Preoperative axillary staging

Sehwan Han
Breast Cancer Center
Inje University Sanggye Paik Hospital, Seoul

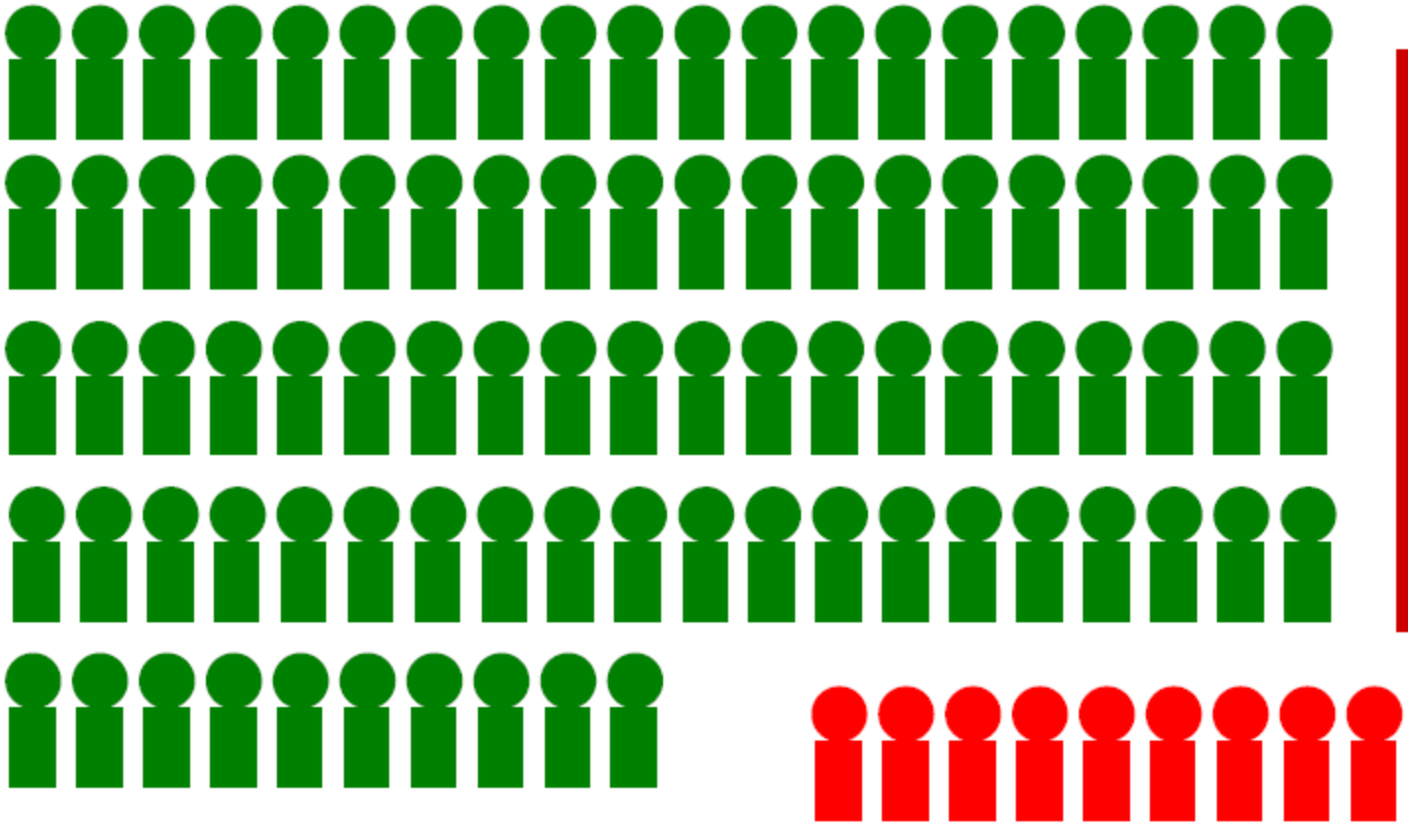
Why we have to stage ALN?

- one of the most important prognostic indicators in breast cancer
- particular value in the choice of adjuvant or neoadjuvant systemic therapy
- Unnecessary axillary surgery can be avoided in patients with uninvolved ALN.

