The Oncologist®

Standardized Approach to Lymphedema Screening

ELIZABETH S. DYLKE,[a] LEIGH C. WARD,[b] SHARON L. KILBREATH[a]

[a]Faculty of Health Sciences, University of Sydney, Lidcombe, Australia; [b]School of Chemistry and Molecular Biosciences, The University of Queensland, St. Lucia, Australia

Disclosures of potential conflicts of interest may be found at the end of this article.

The recent article by O'Toole and colleagues on the need to standardize the screening and diagnosis of lymphedema echoes the concerns of researchers over the past 60 years [1]. Although the importance of preoperative measurements to aid the early detection of lymphedema has gained support, the preferred method of and diagnostic threshold for detection remain controversial.

The suggestion of O'Toole et al. of perometry as the preferred measurement method has merit [1]. Perometry has excellent intra- and interrater reliability and provides limb volumes and circumferences comparable to those found by traditional measurement methods [2]. The reliability of perometry has been established with the patient sitting and the measured limb horizontally positioned; however, some research has described patients bent over with the arm held vertically in the perometry frame [3]. It is unclear why this bent position would be preferable for patient comfort or measurement accuracy. In addition, reliability and validity of the limb volume measurements in this position have not been established.

Our major concern is the proposal of a >5% change in limb volume on two consecutive visits as the criterion for the diagnosis of early stage lymphedema. This item is the latest in a long list of criteria that have previously been suggested; for example, a 3% change in limb volume, using perometry, has also been proposed [3]. The evidence for the efficacy of both thresholds is limited. It is unknown if these values represent an abnormal change in limb volume or simply a change in body weight, measurement error, or even normal fluctuation [4, 5].

Another concern is the sensitivity of the tool itself. Perometry measures overall limb volume including muscle and fat but not specifically our area of interest in early lymphedema diagnosis, extracellular fluid (ECF). Bioimpedance spectroscopy (BIS) is a measurement tool that specifically quantifies ECF volume. As demonstrated previously, BIS can detect changes in ECF volume up to 10 months before volume measurements detect limb-size changes indicative of lymphedema [6]. The use of interlimb BIS ratios for diagnosis and monitoring negates confounders such as weight changes or whole-body changes in body fluids. Furthermore, evidence-based diagnostic thresholds were adopted early with BIS. Cornish et al. proposed statistically determined thresholds if the preoperative measurements were either known or unknown, based on the standard deviation of the mean for a normative population [6]. This represents a robust statistical approach to diagnosis and a shift away from arbitrarily determined diagnostic thresholds.

Both perometry and BIS are costly, and neither is available worldwide. Focusing on only one of these tools may reduce translatability of research into clinical practice. An alternative, proposed decades ago, is use of a combination of tools rather than relying on a single one to identify women with swelling [7]. This approach would enable new technologies to be added in concert with commonly available clinical tools such as the tape measure, provided all are based on a standardized approach and evidence-based thresholds. In this age of evidence-based medicine, it is timely in the field of lymphedema to move away from belief-driven practices to those supported by evidence.

DISCLOSURES

Leigh C. Ward: Impedimed Ltd. (C/A). **Sharon L. Kilbreath:** Impedimed Ltd. (RF). The other author indicated no financial relationships.

(C/A) Consulting/advisory relationship; (RF) Research funding; (E) Employment; (H) Honoraria received; (OI) Ownership interests; (IP) Intellectual property rights/inventor/patent holder; (SAB) Scientific advisory board

REFERENCES

1. Hartley ID, Brandt EM. Control and prevention of lymphedema following radical mastectomy. Nurs Res 1967;16:333–336.

2. Stanton AW, Northfield JW, Holroyd B et al. Validation of an optoelectronic limb volumeter (Perometer). Lymphology 1997;30:77–97.

3. Stout Gergich NL, Pfalzer LA, McGarvey C et al. Preoperative assessment enables the early diagnosis and successful treatment of lymphedema. Cancer 2008;112:2809–2819.

4. Ancukiewicz M, Russell TA, Otoole J et al. Standardized method for quantification of developing lymphedema in patients treated for breast cancer. Int J Radiat Oncol Biol Phys 2011;79:1436–1443.

5. Czerniec SA, Ward LC, Refshauge KM et al. Assessment of breast cancer-related arm lymphedema-comparison of physical measurement methods and self-report. Cancer Invest 2010;28:54–62.

6. Cornish BH, Chapman M, Hirst C et al. Early diagnosis of lymphedema using multiple frequency bioimpedance. Lymphology 2001;34:2–11.

7. Stillwell GK. Physiatric management of postoperative lymphedema. Med Clin North Am 1962;46:1051–1063.

Correspondence: Elizabeth S. Dylke, Ph.D., Faculty of Health Sciences, University of Sydney, 75 East Street, Lidcombe, NSW 2141, Australia. Telephone: 61-2-9351-9021; Fax: 61-2-9351-9601; E-Mail: elizabeth.dylke@sydney.edu.au Received July 2, 2013; accepted for publication August 21, 2013. 1083-7159/2013/$20.00/0 http://dx.doi.org/10.1634/theoncologist.2013-0238

