

Analysis of Known Risk Factors for Bladder Cancer in Pakistani Population

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Abstract

The association of aetiological agents incriminated for bladder cancer are well recognised. They are divided into two groups, occupational and non-occupational. The commonest occupational agents are 2-naphthylamine, benzidine, aminobiphenyl, dichlorobenzidine, orthodiansidine and orthotolidine. Recognised non-occupational agents include tobacco, recurrent chronic bladder infection/infestation, coffee and drugs. This study was conducted to evaluate these factors in patients with bladder cancer in our population. Of 250 cases studied, 203 were males and 47 females with a male to female ratio of 4.3:1. In 13.6% cases occupational factors were established with an average duration of exposure of 12 years. Majority (68%) of patients had smoking as the predominant non-occupational factor. In this group average cigarettes smoked per day was 23 with a range of 15 to 90. The duration of smoking ranged between 5 to 55 years with an average of 26 years. Sixty patients (24%) were neither smokers nor had any associated high risk occupation (JFMA 45: 41, 1995).

Introduction

The association between environmental agent that could cause the development of a malignancy was first described by Percival Pott in 1775 who reported scrotal cancer in chimney sweeps. Several carcinogenic agents causing bladder cancer both occupational and non-occupational are well recognised. The incidence of bladder cancer attributed to occupational exposure is between 8% and 20%. The most common occupational carcinogens are 2-naphthylamine, benzidine, aminobiphenyl, dichlorobenzidine, orthodiansidine, orthotolidine, phenacetin, chlornaphazine and cyclophosphamide²⁻⁴. Epidemiologic studies by Case and co-workers showed that the mean latent period may be as long as 40 to 50 years, however, time period may be diminished in patients who have higher exposure to carcinogens. Mean latent period for tumours in the rubber and chemical industry was 25 years. Factors recognised as non-occupational carcinogens include tobacco⁵, excessive exposure to motor vehicle exhaust fumes², chronic urinary tract infection¹, schistosomiasis⁶, saccharine⁷, coffee⁸ and drugs^{11,12}. Both retrospective and prospective studies have shown that there is an increased risk of developing bladder cancer in cigarette smokers¹³.

This study has analysed these risk factors in patients with bladder cancer in local population. This evaluation is important since bladder cancer ranks 10th amongst the commonest malignancies in males in Pakistan and is on top of the list of urological malignancies¹⁴.

Patients and Methods

The study is based on data collected from 250 consecutive patients of carcinoma of urinary bladder admitted in the Sindh Institute of Urology and Transplantation, Dow Medical College, Karachi, between 1988-1991. Diagnostic criteria and assessment included detailed clinical history, clinical examination, laboratory investigations, intravenous urography,

ultrasound, exfoliative urinary cytology, CT scan (where indicated), cystoscopy and biopsy. Final diagnosis was established after histopathological examination of biopsied tissue. Thereafter a detailed history of known etiological factors was documented on a proforma to include the following occupational and non-occupational risk factors.

Occupational factors include chemicals like petroleum products (plant processing petroleum products), dyes like benzidine compounds used in textile printing, tailoring and hair dyes used by hairdressors and rubber article containing β -naphthylamine. Non-occupational factors include cigarette smoking, drugs like phenacetin, cyclophosphamides and chlornaphazine and chronic infection/infestation of bladder.

Results

Of the 250 cases, 203 were males and 47 females with a male to female ratio of 4.3:1. Age distribution ranged from 14 to 81 years and peak age group was between 51 to 60 years. Etiological factors were evaluated in each patient (Table I).

Table I. Environmental factors for bladder cancer.

Occupations	Incriminated chemical agents	No.	%
A. Occupational			
I. Chemicals			
Petrol pump workers	Petrochemical compounds	11	4.4
Sui gas workers	Natural gas	2	0.8
II. Dyes			
Textile printing	Benzidine compound	7	2.9
Tailoring	Benzidine compound	6	2.4
Leather woks	Benzidine compound	4	1.6
Hair dressing	Benzidine compound	1	0.4
III Rubber articles			
Rubber industry	β -naphthylamine	3	1.2
B. Non-Occupational			
Cigarette smoking		170	68

Thirty-four (13.6%) had established occupational and 170 (68%) non-occupational factors. In the occupational group 7.1% cases had exposure to benzidine compounds like textile printing, tailoring and hair dressing. Thirteen (5.1%) patients were exposed to petrochemical compounds and natural gas. Three patients had long history of exposure to beta-naphthylamine in rubber industry. The duration of exposure varied from 3 to 15 years with an average duration of 12 years. Majority of patients (68%) had one non-occupational factor, i.e., smoking (Table I) while no other factor was recognised.

The number of cigarettes smoked per day varied from 15 to 90, the average being 23 cigarettes per day. Sixty percent of patients smoked upto 20 cigarettes per day while 12.2% were heavy smokers, i.e., more than 30 cigarettes per day (Table II). The duration of smoking ranged between 5 to 55 years, the average being 26 years. Majority (88.2%) of patients smoked for 10 to 40 years and small number (4.7%) for more than 40 years (Table III). Of the 80 patients with bladder cancer who were non-smokers, only 20 (25%) had high risk occupations.

Table II. Number of cigarettes smoked in non-occupational group.

No. of cigarettes/day	No. of patients	% of total cases
<10	37	21.7
11-20	65	38.2
21-30	47	27.6
31-40	16	9.4
41-50	3	1.7
>50	2	1.1

Table III. Duration of smoking in years in non-occupational group.

Duration in years	No. of patients	% of total cases
<10	14	8.2
10-20	54	31.7
21-30	65	38.2
31-40	31	18.2
41-50	4	2.3
>50	4	2.3

Discussion

Historically in 1885 bladder cancer was the first tumour identified where an association was established between chemicals exposure and development of cancer¹⁵. Since then several chemicals used in various industries appeared as causative factors of bladder cancer. Thus 8-20% of the bladder cancer were attributed to be caused by exposure to chemicals^{2,16}, while pursuing occupations in gas, petrochemical industry, rubber industry, dyeing and textile industries, leather works and tailoring, etc. In these studies the frequency of such occupational bladder cancer varied between geographical regions, depending upon the type and concentration within an area of chemical industries. Our data of 13.6% of bladder cancer where occupational association was identified corroborates with Western reports. Since in the Western reports exposure period varied from 5 to 25 years, the urothelial

cancer of today represents the working practices of 25 years ago, the same may apply to our patients. With the advent of the development of chemical industries in Pakistan, we need a candid view specially of industries using high risk chemicals.

Cigarette smoking has been identified as an important risk factor for bladder cancer and the cause and effect relationship has been identified by several studies¹⁷⁻¹⁹. Various measures have been used to assess the magnitude of the relationship between smoking and bladder cancer, i.e., number of cigarettes smoked and duration of cigarette smoking^{7,20}. Our data supports the contentions that cigarette smoking is the most consistent finding in the epidemiological studies of bladder cancer.

In 60 patients no known factors could be identified. This group which constitutes 24% of our patients needs further evaluation for possible etiological factors prevalent locally. This initial study highlights the need for a more detailed multi-centre study to identify etiological factors for bladder cancer in Pakistan.

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