The Problem For Using Chemotherapy

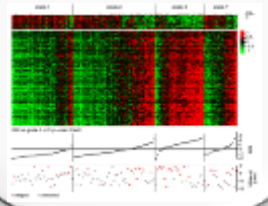
(Most Common Presentation Of Breast Cancer Today: T1 N0 ER+ Grade 2

Need To Treat 100 Women



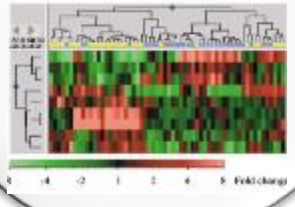
And Only One Benefits !

Genomic Grade



Recurrence Score

70 genes



Other Prognostic Signatures…

High Risk

Relative Endocrine "Resistance"

Relative Chemo "Sensitivity"

Why we have to stage ALN?

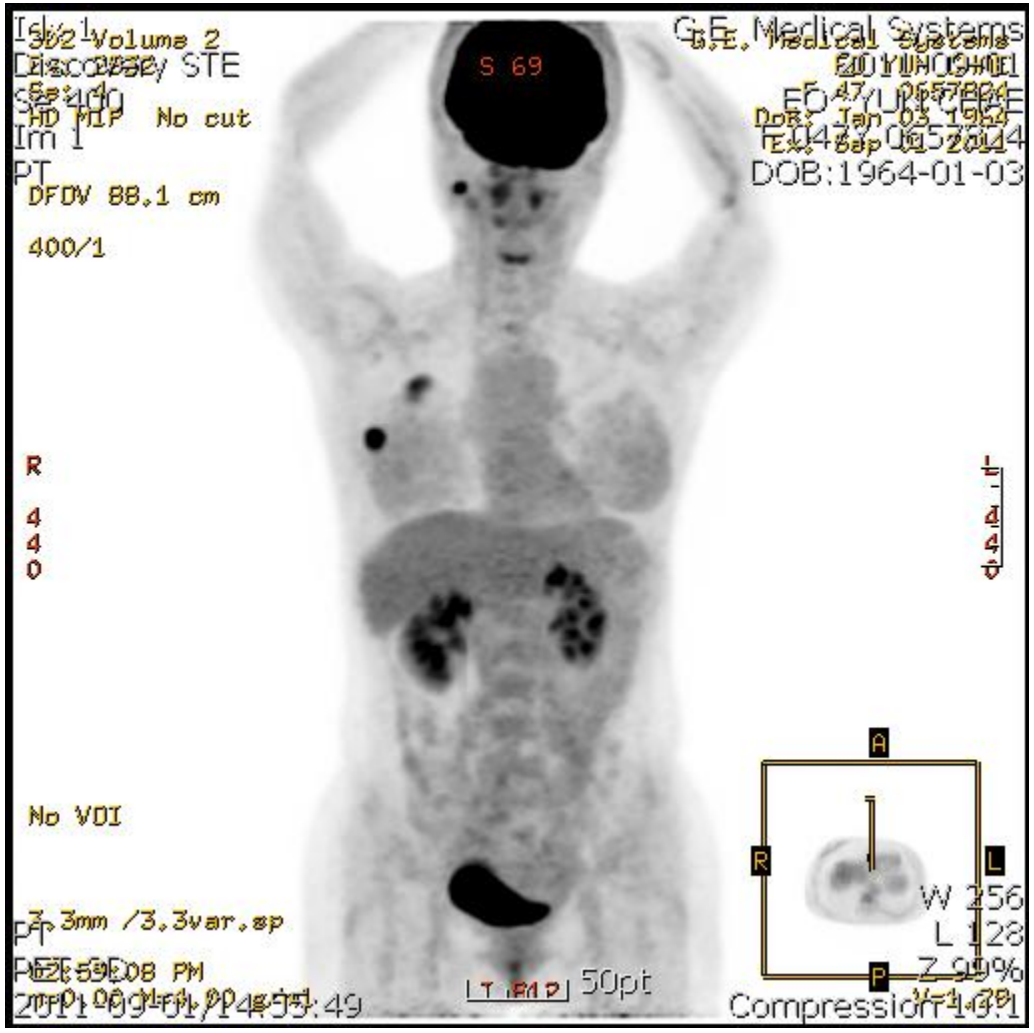
- **Most of risk assessment tools based upon ALN status.**
- **Concept about ALN has been changed;**

  Staging >> Treatment
- **SNB for the patients with clinically uninvolved ALN is widely accepted.**

