

IN PRACTICE

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CUTTING EDGE: A GEL-TISSUE HYBRID MODEL FOR ULTRASOUND GUIDED KIDNEY BIOPSY

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Introduction: Ultrasound (US) guided, or Point of Care Ultrasound (POCUS) procedures are increasingly commonplace in healthcare. These procedures improve accuracy and benefit patient safety [1]. Simulation provides a safe environment for healthcare providers to learn how to use the US probe and carry out different surgical or medical interventions such as a kidney biopsy. An innovative US compatible model for kidney biopsies was created out of mixed materials using Aqueous Dietary fibre and Antifreeze Mix (ADAM) Gel [2], a porcine kidney and porcine muscle and skin.

Methods: The model was created after two months of trialling different formulations of ADAM Gel, which was made from psyllium husk, anti-foam, propylene glycol and water. A porcine kidney was situated between two layers of ADAM Gel and a final layer of porcine muscle with skin attached was positioned on top. Both fresh and frozen kidneys were trialled. It was found that the kidneys that were frozen immediately after harvest and thawed before use yielded much better visual results under US in comparison to the fresh kidney used

a day after harvest. Parts of the kidneys internal structures were well defined under ultrasound to assist in accurate identification of anatomical landmarks. The biopsy needle could be inserted through the layers and a tissue core, with visible glomeruli, was collected from the kidney. This could then be viewed under a microscope for diagnostic purposes.

Results: The models were used at a national nephrology conference in Ireland. The mean learner (n=10) rating of the quality and performance of the models was 9.6 out of 10. The qualitative feedback on the models were that they were 'very realistic', 'easy to use' and that completing the procedure felt like a 'true to real life experience'.

Discussion: In summary, ADAM Gel allowed for the creation of a realistic synthetic base for learning how to carry out US guided procedures. It can be used alongside animal/biological tissue or other synthetic materials for a variety of different medical interventions and treatments. The ability to take tissue samples from the model means the procedure can be followed through up to diagnostic level rather than ending at the patient care level.

Ethics Statement: As the submitting author, I can confirm that all relevant ethical standards of research and dissemination have been met. Additionally, I can confirm that the necessary ethical approval has been obtained, where applicable.

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