

Review Article

Genitourinary cancers: Summary of Indian data

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Abstract

Tumors of the genitourinary system are one of the most common tumors encountered in clinical practice. The associated morbidity and mortality and the significant proportion of affected middle-age individuals have a major bearing on the death-adjusted life years compared to other malignancies. Genitourinary system tumors encompass a very broad spectrum with regard to age, location, histology, and clinical outcomes. Advances in diagnostic imaging, surgical techniques, radiotherapy equipment, and generation of newer chemotherapeutic and targeted agents over the past few years have helped improving treatment outcome. Several focused groups within India have been working on a range of topics related to genitourinary system tumors, and a significant body of work from India in the recent years is being increasingly recognized throughout the world. The present article summarizes the key published work related to the epidemiology of genitourinary system tumors in the Indian setting. A PubMed search was made for locating and selecting articles relevant to the topic.

Key words: Data, genitourinary cancers, India, Indian

Introduction

Genitourinary tumors are commonly encountered in clinical practice. The work of Indian researchers on these tumors is recognized internationally. In an Indian study,^[1] genitourinary cancers (20.79%) were the most common cancers in both sexes. In males, genitourinary system formed 17.48% of all the malignancies (prostate cancer [40.71%] and urinary bladder [30.40%]). In 2001, a WHO-sponsored Indian Council of Medical Research project called “Development of an Atlas of Cancer in India” reported 12,044 (25.6%) reproductive cancers during the period of 2006–2008 (National Cancer Registry Programme, 2010). Among these, in males, prostate (77.6%), penis (11.6%), and testis (10.5%) were majority. PubMed was used to locating, selecting, extracting, and synthesizing data.

Bladder Cancer: Indian Data

Urothelial carcinoma of urinary bladder cancer is the fourth most common cancer in men and eighth most common malignancy in women in the Western world.^[2] Among the various known risk factors, cigarette smoking is the most important and responsible for 48% cases of bladder cancer in men and 32% in women in the USA.^[3] There are only a few centers in India where high volumes of bladder cancer are being treated. Most of the data come from these tertiary centers. Two large series from different parts of the country have looked into the epidemiological aspects of bladder cancer. Gupta *et al.*^[4]

published a series of 561 bladder cancer patients treated between 2001 and 2008 at SGPGI, Lucknow. In this series, 97% of the patients presented with painless hematuria. The mean age was 60.2 ± 4.4 years (range: 18–90 years old) and the male to female ratio was 8.6:1. Transitional cell carcinoma was the most common histological variety (97.71%). A total of 26% of the patients had muscle invasive disease at the time of presentation. Biswas *et al.*^[5] published a retrospective epidemiological study of 88 patients diagnosed with carcinoma bladder at the Departments of Urology and Pathology from CNMC and H, Kolkata, from December 2007 to November 2009. The median age of bladder cancer was 65–70 years.^[1] Moreover, there was a male preponderance (86.4% male vs. 13.6% female). Tobacco smoking (75% of the cases) revealed a strong relationship with bladder cancer and that was quantity- and duration-dependent.^[1,2] Painless hematuria was the most common presentation. The authors observed maximum number (50%) of bladder cancers among laborer and industry workers including employees of leather and textile factories, hair-dye handlers (barber), and shoe-makers. The risk of bladder cancer among workers, especially in industries, should, therefore, be monitored continuously by regular surveillance. Yeole and Jussawalla^[6] reported data collected from the Bombay Cancer Registry and found that bladder cancer was very uncommon in the first three decades of life. However, after the age of 30, the incidence

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rates increase with age, in log-linear fashion, in both sexes. The Indian figures differ from the Western literature in two aspects. First, the difference in the incidence of smoking among Indian males and females is much more prominent (74% vs. 22%) than in the West. Second, the incidence of bladder cancer *per se* is much more predominant in Indian males (8.9:1). This difference is lesser in the Western series (3:1–4:1). The excess frequency of bladder cancer in men versus women is explained by the smoking habits of men and estrogen–progesterone hormonal influence in the female reproductive life.

The presenting symptoms include hematuria and altered urinary storage symptoms. The diagnostic modalities include computed tomography (CT) scan and the treatment modalities include transurethral resection of bladder tumor. If the tumor is found to be muscle-invasive, then radical cystoprostatectomy is the treatment of choice with lymph node dissection. If the muscle is not involved, the intravesical immunotherapy with Bacillus Calmette–Guerin is given with regular surveillance cystoscopies. After removal of the bladder, the patient is offered an ileal conduit or a neobladder.

Penile Cancer

The incidence of carcinoma of penis is multifactorial and depends on various factors such as prevalent circumcision practice, number of sexual partners, prior human papillomavirus infection, and exposure to tobacco products. This cancer is more common in Indian population. Pahwa *et al.*^[7] published a series of 54 patients of carcinoma penis from May 2005 to June 2006 operated at MAMC, New Delhi. Three-fourths of the patients were older than 50. About one-quarter patients presented with phimosis. About 70% of the patients were found to be smokers. Most patients presented at advanced age and hence, a national awareness campaign against this disease should be promoted.

Treatment includes partial-to-total penectomy with or without ilio-inguinal lymph node dissection. Inguinal dissection can be done via robotic approach (videoendoscopic inguinal lymphadenectomy).

