



## Prostatic involvement by transitional cell carcinoma in patients with bladder cancer and its prognostic significance

Steven S. Shen MD, PhD<sup>a,\*</sup>, Seth P. Lerner MD<sup>c</sup>, Bahar Muezzinoglu MD<sup>b</sup>, Luan D. Truong MD<sup>a</sup>, Gilad Amiel MD<sup>c</sup>, Thomas M. Wheeler MD<sup>b</sup>

<sup>a</sup>Department of Pathology, The Methodist Hospital, Houston, TX 77030, USA

<sup>b</sup>Department of Pathology, Baylor College of Medicine, Houston, TX 77030, USA

<sup>c</sup>Scott Department of Urology, Baylor College of Medicine, Houston, TX 77030, USA

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**Summary** To study the importance of prostatic involvement by transitional cell carcinoma (TCC) in patients with bladder cancer, we examined the entire prostates by whole-mount sections from 214 radical cystoprostatectomy specimens for detailed patterns of involvement by TCC and correlated the results with lymph node metastasis and patients' survival. Prostatic involvement by TCC was detected in 69 (32%) of 214 cases. Among them, 30 (43%) patients had carcinoma in situ (CIS) and the other 39 (57%) were invasive TCC. Carcinoma in situ occurred in either prostatic urethra (n = 6, 20%) or, more commonly, in prostatic ducts/acini (n = 14, 47%), and in a combination of prostatic urethra and ducts (n = 10, 33%). Ten (26%) of the invasive TCC resulted from direct penetration from the primary tumor in the bladder, and the remaining 29 (72%) cases arose from prostatic urethra/ducts, of which 11, 13, and 5 invaded the lamina propria, prostatic stroma, and periprostatic or seminal vesical tissue, respectively. Both prostatic TCC involvement and nodal metastasis were highly significant prognostic factors for patients' survival and the survival significance of prostatic TCC involvement still existed regardless of lymph node status. Furthermore, the presence of prostatic CIS and degrees of prostatic invasion are associated with nodal metastasis and survival. Patients with prostatic CIS or urethral lamina propria invasion had a similar, but higher incidence of lymph node metastasis and lower long-term and 5-year survival than those patients without prostatic involvement. Similarly, prostatic stromal invasion and periprostatic/seminal vesical invasion had a similar, but much higher nodal metastasis and worse survival than patients with only prostatic CIS or urethral lamina propria invasion. In summary, presence of prostatic TCC involvement and levels of involvement are significant prognostic factors in patients with bladder cancer.

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\* Corresponding author.

E-mail address: stevenshen@tmh.tmc.edu (S. S. Shen).

## 1. Introduction

Transitional cell carcinoma (TCC) of the prostate is frequently diagnosed in patients undergoing radical cystoprostatectomy for bladder cancer. Most prostatic TCCs are associated with previous or concurrent TCC of the urinary bladder [1]. Fewer than 4% are considered to be primary cancers arising from the prostatic urethra or ducts. In patients with bladder cancer, TCC involvement of the prostate is included in stage pT4a of the TNM classification regardless of the depth or extent of prostatic invasion [2].

