

REVERSAL OF CHANGES IN THE URINARY TRACT

(Due to extrinsic pressure from pelvic masses in women)

by

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Review of Literature

It has been known for over a century that ureteral dilatation and hydronephrosis might accompany pregnancy, prolapse of the uterus and pelvic malignancy but Tice, in 1915, first mentioned the possibility of the influences of a large uterine tumour upon the renal function by pressure upon the ureters and interference with the action of the kidneys. Kellar, in 1921, reported a case of a patient 68 years of age who had an intraligamentary tumour of the right ovary and displacement of the ureter which was observed at the time of operation.

Hartman and Bonnett (1923), studied 1000 consecutive cases of uterine fibromyoma, out of which a few had cystitis and haematuria as a complication of retention of urine. Possible changes in the upper urinary tract were not commented on. No urological studies were made in these cases.

Until 1929, references to changes

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Paper read at the 12th All-India Obstetric and Gynaecological Congress at Ahmedabad in December 1963.

in the upper urinary tract were based upon operative findings but no complete urological data were presented. Stein and Rodgers (1932), were the first to apply present day methods of urological study of this problem.

Kretschmer and Kanter, in 1937, reported for the first time the frequent occurrence of ureteral obstruction in conjunction with such gynaecological lesions as ovarian cysts, fibromyoma of the uterus and pelvic inflammation by intravenous pyelographic study.

Material and Method

Thirty-five female patients with pelvic masses were submitted to radiological study. Their ages varied from 9 years to 70 years. All the patients were admitted in the hospital and a detailed history, specially relating to the urinary tract, was taken, and physical examination made by one of the authors. A plain skiagram, followed by intravenous pyelography, was done pre-operatively in all cases. At operation, the site of origin, size and shape of the pelvic mass was noted in detail. Its relation to urinary tract was also observed. The cases showing uretero-hydronephrosis and/or extrinsic pressure on the bladder were subjected to a repeat

intravenous pyelography on the 10th post-operative day, to see whether there was any evidence of regression.

Table I gives the percentage of cases showing pressure effect on the urinary tract along with the percentage of regression in different types of pelvic masses. The incidence of hydronephrosis in these cases is too high to be just coincidental.

greater extrinsic pressure than the solid tumours. It is also interesting to note that reversal of the changes took place in hundred per cent cases of the cystic tumours, giving a higher overall percentage in ovarian tumours than the uterine tumours.

In cases of endometriosis and adenomyosis, only partial regression of the changes took place. This may

TABLE I
Percentage of Pelvic Masses Causing Pressure Changes in Urinary Tract and their Regression

	Total	No. of cases showing changes	Percentage	No. of cases showing regression	Percentage of complete regression	Partial regression
No. of cases ..	35	21	60%	14	66.6%	—
Ovarian tumours						
—solid ..	11	7	63.5%	3	42.8%	—
Ovarian tumours						
—cystic ..	8	6	75.0%	6	100.0%	—
Leiomyomas uteri	8	3	37.5%	2	66.6%	—
Leiosacromas uteri	3	2	63.6%	2	100.0%	—
Endometriosis ..	1	1	100.0%	—	—	1
Adenomyosis uteri	1	1	100.0%	—	—	1
Ectopic pregnancy	3	1	33.0%	—	100.0%	—

In this series of cases, the percentage of pressure changes in the urinary tract due to ovarian tumours is higher (68.4%) than that due to leiomyoma uteri (37.5%). This compares well with Kretchmer and Kanter's figures where 81.9% of ovarian tumours were responsible for pressure changes as compared with leiomyomas which caused change in only 65.7% cases. This table also reveals the fact that the cystic ovarian tumours were responsible for greater percentage of pressure effects than the solid ovarian tumours, which is probably due to the fact that the cystic tumours can mould themselves to the shape of the pelvis, thus causing

be due to direct involvement of the ureter in the case of endometriosis. Probably a repeat intravenous pyelography, a few months later, would show complete regression of the pressure changes since both ovaries were removed at the time of operation. Reports on the effect of pelvic endometriosis on the ureter are few. Randall, in 1941, and O'Connor and Greenhill, in 1945, reported one case of primary intra-ureteral endometriosis while Goddall, in 1948, reported 4 cases causing hydroureter and hydronephrosis.

