

Applications of Diagnostic Ultrasonography for Cancer Survivor Care

CME
Credits

Shaw-Gang Shyu*

Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, Taipei, Taiwan

For more than a decade, malignant tumors (or cancers) have continued to rank first among the top ten causes of death among Taiwanese people. Statistics over the years have shown that the number of cancer deaths has continued to rise,^[1] while the survival time of various cancers has increased year by year, and the mortality rate has gradually decreased, possibly due to the popularization of cancer screening and the advancement of cancer treatment. The latest statistics by 2016 show that the 5-year survival rate of all cancers in Taiwan has reached 49.4%.^[2] The ideal public health prevention and control consists of early screening, early treatment, and disability reduction. However, based on recent trends and the current situation in Taiwan, cancer-related care is a major health-care issue that cannot be ignored. From the moment, a patient is diagnosed with cancer, he/she is called a cancer survivor. Patients are burdened with cancer itself or treatment-related impairments. It is a long-term struggle for cancer patients to maintain independence in their lives or even return to the workplace. In addition to the treatment of the tumor itself, supportive treatment and complications management have received more and more attention in recent years. Therefore, more emphasis is also laid on the quality of life and physical function of cancer patients. Cancer rehabilitation is a rehabilitation medicine for cancer survivor care that deals with proper pain control, reconstructs their functions, and seeks compensation methods to improve the quality of life and individual functions of patients.

In recent years, the popularization and mature application of medical ultrasonography in various specialized fields, the rapid development of the technology of diagnostic ultrasonography, and the booming development of ultrasound examination and interventional technology for the skeletal muscle and peripheral nerve have provided powerful tools for the planning and training of rehabilitation for cancer patients. Due to length limitations, only three examples are presented below

to illustrate how diagnostic ultrasonography can be used for cancer survivor care.

In developed countries, the most important cause of limb lymphedema is malignancy. Among them, the majority of upper limb lymphedema is caused by breast cancers, whereas in contrast, the majority of lower limb lymphedema is caused by gynecological cancers. Currently, existing literature has reported the application of ultrasonography in the diagnosis, monitoring, and tracking of lymphedema.^[3] Although radionuclide lymphography remains to be the gold standard, skeletal muscle ultrasonography can be used to identify the potential cause of lymphedema aggravation, which is convenient and timely, assisting interventional therapy [Figure 1].

Patients with breast cancers or head-and-neck cancers (HNC) would be troubled by the pain and functional limitations of the shoulder joints following the tumor resection and postoperative radiation therapy. Among the tools for differential diagnosis, ultrasonography is particularly suitable as an imaging inspection tool for joints or tendon ligaments, to detect lesions of the shoulder joints or rotator cuffs [Figure 2], facilitating immediate interventional treatments, decision changes, and the arrangement of appropriate rehabilitation or treatment plans.

Dysphagia in patients with HNC is a significant and important issue. Other common disabilities and complications include mucositis and ulcers, dental caries and periodontal diseases, xerostomia, swallowing disorder, trismus, speech and voice disorders, painful fibrosis and contracture of the shoulder and neck, osteoradionecrosis, lymphedema, cranial nerve-related disabilities, brachial plexus and shoulder joint disorders, pulmonary complications (aspiration pneumonia, lung collapse, and mixed lung disease, etc.), peripheral neuropathy,

Address for correspondence: Dr. Shaw-Gang Shyu,
Department of Physical Medicine and Rehabilitation, National Taiwan
University Hospital, Taipei, Taiwan.
E-mail: shawgangshyu@gmail.com

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tumor metastasis, psychological and emotional problems, and difficulty returning to the workplace, etc.^[4]

Traditionally, videofluorographic swallowing study (VFSS) and fiberoptic endoscopic evaluation of swallowing (FEES) are gold standard for evaluation of swallowing function. Recently, ultra-high-speed computerized tomography showed its potential for swallowing evaluation and measurement of associated structures. Esophageal manometry targets dynamic and kinetic profile of bolus transit. Currently, the application of ultrasonography in swallowing assessment, especially in research on movements of the oral floor and the rise of the throat, is in the ascendant [Figure 3]. Given the number of patients with oropharyngeal malignancies in Taiwan that affect swallowing and its public health significance, the noninvasiveness, immediacy, and convenience of ultrasonography, the popularity of ultrasonography in Taiwan, and the affordability of ultrasonography in Taiwanese patients under the present health insurance system, the academic value and application value of ultrasonography in the care of patients with swallowing disorders are worthy of our attention.

The malignancy or treatment itself can affect the surrounding muscles, bones, or nerves. For example, “the inability of mouth opening, swallowing, neck rotation, shoulders lifting, and falling asleep” caused by the pain and dysfunction of the mouth, neck, and shoulders in patients with HNC often bothers patients and medical care teams. With the advancement of ultrasonic imaging and the development of ultrasonic

positioning of peripheral nerves and ultrasound-guided interventional therapy in recent years, the ultrasonography of the muscles, bones, and nerves that has flourished in the rehabilitation and pain medicine community of Taiwan has become a diagnostic and therapeutic tool for physicians to provide patients with timely, radiation-free, and guided treatments [Figure 4]. It can quickly deal with the pain of patients, thereby improving the quality of life and speeding up the functional training schedule of patients.

