2025 ASCO ANNUAL MEETING

EUBREAST

Comparison of marking techniques for target lymph nodes in 2,596 patients with node-positive breast cancer treated with neoadjuvant chemotherapy: Results from the prospective multicenter AXSANA / EUBREAST-03 / AGO-B-053 study (NCT04373655)

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AXSANA AGO-B BREAST STUDY GROUP AWOgyn CLAUDIA VON SCHILLING FOUNDATION FOR BREAST CANCER RESEARCH EHMANN-STIFTUNG SAVOGNIN EUGEN & IRMGARD HAHN STIFTUNG Karolinska Institutet NOGGO e.V. GBG GERMAN BREAST GROUP

PRESENTED BY: Prof. Dr. Maggie Banys-Paluchowski, University Hospital Schleswig-Holstein Campus Lübeck, Germany

Key Takeaway Points

- In patients with initially node-positive breast cancer undergoing neoadjuvant chemotherapy, use of probe-guided detection markers pre-NACT results in a significantly higher detection rate of target lymph nodes (TLN), compared to clip marking.

- Use of probe-guided detection improves the probability of performing a successful targeted axillary dissection.

Compared with other methods, markers suitable for probe-guided detection placed before NACT show highest detection rate of target lymph node.

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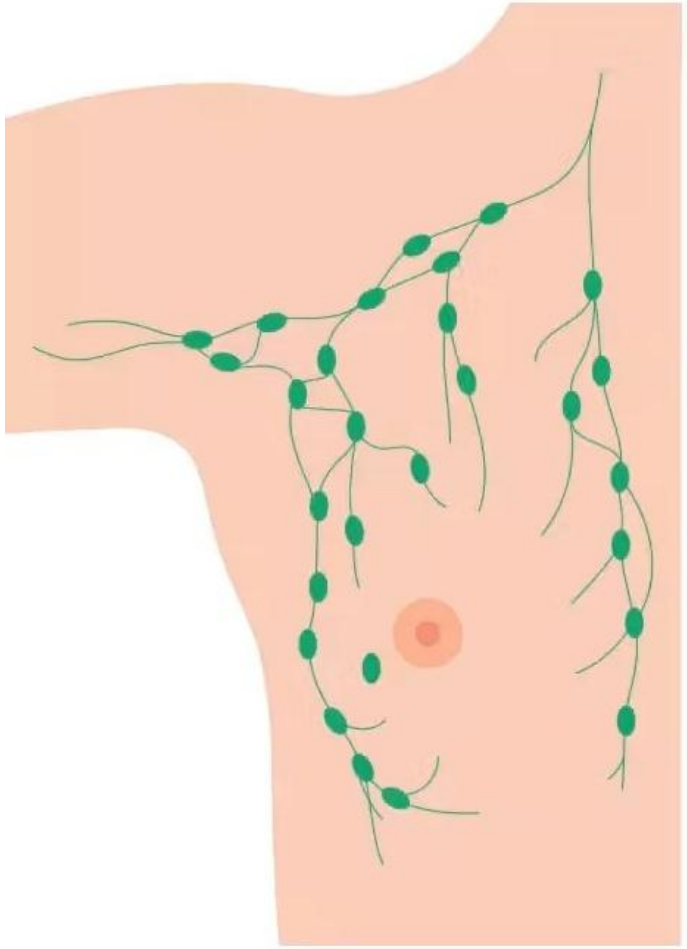
Background

- In the last decades, we have witnessed an unprecedented de-escalation of axillary surgery.
- Surgical staging in cN+ breast cancer scheduled for neoadjuvant chemotherapy (NACT) varies significantly and includes:
  - ALND = Axillary lymph node dissection
  - SLNB = Sentinel lymph node biopsy
  - TLNB = Target lymph node biopsy
  - TAD = Targeted axillary dissection (SLNB + TLNB)



