Innovative 3D pathology and lymphocyte expression of interstitial inflammation for diagnosis of pediatric-onset lupus nephritis

Yung-Chieh Huang, Yong-Chen Hsu, Jun-Pen Chen, and Lin-Shien Fu*

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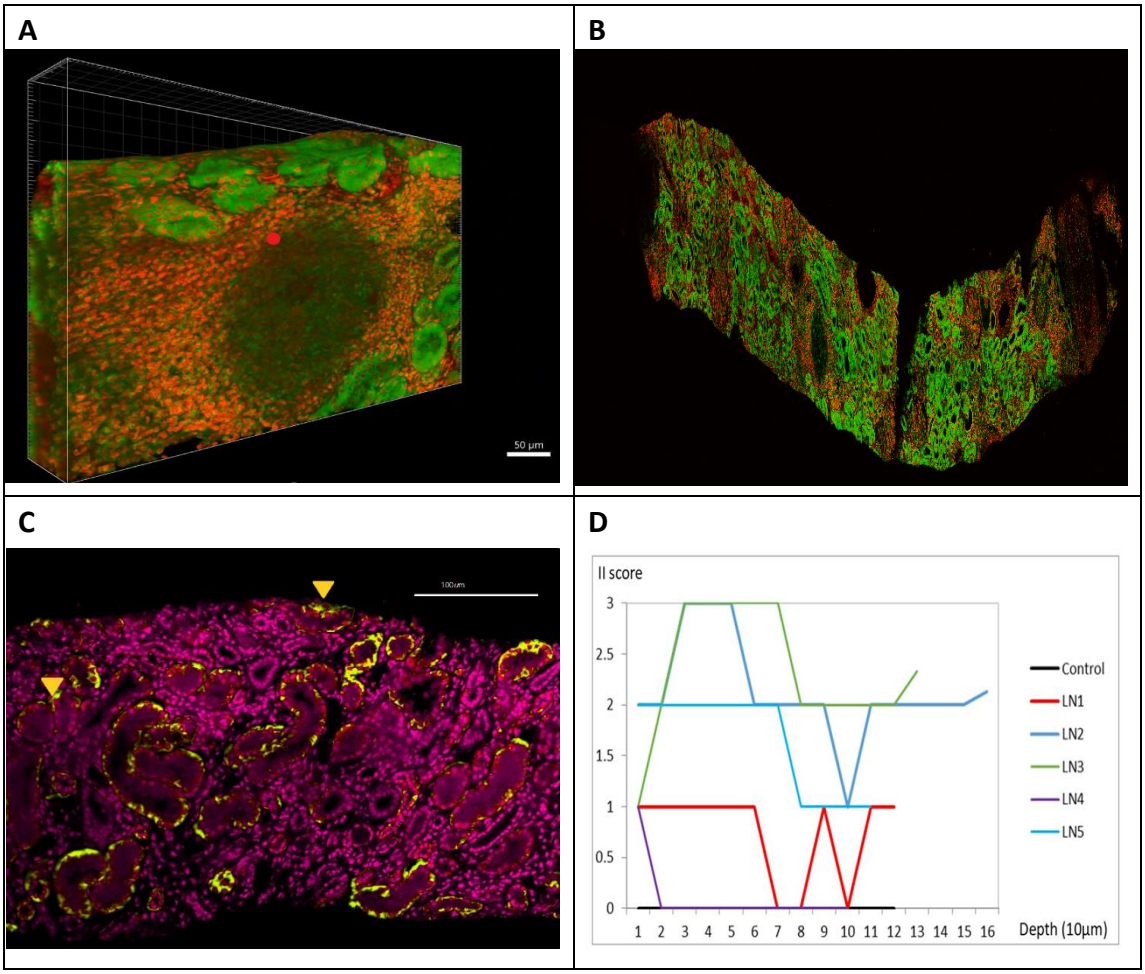
Lupus nephritis is a severe disease, and chronic changes in patients' renal pathology are relevant to the course towards end-stage renal disease. Among which renal tubular atrophy and interstitial fibrosis are the most important for disease prognosis. Recently, a non-chronic and acute pathological change---renal interstitial inflammation has drawn research attention of clinicians and pathologists.

Dr. Lin-Shien Fu, Director of Pediatric Nephrology and Immunology Department of Taichung Veterans General Hospital, analyzed kidney samples of Class III & IV lupus nephritis from patients whose systemic lupus erythematosus (SLE) onset before the age of 18, and found that renal interstitial inflammation is an independent factor for predicting long-term kidney function, leading to the world first clinical report with major scientific merit.

The authors compared traditional pathological sections of lupus nephritis specimens with innovative 3D pathological images, and found that tissue patterns presented by 3D pathology clearly identified chronic changes of lupus nephritis and renal interstitial inflammation. While traditional pathological analysis in interpretation of renal tubular atrophy and renal interstitial fibrosis appeared affect consistency of correlation between groups due to different slice depths, novel 3D pathology supported spatial evaluation of renal interstitial inflammation, chronic changes, and renal tubular atrophy plus renal interstitial fibers in a more comprehensive manner. Complete analysis of pathological scores is expected to assist physicians in more precise evaluation and prediction for lupus nephritis patients. There are several potential drugs/management for modifying B cell/plasma cell and *in situ* complement activation for SLE patients. Precise evaluation in renal pathology in lupus nephritis becomes more and more important.



Novel 3D pathology analyses of renal specimen (A) 3D morphology (red: nuclei, green: membrane), (B) 2D morphology (red: nuclei, green: membrane), (C) Lymphocyte expression (yellow: CD138, plasma cell biomarker), (D) multi-layer interstitial inflammation scoring by tissue depth,