BLADDER CANCER AFTER SPINAL CORD INJURY

Incidence, presentation, histology and prognosis compared with bladder cancer in the non-paralysed population.

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Abstract. We reviewed 25 patients who developed carcinoma of the bladder following spinal cord injury among a series of 6744 paraplegic and tetraplegic patients.

An analysis of the incidence, presentation, possible predisposing factors and prognosis was carried out. The majority presented at a younger age and there was a significantly higher incidence of squamous carcinoma than in the non-paraplegic population. The anterior bladder wall was involved in about 25 per cent of the cases. The prognosis is poor.

Key words: Spinal injuries; Carcinoma of the bladder.

Introduction

KAWAICHI in 1961 reported four cases of carcinoma of the bladder in a series of 1600 spinal cord injury patients. Melzak in 1966 found 11 patients with carcinoma of the bladder in a series of 3800 spinal cord injury patients. It appeared then that there was an unexpected higher number of bladder tumours in these patients and the prognosis was poor. He suggested that patients with flaccid bladders are more prone to developing carcinoma of the bladder.

Turner (1980) reviewed carcinoma of the bladder in patients with all types of neuropathic bladder. He found that 50 per cent were squamous.

Material

This paper updates Melzak's study of patients at the National Spinal Injuries Centre, Stoke Mandeville Hospital.

Twenty-five patients with carcinoma of the bladder were found in the histology records in a series of 6744 spinal cord injury patients at Stoke Mandeville Hospital. Eleven of these patients were described by Melzak in 1966.

Incidence and Mortality

All except four patients have died of their bladder tumours. The death rate of carcinoma of the bladder in the male population in England and Wales is 7.4/100 000. A calculation, taking into consideration the age and sex distribution and length of observation of the 6744 patients with spinal cord injury, gives an expected total of 1.1 deaths from carcinoma of the bladder. We recorded 21 deaths. Cord injury increased the risk of dying of bladder cancer by a factor of about 20.¹

¹ We are indebted to Dr K. McPherson, Department of Social and Community Medicine, University of Oxford, Oxford, for the calculations.

Neurology

Twelve patients had upper motor neurone spastic lesions and another 12 patients had lower motor neurone flaccid lesions while the neurology of one patient was unrecorded.

Age at Diagnosis

It appears that patients with spinal cord injuries develop their tumours at a younger age than in the general population (Table I). A quarter of the patients were under the age of 40 compared with 3 per cent of patients with bladder cancer in the general population, according to the Bristol Bladder Tumour Registry. Carcinoma of the bladder appears to be one of the long term complications of spinal cord injury or its management. The interval between injury and diagnosis varied between 11 and 42 years with a mean of 23 years. We have excluded one patient with a non-invasive transitional cell carcinoma diagnosed 2 months after injury.

FIG. 1.

TABLE I
Age at diagnosis

	<20	20-29	30-39	40-49	50-59	60-69	70-79	80+
Bristol	2	6	37 2.7%	109	297	460	374	94
S.M.H. N.S.I.C.	0	0	6 24%	4	10	5	0	0

Interval between injury and diagnosis

11-42 years

Mean 23 years

Excluding non-invasive T.C.C. at 2 months

Year of Injury

It appears that the majority of patients were injured between 1940-49 (Table II). This incidence may be related to the original management of the neuropathic bladder in this decade, many patients being treated with suprapubic cystotomy.

TABLE II
Year of injury

	Before 1940	40-44	45-49	50-54	55-59	60-64	65-70
No.	3	8	6	2	0	0	1

Unknown 4

Clinical Presentation

The commonest presenting symptom was haematuria (Table III). Haematuria, however, is a common symptom in patients with a neuropathic bladder, because of infection or catheter trauma.

TABLE III
Presenting symptoms

Haematuria	15
Frequency/Dirty urine	5
Bladder pain	4
Suprapubic mass or discharge	3
Difficulty voiding	2
Sweating	1
Metastases	1
No data	1
Diagnosed at autopsy	2

All these patients had clinically infected urine. Fifteen patients were treated initially with suprapubic catheters. Eight patients were subsequently treated with an indwelling urethral catheter.

Bladder stones were found and removed from 11 patients. However, two patients were initially treated with intermittent catheterisation and had no bladder stones at any time.

TABLE IV
Possible predisposing factors

	Yes	No	?
Initial suprapubic catheters—Cystotomy	15	5	5
Subsequent urethral catheters	8	14	1
Bladder stones	11	11	3

No suprapubic catheters	} 2
No indwelling urethral catheters	
No stones	

Site of the Tumour (Table V)

Lateral wall tumours were found in seven patients. Six patients were found to have anterior wall tumours, three of which arose in the track of a suprapubic cystotomy. Tumours widespread throughout the bladder were found in five patients. Three tumours were found in the base of the bladder and the bladder neck. In four the site was not recorded.

