



Original article

The radiological features, diagnosis and management of screen-detected lobular neoplasia of the breast: Findings from the Sloane Project



Anthony J. Maxwell^{a, b, *}, Karen Clements^c, David J. Dodwell^d, Andrew J. Evans^e, Adele Francis^f, Monuwar Hussain^c, Julie Morris^{g, h}, Sarah E. Pinderⁱ, Elinor J. Sawyerⁱ, Jeremy Thomas^j, Alastair Thompson^k, On behalf of the Sloane Project Steering Group

^a Nightingale Centre and Genesis Prevention Centre, University Hospital of South Manchester, M23 9LT, UK

^b Centre for Imaging Sciences, Institute of Population Health, University of Manchester, M13 9PT, UK

^c Screening Quality Assurance Service West Midlands, Public Health England, 1st Floor, 5 St Philip's Place, Birmingham B3 2PW, UK

^d Institute of Oncology, Level 4 – Bexley Wing, St James's University Hospital, Beckett Street, Leeds LS9 7TF, UK

^e Centre for Oncology and Molecular Medicine, Division of Medical Sciences, University of Dundee, Level 6, Ninewells Hospital, Dundee DD1 9SY, UK

^f Department of Breast Surgery, Nuffield House, Queen Elizabeth Hospital, Edgbaston, Birmingham B15 2TH, UK

^g Department of Medical Statistics, Education and Research Centre, University Hospital of South Manchester, M23 9LT, UK

^h Centre for Biostatistics, Institute of Population Health, University of Manchester, M13 9PT, UK

ⁱ Research Oncology, Guy's Hospital, King's College, London SE1 9RT, UK

^j Department of Pathology, Western General Hospital, Crewe Road South, Edinburgh EH4 2XU, UK

^k Department of Breast Surgical Oncology, University of Texas MD Anderson Cancer Center, 1400 Pressler Street, Houston, TX 77030, USA

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ABSTRACT

Objectives: To investigate the radiological features, diagnosis and management of screen-detected lobular neoplasia (LN) of the breast.

Materials and methods: 392 women with pure LN alone were identified within the prospective UK cohort study of screen-detected non-invasive breast neoplasia (the Sloane Project). Demography, radiological features and diagnostic and therapeutic procedures were analysed.

Results: Non-pleomorphic LN (369/392) was most frequently diagnosed among women aged 50–54 and in 53.5% was at the first screen. It occurred most commonly on the left (58.0%; $p = 0.003$), in the upper outer quadrant and confined to one site (single quadrant or retroareolar region). No bilateral cases were found. The predominant radiological feature was microcalcification (most commonly granular) which increased in frequency with increasing breast density. Casting microcalcification as a predominant feature had a significantly higher lesion size compared to granular and punctate patterns ($p = 0.034$). 326/369 (88.3%) women underwent surgery, including 17 who underwent >1 operation, six who had mastectomy and six who had axillary surgery. Two patients had radiotherapy and 15 had endocrine treatment.

Pleomorphic lobular carcinoma in situ (23/392) presented as granular microcalcification in 12; four women had mastectomy and six had radiotherapy.

Conclusion: Screen-detected LN occurs in relatively young women and is predominantly non-pleomorphic and unilateral. It is typically associated with granular or punctate microcalcification in the left upper outer quadrant. Management, including surgical resection, is highly variable and requires evidence-based guideline development.

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Introduction

The widespread use of percutaneous needle biopsy in the investigation of subtle breast abnormalities found at screening

* Corresponding author. Nightingale Centre and Genesis Prevention Centre, University Hospital of South Manchester, M23 9LT, UK.

E-mail address: anthony.maxwell@manchester.ac.uk (A.J. Maxwell).

mammography has led to increasing numbers of women being diagnosed with atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS) over the last three decades [1–3]. These two conditions are closely related and vary histologically only by the extent to which the characteristic abnormal epithelial proliferation fills the breast acini. They are often grouped together under the term lobular neoplasia (LN), for example in the WHO classification [4], although the term lobular intraepithelial neoplasia has also been advocated [5]. The radiological features of LN are poorly documented and there is no clear consensus on how women with LN should be managed. This paper describes the imaging and pathology findings and surgical management in 392 women with LN without other breast neoplasia diagnosed through the UK National Health Service Breast Screening Programme (NHSBSP).

Methods

The Sloane Project is a prospective United Kingdom national cohort of non-invasive breast cancer and atypias diagnosed through breast screening accrued between April 2003 and May 2013, and includes women with ductal carcinoma in situ (DCIS), atypical ductal hyperplasia (ADH) and LN. All UK breast screening units were invited to participate. Details of the radiology, histopathology, and (when undertaken) surgery and radiotherapy for each enrolled woman were submitted to the West Midlands Cancer Intelligence Unit (now the Screening Quality Assurance Service West Midlands, part of Public Health England) by screening units on discipline-specific proformas (available at www.sloaneproject.org.uk).