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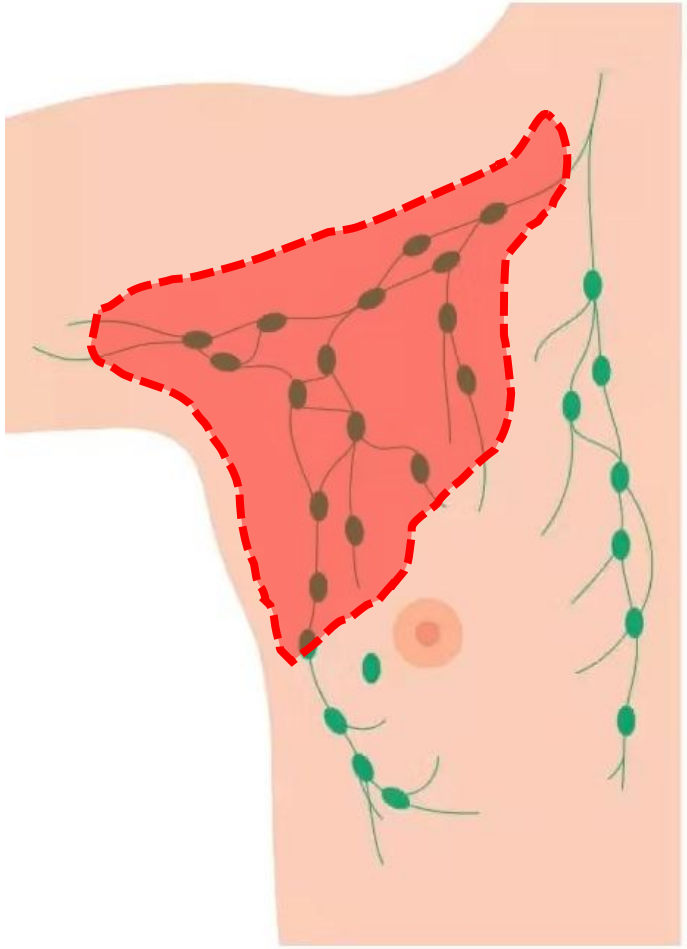

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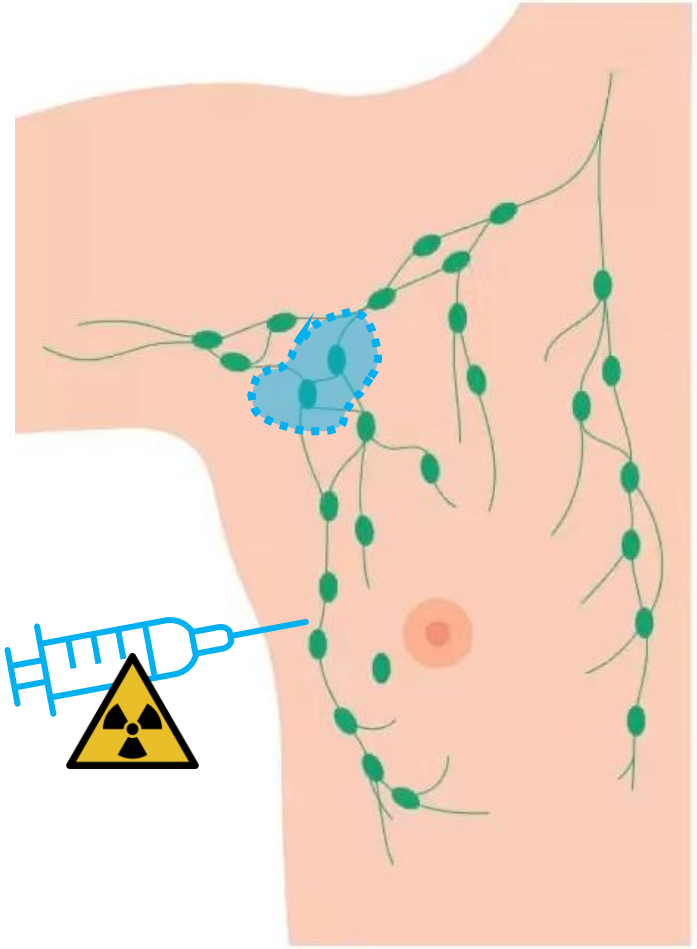

