PREDICTORS OF AXILLARY LYMPH NODE INVOLVEMENT IN SCREEN-DETECTED BREAST CANCER

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ABSTRACT

Background: Axillary lymph node dissection as routine part of breast cancer treatment has been questioned in relation to the balance between benefits and morbidity. The purpose of this study is to determine the association of tumor size, age and histological grade with axillary lymph node metastasis, to determine if some patients could be exempted from axillary dissection.

Methods: The data are derived from BreastScreen NSW, the government sponsored population-based breast screening program. In New South Wales (NSW) Australia between 1995 and 2002, 7,221 patients with invasive breast carcinoma were diagnosed and 5,290 patients were eligible for this study. The relationship between incidence of positive axillary lymph nodes and three study factors (tumor size, age and histological grade) was investigated by univariate and multivariate analysis. Logistic regression models were used to predict probability of axillary metastases.

Results: The incidence of axillary lymph node metastases was 28.6% (95% CI: 27.4%-29.8%). Univariate analysis showed that age, tumor size and histological grade were significant predictors of axillary lymph node metastases ($p<0.0001$). Multivariate analysis identified age, tumor size and histological grade remained as independent predictors ($p<0.0001$). From multivariate analysis, patients with T1a ($\leq$ 5mm) and grade I tumors regardless of age had 5.2% (95% CI: 1.2%- 9.3%) frequency of node metastases. Patients 70 years or older with grade I, T1a and T1b (6-10mm) tumors had 4.9% (95% CI: 3.2%- 7.5%) and 6.6% (95% CI: 5.3%-8.3%) predicted frequency of node metastases.

Conclusions: Tumor size, age and histological grade are predictors of axillary lymph node metastases. Routine axillary lymph node dissection could be avoided in some patient groups with a low frequency of involved lymph nodes if the benefits are considered to exceed the risks.

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AUTHOR'S CONTRIBUTION

This project utilised data collected through the "BreastScreen NSW" program at the NSW Breast Cancer Institute.

Professor Richard Taylor from the Department of Public Health and Community Medicine, University of Sydney initiated the topic of the treatise.

The author's contributions to this treatise included:

- Literature review
- Statistical data analysis
- Interpretation of results
- Writing of the treatise

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ABBREVIATIONS

ALND	Axillary lymph node dissection
SLN	Sentinel lymph node
ALNM	Axillary lymph node metastasis
SLNB	Sentinel lymph node biopsy
CI	Confidence interval
p	Probability

INTRODUCTION

Breast cancer is the leading contributor to cancer incidence and is the most common cause of cancer-related death among females in Australia. A total of 11,314 new cases and 2,521 deaths were registered for 2000.[1]

Axillary lymph node status is an important prognostic indicator for predicting survival and guiding adjuvant therapy in breast cancer patients. Axillary lymph node dissection (ALND) is considered the standard of care in patients with invasive breast cancer[2,3,4] and axillary dissection and histological examination is still the most accurate way for assessment of axillary status.

An important purpose of surgical removal of axillary lymph nodes is to provide prognostic information and guide effect adjuvant systemic therapy. Due to increasing recommendations of adjuvant therapy for node-negative patients with primary tumors larger than 10mm, the routine axillary dissection for staging purposes may not be required. Clinical analysis has proved that information from ALND did not alter management of women $\geq$ 70 years old, unless they were classified as high risk[5]. Sentinel lymph node biopsy (SLND) was introduced in 1991, and is used as an alternative to complete axillary lymph node dissection in all patients with breast cancer in some centres.

As for treatment, it has been shown that although axillary dissection reduces the incidence of tumor recurrence in axillary lymph nodes, it does not improve survival[6,7]. Some studies have suggested routine axillary lymph node dissection can be avoided in patients with pure tubular carcinomas measuring $\leq$ 1 cm due to a low frequency of axillary lymph node metastases (ALNM)[8,9].

The complications of ALND include lymphoedema, paraesthesia, pain and weakness of upper extremity that reduce in the quality of life[10-12]. With the increase in population-based screening, diagnosis of breast cancer at earlier stages has increased[2]. Most of

patients detected by screening have small tumor size without ALNM[13,14]. ALND may be unnecessary for some of them.

The purpose of this study is to analyze the relationship between incidence of axillary lymph node involvement and three study factors (age, tumor size and histological grade) and establish a model to identify subgroups that have low risk of ALNM and could avoid axillary dissection. The low risk is considered as frequency less than 10% axillary metastases[14,15].