

Evaluating the Diagnostic Accuracy of Axillary Ultrasound in Predicting Residual Nodal Disease Following Neoadjuvant Chemotherapy in Node-Positive Breast Cancer

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Background

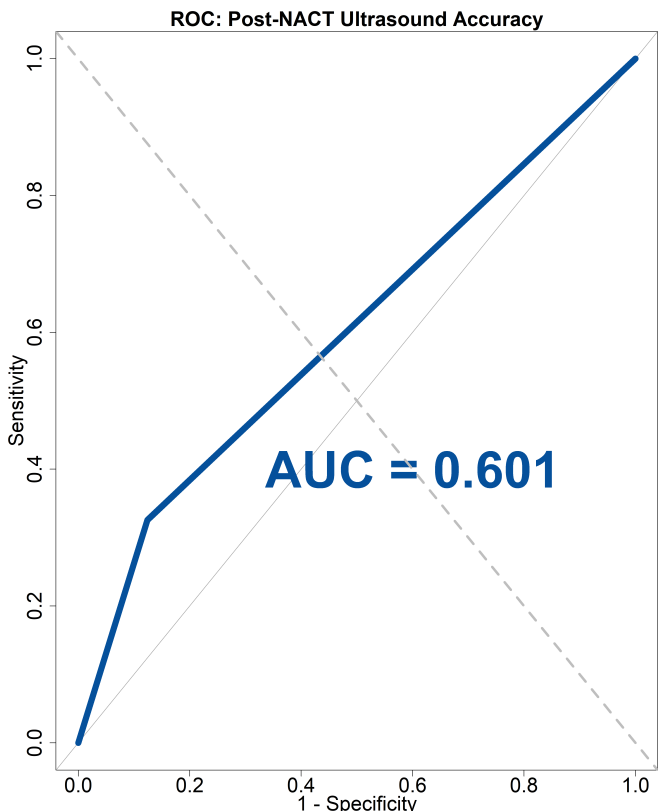
- Axillary nodal status remains central to breast-cancer staging.
- In cN1 disease, NACT enables axillary downstaging — shifting management from ALND toward SLNB or targeted axillary dissection.
- AUS is the recommended post-NACT restaging tool, yet the AXSANA registry (3,260 patients) reported only 46.4% sensitivity.
- South Asian / LMIC data remain sparse.

Objectives

- Evaluate the diagnostic performance of post-NACT AUS against surgical histopathology in a cN1 South Asian cohort.
- Identify clinicopathological predictors of false-negative AUS to guide risk-stratified surgical planning.

Methods

- Retrospective cohort, Aga Khan University Hospital, Karachi (Jan 2020–Dec 2024).
- cN1 breast cancer treated with NACT, then AUS and axillary surgery (SLNB/ALND).
- “Radiologically suspicious” node: cortical thickness ≥3 mm or fatty hilum displaced/absent.
- Reference standard: surgical histopathology.
- Firth’s penalized logistic regression identified false-negative predictors (R v4.4.2; p<0.05).



Results

N = 199 (from 2,863 screened, 2020–2024) · Concordant 127 (63.8%) · Discordant 72 (36.2%)

Characteristic	Concord.	Discord.	p
Complete path. response	54.3%	20.8%	<0.001
ypN0 (no residual disease)	78%	19%	<0.001
Triple-negative subtype	28%	8.3%	0.001