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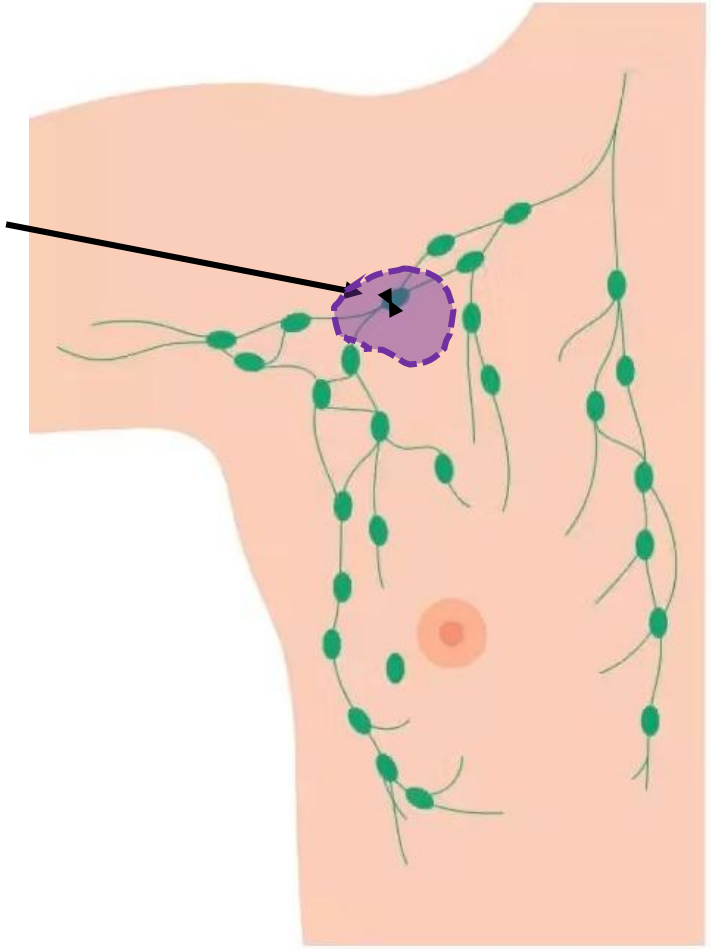

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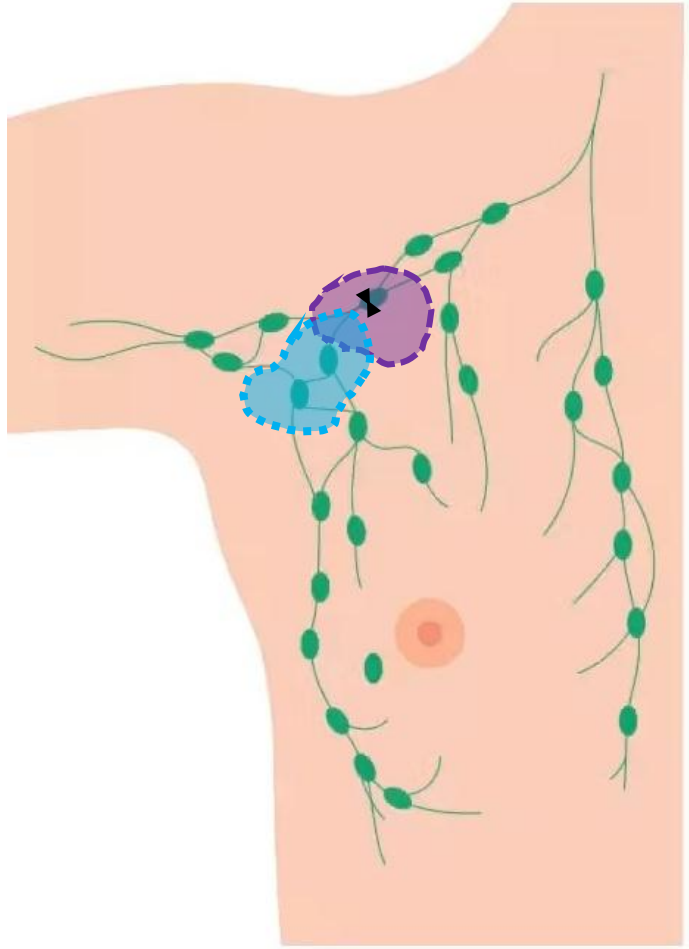

