IN-CONVERSATION
(MED eNews newsletter Issue 2, January 2023)

HiCura's AI solution helps doctors to pinpoint needles placements

We talk to co-founder Cailin Ng, HiCura Medical, about their technology and recent participation at MEDICAL FAIR ASIA 2022.

Tell us about the latest healthcare tech from HiCura Medical and its launch at MEDICAL FAIR ASIA 2022

HiCura Medical Pte. Ltd. aims to empower medical professionals to make better decisions by integrating AI into ultrasound-guided procedures. HiCura has developed uSINE, an AI ultrasound guidance software to increase the accuracy and success rate of spinal injections, which includes epidural for women in labour, spinal anaesthesia for surgeries and spinal tap or lumbar puncture to extract cerebrospinal fluid for disease diagnosis. uSINE automatically identifies spinal landmarks in real-time during an ultrasound scan of the spine and guides the medical professional to locate the correct needle insertion spot and angle for a successful first needle attempt. We are proud to launch our first product- uSINE® at MEDICAL FAIR ASIA 2022 where medical professionals can get to interact with our device.

What are the benefits for the patient/user?

Epidural, spinal anaesthesia and lumbar puncture requires needle access through a narrow space between bony structures into the epidural space and beyond. It is a difficult technique and currently, doctors are using the palpation method to manually feel the bony landmarks to determine needle insertion location. This can be very challenging for novices. It is also not effective for patients with high body mass index (BMI) whose bony landmarks may not be palpable. As a result, the first needle puncture success rate can be as low as 43% [1] for challenging patients which means more than half of these patients require more than one needle puncture. uSINE makes use of ultrasound to automatically identify the spinal landmarks and guides doctors to locate the optimal needle insertion spot and angle, thereby increasing the accuracy of the needle insertion. Clinical studies performed on over 200 patients showed that uSINE can achieve a first needle puncture success rate of 81% on patients with high BMI, and 92% on patients with healthy BMI. uSINE saves procedural time by reducing the number of needle puncture attempts for challenging patients, reduces the risk of complications from multiple punctures, and increases patient's safety and satisfaction.

[1] Wang, Q., Yin, C., Wang, T. L., Ultrasound facilitates identification of combined spinal-epidural puncture in obese parturients, Chinese Medical Journal, 125, 3840-3, 2012

What inspired this technology:

The initial idea was inspired by Prof Alex Sia and A/Prof Sng Ban Leong from KK Women's and Children's Hospital. Being clinicians, they identified an unmet need in clinical practice and envisioned a better and innovative way to improve the way epidurals are being performed. Cailin, CEO of HiCura and a mother of 2 children, had a difficult epidural herself during the birth of her 2nd child. She was traumatised and distressed by the multiple punctures it took for a successful epidural. When the doctors suggested using technology and AI to improve a conventional technique, she saw the immediate benefits to patients like her and decided to set up HiCura to develop this technology.

What is the feedback from the users/industry on this technology thus far? uSINE has the potential to transform the current way doctors are performing epidural, spinal anaesthesia and lumbar punctures. uSINE gives doctors the confidence to move away from the palpation method to a safer and more efficient ultrasound-guided way of performing these procedures. Doctors who have used uSINE found it a breeze to use and agreed that uSINE increases accuracy and improves patient care. We have performed 3 clinical studies

in KK Women's and Children's hospital that have shown a high first needle puncture success rate on patients using uSINE. For the first trial performed on normal-BMI patients, the first needle puncture success rate is 92% [2], and on subsequent 2 trials with high-BMI patients, the first needle puncture success rate is 79% [3] and 82% [4] respectively.

[2] Oh TT, Ikhsan M, Tan KK, Rehena S, Han NL, Sia AT, Sng BL. A novel approach to neuraxial anesthesia: application of an automated ultrasound spinal landmark identification. BMC anaesthesiology. 2019 Dec;19(1):1-8. [3] In Chan JJ, Ma J, Leng Y, Tan KK, Tan CW, Sultana R, Sia AT, Sng BL. Machine learning approach to needle insertion site identification for spinal anesthesia in obese patients. BMC anaesthesiology. 2021 Dec;21(1):1-8. [4] Tan HS, Chan JJ, Oh TT, Lim MJ, Tan CW, Sultana R, Sng BL. Optimising a machine learning approach to identify landmarks during pre-procedure lumbar ultrasound for spinal anaesthesia in obese parturients, paper-in-writing.

In your opinion, what does the future look like for this technology?

AI has immense potential to transform medicine, especially in medical imaging. There are many successful examples of how AI can increase accuracy in diagnosis, especially in mammography. And there is a huge space of play for AI in imaging-guided interventional procedures which requires on-the-spot clinical decision making. HiCura continues to develop innovative solutions to empower doctors to make better decisions during imaging-guided procedures. We believe that uSINE® will be a landmark tool-- not just for clinical applications but in medical education and training too. uSINE® has received HSA approval for use in hospitals in Singapore. HiCura’s goal is to provide all patients with the right to safer and better neuraxial procedures. The HiCura team aims to meet this goal through constant innovation and partnership with clinical experts to empower clinicians to make better decisions.

****