TABLE V
Site of tumour

Lateral wall	7
Anterior wall	6 (S.P. Track in 3)
Throughout	5
Base and bladder neck	3
Unknown	4

TABLE VI
Histology

	Bristol	S.M.H.
Papilloma	26	0
Transitional C.C.	1379	13 (5 partly squamous)
Squamous C.C.	24 (1.6%)	11 (44%)
Adeno carcinoma	3	0
Not known	68	0
Undifferentiated	0	1
Invasive	22	
Non invasive	1	
Not known	2	

Histology (Table VI)

Eleven of these tumours (44 per cent) were of the squamous cell type and one was undifferentiated. Five of the remaining 13 transitional cell tumours were also partly squamous. Most of these tumours were invasive (22), one was non-invasive and the information could not be retrieved in two.

Survival

Generally these are fatal tumours whichever way they are treated and 20 out of the 25 patients were dead within two years of the diagnosis. There were four long-term survivors (6, 10, 11 and 14 years), three were squamous and were treated with radiotherapy only; one was transitional and was treated with cystectomy and radiotherapy.

Discussion

Patients with spinal cord injuries are more prone to develop carcinoma of the bladder than the general population. None of the patients was engaged in an occupation with a high risk of bladder cancer.

The number of patients with spasticity below the level of their lesions equalled those with flaccidity, hence we do not agree with Melzak that flaccid, non-contractable bladders are at higher risk than spastic ones. Tumour formation may not be peculiar to spinal cord injury patients alone and we expect that patients with neuropathic bladders due to other aetiology than trauma may share the same risk, as suggested by Turner and Davies.

There was a statistically significant difference in the percentage of patients who presented under the age of 40 (24 per cent in the spinal cord injury population), compared with 3 per cent in the general population.

Fifteen patients were treated initially with suprapubic catheters for periods varying between 1 month and 25 years. Twenty patients had an indwelling catheter for varying periods of 2 months to 5 years. Suprapubic catheters, cystostomy and indwelling urethral catheters were the primary line of management available before 1950. Seventeen out of the 25 patients were injured during this period and at least 15 were managed originally by one of these lines of treatment. It would be too easy to blame this line of management, however, as we know of two patients who were treated initially with intermittent catheterisation.

Dr Hicks *et al.* have demonstrated the presence of Nitrosamines in infected human urines when studying patients with carcinoma of the bladder from Stoke Mandeville Hospital and also patients with schistosomiasis of the bladder. Although not proven, Nitrosamines may be important in the aetiology of carcinoma of the bladder in these patients.

The tumours encountered in patients with cord injury differed strikingly from those seen in the general population by the high incidence of squamous carcinoma and of the anterior site. Also three of these tumours involved the suprapubic track. The fact that these tumours are so lethal in our patients may well be related to the delay of diagnosis.

Can these patients be diagnosed earlier? Cytology of the urine is unreliable in the presence of infection. As most patients presented with haematuria or other lower tract symptoms the development of these symptoms in anyone 10 years or more after the onset of paralysis should suggest a bladder tumour. Cystoscopy and biopsy should be performed without delay.

SUMMARY

Twenty-five patients with carcinoma of the bladder were found in a series of 6744 paraplegic and tetraplegic patients. The incidence of carcinoma of the bladder is at least 20 times higher than in the general population. There is no difference in the incidence between flaccid and spastic neurology below the level of the lesion. Most of these tumours were invasive and histologically 44 per cent were squamous, the anterior wall being involved in 25 per cent of the cases. The prognosis was poor. We advocate vigilant investigation of the urinary tract including cystoscopy and biopsy in patients with spinal cord injury complaining of haematuria.

RÉSUMÉ

On a trouvé 25 patients avec cancer de la vessie dans une population de 6744 paraplegiques. L'incident du cancer de la vessie est 20 fois plus élevé que dans la population générale. Il n'y avait pas de différence d'incidence entre la neurologie flaccide et spastique. La plupart des tumeurs étaient invasives et 44% étaient du type épithélial. Le mur antérieur était affecté dans 25% des cas. Le pronostic était affreux. L'investigation vigilante du système urinaire avec cystoscopie et biopsie est recommandée chez les paraplegiques et tétraplegiques avec hématurie.

ZUSAMMENFASSUNG

Unter 6744 para—oder tetraplegischen Patienten wurden 25 Patienten mit einem Harnblasenkarzinom entdeckt. In der Patienten gruppe ist die Häufigkeit von Blasenkarzinomen mindstens 20 mal grösser als in der normalen Bevölkerung.

Das Tumor-Vorkommen ist gleich bei Patienten mit schlaffer oder spastischer Lähmung. Die meisten Tumoren waren invasive Tumoren und 44% waren histologisch vom Squamosen Typ. In 25% der Fälle war die vordere Blasenwand betroffen. Die Prognose war schlecht. Wenn Patienten mit Querschnittslähmung Zeichen von Hämaturie zeigen, sollte deshalb immer eine sorgfältige Abklärung des Harnwegstraktes (einschliesslich Zystoskopie und Biopsie) erfolgen.

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