Original Article

Incidental prostatic adenocarcinoma and transitional cell carcinoma involvement of the prostate gland in patients undergoing radical cystoprostatectomy for bladder cancer treatment in Rajavithi Hospital

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Incidental prostate cancer, radical cystoprostatectomy, transitional cell carcinoma involvement of the prostate gland

Abstract

Objective: To determine the incidence of incidental prostatic adenocarcinoma and transitional cell carcinoma (TCC) involvement of the prostate gland in patients undergoing radical cystoprostatectomy in Rajavithi Hospital, Secondly, to assess the possible influence of the patient factors and bladder cancer on the pathological findings of the prostate gland.

Materials and Methods: We retrospectively reviewed 169 male patients who had undergone radical cystoprostatectomy for bladder cancer between April 2013 and August 2019. Pathologic findings of the prostate gland and urothelial cancer in the prostate gland were catalogued. Information including age, body mass index (BMI), underlying disease, glomerular filtration rate (GFR), pathologic stage, and grade was collected and analyzed to determine any correlations.

Results: Incidental prostatic adenocarcinoma and TCC involvement of the prostate gland were found in 15 patients (8.9%) and 29 patients (17.2%), respectively. There were no correlations between patient demographics and pathological findings of the prostate gland.

Conclusion: Although the incidence of incidental prostatic adenocarcinoma and TCC involvement of the prostate gland in our research is low, the screening of every candidate for prostate sparing cystectomy with a digital rectal examination, prostate-specific antigen, and transurethral biopsy of the prostatic urethra and bladder neck prior to surgery are recommended.

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Introduction

According to the data in the GLOBOCAN 2020 database, bladder cancer ranked as the sixth most commonly found cancer in males while prostate cancer is the second-highest. Age standardized incidence rates in 2020 were 9.5 and 30.7 per 100,000 respectively.[1] The standard treatment for muscle-invasive bladder cancer and persistent non-muscle invasive bladder cancer is radical cystectomy.[2,3] In men, standard radical cystectomy includes resection of the bladder, regional lymph nodes, prostate gland and seminal vesicles. This surgery has a major impact on urinary continence and sexual function.[4,5]

There are some reports of prostate sparing radical cystectomy, which improves the patient's continence and sexual performance after surgery.[6,7] However, this method of surgery is risky for patients who are potential prostatic cancer sufferers or in whom there may be transitional cell carcinoma (TCC) involvement of the prostate gland.[7-9] As a consequence, candidates must be carefully scrutinized before selection and patients who are recommended for sparing radical cystectomy must be those in whom primary bladder cancer has not yet progressed into the prostate gland and not a prostate cancer.[8]

The purpose of this study is to investigate the incidence of prostatic adenocarcinoma and prostatic involvement by TCC in radical cystoprostatectomy specimens, and to determine the any correlation between patient demographics and the findings of the prostate gland.

Materials and Methods

Study design

We retrospectively reviewed 169 male patients who underwent radical cystoprostatectomy for bladder cancer at Rajavithi Hospital between April 2013 and August 2019. Institutional research ethics board approval was obtained prior to data collection (Study Code: 63013).

The exclusion criteria were: 1) Final pathology was not TCC, 2) Patient who received neoadjuvant chemotherapy before the procedure, 3) Patient diagnosed with prostate cancer before radical cystoprostatectomy, and 4) Missing data.

All data were collected and analyzed including patient age, body mass index (BMI), underlying disease, glomerular filtration rate (GFR), pathologic T stage and grade of bladder TCC. We also investigated any correlation between these factors and the findings of the prostate gland.

Statistical analysis

Statistical analysis was carried out using the Statistical Package for the Social Sciences v.17.0 (SPSS Inc, Chicago, IL, USA). Descriptive data are presented as percentage, mean, mode, and standard deviation (SD). Comparisons between the two groups were carried out using the Student T-test, Mann-Whitney U test, Chi-square test and Fisher Exact test. For all statistical tests, a p-value of less than 0.05 was considered to indicate statistical significance.

Results

A total of 224 patients had undergone radical cystoprostatectomy. Following a review of the pathological reports 55 patients were excluded. Reasons for exclusion were: adenocarcinoma (5 cases), squamous cell carcinoma (4 cases), sarcomatoid carcinoma (1 case), small cell carcinoma (1 case), had received neoadjuvant chemotherapy before the procedure (12 cases), and missing data (32 cases).

One hundred and sixty-nine patients met the inclusion criteria with a mean age of 65.1 years.

The most common final pathologic stage was pT2 (52 patients, 30.8%). Twenty seven patients (16%) had low grade and 142 patients (84%) had high grade TCC (Table 1).

Table 1. Patient demographics

Factors N=169	n	%
Age (years), mean±SD	65.1±9.9	
BMI (kg/m^2), mean±SD	22.8±4.2	
Diabetes mellitus, n (%)	33	19.5
Hypertension, n (%)	68	40.2
GFR (ml/min), Median (min-max)	51.4 (8-183)	
T stage, n (%)		
T0	6	3.6
Tis	2	1.2
T1	39	23.1
T2	52	30.8
T3	40	23.7
T4	30	17.8
Grade, n (%)		
Low	27	16
High	142	84

BMI = body mass index, GFR = glomerular filtration rate.