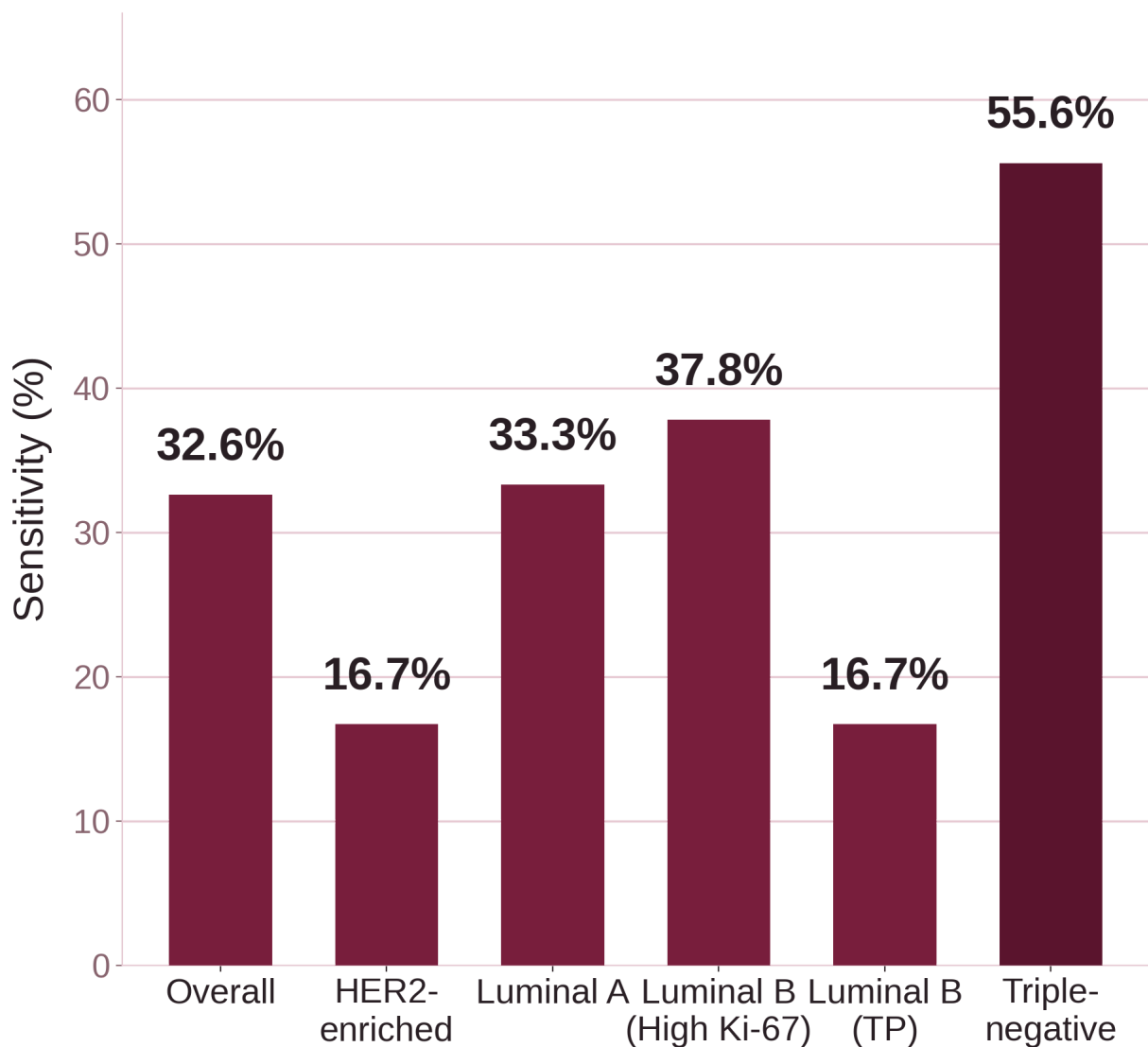
Diagnostic accuracy of post-NACT AUS:

63.8% Acc.	32.6% Sens.	87.6% Spec.	66.7% PPV	63.1% NPV
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Predictors of false-negative AUS (n = 157 with negative AUS):

Variable	OR (95% CI)	p
ypT2–4 (vs ypT0–1)	4.41 (1.70–12.0)	0.002
HR– HER2+ (vs HR+/HER2–)	0.22 (0.05–0.80)	0.021
Triple-neg. (vs HR+/HER2–)	0.26 (0.06–0.91)	0.036

Sensitivity by molecular subtype:



Conclusion

- ✓ Post-NACT AUS has **poor sensitivity (32.6%)** — it cannot stand alone to exclude residual axillary disease in cN1 breast cancer.
- ✓ **HR-positive biology and ypT2–4 stage (OR 4.41)** carry the highest false-negative risk — surgical staging is still warranted.
- ✓ A suspicious AUS retains real **rule-in value**: two-thirds of AUS-positive patients had residual nodal disease.