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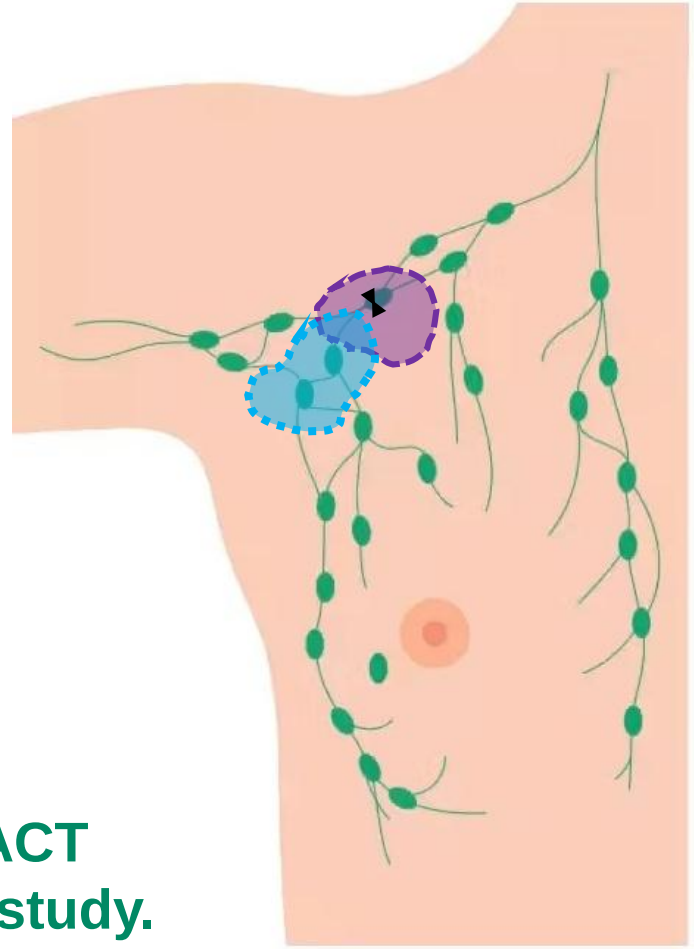
- Limited comparative data on marking techniques for TAD/TLNB
- **<u>Aim</u>: To examine the TLN detection rate using different pre-NACT marking techniques in the international prospective AXSANA study.**



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Methods

- AXSANA (NCT04373655) is an international, multicenter, prospective cohort study
- Patients with initially cN+ breast cancer receiving neoadjuvant chemotherapy are eligible
- Axillary staging performed according to institutional and national standards and may include ALND, SLNB, TAD, or TLNB; all currently available TLN marking techniques allowed
- **Primary endpoints**: invasive disease-free survival, axillary recurrence rate, health-related quality of life (HRQoL), and arm morbidity (e.g., lymphedema, pain, mobility)
- Comparison of pre-NACT marking techniques is a **secondary endpoint:**
  - **TLN detection rate**
  - **Number of LNs removed**
- High-quality standards with 100% of datasets monitored by breast surgeons
- Funding: AGO-B (AGO-B-053), AWOgyn, Claudia von Schilling Foundation for Breast Cancer Research, Ehmann Foundation Savognin, Eugen & Irmgard Hahn Stiftung, EndoMag, Merit Medical, Mammotome, Sirius Medical. AXSANA is further supported by GBG and NOGGO e.V.