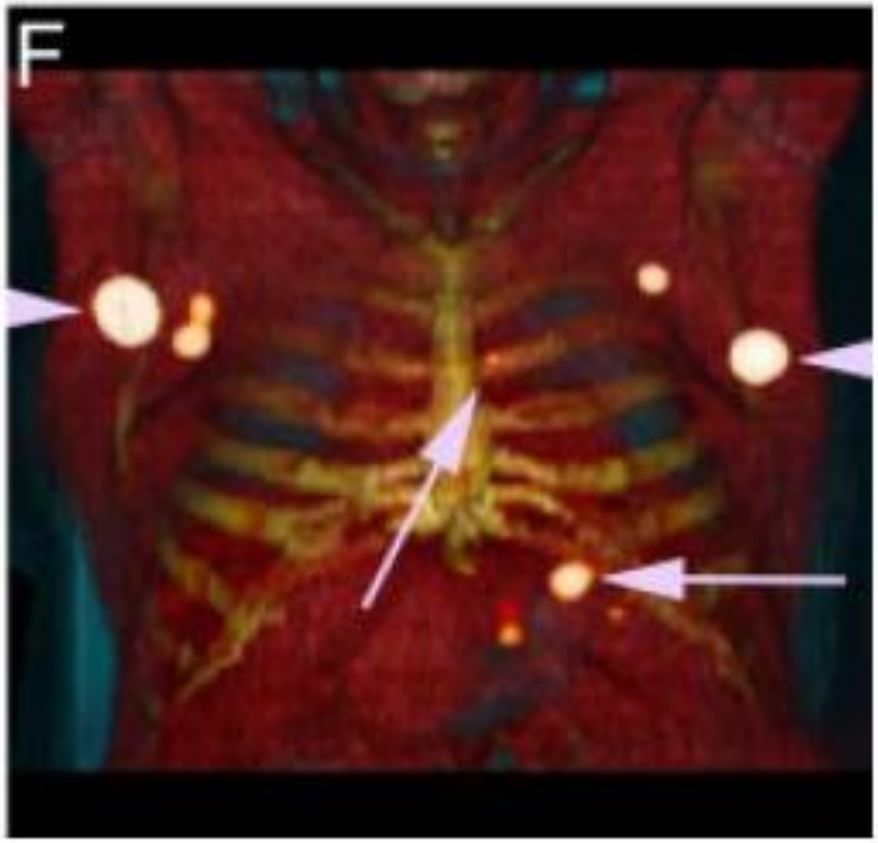
Preoperative staging tools of axilla

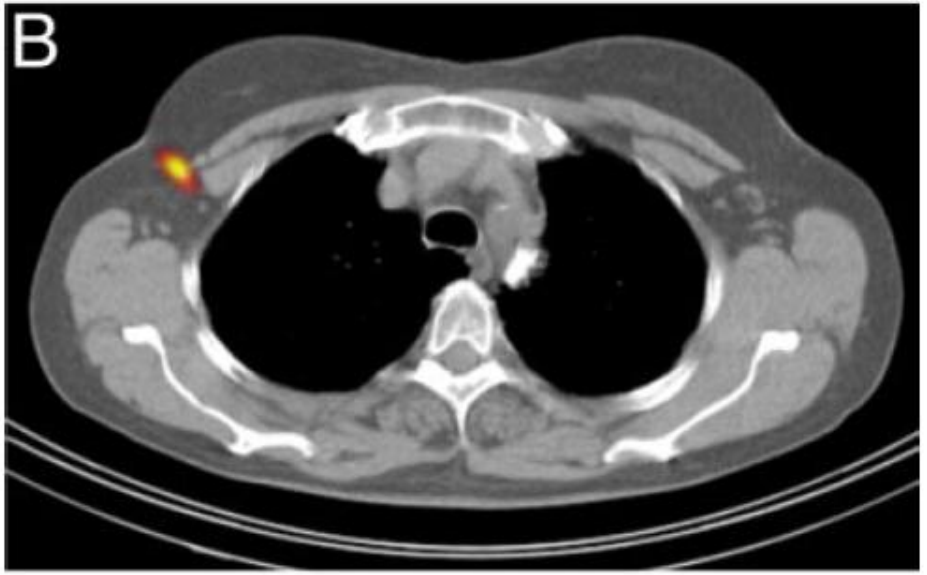
- P/E
- Mammography
- USG
- CT
- MRI
- PET-CT