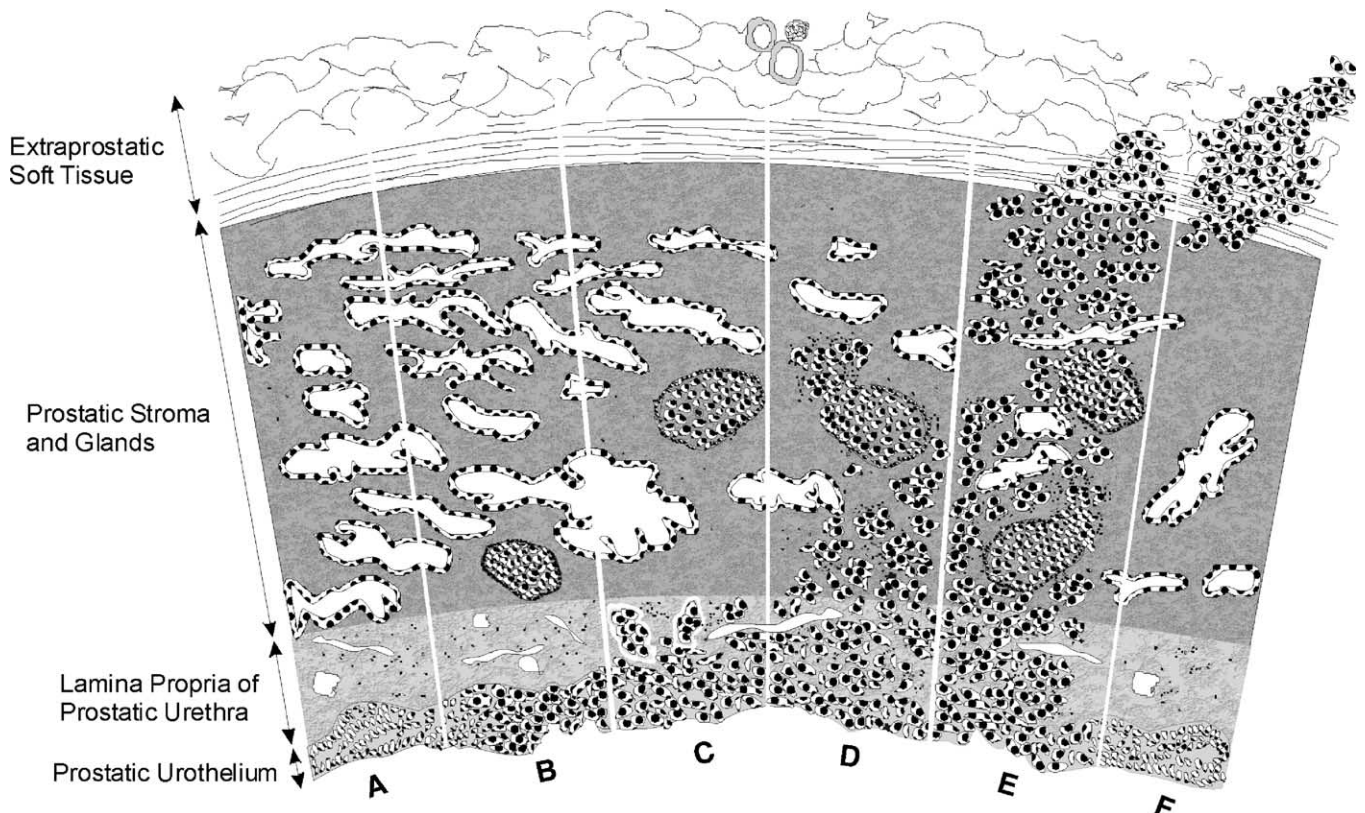
Prostatic carcinoma in situ (CIS) coexisting with bladder cancer was first recognized and described by Melicow in 1952 [3]. Since 1972, these lesions have been consistently referred to as TCC involvement of prostate [4]. However, there are multiple patterns and degrees of involvement by TCC that are not uniformly recognized or categorized, and their significance in the bladder tumor staging and best treatment strategies are not clearly defined. The incidence of prostatic TCC involvement in patients with bladder cancer is reported to range from 10% to 51% [5-9], depending on the method of prostatic examination and the patient population. Although several studies have clearly shown that prostatic stromal invasion by TCC is a poor prognostic factor for patients with bladder cancer [5,10-14], in most

studies, however, the pattern and degree of involvement by TCC were not adequately staged and tumors directly extending from the bladder were also included in the reported figures.

In this study, we examined in detail the prostatic TCC involvement in 214 radical cystoprostatectomies by evaluating whole-mount sections of entire prostates and correlating them with lymph node metastasis and patients' survival.

## 2. Materials and methods

Whole-mount prostate sections from 214 consecutive cystoprostatectomy specimens for bladder cancer from the files of the Methodist Hospital (Houston, Tex) between 1988 and 2003 were reviewed for prostate involvement of TCC. The processing of the prostate from the radical cystoprostatectomy specimens was performed in the same manner as described elsewhere by Wheeler [15]. Briefly, after careful dissection of prostate from the radical cystoprostatectomy specimen, the prostate was placed in 10% neutral buffered formalin for at least 2 days. After the entire surface was inked, the prostate was sectioned at 5-mm intervals in the transverse plane from the apex to the base of the gland. The most apical portion of the prostate



**Fig. 1** Patterns of prostatic involvement by transitional cell carcinoma. A, Normal; B, Carcinoma in situ involving prostatic urethra and duct; C, Lamina propria invasion of prostate; D, Prostatic stromal invasion; E, Periprostatic soft tissue invasion; F, Penetrating invasion from bladder cancer.

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