



Imagine Now & Next

Probing into intraoperative ultrasound

Intraoperative ultrasound has become a valuable tool in modern medicine, allowing surgeons to clearly visualise and guide interventional procedures. Add in the latest developments in robotic surgery and fusion imaging, and it offers significant opportunities to physicians when planning and carrying out complex surgery, while also improving patient outcomes. But different surgical approaches, from open to minimally invasive, have different requirements of ultrasound transducers. FUJIFILM Healthcare Europe offers a diverse range of intraoperative probes developed with input from practitioners, and is continually innovating new and better transducers. But what are the key considerations when selecting an ultrasound probe for your procedures?

Opportunities in open surgery

Ultrasound imaging in open surgery, such as hepatobiliary-pancreatic surgery, allows the surgeon to visualise complex anatomical variations, assisting with tumor location and an understanding of its interaction with the surrounding vasculature. Probes for open surgery include the finger-grip probe and the linear T-shaped probe. The finger-grip probe acts as an extension of the surgeon's finger allowing palpation while scanning, and access to small operating fields. The T-shaped probe, on the other hand, offers a wider field of view over a large area, making it useful for visualising anatomical structures and blood flow.

Full flexibility for minimally invasive surgery

Minimally invasive surgery is increasing in frequency due to its benefits to the patient – less trauma, fewer complications, reduced scarring and quicker recovery times. Laparoscopic ultrasound probes support efficient keyhole surgeries in HPB, urology, coloproctology, gynecology and more. Their flexible and slim designs allow them to access the surgical cavity via the trocar, where the tip of the probe can be manipulated in different directions to provide views at all angles. A linear array allows firm contact with the organ, overcoming the lack of tactile sensation and capturing real-time feedback throughout the procedure.

Adapting to robotic surgery

The use of robotic surgery is expanding across a range of common procedures. Robotic intraoperative ultrasound probes have been designed to be used by the most popular systems, bringing the benefits of this type of real-time visualisation to this expanding field. Intraoperative drop-in probes have small footprints, well-positioned grasping fins, soft cables and lightweight designs. The probes offer full 360 articulation to make the most of the freedom of movement of the robotic arm. Drop-in probes can be selected in two different functional sizes, suitable for either larger fields of view of bigger organs, or for delicate use in procedures such as robotic-assisted partial nephrectomy or prostatectomy.

Seeing more with fusion imaging

Selecting the right probe provides the best field of view for the intervention, but the information provided can be further enhanced by combining the most advanced imaging modalities. Fusion imaging combines real-time ultrasound with CT, MRI, PET or another ultrasound volume to provide live views in theatre for a true multimodality approach. It can be used to guide the surgeon by synching and overlaying real-time ultrasound images with high resolution pre-operative scans. It can be useful in a number of surgeries, such as liver resections in the case of disappearing lesions. Isoechoic liver lesions caused by chemotherapy treatment are difficult to locate, but their removal is still critical for the patient. Using pre-chemotherapy datasets, combined

with live ultrasound, guides surgeons to lesions which are no longer visible, resulting in successful resection. Fusion imaging can even integrate pre-operative planning into the visual, to further guide the operation and improve success rates.

Probing the future

Working with surgeons to guide future R&D activities ensures that probes keep up-to-date with the latest evolution in surgical procedures and operative skills. After all, it is the hands-on experience that can provide the most valuable insights. Improving these tools provides opportunities to make interventions safer and more successful for patients, especially when combined with advances in robotics, imaging and minimally invasive surgery. There are many developments in the pipeline to try to design the best probes possible, so watch this space for the latest developments!

For more information on our intraoperative ultrasound probes visit www.hce.fujifilm.com/products/ultrasound/clinical-applications/surgery.html