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Immediate Lymphatic Reconstruction and Risk of Lymphedema After Axillary Lymph Node Dissection: A Propensity-Weighted Survival Analysis

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BACKGROUND

- Breast cancer–related lymphedema (BCRL) affects 20–40% of patients after axillary lymph node dissection (ALND) and causes substantial long-term morbidity.
- Immediate lymphatic reconstruction (ILR) is an emerging preventive strategy, but real-world effectiveness data remain limited.
- Many prior studies rely on crude incidence comparisons and do not account for variable follow-up or baseline differences.
- Aim:** To evaluate the association between ILR and time to BCRL diagnosis among patients undergoing mastectomy with ALND using propensity-weighted survival analysis.

METHODS

- Design:** Retrospective cohort study (2020–2025) at a single tertiary academic center
- Exposure:** ILR at time of mastectomy and ALND
- Outcome:** Time to clinically diagnosed BCRL (by licensed lymphedema therapist)
- Follow-up:** 6 months to 5 years
- Analysis:**
 - Inverse probability of treatment weighting (IPTW)
 - Propensity-weighted Cox proportional hazards models
 - Complementary multivariable survival modeling

RESULTS

Figure 1. Baseline Characteristics by ILR Status

Figure 2. Adjusted Hazard Ratios for BCRL Risk

ILR (vs no)	0.44 (0.18–1.05)
BMI (per kg/m ²)	1.03 (0.99–1.08)
Tobacco Use (vs no)	0.36 (0.14–0.91)
Diabetes (vs no)	0.77 (0.30–1.94)
Pathologic Stage II (vs I)	1.97 (0.42–9.19)
Pathologic Stage III-IV (vs I)	2.85 (0.58–13.9)
Surgeon B (vs A)	0.59 (0.25–1.40)

Multivariable Cox proportional hazards model evaluating predictors of BCRL following ALND. ILR was associated with a lower hazard of BCRL (HR 0.44, 95% CI 0.18–1.05; P = .064). Error bars represent 95% CIs.

Figure 3. Cumulative Incidence of BCRL Before and After Propensity Weighting

KEY FINDINGS

- Among 56 patients who underwent mastectomy with ALND, **43%** underwent ILR.
- BCRL developed in **46%** of ILR patients versus **63%** of patients without ILR.
- In propensity-weighted survival analysis, ILR was associated with a lower hazard of BCRL: **HR 0.24** (95% CI 0.05–1.03).
- Findings were consistent in complementary multivariable survival modeling: **HR 0.44** (95% CI 0.18–1.05).
- Propensity weighting addressed baseline differences between groups, strengthening causal inference in this nonrandomized cohort.

IMPLICATIONS

- ILR may reduce the risk of BCRL following ALND.
- Incorporating time-to-event modeling and propensity weighting strengthens evaluation of preventive surgical interventions in real-world settings.
- These findings support continued expansion of ILR programs where microsurgical expertise is available.
- Larger multicenter studies are needed to confirm durability of effect and identify patients most likely to benefit.