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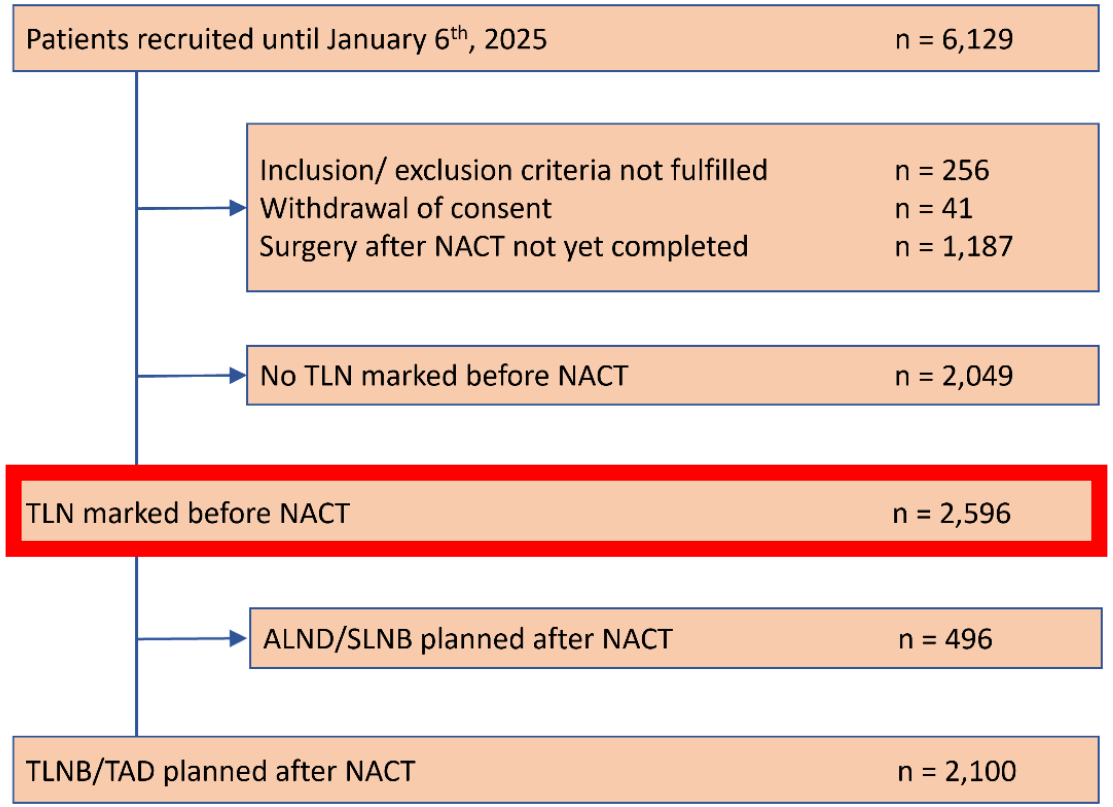
Results

- At least one TLN was marked before neoadjuvant chemotherapy in 2,596 patients
- Median number of suspicious LNs pre-NACT: 2 (interquartile range: 1-3)
- ≥ 4 suspicious nodes in 346 (13.3%) patients
- 2,484 patients (95.7%) underwent a minimally invasive biopsy of ≥ 1 node(s)
- Targeted removal of the TLN was planned in 2,100 patients



NACT neoadjuvant chemotherapy; TLN target lymph node; ALND axillary lymph node dissection; SLNB sentinel lymph node biopsy; TLNB target lymph node biopsy; TAD targeted axillary dissection

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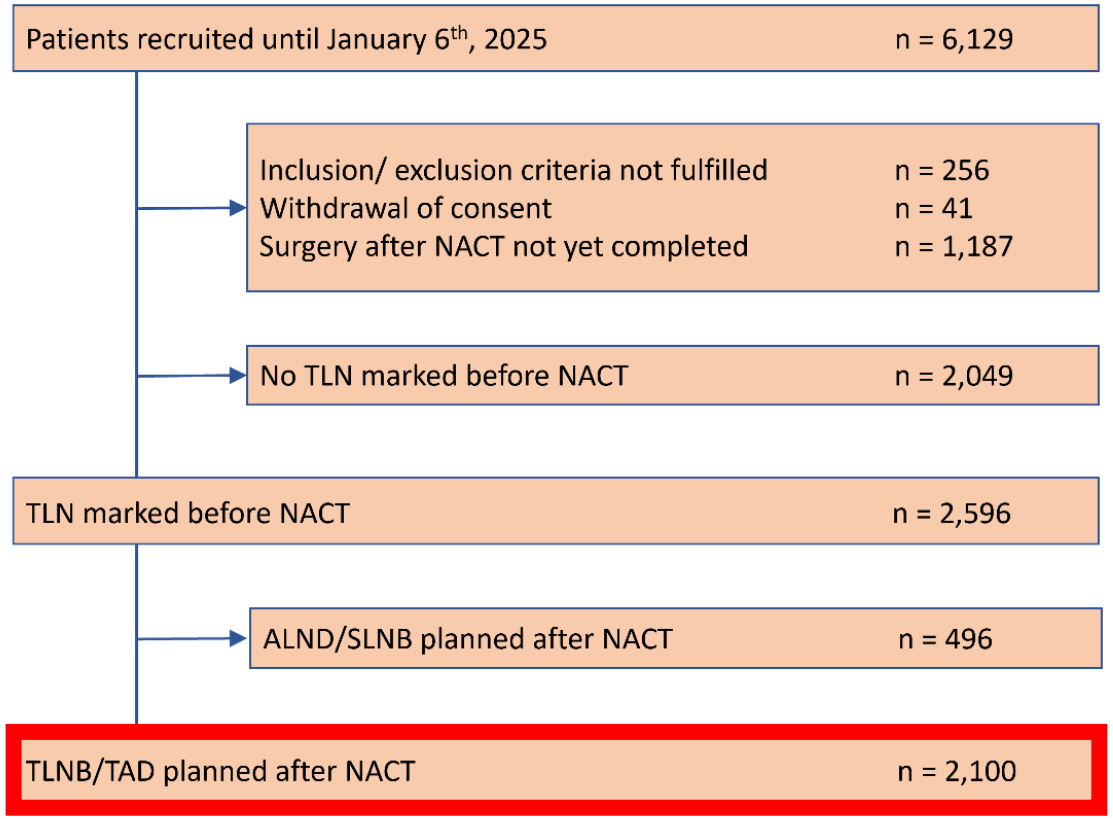