PET/CT


GE Medical Systems
DOB:1964-01-03
HD MIP No cut
DFOV 88.1 cm
400/1
No VDI
3mm /3.3var.sp
50pt
W 256
L 128
Z 99%
Compression

SPECT/CT





BMC Cancer

BioMed Cent

Research article

Open Acce

Utility of ^{18}F-fluoro-deoxyglucose emission tomography/computed tomography fusion imaging (^{18}F-FDG PET/CT) in combination with ultrasonography for axillary staging in primary breast cancer

Shigeto Ueda[1], Hitoshi Tsuda*[2], Hideki Asakawa[1], Jiro Omata[1], Kazuhiko Fukatsu[3], Nobuo Kondo[4], Tadaharu Kondo[5], Yukihiro Hama[6], Katsumi Tamura[6], Jiro Ishida[6], Yoshiyuki Abe[6] and Hidetaka Mochizuki[1]

Conclusion: The diagnostic accuracy of ^{18}F-FDG PET/CT was shown to be nearly equal to ultrasound, and considering their limited sensitivities, the high radiation exposure by ^{18}F-FDG PET/CT and also costs of the examination, it is likely that AUS will be more cost-effective in detecting massive axillary tumor burden. However, when we cannot judge the axillary staging using AUS alone, metabolic approach of ^{18}F-FDG PET/CT for axillary staging would enable us a much more confident diagnosis.

Preoperative Ultrasound-Guided Needle Biopsy of Axillary Nodes in Invasive Breast Cancer

Meta-Analysis of Its Accuracy and Utility in Staging the Axilla

Nehmat Houssami, MBBS, PhD, Stefano Ciatto, MD,† Robin M. Turner, PhD,* Hiram S. Cody, III, MD,‡ and Petra Macaskill, PhD**

Objective: Systematic evidence synthesis of ultrasound-guided needle biopsy (UNB) of axillary nodes in breast cancer.

Summary Background Data: Women affected by invasive breast cancer undergo initial staging with sentinel node biopsy, generally progressing to axillary node dissection (AND) if metastases are found. *Preoperative* UNB on the use of systemic therapy. Sentinel node biopsy (SNB) is the standard initial surgical approach for staging the axilla in most women; those found to have sentinel node metastases will generally undergo further surgery, a completion axillary node dissection (AND). The past decade has seen the introduction of ultrasound-guided needle biopsy (UNB) in preoperative evaluation of axillary nodes to po-

(*Ann Surg* 2011;254:243–251)

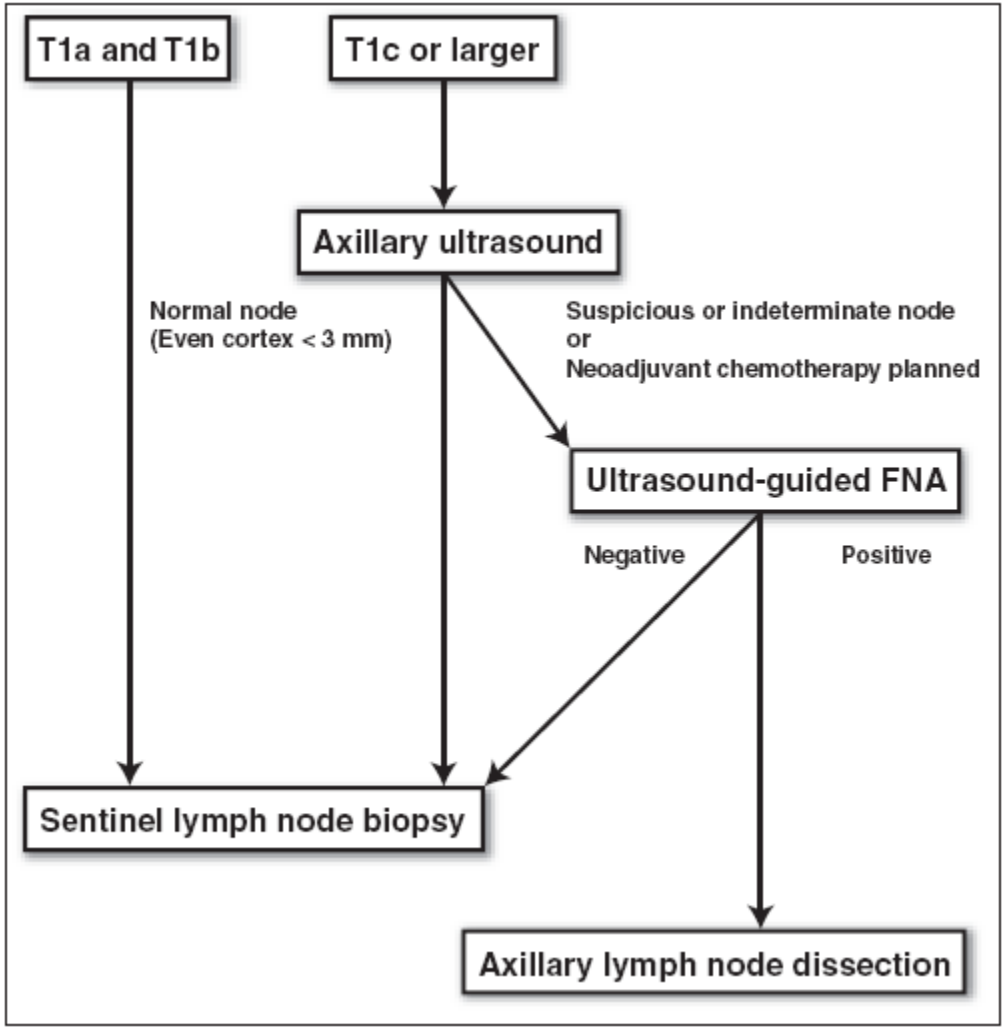
Ultrasound-guided needle biopsy (UNB); meta-analysis

