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EVALUATION OF URINARY NUCLEAR MATRIX PROTEIN 22 TEST FOR DETECTION OF UPPER TRACT UROTHELIAL CARCINOMA

*Ithaar H Derweesh MD **, *Jim Y Wan PhD*, *Christopher J DiBlasio MD*, *John B Malcolm MD*, *Reza Mehrazin MD*, *Anthony L Patterson MD* and *Robert W Wake MD*. *Memphis TN*; *Memphis TN*; *Memphis TN*; *Memphis TN*; *Memphis TN*; *Memphis TN* and *Memphis TN*.

INTRODUCTION AND OBJECTIVE: The NMP22® BladderChek® Test (NMP22, Matritech) is a non-invasive urine-based qualitative assay that is approved by the FDA for the diagnosis of bladder cancer. We assessed the ability of urinary NMP 22 to detect upper tract urothelial carcinoma (UT-TCC).

METHODS: From January 2005 to September 2007, we obtained urine NMP22 on all patients with enhancing solid or complex-cystic or renal pelvic masses, or other solid or inflammatory renal lesions considered for surgery. Demographics (age, sex, race, BMI, smoking history), tumor characteristics (staging, pathology), and NMP22 results were recorded. NMP22 status was analyzed within subgroups based on tumor type (urothelial-TCC) or parenchymal (Renal Cell Carcinoma histological subtypes, Oncocytoma, Angiomyolipoma). Patients with co-existing/prior diagnosed bladder TCC or inflammatory lesions (xanthogranulomatous pyelonephritis, emphysematous pyelonephritis) were excluded from analysis for sensitivity, specificity, positive (PPV) and negative predictive value (NPV) of NMP22 for diagnosis of UT-TCC. Multivariate analysis was performed to elucidate variables associated with NMP 22 positivity.

RESULTS: 260 patients (149 Male/111 Female, 126 African-American and Other/134 Caucasian, average age 57.4 years) had NMP22 determination. 197 were parenchymal tumors (153 Clear Cell Carcinoma, 13 Papillary Cell, 4 Sarcomatoid, 3 Chromophobe, 1 Collecting Duct, 10 Oncocytoma, 13 Angiomyolipoma), 41 were UT-TCC, and 22 were inflammatory/infectious. Sensitivity of NMP22 in predicting presence of UT-TCC was 78.0%, specificity was 88.3%, PPV was 59.2%, and NPV was 95.0%. Multivariate analysis demonstrated age ≥60 years (OR 2.46, p=0.047), TCC pathology (OR 37.0, p<0.001) and smoking history (OR 10.6, p=0.001) are significantly associated with NMP22 positivity.

CONCLUSIONS: NMP22 may be useful in diagnosis of UT-TCC. In absence of lower tract disease and with a radiographic renal lesion with positive NMP22, the high specificity should increase clinical suspicion for presence of UT-TCC. Conversely, negative NMP22 in the presence of a renal lesion may also be a useful tool to rule out UT-TCC because of its high sensitivity and NPV.

Multivariate analysis for factors associated with NMP 22 test positivity

Variable	Odds Ratio	95% CI	p value
Pathology (TCC vs. Other)	37.0	10.8–125	<0.001
Smoking History (Yes vs. No)	10.64	2.61–43.48	0.001
Age (≥60 vs. <60 years)	2.46	1.01–5.98	0.047
Clinical Stage (>1 vs. 1)	3.03	0.87–10.6	0.083
Side (Right vs. Left)	0.48	0.19–1.15	0.100
BMI (≥30 vs. <30 kg/m ²)	1.70	0.73–3.98	0.222
Race (African-American/Other vs. Caucasian)	1.67	0.66–4.26	0.281
Tumor Size (≥4 vs. < 4cm)	1.46	0.51–4.15	0.476
Sex (Male vs. Female)	0.82	0.33–2.00	0.666

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