The number of patients with incidental prostatic adenocarcinoma was 15 (8.9%). There were no significant differences between the groups negative and positive for the carcinoma and age, BMI, diabetes, hypertension, GFR, and pathological grade (Table 2).

The numbers in the negative and positive groups showed statistically significant differences with regard to the T stages ($p < 0.001$). However, there was no correlation between the T stage of bladder cancer and incidental prostatic adenocarcinoma (Table 2).

The most common Gleason Score was 3 + 3 = 6, observed in 7 out of 15 patients (46.6%), and the others are described in Table 3.

Twenty-nine patients (17.2%) had TCC involvement of the prostate gland. In this patient group, 7 patients (31.8%) had prostatic urethra involvement and 22 patients (68.2%) had tumor involved prostatic parenchyma. There were two cases with both primary prostatic adenocarcinoma and TCC invasion of prostatic parenchyma (Table 4).

The comparisons between the negative and positive groups and age, BMI, diabetes, hypertension, GFR, and pathological grade did not show any statistically significant differences.

Although, the numbers in the negative and positive groups showed statistically significant differences among the T stage groups ($p < 0.001$), there was no correlation between T stage of bladder cancer and TCC involvement of the prostate gland (Table 4).

Table 2. Patient factors with incidental prostatic adenocarcinoma

Factors	Negative	Positive	P-value
Age (years), Mean±SD	65.0±10.1	65.8±8.2	0.774
BMI (kg/m^2), Mean±SD	22.7±4.1	23.8±5.5	0.353
Diabetes mellitus, n (%)	30 (90.9)	3 (9.1)	1.000
Hypertension, n (%)	62 (91.2)	6 (8.8)	0.984
GFR (ml/min), Median (min-max)	51.5 (8-183)	49.0 (18-119)	0.851
T stage, n (%)			< 0.001
T0	3 (50.0)	3 (50.0)	
Tis	0 (0.0)	2 (100.0)	
T1	36 (92.3)	3 (7.7)	
T2	48 (92.3)	4 (7.7)	
T3	40 (100.0)	0 (0.0)	
T4	27 (90.0)	3 (10.0)	
Grade, n (%)			0.470
Low	26 (96.3)	1 (3.7)	
High	128 (90.1)	14 (9.9)	

BMI = body mass index, GFR = glomerular filtration rate.

Table 3. Gleason Score of patients with prostatic adenocarcinoma

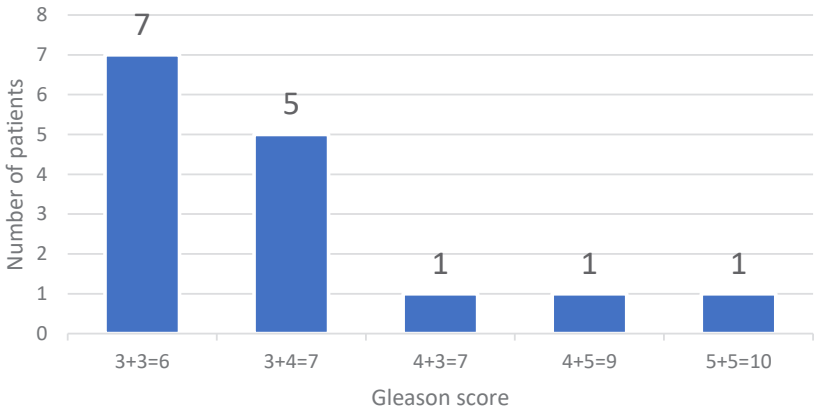

Table 4. Patient factors and transitional cell carcinoma involvement of the prostate gland

Factors	Transitional cell carcinoma involvement of the prostate gland		
	Negative	Positive	P-value
Age (years), Mean±SD	65.5±9.9	63.2±9.8	0.261
BMI (kg/m^2), Mean±SD	22.6±4.1	23.6±4.8	0.251
Diabetes mellitus, n (%)	25 (75.8)	8 (24.2)	0.229
Hypertension, n (%)	53 (77.9)	15 (22.1)	0.166
GFR (ml/min), Median (min-max)	52.8 (11-183)	39.0 (8-115)	0.057
T stage, n (%)			< 0.001
T0	6 (100.0)	0 (0.0)	
Tis	2 (100.0)	0 (0.0)	
T1	36 (92.3)	3 (7.7)	
T2	50 (96.2)	2 (3.8)	
T3	38 (95.0)	2 (5.0)	
T4	8 (26.7)	22 (73.3)	
Grade, n (%)			0.363
Low	24 (88.9)	3 (11.1)	
High	116 (81.7)	26 (18.3)	

BMI = body mass index, GFR = glomerular filtration rate.