- Thirty-one studies provided 2874 UNB data from 6166 subjects
- median proportion with metastatic nodes 47.2%
- sensitivity 79.6%
- specificity 98.3%
- PPV 97.1%
- median UNB insufficiency was 4.1%.

USB for ALN

- **Conclusions:**
- **Preoperative UNB of the axilla is accurate for initial staging of women with invasive breast cancer.**
- **Useful in neoadjuvant setting**
- **Meta-analysis indicates that UNB provides better *utility in women with average or higher underlying risk of node* metastases.**

USG-based management for ALN



Summary

- **All the staging modalities have comparable accuracy for predicting ALN status.**

Do we need all the modalities for staging axilla?

- **SNB is a standard for ALN staging in early breast cancer.**
- **Cost analysis between staging methods is mandatory.**

Axillary Dissection vs No Axillary Dissection in Women With Invasive Breast Cancer and Sentinel Node Metastasis

A Randomized Clinical Trial

Armando E. Giuliano, MD
Kelly K. Hunt, MD
Karla V. Ballman, PhD
Peter D. Beitsch, MD
Pat W. Whitworth, MD
Peter W. Blumencranz, MD
A. Marilyn Leitch, MD
Sukamal Saha, MD
Linda M. McCall, MS
Moni

Context Sentinel lymph node dissection (SLND) accurately identifies nodal metastasis of early breast cancer, but it is not clear whether further nodal dissection affects survival.

Objective To determine the effects of complete axillary lymph node dissection (ALND) on survival of patients with sentinel lymph node (SLN) metastasis of breast cancer.

Design, Setting, and Patients The American College of Surgeons Oncology Group Z0011 trial, a phase 3 noninferiority trial conducted at 115 sites and enrolling patients from May 1999 to December 2004. Patients were women with clinical T1-T2 invasive breast cancer, no palpable adenopathy, and 1 to 2 SLNs containing metastases identified by frozen section, touch preparation, or hematoxylin-eosin staining on permanent section. Targeted enrollment was 1900 women with final analysis after 500 deaths.

The use of SLND alone did not resulted in inferior survival compared with ALND.

is noninferior to ALND. Disease-free survival was a secondary end point.

Results Clinical and tumor characteristics were similar between 445 patients randomized to ALND and 446 randomized to SLND alone. However, the median number of nodes removed was 17 with ALND and 2 with SLND alone. At a median follow-up of 6.3 years (last follow-up, March 4, 2010), 5-year overall survival was 91.8% (95% confidence interval [CI], 89.1%-94.5%) with ALND and 92.5% (95% CI, 90.0%-95.1%) with SLND alone; 5-year disease-free survival was 82.2% (95% CI, 78.3%-86.3%) with ALND and 83.9% (95% CI, 80.2%-87.9%) with SLND alone. The hazard ratio for treatment-related overall survival was 0.79 (90% CI, 0.56-1.11) without adjustment and 0.87 (90% CI, 0.62-1.23) after adjusting for age and adjuvant therapy.

