

Long-term outcomes following level three axillary lymph node dissection for breast cancer

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ABSTRACT

Introduction

Axillary lymph node dissection (ALND) for node positive breast cancer traditionally includes levels I and II. Data remains limited regarding outcomes following level III ALND for patients with level III nodal metastasis. We sought to assess the oncologic outcomes of patients with breast cancer undergoing level III ALND.

Methods

We performed a retrospective cohort study including all patients undergoing level III ALND from 2004-2014 at a tertiary care cancer centre. Diagnosis of malignant level III lymph nodes (LNs) was made either pre-operatively (clinical exam and imaging) or intra-operatively (surgeon assessment). Primary outcomes were overall and recurrence-free survival (OS, RFS) and time to recurrence (TTR). Kaplan-Meier methods were used to compute survival curves.

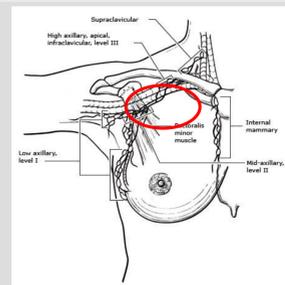
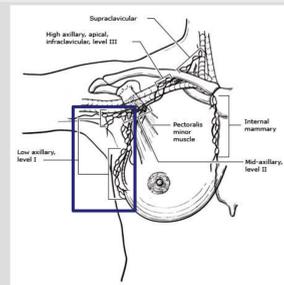
Results

Of 21 patients undergoing level III ALND, 18 had a mastectomy and 3 a lumpectomy. Additional treatment included chemotherapy in all patients, radiation in 16, and hormonal therapy in 13. Of the 13 (61.9%) patients diagnosed pre-operatively who received neoadjuvant treatment (NAT), 3 demonstrated complete pathologic response, 6 had residual level III LN disease, and 4 had disease limited to levels I and II. Among 8 patients diagnosed intra-operatively, all had metastatic disease in level III LNs. At 34-month median follow-up, actuarial 5-year OS was 67.5% (95%CI: 55.0-80.0%) and 5-year DFS was 50.8% (95%CI: 34.5-60.3%). At last follow-up, 13 (66.7%) patients were alive, including 2 (9.5%) with disease and 11 (52.4%) without disease. There were no isolated local recurrences and 9 (42.9%) patients developed distant recurrences. Median TTR was 5 months (1-36 months). Fewer NAT patients recurred (31% vs. 62%).

Conclusion

Level III ALND dissection provides good local control and breast cancer patients with level III nodal disease can achieve long-term survival. Among patients undergoing level III ALND actuarial 5 year survival was 67.5%, with the majority of patients alive without disease at last follow-up. Intra-operative identification of malignant level III LNs was accurate

BACKGROUND



Level I and II axillary lymph nodes

Level III axillary lymph nodes

Axillary level III lymph nodes: nodal tissue **medial** to the **main insertion of pectoralis minor on the coracoid process**

5 year overall survival with level I and II involvement: 50-85%
5 year overall survival with supraclavicular node involvement: 20 %
Limited data on survival with level III axillary nodal disease

OBJECTIVES

Primary outcomes:

Overall Survival (OS)

Defined as from date of surgery to date of death

Disease-free survival (DFS)

Defined as from date of surgery to date of recurrence or distant metastases

Documented radiographically or biopsy-proven if local recurrence

Secondary objectives:

To evaluate the adequacy of intra-operative assessment of level III axillary lymph node metastases (AT)

Level III axillary lymph node involvement on surgical pathology

To evaluate level III axillary node response to neoadjuvant therapy (NAT)

Level III lymph node involvement on surgical pathology

METHODS

Retrospective cohort study

Single institution

Tertiary care academic cancer centre

Population

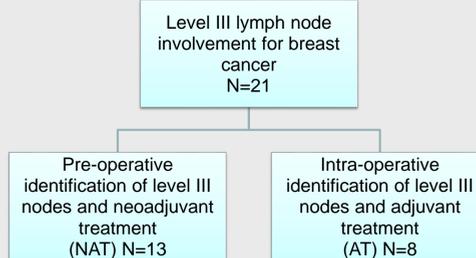
Institutional prospective breast cancer database
Level III ALND for breast cancer
2004 to 2014

Primary chart review

Demographics
Clinicopathologic variables

Analysis

Descriptive analysis of cohort characteristics
Survival analysis using Kaplan-Meier methods



Two distinct groups identified

Neoadjuvant treatment followed by surgery group (NAT)
Surgery followed by adjuvant treatment group (AT)

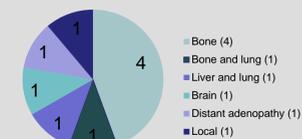
RESULTS

Demographics	All n (%)	NAT n (%)	AT n (%)
Number of patients	21	13	8
Year of diagnosis			
2004-2006	4 (19.0)	0 (0.0)	4 (50.0)
2007-2009	8 (38.0)	5 (38.5)	3 (37.5)
2010-2012	4 (19.0)	4 (30.8)	0 (0.0)
≥2013	5 (24.0)	4 (30.8)	1 (12.5)
Age (years)			
≤ 40	3 (14.3)	3 (23.1)	0 (0.0)
41-50	6 (28.6)	4 (30.8)	2 (25.0)
51-60	7 (33.3)	4 (30.8)	3 (37.5)
61-70	4 (19.0)	2 (15.4)	2 (25.0)
≥ 71	1 (4.8)	0 (0.0)	1 (12.5)

