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A comparison of intraobserver variability of WHO/ISUP and Fuhrman nuclear grading systems for clear cell renal cell carcinoma

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Introduction and objectives: The nuclear grade (NG) is an indicator of prognosis for certain renal cell carcinoma (RCC) types. The WHO/ISUP NG system replaced the previously used Fuhrman system (FS) in 2012. The objective of this study was to assess the intraobserver variability within these two systems.

Methodology: All clear cell RCCs (CC-RCC) reported in the Histopathology Departments of the National Hospital and the University of Colombo, Sri Lanka, from 2016 to 2020 were selected. One routinely stained slide with a representative tumour section was selected from each case. Two rounds of NG assessment were performed using each system with two-week wash-out periods. The slide sequence was changed between each round, and the findings were recorded in four separate data-entry sheets to prevent bias. The intraobserver agreement for each system was calculated using the kappa index (SPSS version 25.0). The slides with different NGs within the same system were re-examined to identify reasons for the discrepancy.

Results: There were 189 CC-RCCs. The kappa values for the WHO/ISUP NG system and FS were 0.953 and 0.856, respectively (95% CI = 0.916-0.99 and 0.794-0.918, respectively). The complexity of criteria, artefacts and poor slide quality hampered the accurate assessment of nuclear details and affected NG.

Discussion and conclusion: The WHO/ISUP system showed an almost perfect level of intraobserver agreement. Complexity/multiplicity of nuclear criteria would have resulted in higher intraobserver variability in FS. Although discordant with prior documentation, FS also demonstrated a strong level of intraobserver agreement in this study.

Keywords: renal cell carcinoma, WHO/ISUP, Fuhrman, intraobserver variability, kappa

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