

Urinary Cytology as a Test in Mass Screening

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NEMOTO, R., KATO, T., SHIBATA, K. and KANO, M. *Urinary Cytology as a Test in Mass Screening.* Tohoku J. exp. Med., 1981, 135 (1), 115-116 — A rapid and simple cytologic screening system for urinary tract cancer stained with toluidine blue was described. Utilizing this system, a hospital population was screened for urinary tract cancer from specimens sent for routine urinalysis. In this study of 16,062 fresh urine sediments selected at random from non-urologic patients, three cases histologically proven bladder cancer were detected, leading to the detection rate of one bladder cancer in 5,000 individuals. The results emphasizes the usefulness of this simple screening technique in combination with clinical urinalysis and cytology for early detection of urinary tract malignancy. ——— urinary cytology; mass screening; urinary tract cancer; toluidine blue

The problem in urology, as in other fields of medicine, is to initiate reasonable therapeutic procedure sufficiently early to afford hope for cure. If a simple, non-invasive and inexpensive test to detect early stage of cancer could be developed, as the minifilm is applied to mass screening for pulmonary cancer and other thoracic lesion, it would be a powerful weapon. Herein we made an attempt to screen a hospital population for urinary tract cancer by utilizing the rapid cytologic technique on fresh urine specimens sent for routine urinalysis. The purpose of the study was to detect cancer before hematuria or other symptoms developed and to make the diagnosis during the early period between the first cell mutation and the first clinical symptom.

MATERIALS AND METHOD

From April 1979 to March 1980 we examined urinalysis sediment for urinary tract cancer selected at random from in- and out-patients at Akita Municipal Hospital. Most patients did not complain of any symptoms of disease of the urinary tract. The urine used in the study had been centrifuged by the medical technologists in the clinical microscopy laboratory. After a usual microscopic examination including counts of leucocytes, erythrocytes and epithelial cells, a drop of the sediment was placed on a slide and another drop of an aqueous solution of toluidine blue (1% aqueous toluidine blue diluted 5 times with distilled water) was added and mixed. The slide was covered with a cover slip and scanned for abnormal cells. For the study, approximately 80 specimens were examined each day spending about 1 to 2 min on each scanning. Preliminary screening was carried out by cytology technicians and all questionable and suspicious slides were then studied by a staff with wide experience in cytopathology. When any abnormality was observed a permanent specimen, Papanicolaou staining was made and doubtful results were retested.

Received for publication, January 16, 1981.

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RESULTS AND DISCUSSION

Of the 16,062 individuals examined by the screening and retested examinations, 6 (0.04%) were considered to be abnormal finally (Table 1). In the 6 patients with positive cytology, four were submitted to a complete urological investigation. One of them was a false positive from a 50-year-old man who had had stomach cancer, despite a most searching examination including at random biopsy of bladder and retrograde pyelograms. The other three were proven histologically to be transitional cell carcinoma of the urinary bladder. All the cases of transitional cell carcinoma were, in a sense, unsuspected. One of them who had had a carcinoma of the urinary bladder resected 5 years ago had been in out-patient for treatment of essential hypertension.

TABLE 1. *Review of mass screening for urinary tract cancer utilizing urinary cytology*

Reference	Number of patients screened	Positive cytology	False positive	No further examination	Bladder cancer	Prostate cancer	Other cancer
Presti and Weyrauch (1955)	1575*	5	2	0	0	1	2
Holmquist (1977)	1032†	5	1	0	1	3	0
Holmquist (1980)	1208†	5	0	0	1	1	3
Present study	16062*	6	1	2	3	0	0

Subjects were either selected at random (*) or over 40 years old (†).

In assessing the efficacy of a cytologic technique in detection of the urinary tract cancer by mass screening, several investigators (Presti and Weyrauch 1955; Holmquist 1977, 1980) reported their experience (Table 1). Holmquist repeated the examination of urine sediments with a simple staining technique by toluidine blue and suggested the usefulness of this procedure to detect unsuspected cases of bladder cancer in a hospital and clinic population where urinalysis are done routinely. Our present study also indicates the value of a rapid cytologic screening technique for fresh urine specimens stained with toluidine blue. The detection rate of one bladder cancer in 5,000 patients selected at random makes this simple technique worth-while in mass screening. The technique is more efficient and valuable when it is used for selective screening of high risk group including aged subjects, industrial workers exposed to aromatic amines and a bilharzial population. Our study, in contrast with other investigators in USA, discovered no certain prostate cancer because of lower incidence of this disease in Japan.

References

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