

Bioimpedance Spectroscopy Enables Early Detection of Clinical Lymphedema: Improves Health, Enhances Quality of Life for Cancer Survivors

DECEMBER 18, 2018 BY [THE WESTERN PA HEALTHCARE NEWS TEAM](#)

Indications for monitoring Heart Failure (HF)

By Richard Carreon

Breast Cancer Awareness month has evolved into year-round opportunities for educating consumers about the need for prevention and early detection. But an important issue that is often overlooked during these campaigns is the devastating impact of breast cancer-related lymphedema (BCRL). BCRL affects three to five million people in the U.S. – up to [65 percent](#) of the 250,000 annual breast cancer patients in this country depending on the type of treatment.

Damage to the lymphatic system from cancer treatments can lead to fluid buildup in the limbs and progressive swelling. If untreated, lymphedema can result in pain, infection, reduced mobility and overall impaired function. The daily harm to quality of life cannot be overstated, often preventing a patient from successfully moving on from cancer treatment.

Fortunately, technologies are now available, allowing for earlier detection and proactive management and prevention of chronic lymphedema, a common side-effect following surgery for breast cancer and other cancers.

Introducing Bioimpedance Spectroscopy (BIS): Greater Accuracy, Earlier Detection

While clinicians have historically struggled to detect and understand early lymphatic changes following breast cancer treatments, a technology known as bioimpedance spectroscopy (BIS) provides physicians and oncologists with an effective tool to measure and monitor clinical lymphedema. When utilized immediately upon breast cancer diagnosis to obtain baseline information, and with continued use throughout the treatment cycle, BIS is changing the clinical landscape and day-to-day living for cancer survivors.

Now available in select markets globally as SOZO, this intuitive FDA-cleared and CE-marked digital health and wellness platform combines BIS technology with population health data to create a rapid, non-invasive scan of a person's body, providing a precise snapshot of body composition, fluid status and hydration. It also provides users with digital tools that help promote positive behavioral changes.

Thanks to the multiple advantages of utilizing SOZO, there is accelerated adoption of BIS throughout the U.S. healthcare system:

- Providers now recognize that the commonly used measures of weight, blood pressure, and BMI deliver limited information that is often misleading.
- Invasive tissue measurements, such as dual-energy X-ray absorptiometry (DXA) or CT scanning, are expensive and not suitable for routine use due to radiation exposure.
- Other fluid (intracellular and extracellular) measurements, such as deuterium oxide dilution, are also invasive, costly and extremely time consuming.
- Circumference measurement (tape measure), water displacement and perometer methods do not always detect the onset of clinical lymphedema early enough to halt or reverse the condition.

BIS technologies offer a painless, non-invasive and reliable alternative that should be considered the standard approach for the detection of lymphedema. In fact, [studies indicate](#) that BIS devices can detect sub-clinical lymphedema in breast cancer survivors up to 10 months earlier than traditional methods.

Economic Impact

In the growing value-based environment, cost savings play an important role in all healthcare decision-making. A recent analysis of commercial payers found that within two years of treatment a [diagnosis of lymphedema adds \\$14,600](#) to the average cost of treatment for a patient with breast cancer.

Today, several breast cancer treatment programs that are using BIS for subclinical detection report substantially less persistent, clinical lymphedema, particularly among patients at high risk after axillary dissection, radiation or taxane-based chemotherapy. These centers report progression to clinical lymphedema in fewer than 10 percent of these high-risk patients.

This significant reduction is made possible by addressing two of the main principles of breast cancer treatment: early detection and tailored intervention.

BIS for Heart Failure

A major concern for breast cancer survivors and patients is the [elevated risk of heart failure](#) during and after treatment. The sometimes harmful effects of surgery, drugs, and radiation leave breast cancer patients and survivors more susceptible to cardiac events and re-hospitalization.

To address these issues, BIS presents capabilities not provided by conventional invasive cardiac measurements. BIS allows oncologists and physicians to non-invasively monitor patients, providing data needed to make treatment decisions that promote optimal cardiac performance.

BIS technologies can alert physicians to the possibility of fluid overload/hypervolemia before a patient becomes symptomatic or begins to decompensate, reducing re-admissions and improving quality of life—all within the current workflow and without the need for an expensive implantable device. This is significant given that heart failure is the most common discharge diagnosis among patients over 65 years and the most common cause of readmission within 60 days.

In fact, a Medicare Advantage Plan in California is so confident in this approach, it has purchased SOZO digital health platforms, as well as ongoing monthly subscription services for in-home monitoring and management of members. With a goal to optimize the health of beneficiaries while reducing health care cost burdens, plan leadership regards the assessment and monitoring of fluid status as critical to the management of CHF members and an important component of its specialized population health management program.

When SOZO detects a change of fluid status, this may signal the need to increase or decrease medication levels. Correct levels significantly reduce hospital stays and readmissions. The health plan says that remote patient monitoring represents a vital aspect of strengthening patient health outcomes and the quality of care. They will rely upon SOZO data capture and information reporting to the treating physician to enable better patient tracking and care coordination that enhances the medical home.

Looking ahead, studies are currently underway to compare the effectiveness of BIS technology vs. pulmonary artery pressure monitoring in heart failure patients. With continued research on BIS devices, additional applications and opportunities for improved outcomes and cost-savings are likely to arise.

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