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Original Research

## Management and 5-year outcomes in 9938 women with screen-detected ductal carcinoma in situ: the UK Sloane Project



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**KEYWORDS**

Ductal carcinoma in situ;  
Radiotherapy;  
Margins;  
Recurrence

**Abstract Background:** Management of screen-detected ductal carcinoma in situ (DCIS) remains controversial.

**Methods:** A prospective cohort of patients with DCIS diagnosed through the UK National Health Service Breast Screening Programme (1st April 2003 to 31st March 2012) was linked to national databases and case note review to analyse patterns of care, recurrence and mortality.

**Results:** Screen-detected DCIS in 9938 women, with mean age of 60 years (range 46–87), was treated by mastectomy (2931) or breast conserving surgery (BCS) (7007; 70%). At 64 months median follow-up, 697 (6.8%) had further DCIS or invasive breast cancer after BCS (7.8%) or mastectomy (4.5%) ( $p < 0.001$ ). Breast radiotherapy (RT) after BCS (4363/7007; 62.3%) was associated with a 3.1% absolute reduction in ipsilateral recurrent DCIS or invasive breast cancer (no RT: 7.2% versus RT: 4.1% [ $p < 0.001$ ]) and a 1.9% absolute reduction for ipsilateral invasive breast recurrence (no RT: 3.8% versus RT: 1.9% [ $p < 0.001$ ]), independent of the excision margin width or size of DCIS. Women without RT after BCS had more ipsilateral breast recurrences ( $p < 0.001$ ) when the radial excision margin was  $< 2$  mm. Adjuvant endocrine therapy (1208/9938; 12%) was associated with a reduction in any ipsilateral recurrence, whether RT was received (hazard ratio [HR] 0.57; 95% confidence interval [CI] 0.41–0.80) or not (HR 0.68; 95% CI 0.51–0.91) after BCS. Women who developed invasive breast recurrence had a worse survival than those with recurrent DCIS ( $p < 0.001$ ). Among 321 (3.2%) who died, only 46 deaths were attributed to invasive breast cancer.

**Conclusion:** Recurrent DCIS or invasive cancer is uncommon after screen-detected DCIS. Both RT and endocrine therapy were associated with a reduction in further events but not with breast cancer mortality within 5 years of diagnosis. Further research to identify biomarkers of recurrence risk, particularly as invasive disease, is indicated.

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## 1. Introduction

Although described more than 80 years ago [1] ductal carcinoma in situ (DCIS) became a common management problem after the introduction of breast screening and now comprises 20–25% of screen-detected breast cancer. Similar to invasive breast cancer, DCIS is heterogeneous in terms of underlying biology, presentation and outcome [2]. The clinical behaviour of DCIS is unpredictable, challenging clinical decision-making. Recently, concern regarding the overtreatment of DCIS [2] has been fuelled by large retrospective American series demonstrating excellent ( $> 95\%$ ) long-term survival 10–20 years after diagnosis although others have suggested that detection and treatment of screen-detected DCIS may prevent subsequent invasive disease [3–5].

Standard treatment for DCIS includes mastectomy or breast-conserving surgery (BCS), with or without radiotherapy (RT) and/or endocrine therapy to decrease ipsilateral recurrence and/or contralateral breast carcinoma [6–8]. It remains unclear which patients benefit from these adjuvant therapies. Prospective data are lacking, and the clinical significance of early detection and treatment for DCIS remains unclear. Here, we report the first analysis of recurrence and mortality from a prospective cohort study of DCIS detected through a contemporary national screening programme. Using diagnostic imaging, surgery, histopathology and

adjuvant therapy data provided by the local breast screening unit where diagnosis was reached, along with longitudinal follow-up of patients through case note review and linkage to national databases, we describe the features and outcomes after diagnosis of screen-detected DCIS.

## 2. Methods

The United Kingdom National Health Service (NHS) Breast Screening Programme (NHSBSP) invites women aged 50–70 years to attend breast screening every 3 years (Supplementary Figure and text p2). The Sloane Project was established in memory of Professor John Sloane, a breast pathologist, to audit the features, patterns of care and outcomes for women with non-invasive neoplasia detected within the NHSBSP. Data capture was via radiology, pathology, surgery and radiotherapy (RT) paper proformas collected at screening unit level, sent to Public Health England, then each patient's data entered on a secure database held on an SQL server that generated an individual patient and tumour identifier. The data reported here are for women in the dataset who had DCIS identified. For the 34 women with bilateral DCIS, the higher grade and/or larger lesion was considered the index.

Data included demographic, diagnostic, treatment and vital status. Adherence to NHSBSP guidelines and participation in the relevant quality assurance

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