

Re-Imagining Lymphedema Diagnosis on a Continuum

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Background

- Lymphedema is a chronic progressive disease that impacts patient physical and psychosocial well-being
- It is estimated that more than 1 in 5 women who survive breast cancer will develop Breast Cancer Related Lymphedema (BCRL)
- The most used criteria for diagnosis of lymphedema is arm volume change (VC) from baseline >10%
- Early diagnosis and intervention are essential to decrease the likelihood of lymphedema progression

Methods

- The patient cohort is part of a randomized, controlled trial comparing Axillary Lymph Node Dissection (ALND) with and without Immediate Lymphatic Reconstruction (ILR) in women with breast cancer at Memorial Sloan Kettering
- Patients included were those who underwent ALND without ILR and had at least 12 months of follow-up
- Arm volume measurements, Upper Limb Lymphedema 27 (ULL-27) Questionnaire, and compression use were collected at baseline and the 12-month post-operative visit
- Normal VC was calculated based on the mean volume change and SD of the group of patients with normal lymphatic drainage after ALND based on ICG lymphography
- Arm VC criteria of 5.8%, 7.9%, and 10% were 1, 1.5, and 2 SD from Normal VC respectively

Hypothesis

Arm volume difference >10% alone does not capture a significant portion of patients experiencing lymphedema symptoms post-ALND

Table 1. Lymphedema Incidence, by Volume Alone

Characteristic	Incidence		Δ 12mULL physical	
	n(%)	N	Mean	Mean (SD)
> 10 percent change	15 (25%)	14	-35	(26)
Unknown			1	
> 7.9 percent change	20 (33%)	19	-31	(24)
Unknown			1	
> 5.8 percent change	31 (52%)	30	-26	(23)
Unknown			1	

¹n (%)

Table 2. Lymphedema Incidence, by Volume change OR at least occasional compression

Characteristic	Incidence		Δ 12mULL physical	
	n(%)	N	Mean	Mean (SD)
> 10 percent change	23 (38%)	22	-28	(24)
Unknown			1	
> 7.9 percent change	26 (43%)	25	-27	(23)
Unknown			1	
> 5.8 percent change	37 (62%)	36	-25	(22)
Unknown			1	

¹n (%)

Characteristic	Incidence		Δ 12mULL physical	
	n(%)	N	Mean	Mean (SD)
> 10 percent change	6 (10%)	6	-42	(26)
> 7.9 percent change	8 (13%)	8	-35	(26)
> 5.8 percent change	8 (13%)	8	-35	(26)

¹n (%)

Table 3. Lymphedema Incidence, by Volume change AND at least occasional compression

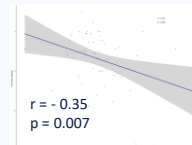


Figure 1. Scatterplot of Δ12m ULL Physical and 12m %VC

Results

- 60 patients were randomized to the control group of the RCT (ALND with no ILR) with at least 12 months follow-up
- 25%, 33%, and 52% met the >10%, >7.9%, and >5.8 cut-offs for volume change alone
- 38%, 43%, and 62% met the respective volume change cut-offs OR used compression at least occasionally
- 10%, 13%, and 13% met the respective volume change cut-offs AND used compression at least occasionally
- Volume change correlated significantly with change in baseline to 12-month ULL-Physical score ($r = -0.35$, $p = 0.007$)

Conclusion

- Arm VC >10% is an arbitrary cut-off for the diagnosis of lymphedema that has not been studied or validated sufficiently
- Arm VC >10% alone does not capture a significant portion of patients experiencing lymphedema symptoms post-ALND
- The physical portion of the ULL-27 correlates significantly with Arm VC, however the strength of association is weak
- Many patients may not reach the 10% commonly used threshold to diagnose lymphedema because they are using compression and therefore BCRL may be underestimated
- Diagnosis of lymphedema should include arm volume change, symptoms, and use of compression instead of arm volume alone

