was centralized to eight designated specialist units, to which all referrals would be subsequently made [3]. Since the introduction of centralized breast services the number of referrals has increased significantly from 23,575 in 2006 to 37,631 in 2010 [1]. Interestingly, the same time frame has seen a reduction in the diagnostic yield from these clinics [1]. Each specialist center now receives over 4000 new referrals per year [1].

To rationalize the triaging of such numbers of referrals a standardized pro forma referral letter has been introduced for general practitioners [4]. Referrals can be categorized as urgent, early or routine [4]. Urgent referrals are directed to the triple assessment clinic and are seen within 2 weeks. A previous study has demonstrated a 91% sensitive in detecting high risk symptomatic referrals [5]. Despite this, a study by Ahmed et al., which compared the GPs requested referral category to a breast surgeon's category assignment based on the information in the referral letter, found a poor overall correlation [6].

In our unit, patients over the age of 35 years who are referred as routine are assigned to an "image-first" category. These include women with non-blood-stained nipple discharge, asymmetrical nodularity or breast pain [7, 8]. All patients receive a mammogram prior to a clinical assessment by a physician. A key performance indicator for the National Cancer Control Program is that over 90% of patients will have breast imaging in symptomatic clinics [3]. As such,

Table 2 Proportion of patients who proceeded to biopsy and biopsy result codes for all "image first" patients and for the 50–64 age group

	Total "image first" patients $N = 1688$	Patients aged 50–64 $N = 345$
Proportion of patients who underwent biopsy	185(11%)	50(14.5%)
B1	9(4.90%)	3(6%)
B2	90(48.60%)	21(42%)
B3	12(6.50%)	3(6%)
B4	2(1.10%)	1(2%)
B5	72(38.9%)	21(425)

performing imaging before clinical review does not place extra pressure and cost on radiology services.

These "image first" clinics recognize the superior role imaging currently plays in breast disease compared to clinical examination. Physical examination compares poorly to imaging modalities with a sensitivity reported between 28 and 54%, although specificity is high at 98.8% [7, 8]. Conversely, mammography had a sensitivity of 77.6% and US of 75.3% [7]. However, when ultrasound and mammography are used in conjunction, sensitivity increases appreciably to 97% [7].

Prior to this, a patient would have first been seen in the clinic and referred for mammogram. This often necessitated a second clinic visit to disclose the results of these investigation. In this review, 55% ($n = 233$) of patients who underwent additional imaging were recalled directly from the radiology department. These patients had additional mammographic views and/or ultrasound of an area of suspicion before being seen in clinic. Therefore, these "image-first" patients are thus imaged in a timely manner with a reduction in the number of clinic visits required, which we believe is a cost effective alteration to our service [9]. A substantial majority of litigation relating to breast disease related to delayed diagnosis. We feel that the "image first" clinic, by managing patients in a more timely manner, could have positive medico-legal implications.

This retrospective analysis found that out of the 1688 symptomatic routine referrals who were triaged to the image first clinic, 65 patients (3.9%) were diagnosed with breast cancer. A total number of 185 patients (11%) underwent a radiological biopsy and 10 patients (0.6%) underwent a surgical biopsy. Of the total number of women assigned to the "image-first" group, 345 (20.4%) were in the age group eligible for breast screening (ages 50–64). In this specific age group, 20 patients (5.8%) were diagnosed with breast cancer.

Table 3 Proportion of patients who required additional investigations, who proceeded to biopsy and cancer detection rate in "image first" clinic and screening population

	Total image first patients $N = 1688$	Patients aged 50–64 $N = 345$	Screening cohort $N = 42{,}099$
Additional imaging	424(25.1%)	90(26%)	1429(3.39%)
Biopsy	185(11%)	50(14.5%)	496(1.8%)
Cancer diagnosed	65(3.9%)	20(5.8%)	267(0.63%)

During the same study period 42,099 women underwent screening mammography in the Merrion Unit as part of the National Breast Screening Programme with a breast cancer detection rate of 0.63%. This demonstrates that referral, even non-urgent referrals, to a symptomatic breast clinic have a higher rate of cancer detection than the national screening programme. This is concordant with previously published literature that demonstrates cancer detection rates based on diagnostic mammograms are up to 11 times greater than a screening population [10]. It has also been shown that cancers detected from diagnostic mammography have less favorable tumor characteristics such as increased size, nodal involvement, increased stage at diagnosis and negative hormone receptor status [10–13]. Screen detected cancers have also been found to be associated with improved 10-year survival compared to symptomatic cases, after adjustment for lead time bias [14]. This highlights the importance of managing symptomatic referrals in a timely manner.

We feel that other national symptomatic breast cancer centers could benefit from "image first" clinics. However, these symptomatic patients are not comparable to a screening population of patients [10–13]; therefore, implications for general population breast cancer screening cannot be derived from this study.

Conclusion

Breast specialist units in Ireland are experiencing increased volumes of referrals. This study demonstrates a novel triaging system to streamline our limited resources. We have shown that the implementation of these "image-first" clinics have a high rate of cancer detection when compared to an asymptomatic cohort of women. We believe that "image-first" clinics are a valuable tool in improving overall service efficiency and patient care. Implementation of "image-first" clinics in other national symptomatic breast cancer centers would ensure suitable patients are assessed within the 12-week guideline.

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