Discussion

The GLOBOCAN 2020 data indicates that incidence rates of prostate cancer vary from 6.3 to 83.4 per 100,000 men across regions, with the highest rates found in Northern and Western Europe, the Caribbean, Australia/New Zealand, Northern America, and Southern Africa and the lowest rates in Asia and Northern Africa. The incidence rate of prostate cancer in Thailand is 14.6 per 100,000 of population and the number of new cases in 2020 was 8,630 patients (9.2%).[1]

In our study, the incidence of incidental prostatic adenocarcinoma was 8.9% (15 patients). This lower incidence of prostatic adenocarcinoma than those reported in other studies may be due to race and ethnicity. As can be seen in Table 5 there is a large variation in percentage, the USA being the highest and Thailand the lowest.[6]

Baade et al. reported that prostate cancer rates had increased in some Asian countries including Japan and China. Fourteen percent of all prostate cancer diagnosed worldwide in 2008 were within the Asia-Pacific region and approximately 60% of these prostate cancer cases were diagnosed in either Japan (32%) or China (28%).[11]

Pu et al. and Baade et al. reported that although some of the increases in incidence rates may be the consequence of enhanced screening, in actuality, westernization of lifestyle, reduced physical activity, and increased consumption of fat may be major contributors.[12,13]

Although there is currently no evidence to indicate factors related to differences in incidence, it seems likely that the cause is multifactorial. Dembowski et al. and Ram et al. reported that in their study in Poland the most common prostatic Gleason score found from cystoprostatectomy specimens was 3+3 = 6, the same as in our study.[17,22]

The incidence of prostatic TCC involvement was 17.2% (29 patients) which was less than in previous studies (Table 6). The reason for these being lower is unclear; however, it may be related to differences in patient populations, age at presentation, sample size, variance in pathological sampling techniques or even duration of each study.

We found no significant differences between the patients with coexistence of both types of neoplasms (TCC and prostatic adenocarcinoma) and isolated TCC of the bladder as regards BMI, diabetes, hypertension, GFR of patients, findings similar to a previous study by Ram et al.[22] The T stage and grade of bladder cancer did not show a correlation with incidental prostatic adenocarcinoma or TCC involvement of the prostate gland in our study.

Table 5. Published reports of incidental prostatic adenocarcinoma

References	Nations	Duration	Mean age	Samples	Prostatic adenocarcinoma n (%)
Romero et al.[14]	Brazil	1997-2003	66.7	60	17 (28.3)
Pettus et al.[15]	USA	2001-2004	69.0	235	113 (48.0)
Abdelhadey et al.[16]	Canada	1987-2003	67.0	217	58 (28.0)
Dembowski et al.[17]	Poland	2009-2014	68.9	116	17 (14.6)
Sanli et al.[18]	Turkey	2001-2004	66.9	97	21 (21.6)
Tanaka et al.[19]	Japan	1994-2016	66.0	431	43 (18.1)
Yang et al.[20]	China	2004-2014	66.0	340	95 (28.0)
Tang et al.[21]	China	1994-2012	63.5	762	132 (17.3)
Ram et al.[22]	India	2013-2014	65.0	175	38 (21.0)
Our study	Thailand	2013-2019	65.0	169	15 (8.9)

Table 6. Published reports of prostatic involvement by transitional cell carcinoma (TCC)

References	Nations	Duration	Mean age	Samples	Prostatic involvement by TCC
Ayyathurai et al.[23]	USA	1992-2006	68.0	320	78 (24.0)
Pettus et al.[15]	USA	2001-2004	69.0	235	77 (33.0)
Revelo et al.[24]	USA	2000-2002	67.4	121	58 (48.0)
Richards et al.[25]	USA	2014-2016	67.0	96	24 (25.0)
Tabibi et al.[26]	Iran	2003-2007	62.6	100	21 (75.0)
Our study	Thailand	2013-2019	65.0	169	29 (17.2)

Finally, the majority of reports are limited to small retrospective cohorts and need to be analyzed within the context of such limitations therefore it is also important for the surgeon to weigh the oncologic risk of organ preservation against cancer recurrence. If prostatic preservation is a potential option, digital rectal examination, prostate-specific antigen, and transurethral sampling of the prostatic urethra and bladder neck are all advisable to maximize the procedure most appropriate for the patient.[27]

There are some limitations in our study. First, more than one pathologist was involved in the examination of the specimens resulting in some potential bias as regards interpretation. Second, the study comprised only a small sample size reducing the statistical power of the study. Third, it is retrospective in nature resulting in limitations with regard to variations in technique in recording of the data.

Conclusion

The incidental prostatic adenocarcinoma and TCC involvement of the prostate gland from our study were found to be lower than in previous studies. However, there are significant factors which need to be considered to indicate the possible coexistence of primary prostate cancer and TCC involvement in the patient diagnosed with primary bladder cancer. The screening of every candidate for prostate sparing cystectomy with a digital rectal examination, prostate-specific antigen, and transurethral biopsy of the prostatic urethra and bladder neck prior to surgery are recommended.

Conflict of interest

The authors declare no conflict of interest.

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