

## URINARY TRACT INFECTION IN PAROUS WOMEN

by

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### *Introduction*

The potential danger of urinary tract infection during pregnancy and the possible risk of development of a chronic inflammatory lesion, often asymptomatic, with ultimate irreversible renal damage has led to intensive research in this field. But unlike bacteriuria in pregnancy information on the prevalence of residual infection and its effect on the urinary tract in women referred to gynaecological outpatients is very limited. The objective of the present communication, therefore, has been to assess and analyse the extent to which the urinary tract in parous women is adversely affected, both anatomically and functionally, by the repeated assaults of pregnancy and childbirth.

### *Methods and Materials of Study*

One hundred cases of non-gravid parous women were collected by random selection from those attending the gynaecological outpatients department of Nilratan Sircar Medical College and Hospital, Calcutta during the period from June, 1976 to December, 1977. There was at least 6 months interval between the delivery and the present investigation, because it is expected that by this

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time the normal resolution of physiological changes of urinary tract due to pregnancy should be completed.

Two groups of parous women were studied. The first group consisting of 50 cases had urinary symptoms. The second group also consisting of 50 cases were all asymptomatic. They attended the outpatients' department with other gynaecological problems.

At the first visit, relevant facts were elicited from history and clinical examination. Besides age, parity and socio-economic status, details of past obstetric performance were recorded. Clinical examination included assessment of nutritional status, record of blood pressure and thorough pelvic examination. Parous women with marked genital prolapse have been excluded from the present study. Special investigation consisted of examination of midstream specimen of urine, including culture and sensitivity, estimation of haemoglobin percentage and blood urea. Special culture of urine for Acid Fast Bacillus was performed in cases who had significant number of pus cells in the urine but the ordinary culture was sterile. In few selected cases, intravenous pyelogram and cystoscopic examination were performed.

### *Analysis and Results*

Incidence of positive culture of urine was observed in 13 per cent of parous

woman. *Esch. Coli* alone was responsible in 84.6 per cent of cases, while in 7.7 per cent this organism in combination with others was found to be responsible. *B. Proteus* was found in 7.7 per cent.

Fifty out of 100 cases had some sort of urinary symptom. Out of these 50 cases culture was positive in 26 per cent. Urine culture was negative in the remaining 50 asymptomatic cases.

Out of 50 cases, maximum number, 23, had frequency and dysuria. This was the predominating symptom irrespective of the bacteriological finding of the urine. Symptoms of urge and stress incontinence were most frequently recorded in culture negative cases (Table I).

3.5 per cent and trace in 17.2 per cent).

There was no significant difference in the haemoglobin concentration between culture positive and culture negative cases. None of the cases had blood urea level more than 30 mgm. per cent.

Only 5 cases showed rise of blood pressure above 140 systolic and 90 diastolic. Out of these 5, only 2 had positive urine culture.

Incidence of infection was assessed in 4 age groups. It was 20 per cent in the age group below 20, 10 per cent in 21 to 30, 15.5 per cent in 31 to 40 and 6.6 per cent in age group above 40.

Incidence of infection was high in uniparous (20 per cent) and in grand multi-

TABLE I  
*Analysis of Symptomatic Cases in Relation to Positive Urine Culture (50 Cases)*

Symptoms	Culture +ve	Percentage	Culture -ve	Percentage
Frequency and dysuria	8	61.5	15	40.5
Frequency, dysuria and haematuria	2	15.4	5	13.5
Frequency, dysuria, haematuria, recurrent temperature and backache	3	23.1	5	13.5
Urge incontinence	—	—	5	13.5
Stress incontinence	—	—	4	10.8
Stress and urge incontinence	—	—	3	8.2

Of culture positive 76.9 per cent cases and of culture negative 20.5 per cent showed more than 5 pus cells per high power field. Special culture for acid fast bacillus was negative in 9 cases who had persistent excretion of pus cells, more than 10 per high power field with, negative ordinary culture.

Proteinuria was associated more often with culture positive (present in 15.4 per cent and trace in 30.8 per cent) than with culture negative cases (present in

parous (13.1 per cent) women. Incidence was low, 9.2 per cent in paras 2-5.

Intravenous pyelogram was done in 40 cases, out of which only 8, 20 per cent, showed abnormalities. Out of the cases showing radiological abnormalities, 3 had congenital deformities, 2 had abnormal ureteral dilatation and 3 showed only cystocele (Table II).

Out of 25 cystoscopic examinations, only 9 showed abnormalities. Trabeculation was seen in 5 cases, which was a common finding in cases with cystocele.

TABLE II  
Radiological Abnormalities

Abnormalities	No. of cases
Non-functioning (Lt.) kidney and Hydronephrotic change in (Rt.) kidney due to fibrous band at pelvi-ureteral junction (Fig. 1)	1
Complete non-excretion of dye in (Rt.) kidney with minimal hydronephrotic change in (Lt.) kidney possibly due to congenital agenesis of (Rt.) kidney, as soft tissue shadow is also not visible (Fig. 2)	1
Back pressure change in (Rt.) pelvi-calyceal collecting system possibly due to lower polar aberrant artery or fibrous band (Fig. 3)	1
Abnormal ureteral dilatation (Bilateral) (Fig. 4)	1
Abnormal ureteral dilatation only on (Rt.) side (Fig. 5)	1
Only cystocele	3

cidence of urinary tract infection following pregnancy as 5.4 per cent. The higher incidence in India may perhaps be due to frequent childbirth in addition to poor nutritional status of the expectant mothers.