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Results

- TLN marking pre-NACT:

Clip

n = 1,594 (75.9%)

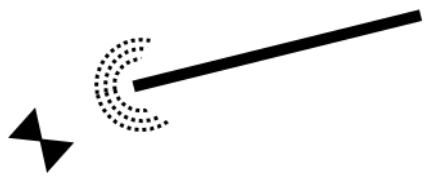
Post-NACT localization necessary (wire, intra-op. ultrasound, probe-guided markers etc.)

61 (3.8%) clip not visible
88 (5.5%) preop. localization questionable

Probe-guided

n = 355 (16.9%)

Magnetic seed: 225
Radar marker: 102
Radioactive seed: 16
RFID: 10
Other: 2



Carbon ink

n = 118 (5.6%)

Combination

n = 33 (1.6%)

Clip + carbon: 16
Clip + magseed: 7
Magseed + carbon: 5
Clip + radar marker: 3
Clip + radioact. seed: 1
Clip + carbon + radioact. seed: 1

Results

TLN detection rate differed significantly according to the marker used (p = 0.004) and was highest in case of probe-guided techniques (96.6%), followed by carbon (94.9%), and clip (89.6%)

Marking technique pre-NACT	Number of pts.	Number of removed nodes during TAD/TLNB Mean ± SD	TLN detection rate
Clip	1,594	2.95 ± 1.90	89.6%
Carbon ink	118	2.99 ± 1.73	94.9%
Total probe-guided detection markers	355	2.81 ± 1.73	96.6%
Magnetic seed	225	2.77 ± 1.64	96.9%
Radar marker	102	3.10 ± 2.01	96.1%
Radioactive seed	16	1.88 ± 0.72	100%
RFID	10	2.40 ± 1.08	90%
Other	2	2.00 ± 0.00	100%
Combination	33	2.76 ± 1.42	93.9%
Total	2,100	2.92 ± 1.86	91.2%

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Number of removed nodes: TAD/TLNB removed a mean number of 2.92 lymph nodes, which was not significantly different (p = 0.219) across different TLN marking cohorts

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Results

Multivariable analysis demonstrated significantly higher risk of TLN non-detection when:

- a clip was used to mark TLN pre-NACT ($p < 0.001$)
- lymph node remained clinically suspicious after NACT ($p = 0.02$)
- less site experience (< 30 cases) with the TLN marking technique ($p = 0.004$)
- BMI > 25 mg/m^2 ($p = 0.01$)

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Conclusions

- Largest prospective analysis comparing different marking techniques for targeting nodes in patients with initially node-positive breast cancer undergoing neoadjuvant chemotherapy
- Use of probe-guided detection markers pre-NACT resulted in a significantly higher TLN detection rate vs. clip
- TLN detection rate was associated with site's learning curve, BMI, & axillary response
- Use of probe-guided detection improved probability of performing a successful TAD
- The analysis of primary endpoints (oncological safety and patient-reported outcomes) of different surgical techniques is ongoing.