Conclusion Among patients with limited SLN metastatic breast cancer treated with breast conservation and systemic therapy, the use of SLND alone compared with ALND did not result in inferior survival.

Trial Registration clinicaltrials.gov Identifier: NCT00003855

JAMA. 2011;305(6):569-575 www.jama.com

tecto

metastases and maintains regional control,[2,3] but the contribution of local therapy to breast cancer survival is controversial.[4,5] The Early Breast Cancer Trialists' Collaborative Group synthesized findings from 78 randomized controlled trials, concluding that local control of breast cancer was associated with improved disease-specific survival.[6]

ALND, as a means for achieving local disease control, carries an indisputable and often unacceptable risk of complications such as seroma, infection, and lymphedema.[7-9] Sentinel lymph node dissection (SLND) was therefore devel-

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Design, Setting, and Patients The American College of Surgeons Oncology Group

Changing patterns of practice:

nonperformance of AND in about 20% of SNB–positive patients with macrometastases (*>2 mm) and in more than 40% of SNB–positive patients with* micrometastases (≤2 mm).

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These results do not apply to

- patients undergoing mastectomy
- those undergoing lumpectomy without radiation
- those receiving partial breast irradiation or neoadjuvant therapy
- those who receive radiation that does not cover the axilla.

Another side

- **Loco-regional recurrence is a marker for poor clinical outcome.**

  - one breast cancer death can be avoided if every 4 local recurrences are prevented (EBCCTG, *Lancet*. 2005:366:2087-2106).

- **Certain proportion of breast cancer patients with extensive ALN involvement can be cured by curative ALN dissection and enjoy long-term disease free status.**

Comparable Survival Between pN0 Breast Cancer Patients Undergoing Sentinel Node Biopsy and Extensive Axillary Dissection: A Report From the Korean Breast Cancer Society

Hyeong-Gon Moon, Wonshik Han, and Dong-Young Noh

A B S T R A C T

Purpose
Recent studies showing survival benefit of extensive axillary lymph node dissection (ALND) in pN0 breast cancer have challenged the concept of sentinel node biopsy (SNB). In this study, the survival and recurrence after SNB alone and ALND in pN0 Korean breast cancer patients were investigated.

N=17,672

Patients and Methods
Using information from two large databases, including a Kore sessed survival relative to the extent of ALND in pN0 breast cancer patients. We also compared the survival of pN0 patients who underwent SNB alone with survival in those who underwent varying degrees of ALND.

Results
In an analysis of 1,607 pN0 patients from a single institution, less extensive ALND significantly increased the risks of breast cancer death and systemic recurrence but not of locoregional recurrence. These findings were validated by an analysis of nationwide registry data on 17,672 pN0 patients; patients with > 20 dissected lymph nodes had significantly better overall survival (OS) and breast cancer–specific survival (BCSS) than those with 10 to 20 or < 10 dissected lymph nodes. Patients who underwent SNB alone showed OS (hazard ratio [HR], 1.03; 95% CI, 0.08 to 1.56) and BCSS (HR, 1.15; 95% CI, 0.75 to 1.78) similar to those of patients who underwent extensive ALND (> 20 dissected lymph nodes), despite the small number of lymph nodes removed.

Conclusion
Extensive ALND is associated with better survival and less systemic recurrence than less extensive ALND in patients with pN0 breast cancer. However, SNB alone showed excellent survival results, similar to those of extensive ALND, supporting the long-term oncologic safety of SNB.

J Clin Oncol 28:1692-1699. © 2010 by American Society of Clinical Oncology

Extensive ALND is associated with better survival and less systemic recurrence than less extensive ALND in patients with pN0 breast cancer

