

Preserved Axillary Level I Posterior Lymph Node Drainage in Women Without Breast Cancer-Related Lymphedema After Axillary Lymph Node Dissection

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Background

- Clearance of axillary levels I and II lymph nodes is standard in axillary lymph node dissection (ALND).
- Preservation of axillary lymph nodes after ALND has been reported in 27% to 47% of breast cancer survivors and may alleviate or prevent the development of breast cancer-related lymphedema (BCRL).
- Identifying alterations of lymphatic drainage in patients who do not develop BCRL after ALND can offer important insights to variations of lymphatic anatomy and function that may be protective against BCRL.
- We recruited healthy female volunteers and female breast cancer survivors without BCRL treated with ALND ≥ 2 years prior to study enrollment for lymphatic mapping with SPECT/CT lymphoscintigraphy to compare upper extremity lymphatic drainage.

Methods

- BCRL diagnosis was excluded from all volunteers at study initiation with BCRL surveillance measurements of limb volumetry (perometry) and bioimpedance spectroscopy (L-dex)
- Intradermal hand/wrist injections of 0.1 mL 99-Tc sulfur radiocolloid were given bilaterally to 36 healthy female volunteers (control arms, n=72) and the affected side of 24 female breast cancer survivors without BCRL after ALND (at-risk arms, n=24). Arms were imaged with SPECT/CT at 2 hours. A nuclear medicine physician independently reviewed scans and labeled lymph nodes with tracer uptake.
- Chi square tests were run to compare drainage to axillary levels I and II lymph node groups between volunteer groups.

Results

Table 1. Comparison of Axillary Levels I and II Lymph Node Drainage Between the Arms of Healthy Female Volunteers and the At-Risk Arms of Breast Cancer Survivors Spared from BCRL After ALND

Lymph Node Group	Healthy Arms (n=72)	At-Risk Arms (n=24)	Chi Square p-value
Level I (Overall)	100% (72)	92% (22)	p = 0.013
Level I Lateral	4.2% (3)	13% (3)	p = 0.144
Level I Posterior	78% (56)	75% (18)	p = 0.779
Level I Anterior	76% (55)	21% (5)	p < 0.001
Level II	97% (70)	58% (14)	p < 0.001

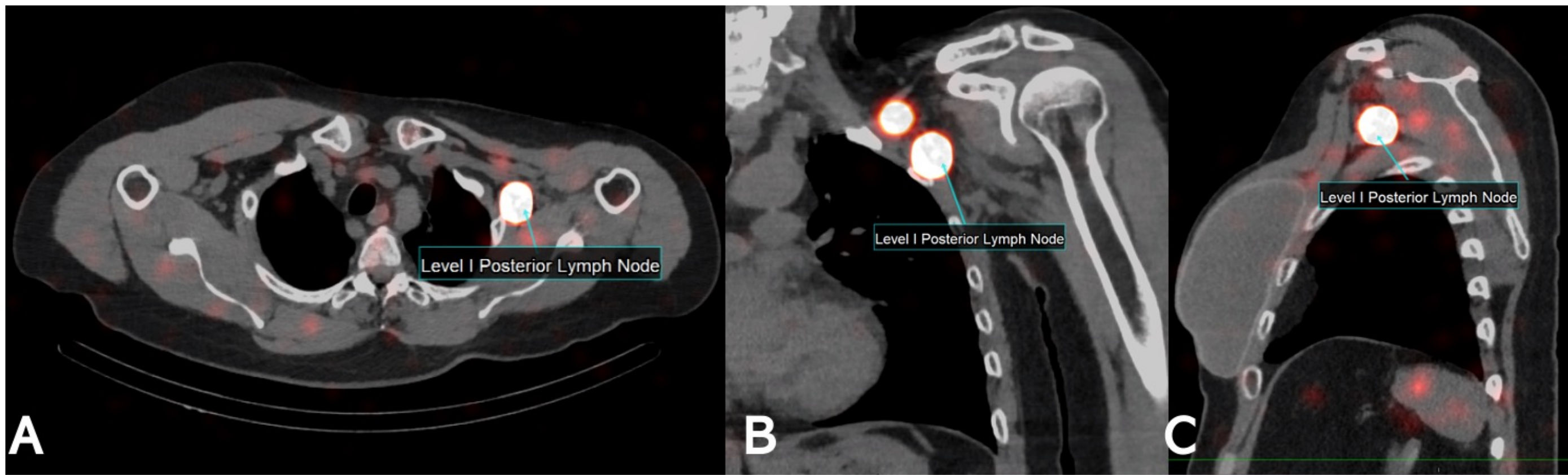


Figure 1. Axillary Level I Posterior Lymph Node Draining the At-Risk Arm of a Breast Cancer Survivor Volunteer Without BCRL Viewed in (A) Transverse, (B) Coronal, and (C) Sagittal Planes. The Arm Demonstrated No Other Axillary Levels I or II Lymph Nodes Draining the Arm.

Discussion and Conclusion

- While axillary level I drainage was preserved in nearly all (92%) female breast cancer survivors without BCRL, distinct changes in levels I and II drainage compared to healthy female volunteer arms were also observed.
- Level I posterior lymph nodes are commonly spared in ALND and may preserve upper extremity lymphatic drainage to prevent BCRL. Avoidance of the thoracodorsal and long thoracic nerves in ALND to prevent upper extremity weakness and paralysis may enable preservation of level I posterior lymph nodes.