

Developments In Ultrasound: And Its Impact In Asia Pacific

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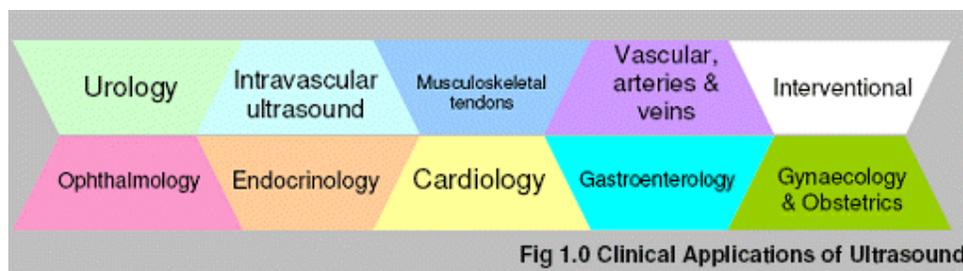
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Ultrasound imaging or Sonography is the utilization of high-frequency sound waves to acquire images inside the human body for diagnostic purposes. Ultrasound is an extremely useful method of examining patient's internal organs because the images are captured in real time, showing movement of internal tissues, organs and blood flow (Doppler Ultrasound).

Clinical Applications of Ultrasound

The use of ultrasound has been integrated in a wide variety of clinical settings, including obstetrics and gynecology, cardiology and cancer detection, the main advantages of ultrasound include;

- Not using ionizing radiation (x-ray)
- It is (usually) a painless medical diagnostic procedure
- Ultrasounds are performed much faster than x-rays or other radiographic techniques.



Generally during an ultrasound procedure, the following events happen;

1. A gel-like substance is smeared on the area of the body to undergo the ultrasound (the gel acts as a conductor).
2. Using a probe/transducer, the ultrasound machine transmits high-frequency (1 to 5 megahertz) ultrasound waves into the body.
3. The sound waves travel into the body and hit a boundary between tissues (e.g. between fluid and soft tissue, soft tissue and bone).
4. The sound from the probe/transducer is reflected off structures inside the body, and the information from the sounds is analyzed by a computer.
5. The computer calculates the distance from the probe to the tissue or organ (boundaries) using the speed of sound in tissue (5,005 ft/s or 1,540 m/s) and the time of the each echo's return (usually on the order of millionths of a second).

6. The computer displays the distances and intensities of the echoes on the screen, forming a two dimensional image.
7. The moving pictures can be recorded on film videotape or transmitted to a Picture Archival and Communication System (PACS).
8. In a typical ultrasound, millions of pulses and echoes are sent and received each second. The probe can be moved along the surface of the body and angled to obtain various views.

Redefining Ultrasound

Ultrasound images are traditionally displayed in two dimensions (thin, flat sections of the body) but developments in the technology made the following possible;

- Three Dimension (3-D) - Formats the sound wave data into 3-D images
- Four Dimension (4-D) - 3-D ultrasound in motion

While both 3-D and 4-D ultrasound has introduced new possibilities in the use of ultrasound technology in the clinical setting, the Zone Sonography Technology™ (ZST), developed by ZONARE Medical Systems fundamentally revolutionizes ultrasound imaging.

Termed as the "new wave" of ultrasound technology, ZST acquires data quickly in relatively large zones as opposed to many narrow lines; each zone contains a volume of data equivalent to many lines in a conventional system.

Zone Sonography
Technology™ acquires
significantly more echo
data in 1/10 time it takes
conventional systems

The technology architecture captures the data so quickly that;

- Need for repeat scanning due to questionable image quality is reduced
- All the raw data can be saved and stored

The substantially faster throughput means that more time is available for a variety of advanced processing options while still delivering extremely high image quality, in addition, a substantial amount of time is saved as focal zones are no longer an issue.

The versatility of ZST translates to clinical solutions for a wide variety of imaging needs in obstetrics, gynecology, vascular and other emerging ultrasound applications.

Impact to Asia Pacific

There are emerging trends in Asia Pacific where more clinicians (other than radiologist) are adopting ultrasound as a screening tool. This includes the establishment of 'satellites clinics' in rural areas or resting homes who are linked to hospitals using telemedicine.

Some of the emerging opportunities include;

- Use of ultrasound in emergency medicine
- Musculoskeletal ultrasound clinics (including sports clinics)
- Anesthesiology ultrasound

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- Veterinarian ultrasound

The introduction of Zone Sonography Technology™ is not just an improvement of current ultrasound technology but a breakthrough that will fundamentally revolutionize the technology into a new era. While much remains to be seen on how it will change the way ultrasound imaging is used, one can expect the results to be phenomenal.

Contact

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