–KBCS reports

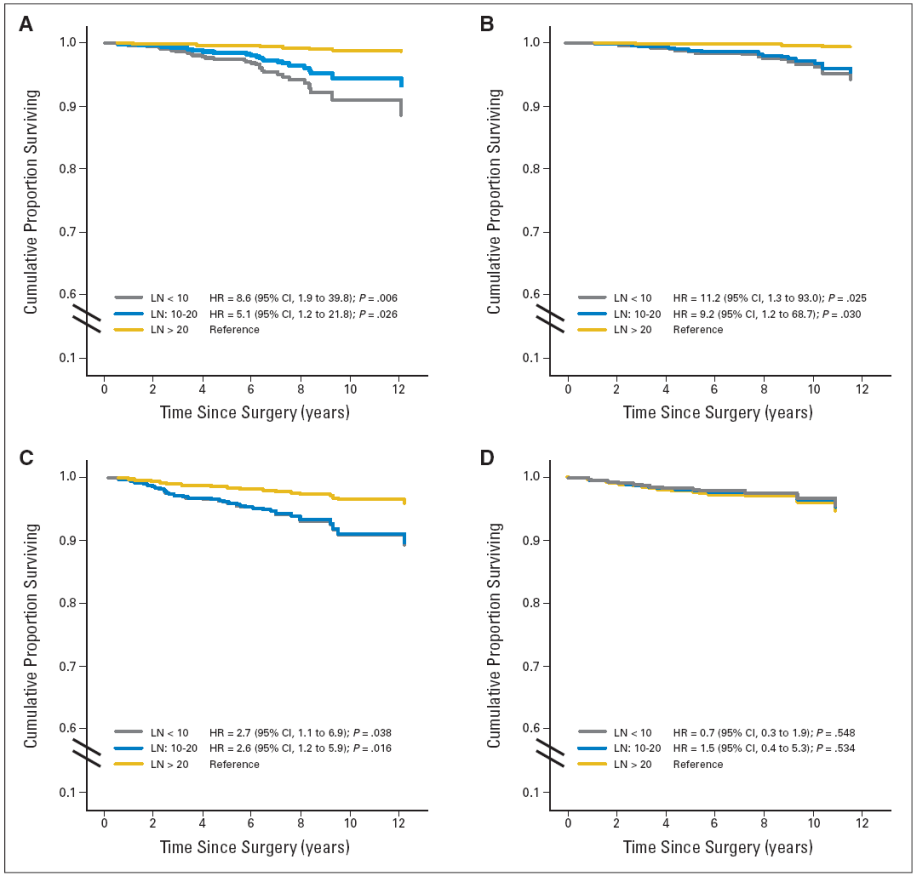

Fig 1. (A) Overall survival, (B) breast cancer–specific survival, (C) distant metastasis-free survival, and (D) local recurrence-free survival and recurrence in Seoul National University Hospital Breast Care Center patients according to the extent of axillary lymph node dissection. Hazard ratio and 95% CI for each group were derived from Cox proportional hazards models adjusted for age, tumor size, histologic grade, adjuvant chemotherapy, adjuvant radiotherapy, and hormone receptor status. LN, lymph node; HR, hazard ratio.

Conclusions

- **Preoperative axillary staging may be more useful as a triage for identification of patients to be candidate of AND for clinically occult node metastasis.**

- **SNB is the standard for ALN staging in clinically uninvolved ALN.**

Perspective

- **SNB could be avoided through integration of novel biological tools and systematic use of preoperative MRI, PET/CT, and USG-guided FNAB.**

Breast Cancer Res Treat
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PRECLINICAL STUDY

