Renal Transplant Pathology: An EM Potpourri

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Abstract

Electron microscopy (EM) plays a vital role in the analysis of renal transplant biopsies. It is often crucial for the identification of glomerular diseases in the transplant. Though certain glomerular disorders are notorious for recurring (e.g., IgA nephropathy, focal segmental glomerulosclerosis, dense deposit disease) or occurring de novo (e.g., membranous nephropathy) in transplants, the list of possibilities is almost endless, and includes monoclonal gammopathies of renal significance. The “open view” afforded by EM is ideal for hunting for unsuspected glomerular pathology, and in some cases is crucial for guiding further diagnostic investigations. The line between the recurrent and de novo categories is frequently blurred; for many patients, no native renal biopsy has been performed, and the original cause of renal failure is either unknown or conjectural (“end-stage renal disease attributed to hypertension/diabetes”). Ultrastructural analysis can also detect unanticipated glomerular disorders present in the donor kidney.

Electron microscopy is also central to the analysis of some forms of transplant rejection; in particular, it can detect microvascular abnormalities associated with chronic antibody-mediated rejection. These include alterations of the glomerular capillary loop (chronic transplant glomerulopathy) and multilayering of peritubular capillary basement membranes. Finally, though to some extent supplanted by immunohistochemical and molecular diagnostic methods, EM is occasionally indispensable for detecting infectious complications of transplantation, particularly those involving unexpected pathogens. Though a comprehensive survey is beyond the scope of this presentation, it will provide examples of all of these categories.