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IMAGING UPPER LIMB LYPHEDEMA AFTER BREAST CANCER TREATMENT. THE ROLE OF ECHOGRAPHY IN STAGING LYPHEDEMA.

AN TASSENOY

Tuesday, November 12th 2019 at 18:00

Room Auditorium P. Brouwer, campus Jette

Please confirm your presence before November 5th to an.tassenoy@vub.be

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ABSTRACT OF THE RESEARCH

In 2015, the Belgian Cancer Registry registered 10,378 new cases of breast cancer in women and 92 in men. Although the incidence of breast cancer greatly increased in the past decades, breast cancer mortality has not similarly raised, and has even slightly decreased by approximately 2% each year. This breast cancer survivorship increases due to the early detection and the treatment advancements. The more targeted and aggressive therapy results in more pronounced side effects. One of these side effects is breast cancer-related lymphedema (BCRL).

Within this work we attempted to improve the insights in the use and interpretation of ultrasound images regarding BCRL and its stages. In a first part, ultrasonographic images, MRI, and tissue biopsies were made of the “edematous” and “healthy” arm of two female cadavers with a breast amputation and axillary dissection, without clinical lymphedema and, in the follow-up study, of patients within the irreversible stage of clinical lymphedema, of whom conservative therapy did not improve edema complaints and who eventually opted for lymph suction. Microscopic evaluation of the tissue samples showed that the density of the dermal collagen was reduced due to the influx of water, making it more transparent to light microscopy. Increased volume and irregular arrangement of adipose cells with increased fibrosis embedded in the subcutaneous layer were features not only observed in case of chronic lymphedema, but also in the cadaver biopsies with less pronounced lymphedema.

Through the different studies, it was shown on ultrasonography and MRI that, thickening of the dermal and, especially, the subcutaneous layer, contributed to the volume increase of the edematous limb to varying degrees.

Making ultrasound images of edema arms of several postmastectomy patients during the “Lymphedema consultation” of the UZBrussels, however, clarified that different patterns of subcutaneous changes could be visualized by ultrasonography. Using histogram analysis, mean grey-values or tissue thickness gives little information concerning edema stage. Our results showed that the subcutis had different echogenic appearances and that the subcutis of patients with acute lymphedema displayed a more hypoechogenic image compared to the normal side. In case of chronic lymphedema, a more homogeneous hyperechogenic appearance, or a cobbledstoned picture were observed.

In an attempt to quantify those different edema patterns, we observed that patients with texture changes standing for overgrowth of adipose tissue and fibrosis, had higher absolute echodensity and ASQ-values than patients with tissue changes representing fluid or where no tissue differentiation could be observed. Clinically, comparing echogenicity of the subcutaneous tissues of both arms, an idea could be formed about the subclinical, acute, or chronic character of the LE stage. The results of this study also showed that minor arm volume changes or subjective complaints can be associated with underlying tissue changes. In patients with less than 10% volume difference, acute and even chronic changes can be observed.

Although water displacement is considered to be the “gold standard” for the diagnosis of lymphedema, arm volume measurements include only a small part in the diagnosis of lymphedema. This technique is neither sensitive enough to detect subclinical and early stage I lymphedema, nor does it takes the lymphedema stage into account. Furthermore, due to the discrepancy between patient’s perceptions and arm measurements and on the other hand, the underestimation by clinicians of the patient’s symptoms, the need for a more extensive examination of the patient’s LE arises.

Imaging procedures as US and MRI can provide additional information about tissue texture changes, stage and whether the lymphedema is susceptible to treatment. As early detection and treatment are important in preventing lymphedema, these techniques could visualize early tissue alterations, before arm measurements can diagnose clinical LE. The recent high-frequency US (e.g. 70 MHz) and the MRI segmentation technology can play an important role in those early tissue changes.

CURRICULUM VITAE

An Tassenoy (born 3 May 1978) is a part time teaching assistant at the Department of Rehabilitation Research of the Faculty of Physical Education and Physical Therapy of the Vrije Universiteit Brussel. She holds a master’s degree in Rehabilitation Sciences and Physiotherapy (2000). Since 2000, she teaches the practical courses of “Fysische applicaties in de Kinetotherapie”, “Vasculaire Kinetetherapie” and “Uro- en gynaecologische revalidatie”.

Over time, she started research concerning breast cancer related lymphedema. Results of these studies are published in different journals and presented at several congresses.

Besides her academic work, she is manager of two private practices, where she is confronted daily with the problems and the treatment of lymphedema.