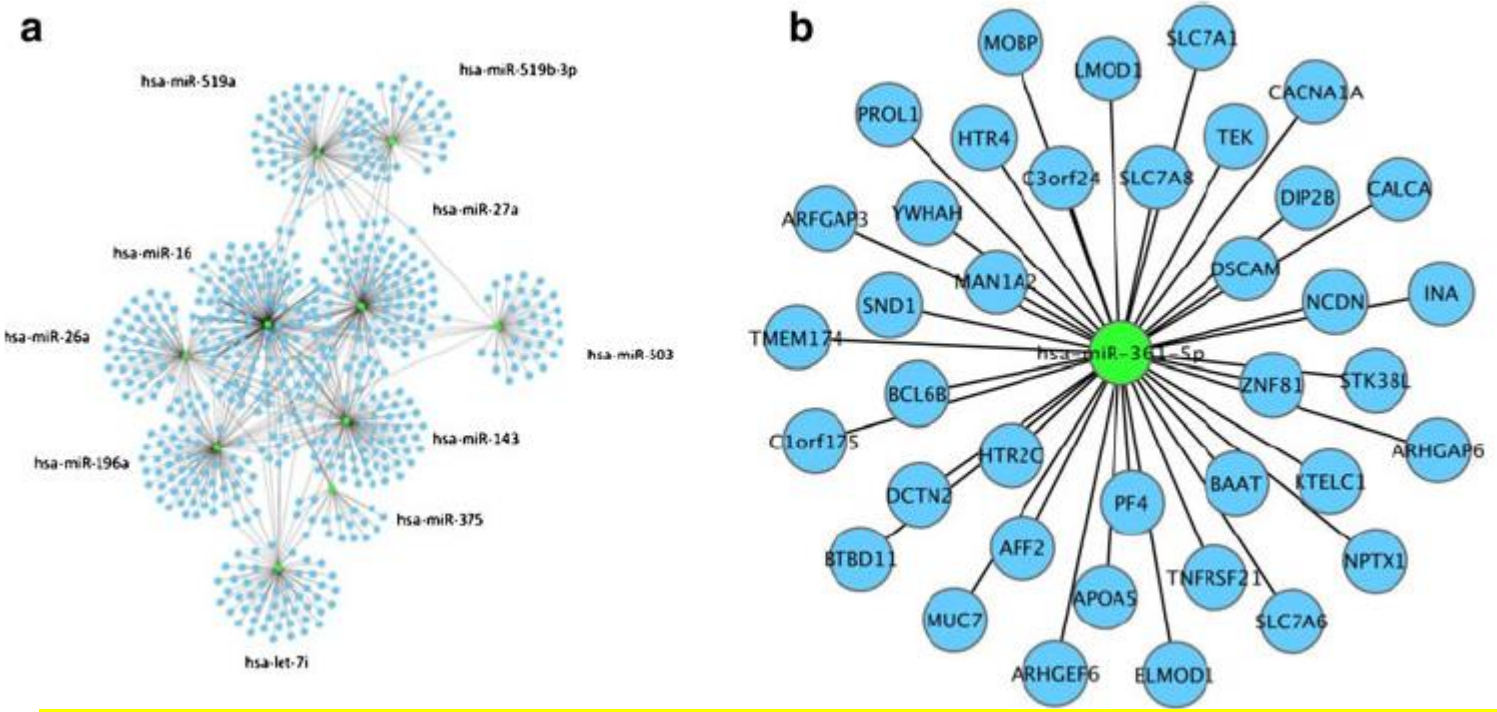
Prediction of lymph node involvement in breast cancer from primary tumor tissue using gene expression profiling and miRNAs

A. Smeets · A. Daemen · I. Vanden Bempt · O. Gevaert · B. Claes · H. Wildiers · R. Drijkoningen · P. Van Hummelen · D. Lambrechts · B. De Moor · P. Neven · C. Sotiriou · T. Vandorpe · R. Paridaens · M. R. Christiaens

Received: 21 October 2010 / Accepted: 12 November 2010

Abstract The aim of this study was to investigate whether lymph node involvement in breast cancer is influenced by gene or miRNA expression of the primary tumor. For this purpose, we selected a very homogeneous patient population to minimize heterogeneity in other tumor and patient characteristics. First, we compared gene expression profiles of primary tumor tissue from a group of 96 breast cancer patients balanced for lymph node involvement using Affymetrix Human U133 Plus 2.0 microarray chip. A model was built by weighted Least-Squares Support Vector Machines and validated on an internal and external dataset. Next, miRNA profiling was performed on a subset of 82 tumors using Human MiRNA-microarray chips (Illumina). Finally, for each miRNA the number of significant inverse correlated targets was determined and compared with 1000 sets of randomly chosen targets. A model based on 241 genes was built (AUC 0.66). The AUC for the internal dataset was 0.646 and 0. 651 for the external datasets. The model includes multiple kinases, apoptosis-related, and zinc ion-binding genes. Integration of the microarray and miRNA data reveals ten miRNAs suppressing lymph node invasion and one miRNA promoting lymph node invasion. Our results provide evidence that measurable differences in gene and miRNA expression exist between node negative and node positive patients and thus that lymph node involvement is not a genetically random process. Moreover, our data suggest a general deregulation of the miRNA machinery that is potentially responsible for lymph node invasion.

Keywords Breast cancer · Microarrays · miRNA · Lymph node · Prediction



There are measurable differences in gene and miRNA expression exist between N0 and N+ patients ,
thus lymph node involvement is not a genetically random process.