The 3 cases of ectopic pregnancy mentioned in our series were diagnosed as ?ectopic, ?twisted ovarian cyst

or broad ligament cyst. It is revealing to note that the ectopic pregnancy in the left broad ligament of 2 months' duration caused pressure changes which disappeared following surgery. The other 2 cases were of pelvic haematoma which lay diffusely in the pelvic cavity and did not show any changes on pre-operative intravenous pyelography. We have not come across ectopic pregnancy being mentioned in the literature as a cause of

lying free in the abdominal cavity with a long pedicle.

Fixation of the tumour also seems to play a part in the production of hydroureter and hydronephrosis.

In Klempner's series of 56 patients with fibromyoma uteri, 58% produced hydronephrosis when they were larger than the size of six months' gestation, and 34% were responsible for such changes when they were smaller in size (Klempner, 1952).

TABLE II
Evaluation of Results as Reported by Different Authors

Name of authors	Total No. of cases	No. of patients showing changes in the urinary tract	Percentage	No. of patients showing regression	Percentage of regression
Klempner (1952)	56	25	44.6	—	75
Long and Montgomery (1950)	13	9	69.2	—	—
Kretschmer and Kanter (1937)	51	—	64.7	—	72.5
Everett and Sturgis (1940) ..	100	50	50	—	43.3
Morris and Juracek (1937) ..	43	—	81.2	—	—
Morrison (1960)	119	16	14.5	12	75
Present series	35	21	60	14	66.6

extrinsic pressure on the ureters. Number of cases of ectopic pregnancy in our series is rather small to reach any definite conclusion. It would be interesting to investigate a larger series of such cases.

In our cases, bladder distortion was a common finding and in most of the cases the deformity as seen in the x-ray films corresponded with the findings at operation.

According to our observation, ovarian cysts lying deep in the pelvis produced marked degree of hydronephrosis, when compared with ones

Illustrative Cases

Case No. 10. K. D. 57 years female presented with a history of mass in the abdomen for the last six months. The mass had suddenly increased in size following an attack of acute pain in the lower abdomen 2 days ago.

Per abdomen — examination revealed a cystic mass filling the lower abdomen, extending more towards the right of midline and rising up to the level of 28 weeks' pregnant uterus. Mobility of the mass was restricted.

Per vaginam — the normal-sized uterus could be defined separate from the cystic mass. Lower pole of this mass could be felt through the right fornix. Diagnosis of a right-sided ovarian cyst was made.

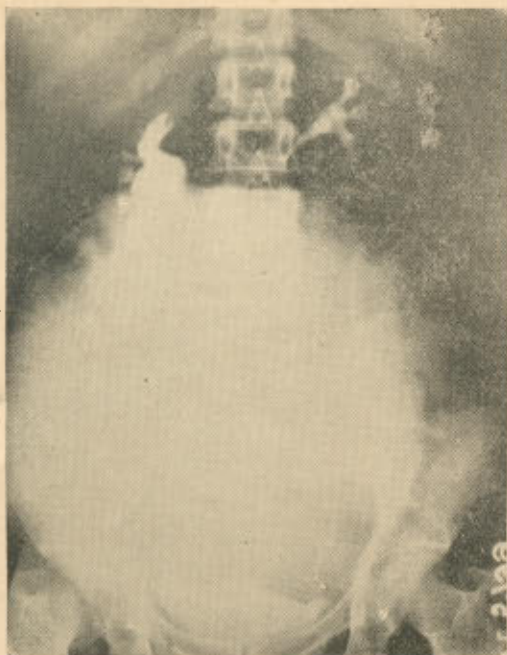


Fig. 1

Pre-operative intra-venous pyelography film showing a large soft tissue mass rising from the pelvis up to the level of upper border of L3 vertebra; no calcification was seen. Both kidneys were functioning normally; hydronephrosis, hydrocalyces and hydropelves with hydro-ureter were seen on the right side, while left side was normal. Fig. 1.

At surgery—a large ovarian tumour arising from the right ovary, was seen which had twisted by one and a half turns. Fortunately panhysterectomy with bilateral ovariectomy was done because of the patient's age. Histopathological report was serous cystadenoma of the right ovary with squamous-cell carcinoma cervix in-situ.

