Multi-target fluorescence in situ hybridization in bladder washings for prediction of recurrent bladder cancer

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The objective of this study was to evaluate the diagnostic value of chromosomal analysis by fluorescence in situ hybridization (FISH) for predicting recurrence of urothelial carcinoma (UC) after transurethral resection. One hundred and thirty-eight patients (median age 68.5 years) with a history of UC were eligible for this prospective study. FISH was applied to cytospin specimens prepared from bladder washings taken during a negative control cystoscopy. The multi-target FISH test UroVysion (Abbott/Vysis) containing probes to the centromeres of chromosomes 3, 7, 17 and the 9p21 locus was used. UC recurrence was defined as a positive biopsy during follow-up. The median follow-up time was 19.2 (4-52) months. FISH was positive in 50 (36%) patients and negative in 88 (64%) patients. A recurrence occurred in 39% of the patients with a positive FISH test and in 21% of patients with a negative FISH test. FISH positivity according to manufacturer’s criteria, at the time of a negative cystoscopy, was not significantly associated with the risk of recurrence (p = 0.12). However, the sensitivity of the FISH test to predict recurrence was significantly improved by considering specimens with rare (< or =10) tetraploid cells as negative (p < 0.006). In addition, presence of 9p21 deletion was significantly associated with recurrence (p < 0.01). Notably, positive standard cytology was an independent factor for subsequent recurrence in this study (p < 0.001). Taken together, multi-target FISH may help to stratify the risk of recurrence of UC at the time of a negative follow-up cystoscopy. Defining the optimal threshold for FISH positivity requires consideration of tetraploid pattern and 9p21 deletion. Our results also emphasize the paramount importance of conventional cytology for UC surveillance.