



Abstract Type : Poster exhibition

Abstract Submission No.: A-0797

Abstract Topic : Interventional Nephrology

Real-time Bedside Evaluation of Kidney Biopsy Adequacy Using Built-in Smartphone Macro Photography

Minji Kim, Jeehyang Park, Yoonho Kim, Junseok Jeon, Hye Ryoung Jang, Jung Eun Lee, Woosong Huh, Kyungho Lee

Department of Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea, Republic of

Objectives : Assessing biopsy adequacy is essential for a successful kidney biopsy procedure. With advancements in smartphone technology, smartphone-based evaluation is increasingly utilized in pathology. Recent improvements in smartphone cameras have enabled high-resolution macro imaging through built-in camera modules. We hypothesized that nephrologists could visually determine specimen adequacy with the assistance of a modern smartphone's built-in macro camera.

Methods : A prospective cohort study was conducted with consecutive adult patients who underwent ultrasound-guided native kidney biopsies performed by two nephrologists between February 2025 and March 2025. Macro photography of each biopsy core was manually captured using the built-in macro photography mode of Galaxy S25 Ultra (Samsung) immediately after each procedure. Adequacy determinations made via smartphone macro imaging were compared to those made by a pathology technician using standard light microscopy (Olympus, BX40). Statistical agreement between the two methods was assessed using Cohen's kappa coefficient.

Results : Among 12 kidney biopsy patients, a total of 43 kidney cores were obtained. 31 (72.1%) cores were considered adequate by both smartphone macro imaging and standard microscopy, while 10 (23.3%) cores were deemed inadequate by both methods. One sample (2.3%) was classified as adequate by smartphone macro imaging but inadequate under microscopy, and another sample (2.3%) was considered inadequate via smartphone macro imaging but adequate under microscopy. The smartphone macro photography-based assessment had a positive adequacy agreement rate of 96.9% and a negative adequacy agreement of 90.9%, with an overall agreement rate of 95.4% (Cohen's kappa: 0.878). The mean number of glomeruli included in final pathology results was 20.4 ± 9.4 , and all biopsies led to definite pathologic diagnosis.

Conclusions : Bedside evaluation of ultrasound-guided kidney biopsy samples using smartphone-based macro photography demonstrated excellent agreement with standard microscopic assessment, offering a cost-effective, accessible, and time-efficient alternative for evaluating kidney biopsy adequacy. This method has the potential to reduce nondiagnostic results in real-world clinical practice.