Cancer survivor care hopes to improve the quality of life of patients, enhance function, reduce the burden on caregivers and society, and then allow patients to have the willingness to receive treatment to extend a quality life or return to society. In Taiwan, cancer survivor care, compared to the four major fields of traditional rehabilitation (neurorehabilitation, musculoskeletal rehabilitation, pediatric rehabilitation, and cardiopulmonary rehabilitation), is a relatively young field. However, due to the significant importance of malignant tumors to modern society and the rapid development of ultrasonic medicine and technology, the future development

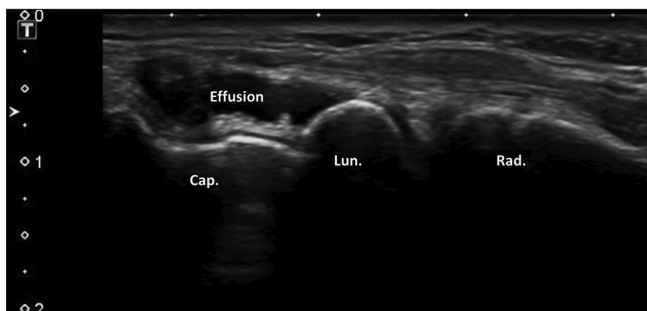


Figure 1: In a patient with upper limb lymphedema after breast cancer surgery, the edema condition worsened in a short period of time. Ultrasound examination showed dorsal wrist arthritis and effusion

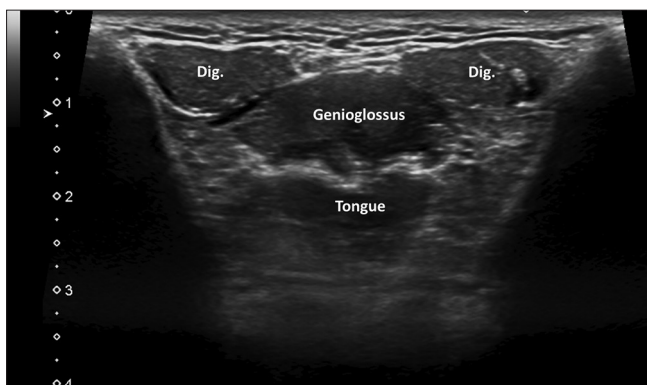


Figure 3: Coronal scan of muscles of the oral floor

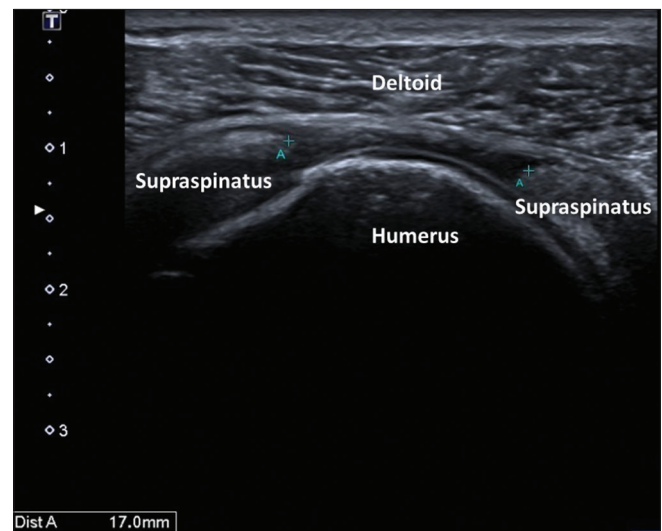


Figure 2: Full-thickness rupture of the superior articular tendon of the shoulder

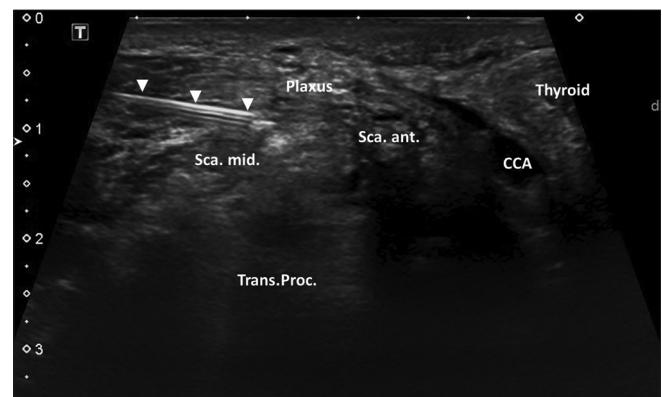


Figure 4: Ultrasound-guided hydrodissection and injection at the brachial plexus in a patient with head-and-neck cancer complaining postoperative radiation neuralgia of the upper limb

and popularization of the relevant medical fields is believed to bring cancer treatment teams more robust support and provide patients with more comprehensive care and support.

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Conflicts of interest

There are no conflicts of interest.

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