Case No. 17. A 30 years multiparous woman came with a history of a mass in the lower abdomen for 8 months. On abdominal examination, a firm midline mass rising up to the level of 20 weeks' pregnant uterus was felt in the lower abdomen. This mass was irregular and nodular.

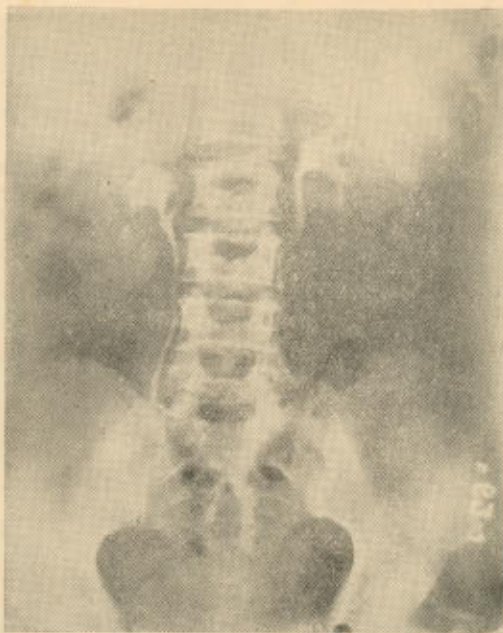


Fig. 2

Post-operative intravenous pyelographic film of case no. 10 showing complete regression of the changes on the right side.

Per vaginam—bimanual examination revealed the mass to be an irregularly enlarged uterus rising up to the level of 20 weeks' pregnant uterus.

At Surgery, a uterus, size of 20 weeks' pregnancy, with multiple fibromyomas was removed.

Post operatively—The urinary tract had returned to normal. The tumour was in midline, mainly lying in the pelvis and caused bilateral pressure effects on the urinary system as compared to the next case being shown here, in whom despite the very large size of the tumour, minimal changes were seen as the tumour was pedunculated.

Case No. 22. 26 years female, came with a history of a mass in the abdomen for 6 years.

Per-abdomen—a semisolid mass was felt filling the left side of abdomen up to the

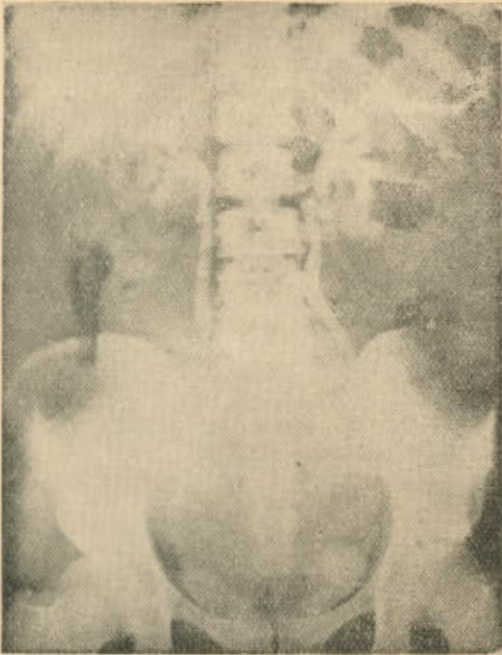


Fig. 3

Pre-operative I.V.P. film showing bilateral hydronephrosis and hydro-ureter stopping short at the level of L5 vertebra with outward deviation of the left ureter and extrinsic pressure on the bladder.

level of left costal margin. It was freely mobile.

Per-vaginam — body of the uterus was felt to be antverted and of normal size; Lower pole of the abdominal tumour could not be felt per vaginam.

At surgery — a pedunculated right ovarian tumour 20 cms. x 24 cms. was removed. Histopathology was innocent teratoma.

Case No. 30. 40 years female came with a history of a mass in the lower abdomen for 2 months. There was no history of amenorrhoea.

Per abdomen — a soft mass was felt just above the symphysis pubis and left inguinal ligament.



Fig. 4

Pre-operative I.V.P. film showing multiple calcified opacities in the left upper abdomen with minimal changes of hydronephrosis in the left collecting system.