The database was searched on 11 November 2013 for women with a final diagnosis of pure LN, i.e. without associated DCIS, ADH or invasive breast cancer. Patients with LN on needle biopsy but not at surgery were included. Women in whom ADH or DCIS was initially diagnosed on needle biopsy but pure LN without ADH/DCIS was found at open biopsy were also included. Women with both LN and ADH/DCIS on needle biopsy but who did not undergo surgery were excluded.

There was no specific question on the histopathology data form to distinguish ALH, LCIS or pleomorphic LCIS (PLCIS); women with PLCIS were identified from free text or from the accompanying histopathology report. In addition, the original pathology reports were obtained for those women in whom the pathological findings were unclear from the forms or where the possibility of pleomorphic LCIS was suspected from the management details supplied.

Data analysed included year of diagnosis, age at diagnosis, lesion side and site(s) (upper outer quadrant, upper inner quadrant, lower outer quadrant, lower inner quadrant and/or retroareolar), background mammographic parenchymal pattern (using the American College of Radiology BI-RADS scale [6]), the predominant radiological feature (microcalcification, parenchymal distortion, well-defined mass, ill-defined mass or other) and the presence and pattern (casting, granular or punctate) of microcalcification. The bidimensional lesion size was recorded on the radiology form for each of the two standard mammographic views (mediolateral oblique and craniocaudal), and the maximum recorded size for each lesion was used for the purposes of this study. Diagnostic and therapeutic procedures were recorded from the pathology, treatment and radiotherapy forms, including details of needle biopsies and surgery to the breast and axilla, adjuvant radiotherapy and adjuvant drug treatment.

Results

At the time of the database search, 12,867 women were registered with the Sloane Project, with complete radiology, pathology

and treatment information available for 10,128. Of these, 392 women had pure LN which had been diagnosed as the result of a screening mammogram taken between 4 April 2003 and 22 May 2013. These patients were diagnosed in 43 screening units. The highest annual registrations of women meeting the study criteria occurred in 2009 (59 patients) and 2005 (48 patients). Only data from 54 patients from 2011–13 were available due to delays in receiving the full set of data forms for other eligible patients by the census date. The main analysis refers to the 369 women with non-pleomorphic LN; the LN was known to be PLCIS in a further 23 patients, and these are considered separately.

Non-pleomorphic lobular neoplasia

Age and screening round

The women ranged from 47 to 78 years of age, with a median of 53 (Fig. 1). Of the 329 with a known screening history, 176 (53.5%) were diagnosed at the first (prevalent) screen.

Lesion side and site

No women with bilateral LN were identified. One woman had contralateral synchronous screen-detected DCIS. The lesions were more commonly found in the left breast (in 214/369 women, 58.0%) than the right ($p = 0.003$, one-sample chi square test). Lesions were predominantly in the upper outer quadrant (Table 1), recorded at one site only (one of the four quadrants or the retroareolar area) in 355 women and at two sites in 14 women. The site was not stated for 4 women.

Breast density

Density information was available for 364 of the 369 women (Table 2), recorded as BI-RADS category 1 (equivalent to the new category A) in 9.1%, category 2 (B) in 48.4%, category 3 (C) in 36.8% and category 4 (D) in 5.8%. Comparison with 9293 women with DCIS accrued by the Sloane Project over the same period shows that a greater proportion of women with DCIS had breast density in category 1 (A) (chi-square test; $p < 0.001$).

Radiological features

The predominant radiological feature was microcalcification in 248 women (Table 2) while stromal deformity or a mass were the predominant feature in 110 patients. The relative frequency of microcalcification as the predominant lesion type increased progressively with increasing breast density, from 16/33 (48.5%) in those with fatty breasts to 17/21 (81.0%) in those with dense breasts ($p = 0.005$; chi-square test for trend). Of the women with an identified pattern of microcalcification as the predominant lesion type, granular calcification was the most common (127/243 – 52.3%), followed by punctate calcification (96/243 – 39.5%).

A further 36 women had microcalcification as a secondary radiological feature, most frequently seen in association with an ill-defined mass (10/24 cases; 41.7%) or parenchymal deformity (19/56 cases; 33.9%) and was punctate in 28 (77.8%) women.

Table 3 shows the distribution of microcalcification patterns in those with microcalcification as predominant and secondary radiological features, together with the median size and range in those women with microcalcification as the predominant finding. Casting microcalcification as a predominant feature had a significantly higher lesion size (Kruskal–Wallis test; $p = 0.034$), compared to granular and punctate patterns.

Non-operative diagnosis

Data on non-operative diagnosis were cross-checked with the NHS Breast Screening Programme/Association of Breast Surgery

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