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STUDY OF URINARY SYSTEM FOLLOWING SURGERY AND/OR RADIOTHERAPY FOR CANCER OF CERVIX

by

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Introduction

Various types of abnormalities either immediate or remote in the urinary system may follow radiotherapy, surgery or either combinations in cancer cervix cases (Mallik, 1960; Green *et al*, 1962; Fraser, 1966; Ulmsten, 1975). Though the urinary bladder commonly is the site of all these abnormalities, the upper urinary tract at times may also be involved. Some of these abnormalities are temporary but residual complications may also persist. These changes may not always be detectable by clinical examination alone. Pyelography and other special examinations help in their diagnosis and should be undertaken in all cases as some of them in future may be urologic cripples (Green *et al*, 1962).

In our country radiotherapy and/or surgery are frequently performed but urological investigations are very infrequently undertaken in carcinoma cervix cases. Hence the present study is undertaken to evaluate radiologically the cases who underwent surgery and radiotherapy.

Materials and Methods

In this series randomised cases (excluding the cases of fistula) who were attending the Tumour Clinic of Eden Hospital, Medical College, Calcutta regularly for last 5 years and were treated either by (i) radiotherapy alone, (ii) Mitra operation, (iii) Wertheim's operations or by (iv) radiotherapy following Mitra Operation or Wartheim's operations are included. Patients having signs of local or distant metastases or showing recurrence of original conditions are deliberately excluded.

The study included (i) clinical examination, (ii) laboratory investigations

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(Routine urine examination, culture and sensitivity tests, blood biochemistry such as urea and N.P.N.) and radiological investigations of the urinary tract such as intravenous pyelography, cystoscopy and retrograde pyelography. Control pyelograms were taken in each case to exclude cases having pre-existing changes in the urinary tract and also to compare with post-treatment findings. Deviations from the pre-treatment findings were considered as evidences of abnormality.

Observations

These 75 cases were distributed as shown in Table I.

group of 41 to 50 years, 17 (23.67 per cent) were in between 51 and 60 years, 6 (7.98 per cent) cases were in between 61 and 70, and the remaining 3 cases (3.99 per cent) were aged above 70 years. The age groups were distributed in all the treatment groups as closely as possible.

TABLE II
Distribution According to Stages of Cancer

Stage of Cancer	No.	Per cent
Stage 0	3	3.99
Stage I	11	14.63
Stage II (Parametrium)	30	39.90
Stage II (Vagina)	16	21.28
Stage III	15	19.95

TABLE I

Type of Treatment	No.	Per cent
Radiotherapy	25	33.3
Wertheim alone	14	18.66
Wertheim followed by radiotherapy	11	14.67
Mitra operation alone	14	18.66
Mitra operation followed by radiotherapy	11	14.67

The ages of all these patients varied in between 25 and 72 years. Twenty-one of them (27.3 per cent) were below 40 years, 28 (37.64 per cent) belonged to age

Urinary complaints were present in 25 (33.33 per cent) cases. In one patient (1.33 per cent), renal angle was tender. No mass could be palpated in any case.

TABLE III
Type of Treatment in Relation to Stage of Cancer

Types of Treatment	Total cases	Per cent	Stages of cancer
Wertheim alone	14	18.66	3 of Stage 0 6 of Stage I 5 of Stage II (Parametrium)
Mitra alone	14	18.66	5 of Stage I 6 of Stage II (Parametrium) 3 of Stage II (Vagina)
Radiotherapy alone	25	33.33	15 of Stage II 10 of Stage II (Vagina)
Mitra followed by radiotherapy	11	14.63	8 of Stage II (Parametrium) 3 of Stage II (Vagina)
Wertheim followed by radiotherapy	11	14.63	11 of Stage II (Parametrium)

TABLE IV
Types of Urinary Complaints

Complaints	Total cases Per cent	Radio-therapy	Wertheim	Mitra Opn.	Mitra & Radio-therapy	Wertheim & Radio-therapy
Burning sensation	8 (10.64)	5	1	1	—	1
Dysuria	3 (3.99)	1	1	1	—	—
Frequency	3 (3.99)	—	1	1	—	1
Urgency	3 (3.99)	1	—	—	—	2
Chronic retention	2 (2.66)	—	1	—	1	—
Haematuria	3 (3.99)	2	—	—	1	—
Stress incontinence	3 (3.99)	1	—	—	—	2

Anaemia or pallor was present in 13 cases (17.29 per cent).

TABLE V

Time Interval	No.	Per cent of cases
Within 6 months	5	6.69
Within 6 to 12 months	8	10.64
Within 13 to 18 months	6	7.98
Within 19 to 24 months	15	19.95
Within 25 to 30 months	13	17.29
Within 31 to 36 months	10	13.30
In between 3 to 5 years	18	23.94

The intervals between treatment and investigation period were so distributed that both early and late abnormalities could be visualised in each period, cases with individual treatments were also distributed accordingly for this purpose.

Urine Examination Report

Total 11 (14.63 per cent) cases showed urinary abnormalities on macroscopical and microscopical examinations. Four cases showed albuminuria, 2 of them were treated with radiotherapy alone, 1 underwent only Mitra operation and the last case had radiotherapy following

Wertheim's operation. Red blood cells were present in all cases, who received radiotherapy alone. Pus cells more than 5 were present in 4 cases, 2 having radiotherapy alone and the other 2 having radiotherapy following Wertheim's operation.

