

Ultrasound-Guided Regional Workshop Utilizing AI to Improve Resident Knowledge and Experience with Common Peripheral Nerve Blocks

Neerav Kothari, MD, Gabriel Sheena, MD
Department of Anesthesiology, University of Illinois Chicago



Introduction	Methods	Results	Conclusion
- Regional anesthesia can improve postoperative analgesia or be used as a primary anesthetic for patients undergoing select procedures - Our institution utilizes a regional anesthesia team to perform peripheral and neuraxial nerve blocks, in coordination with our surgical and anesthesia colleagues - Resident exposure to peripheral nerve blocks are limited, often by patient or surgical factors - Utilizing ultrasound workshops with AI software, our primary goal was to increase resident knowledge, exposure, and confidence in offering and performing regional blocks to patients	- Four separate workshops performed once every two months covering common upper extremity, lower extremity, truncal, and neuraxial blocks were held for residents - Workshops covered indications, risks and benefits, and identification of ultrasonographic landmarks for successful block - The application Nerveblox was utilized, an AI-driven software that can capture real time images from an ultrasound device to identify and highlight anatomical landmarks	- Resident understanding regarding select regional blocks was assessed using surveys at the completion of each workshop. These surveys assessed resident knowledge and confidence before and after the workshop in regards to the nerve blocks presented - Each workshop averaged 10-15 residents. A scale from 1 to 5 was utilized, with 1 representing poor confidence and knowledge, and 5 representing strong confidence and knowledge - An average score of 2.6 was reported pre-workshop, with an improvement to 4.2 on the post-workshop survey. - This reflected a 32% increase in confidence and understanding over all workshops. No workshop survey demonstrated a worsening of resident knowledge and confidence Pre and Post Workshop Confidence Assessment Upper Extremity Blocks Lower Extremity Blocks Truncal Blocks	- Ultrasound-guided workshops can educate residents regarding the benefits of regional anesthesia, and allow them to more confidently discuss it with patients - The use of AI software helped residents by highlighting target anatomy and nerve structures in real-time, which allowed for them to understand important landmarks to be aware of for different blocks - While AI models can improve simulation-based training and education, barriers still exist in its adaptation into clinical practice - Our post-workshop surveys demonstrated an average increase of 32% in confidence and knowledge ratings given by residents - This project successfully increased resident knowledge and confidence in commonly performed peripheral and neuraxial nerve blocks in our institution through ultrasound guided workshops with the assistance of AI-driven software

References

- Smartalpa. (2020). *Homepage - Nerveblox*. Nerveblox - Ultrasound Intelligence. <https://www.nerveblox.com/>
- Recker, F., Neubauer, R., Dong, Y. *et al.* Exploring the dynamics of ultrasound training in medical education: current trends, debates, and approaches to didactics and hands-on learning. *BMC Med Educ* 24, 1311 (2024). <https://doi.org/10.1186/s12909-024-06092-9>
- Sites BD, Gallagher JD, Cravero J, Lundberg J, Blike G. The learning curve associated with a simulated ultrasound-guided interventional task by inexperienced anesthesia residents. *Reg Anesth Pain Med*. 2004 Nov-Dec;29(6):544-8. doi: 10.1016/j.rapm.2004.08.014. PMID: 15635513.
- Swain BP, Nag DS, Anand R, Kumar H, Ganguly PK, Singh N. Current evidence on artificial intelligence in regional anesthesia. *World J Clin Cases*. 2024 Nov 26;12(33):6613-6619. doi: 10.12998/wjcc.v12.i33.6613. PMID: 39600473; PMCID: PMC11514339.