

Ultrasound Sonography at the Pain Clinic in Korea: Past, Present and Future

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Ultrasound is defined as sound having a frequency greater than that of which is audible to humans. Humans hear sounds at a frequency range of 20 to 20,000 cycles per second (hertz). Therefore, any sound having a frequency greater than 20,000 hertz (Hz) falls into the category of ultrasound. Today, ultrasound sonography for medical purposes uses a frequency range of 2 to 12 megahertz (MHz) [1].

As you may know, the practical use of ultrasound has evolved slowly, largely due to the limitations imposed by the equipment. In 1912, the first significant attempt for a practical application in the use of ultrasound was made while searching for the wreck of the Titanic. Technological advances that were made during the Second World War led to the development of SONAR (Sound Navigation and Ranging), which played an important role in under water warfare.

Following World War II, Dr. Douglas Howry applied this technology to medical applications with limited success. It was not until the development of B-mode imaging that ultrasound began to have a prominent position for medical diagnoses. Another leap forward in the use of ultrasound for medical purposes occurred with the advent of gray scale imaging in 1972. The application of digital computers

with sonographic imaging in the late 1970s led to the development of real-time gray scale imaging as we know it today.

Ultrasound sonography has been used to diagnose diseases of the heart, abdomen and pelvis. At their early stages, the more accurate the ultrasound instrument is, the wider the area that the physician can use this device can be expanded. New areas that ultrasound sonography is being used in are needle aspirations and biopsies.

In the 2000s, ultrasound sonography appeared in operating rooms and pain clinics. This meant that ultrasound sonography was begun used for injections near the nerve and tendon.

Ultrasound sonography has several more advantages over the methods of classical pain procedures: First, ultrasound sonography allows physicians to watch their targets (nerve and tendon) directly in order to avoid disturbing vital or sensitive anatomical structures surrounding the targets. Second, ultrasound sonography provides real time guidance, therefore improve the accuracy of block. Third, ultrasound sonography provides observations of the spread of injectates (anesthetics and steroids).

Why does ultrasound sonography appear in operating rooms and pain clinics? There are several reasons. First,

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new electrical technology decreases the size and complexity of the ultrasound instruments, thus many physicians can use these ultrasound instruments easily and conveniently. Also, it is possible that the ultrasound instrument can be easily moved from one working area to another. Second, physicians can provide more accurate treatment for regional block and pain block by using ultrasound sonography. Third, manufacturers of these ultrasound instruments want to establish a new business channel: they want to expand their market into the medical field with ultrasound sonography. All of the above reasons have induced pain physicians to use and study ultrasound sonography.

Now, do you use ultrasound sonography in your pain clinic?

Some physicians may use ultrasound sonography actively for treating patients with pain. Some physicians may use these for small number of patients with pain. Other physicians may not use ultrasound sonography because of financial difficulties and the lack of knowledge of ultrasound sonography.

For the expansion of ultrasound sonography in pain medicine, Korean Pain Society has started an ultrasound sonography workshop in 2009. Through this workshop, more physicians can come in contact with these ultrasound instruments, providing more knowledge for physicians to obtain.

In the Korean Journal of Pain (the official journal of the Korean Pain Society) between 2010 and 2012, I found some journals related to ultrasound sonography. There are only two original articles [2,3] and some case reports [4-6] written by Korean authors. This implies that the use of ultrasound sonography in Korea at an early stage and pain research by using ultrasound sonography has been a slow process.

Why does the use of ultrasound sonography not expand in Korea? There may be some reasons as to why this is the case.

First, only some hospitals and clinics have ultrasound instruments because of the high price for these instruments. Therefore those physicians who do not have enough

financial support have no chance to use the ultrasound sonography. Second, though having ultrasound instruments, some physician have limited uses. The reasons are that physicians have little experience with ultrasound sonography, and most of the treatment involving ultrasound sonography require highly skilled procedures. Third, due to its limited image capabilities, ultrasound instruments pose an obstacle in imaging bony structure, having physicians hesitate using ultrasound sonography.

As mentioned above, ultrasound sonography has many advantages. Additionally, ultrasound sonography allows for easy approach to lesions, permitting movement during examination, and the avoidance of radiation exposure. Therefore, in the future, we must have more education and experience in the use of ultrasound instruments, on the basis that, the number of pain physicians and hospitals using ultrasound sonography will increase. That will be the future that our areas of researchs will be expanded.

REFERENCES

1. Van Holsbeeck MT, Introcaso JH. Musculoskeletal ultrasound, 2nd ed. Missouri, Mosby, Inc. 2001.
2. Koh WU, Kim SH, Hwang BY, Choi WJ, Song JG, Suh JH, et al. Value of bone scintigraphy and single photon emission computed tomography (SPECT) in lumbar facet disease and prediction of short-term outcome of ultrasound guided medial branch block with bone SPECT. Korean J Pain 2011; 24: 81-6.
3. Pak MH, Lee WH, Ko YK, So SY, Kim HJ. Ultrasonographic measurement of the ligamentum flavum depth: is it a reliable method to distinguish true and false loss of resistance? Korean J Pain 2012; 25: 99-104.
4. Park JS, Kim YH, Jeong SA, Moon DE. Ultrasound-guided aspiration of the iatrogenic pneumothorax caused by paravertebral block -a case report. Korean J Pain 2012; 25: 33-7.
5. Park CH, Lee YW, Kim YC, Moon JH, Choi JB. Treatment experience of pulsed radiofrequency under ultrasound guided to the trapezius muscle at myofascial pain syndrome -a case report. Korean J Pain 2012; 25: 52-4.
6. Choi KW, Yoon KB, Yoon DM, Kim DH. Popliteal fossa pain in 24 year-old female. Korean J Pain 2012; 25: 275-7.