Per-vaginam — a cystic mass was felt to be filling the left half of the pelvis with right deviation of the uterus which was felt to be of normal size. Marked tenderness was present over this mass. Provisional diagnosis — ?ectopic, ?broad ligament cyst, was made.

At surgery — a left broad ligament ectopic pregnancy was removed.

Post-operatively the changes in the left kidney and the bladder had completely regressed.

Two other cases of ectopic pregnancy with pelvic haematoma did not show any change on pre-operative I.V.P. films.

Urinary Symptoms. In this series, only two patients had symptoms related to the urinary tract, both had fre-

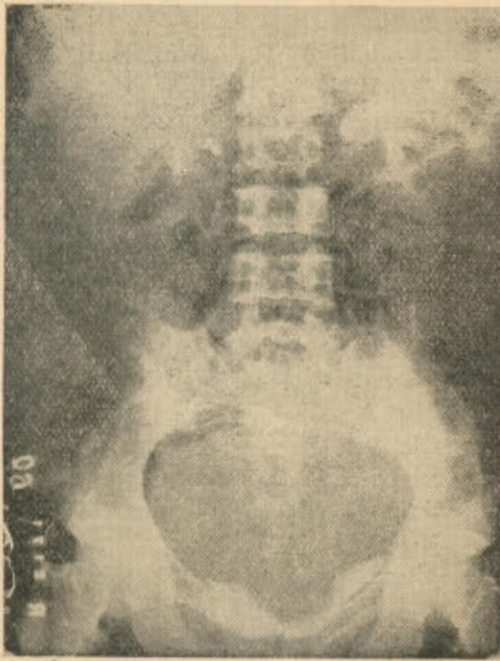


Fig. 5

Pre-operative I.V.P. film showing a soft-tissue opacity in the pelvis rising up to the level of S3 vertebra with upwards displacement of the intestinal gaseous shadows. Right collecting system was normal, left showed hydronephrosis with marked extrinsic pressure effect on the bladder.

quency of micturition. Cuckier and Epstein (1962) reported that out of their series of 7 cases, only 2 had urinary symptoms. No urinary tract infection was present in their cases. Everett (1958) stated that in the absence of complicating urinary infection, complete regression of the upper urinary tract changes to normal quickly followed surgical removal of fibroid tumours.

Morrison and Juracsak (1937) reported an incidence of urinary symptoms in 76% of their cases, out of which 43 cases or 55% of the patients

complained of symptoms referable to the bladder and 21% of symptoms referable to the upper urinary tract. None of the patients in our series had urinary tract infection.

Hypertension. Everett and Sturgis (1940) reported 50% incidence of hypertension in their series while Cukier and Epstein (1962) reported only one case of hypertension out of their 7 cases. In this case, the blood pressure came down to normal within three days. One patient in our series had hypertension, her blood pressure being 150/100 on admission. It remained high throughout her stay in the hospital till she was discharged on the 11th day, following surgery. This patient was 50 years of age with a long-standing pelvic mass of 10 years' duration.

Conclusion

In this series of 35 cases changes in the urinary tract took place in 60% cases. Out of these, reversal of changes occurred in 66.6% cases by the 10th post-operative day. It is possible that this percentage of reversal changes may have increased if these patients had been followed up over a longer period of time.

During the same period 184 patients referred from medical and surgical wards were subjected to intravenous pyelography. Out of these, 25 cases (13%) showed evidence of hydronephrosis varying from a mild to a moderate degree, without any evidence of stone or growth causing obstruction to the upper urinary tract. A fair number of these suffered from pyelonephritis, and all had complained of urinary symptoms necessitating investigations of the urinary tract.

It seems there is only a very small percentage of population that may suffer from the changes in the upper urinary tract such as hydronephrosis and/or hydroureter without any symptoms or a definite local pathology.

This is a preliminary study of the subject. We wish to work on a larger series of cases, including more cases of ectopic pregnancy and pelvic inflammatory conditions to see the pressure effects, and follow them up over longer period.

Acknowledgements

We wish to thank Dr. M. Chaudhuri, the Medical Superintendent, of the Hospital for allowing us to publish these cases.

Our thanks are also due to Mrs. Devi, Clerk in the department of Obstetrics and Gynaecology, for typing this paper.

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