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Chromophobe renal cell carcinoma—chromosomal aberration variability and its relation to Paner garding system: an array CGH and FISH analysis of 37 cases

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Abstract:

Genetically, chromophobe renal cell carcinoma (ChRCC) is characterized by multiple chromosomal changes, especially losses. The most common losses include chromosomes 1, 2, 6, 10, 13, 17, and 21. The Fuhrman grading system lacks prognostic relevance for ChRCC, and recently, a new grading system for ChRCC was proposed by Paner. The objective of this study was to map the spectrum of chromosomal aberrations (extent and location) in a large cohort of ChRCCs and relate these findings to the Paner grading system (PGS). A large cohort of ChRCC was reviewed and graded according to the PGS. All the cases were reevaluated and separated into groups according to their PGS. The final study set was 37 patients. ChRCCs were divided into PG 1–3, sarcomatoid, and aggressive groups. “Aggressive ChRCCs” were designated cases with known metastatic activity, local recurrence, aggressive growth to the adjacent organs, or invasive growth into the renal sinus (with/without angioinvasion). Sarcomatoid tumors were divided into their epithelial and sarcomatoid component (further molecular genetic analyses were performed separately). Array comparative genome hybridization and/or fluorescence in situ hybridization analysis was applied to 42 samples from the 37 cases. Multiple losses, as well as gains, were detected in different chromosomes. Regardless of the PGS groups, the most frequently detected losses involved chromosomes 1 (27/37), 2 (26/37), 6 (23/37), 10 (26/37), 13 (19/37), and 17 (24/37). Loss of chromosome 21 was found in 12/37 cases. The most frequently detected gains were found on chromosomes 4 (22/37), 7 (24/37), 15 (20/37), 19 (22/37), and 20 (21/37). Cluster analysis showed that there is no relation between PGS and particular pattern of chromosomal changes (losses or gains) in ChRCCs. Conclusions are as follows: (1) ChRCCs showed a significantly broader spectrum of chromosomal aberrations than previously recognized. While previously published chromosomal losses were found in our cohort, gains of multiple chromosomes were also identified in a high percentage. The most frequently detected gains involved chromosomes 4, 7, 15, 19, and 20. (2) There is no relation between chromosomal numerical changes and Paner grading system.

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