Pathologic characteristics	All n (%)	NAT n (%)	AT n (%)
Number of patients	21	13	8
Tumour grade			
Grade 1	0 (0.0)	0 (0.0)	0 (0.0)
Grade 2	8 (38.1)	5 (38.5)	3 (37.5)
Grade 3	12 (57.1)	7 (53.8)	5 (62.5)
Unknown	1 (4.8)	1 (7.7)	0 (0.0)
Tumour subtype			
IDC	18 (85.7)	11 (84.6)	7 (87.5)
Mixed	3 (14.3)	2 (15.4)	1 (12.5)
Lymphovascular invasion	16 (76.2)	10 (76.9)	6 (75.0)
Extranodal extension	13 (61.5)	5 (38.5)	8 (100.0)
HR positive	15 (83.3)	9 (69.2)	6 (75.0)
HER2neu positive	3 (14.3)	2 (15.4)	1 (12.5)
Receptor status			
Triple positive	2 (9.5)	1 (7.7)	1 (12.5)
Triple negative	3 (14.3)	2 (15.4)	1 (12.5)

Treatment	All n (%)	NAT n (%)	AT n (%)
Number of patients	21	13	8
Surgery			
Total mastectomy	18 (85.7)	12 (92.3)	6 (75.0)
Breast-conserving surgery	3 (14.3)	1 (7.7)	2 (25.0)
Chemotherapy			
Pre-operative	12 (57.1)	12 (92.3)	0 (0.0)
Post-operative	9 (42.9)	1 (7.7)	8 (100.0)
Hormonal therapy			
Pre-operative	1 (4.8)	0 (0.0)	1 (12.5)
Post-operative	8 (38.1)	5 (38.5)	3 (37.5)
Both	5 (23.8)	4 (30.8)	1 (12.5)
None	7 (33.3)	4 (30.8)	3 (37.5)
Radiation therapy			
Pre-operative	3 (14.3)	3 (23.1)	0 (0.0)
Post-operative	14 (66.7)	9 (69.2)	5 (62.5)
None	4 (19.0)	1 (7.7)	3 (37.5)

Site of Initial Recurrence



Current status of patients

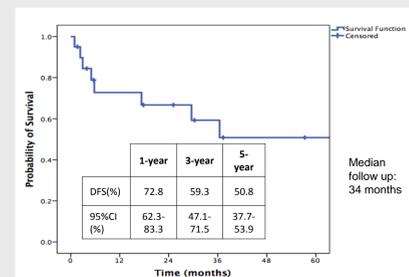
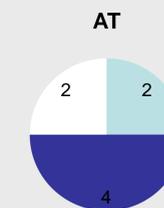
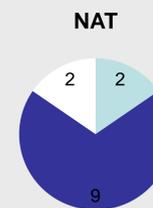
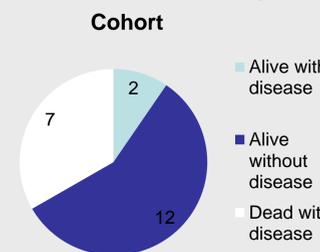


Figure 1. Kaplan-Meier curve: overall survival

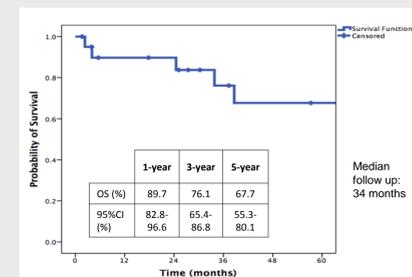


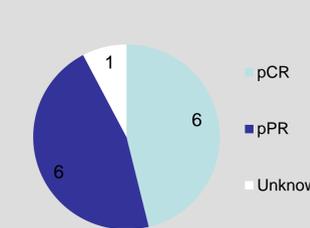
Figure 2. Kaplan-Meier curve: disease-free survival

DISCUSSION

Nodal Analysis

	All n (%)	NAT n (%)	AT n (%)
Number of patients	21	13	8
Number of harvested lymph nodes n (range)	29 (13-46)	27 (13-46)	28 (14-42)
Number of harvested level III lymph nodes n (range)	7.5 (3-14)	8 (3-13)	7 (4-14)
Number of positive lymph nodes n (range)	10 (0-39)	4 (0-32)	15 (9-39)
Positive level I and/or II nodes	18 (85.7)	10 (76.9)	8 (100.0)
Positive level III nodes	14 (66.7)	6 (46.1)	8 (100.0)

Level III nodal response to neoadjuvant therapy



Partial pathologic response

n=6
•Median number of level III nodes harvested = 9
•Median number of level III nodes with disease = 4

Complete pathologic response

n=6
•Median number of level III nodes harvested = 6
•All negative for disease
•Changes consistent with reaction to chemotherapy present in 2; no description in remaining 4 patients

CONCLUSIONS

Patients with breast cancer and level III axillary lymph node involvement at presentation can achieve long-term survival
5-year OS of cohort: 67 %
5-year DFS of cohort: 50.8%

Few local recurrences

Complete axillary clearance provides good local control
Following NAT, almost half (46.1%) of patients had pathologically positive level III lymph nodes

Intra-operative identification of malignant level III axillary lymph nodes appears accurate
All AT patients had pathologically positive level III axillary lymph nodes

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Kodama, H., Nio, Y., Iguchi, C., & Kan, N. (2006). Ten-year follow-up results of a randomised controlled study comparing level-I vs level-III axillary lymph node dissection for primary breast cancer. *The British Journal of Cancer*, 95(7), 811-6. doi:http://dx.doi.org/10.1038/sj.bjc.6603364