Urine Culture

E Coli was found in 7 cases (.31 per cent), 4 of them being treated by radiotherapy alone 2 were being treated by radiotherapy following Wertheim's operation, 1 each after either Mitra or Wertheim's operation alone.

Intravenous Pyelography

It was undertaken in all the cases, when 7 (9.31 per cent) of them showed definite abnormalities. The findings are tabulated in Table VI.

It has been observed that right-sided abnormalities alone was present in 5 cases out of 7, in 2 cases the lesion was left sided. Two cases were following Wertheim operation alone and 1 was following Mitra operation. Two cases each were following Mitra and Wertheim operations associated with radiotherapy.

TABLE VI

Types of changes after I.V.P.	No. & Per cent	Side	Treatment Group
Hydropelvis and hydroureter due to obstruction	2(2.66)	Both right side	Both following Wertheim operation alone.
Hydroureter alone	1(1.33)	Left side	Following Mitra operation alone.
Enlarged left kidney with splashing of calyces and dilatation of left ureter	1(1.33)	Left side	Following Mitra Operation associated with post-operative radiotherapy.
Evidence of soft tissue shadow on right side of abdomen in the kidney region	1(1.33)	Right side	Following Mitra operation and radiotherapy.
Narrowing and kinking of upper part of right ureter and of calyces right side	1(1.33)	Right side	Following Wertheim combined with radiotherapy.
Lower part of right ureter not properly visible and right half of bladder is irregular	1(1.33)	Right side	Following Wertheim and radiotherapy.

Four cases out of these 7 cases were thus following Wertheim operation and 3 were following Mitra Operation.

Cystoscopic Examination

Non-specific cystitis was present in 7 cases (9.3 per cent), 1 of them was associated with changes in the ureter (6th group) and in the remaining 6 cases, cystitis alone was present. Amongst these 6 cases, 3 (50 per cent) were following radiotherapy alone, 1 after Mitra operation, 1 after Wertheim operation alone and the last case was Wertheim and following radiotherapy.

Retrograde Pyelography

Small contracted bladder was found in 2 cases (2.66 per cent), 1 after Mitra operation alone and 1 after Wertheim operation followed by radiotherapy.

In 1 of them bladder margins were irregular in size with presence of small diverticuli.

Evidence of clubbing of calyceal system of right kidney with slight dilatation of right ureter was also present in this case.

No other abnormality was found in other cases where some demonstrable changes could be visualised by intravenous pyelogram earlier.

Discussion

The present study showed that abnormalities in the urinary tract may be encountered frequently following treatment of carcinoma of cervix either by radiotherapy or by operative procedures such as Wertheim or Mitra or after both operative procedures and radiotherapy. These changes are commoner in urinary bladder and consists of retention of urine, inability to initiate the act of micturition or rarely stress incontinence. Infection of the bladder may readily take place if there is incomplete emptying of the viscus. These minor abnormalities in the urinary bladder were commoner after radiotherapy, though they also happened to exist in case who underwent surgery. In the present series, 1 case of contracted bladder was found following radiotherapy after radical surgery. Dewhurst (1972) reported that though contracted bladder may occur after external radiation but

they are more likely to happen when radiotherapy is followed by surgery.

Besides changes in the bladder, radiotherapy alone or in combination with radical surgery produced abnormalities in the ureters and pelvis of the kidney in the form of hydroureter and dilatation of the pelvis, mostly unilateral. Right-sided lesions were commoner than on the left side. It has been reported that (Mallick, 1960) though bladder changes start to occur immediately following the operation, dilatation of the ureters takes place at a much later date. In this series in 3 cases of dilatation of ureters, intravenous pyelography was done in between 1 to 2 years after operation.

In 2 Wertheim operation cases, where the hydroureters were prominent, dilatation was marked in the abdominal part. These changes in the ureters or pelvis were far commoner in this series following Wertheim than Mitra operation or radiotherapy alone (Mitra, 1960).

As to the cause of these changes in the bladder and the ureters following operation or radiotherapy, there is no unanimity of opinion. Suttors (1952) suggested that the chain of events leading to these changes in structure and function begins probably in the bladder which is deprived of its natural support by the upper vagina, the uterine cervix and broad ligament. There may be also some interference in the blood supply. This, according to his results in diminished bladder function and urinary retention with subsequent chronic infection eventually leading to dilatation of the ureters and of the renal pelvis with impairment of renal function.

The current concept as suggested by Mallick (1960) for these changes are that they are due to severed sympathetic and parasympathetic trunks and also due to

some extent of damage of the musculature of the bladder wall.

Hydroureter and hydronephrosis may also be due to neuromuscular inco-ordination which may lead to atonicity of the pelvis or to achalasia of the function, as has been suggested by Underwood (1937).

In these type of cases, pelvis haematoma by causing compression may cause stopping of urinary flow leading to stasis and hydroureter as reported by Millin (1948). Slight compression from outside may cause hydroureter which after operation is caused by periureteric haematoma.

Mallick (1960) on the other hand suggested that possible explanation of the occurrence of the hydronephrosis and hydroureter is oedema of the wall of the ureter. The oedema is slow in appearance and is usually evident between the late third and 4th week of postoperative period.

In intravenous pyelogram taken upto 3 weeks during the postoperative period should not show any hydronephrosis or hydroureter. If it develops it suggests the possibility that the patient is liable to develop uretero-vaginal or some other types of ureteral fistula. Therefore, these sort of studies may predict the future occurrence of these complications and needs of special urologic measures to prevent them.

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