Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care
KSN SEOUL, KOREA 2026
The 46th Annual Meeting of the Korean Society of Nephrology
THE KOREAN SOCIETY OF NEPHROLOGY
Jun 11 (Thu) – 14 (Sun), 2026
COEX, Seoul, Korea

Abstract Type : Poster exhibition
Abstract Submission No.: A-0520
Abstract Topic : Glomerular and Tubulointerstitial Disorders

Diagnostic Equivalence of Low-Voltage Electron Microscopy and High-voltage Transmission Electron Microscopy in Renal Pathology: Implications for Global Accessibility in Low-Resource Settings

Muhammadaziz Aliyev[2], Mekhriniso Eliyeva[3], Daniela Vieira[4], Emad Shahnam[4], Jared Lapkovsky[4], **Beom Jin Lim**[1]
[1]Department of Internal Medicine-Nephrology, The National Specialized Research and Practical Medical Center for Nephrology and Kidney Transplantation, Uzbekistan
[2]Department of Forensic Medicine and Medical Law, Tashkent State Medical University, Uzbekistan
[3]Department of Delong Instruments, Delong America, Canada
[4]Department of Pathology, Yonsei University College of Medicine, Korea, Republic of

Objectives : Transmission electron microscopy (TEM) is essential for diagnosing renal pathology, but its complexity, cost, and facility requirements limit its use, especially in low-resource settings. Low-voltage electron microscopy (LVEM) offers a lower-cost, more accessible alternative. While LVEM has demonstrated potential for generating diagnostically meaningful images, direct comparison with existing high-voltage TEM systems (HVEM) using identical clinical samples is limited. This study aimed to determine if LVEM can reproduce critical ultrastructural findings of conventional HVEM and support diagnosis where traditional EM is unavailable.
Methods : We re-examined renal biopsy thin sections, previously imaged with HVEM (80 kV), using a LVEM system (LVEM 25E, Delong Instruments), operating at accelerating voltages of 10-25 kV). We used standard osmium-fixed, uranyl acetate- and lead-stained sections, placed on 3-mm grids, and imaged them at various magnifications. We qualitatively compared principal diagnostic structures: glomerular basement membrane (GBM) changes, electron-dense deposits, and podocyte foot processes. For amyloidosis, we measured fibril diameters and compared them with reference values.
Results : LVEM produced diagnostic-quality images comparable to HVEM in all specimens. Electron-dense deposits, GBM changes, and foot process effacement were clearly discernible at high magnification. In amyloid-positive specimens, fibril diameters measured on LVEM micrographs (about 9–12 nm) matched the ~10-nm range known for amyloid fibrils.
Conclusions : LVEM reproduced key ultrastructural findings from TEM, including well-defined images of diagnostic deposits and podocyte abnormalities, as well as precise measurement of amyloid fibrils. Its simpler setup, lower cost, and compact design suggest LVEM is not only an alternative in well-funded labs but also a practical solution for renal pathology in developing countries lacking full-scale EM facilities. These results support further validation of LVEM as a globally accessible diagnostic platform.