Testicular Cancer

Being a very rare cancer in the Indian subcontinent, testicular cancer occurs in <1 man per 100,000 populations (newly diagnosed cancer). Records indicate that a total of 403 cases were registered in 2001–2003 across various age groups at different places (five urban centers - Mumbai, New Delhi, Chennai, Bhopal, and Bengaluru, and one rural center – Barshi). High-volume cancer center in Mumbai, India (the Tata Memorial Hospital), registered a grand-total of 10,747 cases of all types of male cancer patients in the year 2006, of which 158 men (1.5% of the total male cases) were diagnosed with testicular cancer itself. On diagnosis, 1–2% of the cases are bilateral, and the predominant histology is germ cell tumor (90–95% of cases). The recorded incidence reaches a peak in the third decade of life for nonseminoma patients and in the fourth decade for pure seminoma patients. The cure rates for testicular cancers are excellent and are dependent on their chemosensitivity, especially to cisplatin-based chemotherapy, tumor node staging at diagnosis, multidisciplinary treatment approach, and strict follow-up and salvage therapies.

Testicular cancers are detected incidentally during self-testicular examinations or the patient presents with testicular swelling or

an indolent retroperitoneal lymph nodal mass. The findings on the ultrasonography and CT are corroborated with testicular markers such as beta-human chorionic gonadotropin and alpha-fetoprotein. History of undescended testis or mumps gives supportive evidence. Radical orchiectomy is the first treatment for any testicular mass suspected to be a tumor. Depending on the type or variant of cancer, the treatment options include chemotherapy and retroperitoneal lymph node dissection, which can be done via open, laparoscopic or robotic approach as well.

Kidney Cancer

Renal cell carcinoma (RCC) is mainly a disease of elderly and typically presents in the sixth and seventh decades of life accounting for 3% of all adult cancers and 85% of all kidney tumors.

Agnihotri *et al.*^[8] carried out a study to investigate the spectrum of RCC in India with regard to age of onset, stage at presentation, and survival in 617 patients treated between January 2000 and December 2012 in a tertiary care hospital in North India. The mean age at diagnosis was 56 (median 56, range: 14–91 years) years, which is much lower than most Western studies. A total of 30.03% of renal tumors presented in patients younger than 50 years of age. Mean survival was lower in patients younger than 39 years with HR of 1.7 (0.83.2). In contrast to the Western countries where more than 60% of the RCC has been reported to present as <4 cm size (T1a), only 10.4% patients were picked up as T1a, which is an ideal size for partial nephrectomy. Unlike in the West where the male-to-female ratio is 2:1, males were 4 times likely to present with renal tumors in our population. This difference in the sex ratio may reflect the difference in perception in seeking health care for a male and a female member of the family looking at the limited financial resources in a developing country like India. Another difference observed was the incidence of clear cell RCC. Contrary to most of the Western literature where clear cell RCC is present in around 85% of the patients, clear cell RCC in the current study was present only in 71.33% of the patients. In a similar study published by Sivaramakrishna *et al.*,^[9] 209 cases of RCC operated from January 1988 to December 2003 at AIIMS, New Delhi, were analyzed. The mean age at presentation was 53 years. Cases were histologically classified as 174 (83.2%) clear cell RCC, 24 (11.4%) chromophobe, and 11 (5.2%) papillary RCC. Mean survival was 43.75 months.

Hematuria or abdominal lump may be the presenting symptom or the patient might be asymptomatic with the lesion being picked up incidentally by various diagnostic modalities such as CT scan and ultrasonography.

Treatment includes radical/partial (nephron-sparing surgery) nephrectomy done by the open, retroperitoneal, laparoscopic, or robotic route. Systemic therapy is also offered for metastatic renal cell cancers.

Prostate Cancer

Prostate cancer is a global burden on the health-care system as it is the second most common cancer and sixth leading cause of cancer-related mortality according to GLOBOCAN 2008. Prostate cancer is one of the few sites of cancer where the difference in incidence rates between that in India and Western countries is enormous. Incidence rates in India are less than one-tenth of the rates seen in the United States,

but there is a rising trend. The epidemiological studies for prostate cancer conducted in India are very few and are mostly hospital-based. Cancer of the prostate is primarily a disease of elderly men. About three-quarters of cases worldwide occur in men 65 years or more.^[10] Yeole^[11] showed increasing trends in prostate cancer incidence rates in five population-based cancer registries (Mumbai, Chennai, Bengaluru, New Delhi, and Bhopal) in the past 20 years. Jain *et al.*^[12] reviewed data from 25 cancer registries from 2009 to 2011. Prostate was the second leading site of cancer for four PBCRs, namely New Delhi, Kolkata, Nagpur, and Thiruvananthapuram. Prostate cancer incidence is relatively low in some states such as Gujarat and Madhya Pradesh, but lowest in the North-East regions of India. The incidence rates of this cancer are constantly and rapidly increasing, and the cancer projection data show that the number of cases will become alarmingly doubled by 2020. Past smoking and current alcohol consumption significantly increase the risk of prostate cancer, which was shown in a population-based case-control study on prostate cancer in New Delhi by Tyagi *et al.*^[13] In a similar study of 123 prostate cancer cases by Ganesh *et al.*, advanced age, body mass index, and hypertension emerged as risk factors for prostate cancer.^[14]

Rise in prostate-specific antigen is indicative of prostate cancer, provided prostatitis is ruled out with adequate antibiotic cover. Other modalities of diagnosing and further classifying the extent of disease spread include magnetic resonance imaging prostate, magnetic resonance spectroscopy, prostate-specific membrane antigen, and positron emission tomography scan.

Treatment options include active surveillance, radical prostatectomy (open, laparoscopic, robotic), hormonal therapy, and radiation.

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Conflicts of interest

There are no conflicts of interest.

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