

The Role of Electron Microscopy in Percutaneous Biopsies of Renal Masses

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Abstract

INTRODUCTION

Percutaneous biopsies have been utilised as a safe diagnostic tool for small renal masses (SRMs). Electron microscopy (EM) plays a key role in distinguishing between renal oncocytic neoplasms, identifying those tumours suitable for surveillance. In this study, we report on our experience of EM and its role in image-guided renal biopsy over a 13 year period.

METHODS

All patients who had undergone imaging guided biopsy at Concord Repatriation General Hospital between January 2012 and July 2024 were retrospectively identified. Data was collected by accessing electronic medical records. Parameters evaluated included biopsy quality, histopathological and EM findings for biopsy and resection specimens, and clinical follow-up.

RESULTS

232 patients had a renal biopsy for a renal mass, with mean age of 55. 122 biopsies had EM for further ultrastructural characterization. 60(49%) were diagnosed as oncocytoma of the kidney (OK), 18 (15%) were chromophobe renal cell carcinomas (chRCC) and 44 (36%) were other diagnoses (including 10 clear cell renal cell carcinomas, 4 angiomyolipomas, and 4 other soft tissue tumours).

Renal oncocytomas were significantly more likely to be followed-up with surveillance imaging. Biopsies with EM findings of a chRCC were mostly treated by surgical resection with concordant final histopathology. Other renal cell carcinomas with overlapping ultrastructural features of an OK or a chRCC were managed by surveillance or resection, depending on patient and tumour factors.

CONCLUSIONS

Image-guided biopsy is a safe and accurate diagnostic procedure for the assessment of SRMs. Electron microscopy has important utility in distinguishing oncocytoma from renal cell carcinomas and avoids unnecessary surgery.