Compared with other methods, markers suitable for probe-guided detection placed before NACT show highest detection rate of target lymph node.

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- Heads & Members of all National Steering Committees
- Study monitors: Sarah Fröhlich, Esther Schmidt, Kristina Wihlfahrt, Tomasz Berger, Timo Basali, Franziska Ruf, Angelika Rief
- EUBREAST Team & Supporters: Marina Mangold, Katharina Jursik, Jessica Wagner, Sarah Goldman, Michael Untch, Michael P. Lux, Hans-Christian Kolberg, Toralf Reimer, Matilda Appelgren, Nikolas Tauber, Achim Rody
- All patients who participate in the AXSANA study

Heads of National Steering Committees

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Belgium: Marian Vanhoeij
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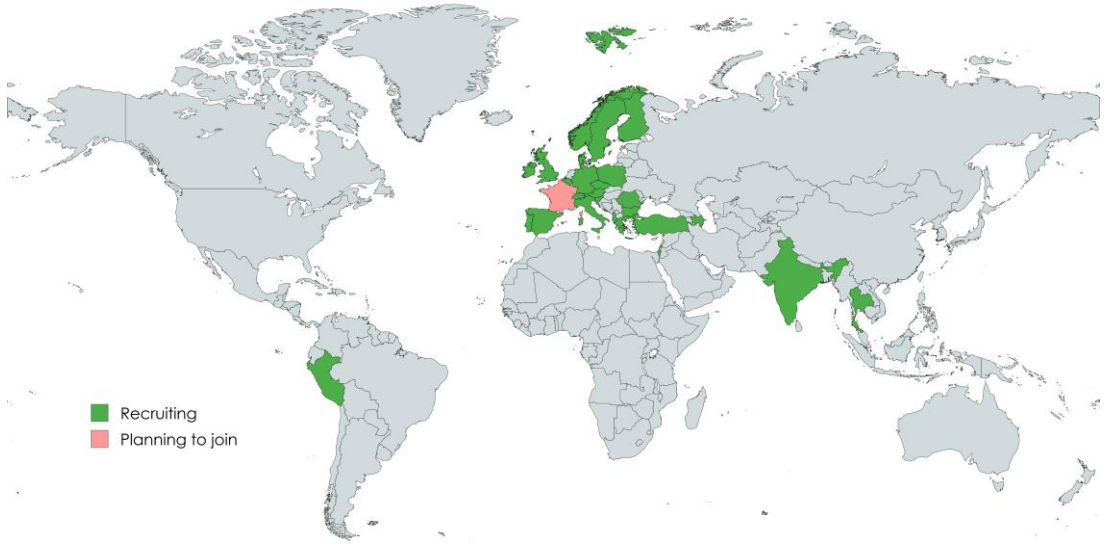

Lay Summary

- Patients with breast cancer who have lymph node metastases often receive preoperative (neoadjuvant) chemotherapy. The optimal surgery for the armpit after chemotherapy is currently subject of debate, with many guidelines recommending de-escalated forms of surgery such as sentinel lymph node biopsy (SLNB) or targeted axillary dissection (TAD = removal of sentinel node[s] and marked target node).
- TAD success depends on reliable identification of a target lymph node (TLN) marked before chemotherapy.
- Different markers are currently in use: clips, carbon ink, and probe-guided detection markers, such as magnetic or radioactive seeds, radar reflectors, and radiofrequency identification tags.
- AXSANA is the largest prospective study worldwide that examines axillary surgery after neoadjuvant (preoperative) chemotherapy (288 sites, 26 countries) and was initiated by the EUBREAST Study Group.
- We report on 2,596 patients whose TLN was marked before neoadjuvant chemotherapy.
- TLN detection rate was highest with probe-guided techniques (96.6%), followed by carbon (94.9%), and clip (89.6%). The mean number of removed nodes was similar across different TLN marking cohorts.
- **If removal of a TLN is planned, placement of a marker suitable for probe-guided detection before chemotherapy shows highest TLN detection rate compared to other methods.**

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