Amongst the organisms responsible for urinary tract infection, *E. Coli* was found to be the commonest viz. 51.6 per cent to 94 per cent—Rao *et al*, 1969; Upadhyay and Verma, 1969; Little and de Wardner, 1966; Gruneberg *et al*, 1968). In the present study *E. Coli* alone was isolated in 84.6 per cent while this organism in combination with others was found to be responsible in 7.7 per cent of cases. Why the *E. Coli* is responsible in such a high percentage of cases, is not very clear. Presumably the other organisms are not capable of initiating infection and are less nephropathogenic than the coliform bacilli.

TABLE III  
Results of Cystoscopic Examination

Total No. of cases	Normal	Abnormal	Number of cases
25	16	Haemorrhagic spots suggestive of acute haemorrhagic cystitis	2
		Bladder neck obstruction with golf-hole like ureteral openings	1
		Only bladder neck obstruction	1
		Trabeculation	5

#### Discussion

The incidence of urinary tract infection in parous women observed in the present study was 13 per cent (Table I) which is higher than that reported by other investigators whose figures vary between 4 per cent (Little and de Wardner, 1966) to 6.9 per cent (Whalley *et al*, 1965). These figures referred to the incidence of bacteriuria during pregnancy. Brumfit (1968) however, reported the in-

The incidence of infection was high in the age group below 20 and above 30. This was also common in uniparous and grand multiparous women. Similar results have been reported by Little and de Wardner (1966) and Kakoty *et al* (1974). But others like Kass (1960), Turner (1961) and Nordon (1970) have reported an increase in the incidence only with increasing age and parity. Most of the authors have based their observation on

bacteriuria during pregnancy and their results are not specifically related to residual infection following pregnancy in parous women.

Commonest symptomatology of these patients was frequency and dysuria. Out of 50 cases reported in the present series, 23 complained of frequency and dysuria of which 61.5 per cent showed positive urine culture. However, half of these patients with symptoms but negative urine culture had excess excretion of pus cells suggesting the possibility of urethritis rather than cystitis in these cases.

Out of 7 cases, who had frequency, dysuria and haematuria, 2 showed positive urine culture and cystoscopy revealed the picture of acute haemorrhagic cystitis (Table III); while in 5 cases, no obvious cause was found even in intravenous pyelogram. Possibly they had transient cystitis which healed by the time they were examined. Alternatively a high-up lesion could exist which was missed in intravenous Pyelogram.

Out of the 8 cases with frequency, dysuria, recurrent pyrexia and loin pain, 3 had acute pyelonephritis at the time of examination, confirmed by urine culture and microscopical examination of urine. They were adequately treated and followed up. Intravenous pyelogram was done in all cases after the acute episode had subsided. One case showed non-functioning left kidney, obstruction at the pelvi-ureteral junction of right kidney with hydronephrotic change. The other 4 cases showed negative urine culture and their intravenous pyelograms were also normal. Probably they were treated elsewhere inadequately and had persistence of low grade infection.

None of the cases with stress and urge incontinence in this series showed positive urine culture. There was no obvi-

ous pelvic cause also for urge incontinence. According to Donald (1958) in many cases with urge or stress incontinence, the bladder dysfunction is basically psychological and environmental.

Proteinuria in the present series, was associated more often with culture positive than with culture negative cases. The high incidence of proteinuria in culture positive cases may be attributed to the underlying chronic renal disease and associated impaired renal function as has been suggested by Kinacid-Smith and Bullen (1965).

It is important to realise that positive culture is a clear evidence of infection but not of inflammation, whereas an increased number of pus cells is the direct evidence of inflammation but not of infection (Little and de Wardner, 1966). In the present study 76.9 per cent of culture positive cases had excess excretion of pus cells showing thereby that the inflammation is due to infection with pyogenic organisms. Similar result was observed by Gruneberg *et al* (1968). However, 20.5 per cent culture negative cases also showed pus cell excretion more than 5 per high power field. "Sterile" urine in the presence of significant number of pus cells may indicate the possible existence of renal tuberculosis. None of the cases in the present series, however, exhibited evidence of this specific renal infection. Rosentheim (1960) has pointed out that latent pyelonephritis may exist as a source of continuing infection commonly with a "Sterile" urine. The nature of the infection can only be demonstrated by pyrogen test using intravenous injection of "Pyrexal". This investigation could not be carried out in the present series and therefore, the possible existence of such latent infection can not be ruled out in these cases

Intravenous pyelogram was done in 40 cases. Of these, urologic abnormality was detected only in 8 cases, 20 per cent (Table II). Gower *et al* (1968) in a similar study demonstrated radiological abnormality of 18 per cent. In the present study, there was no evidence to suggest that the infection during pregnancy caused renal radiological abnormalities excepting probably in 2 cases who had ureteral dilatation. Both these cases did not give history of urinary tract infection during pregnancy. The ureteric dilatation in these cases could have been initially due to normal physiological effects of pregnancy and perhaps its persistence was due to the absence of normal postpartum involutinal changes of ureter with asymptomatic infection. This finding and conclusion are in contrast to the generally accepted view that the radiological changes of pregnancy resolve and normal anatomical contour is restored within a few months after delivery (Donald, 1964).

In the present study 7.5 per cent showed congenital abnormality, a factor which is known to increase the susceptibility to renal infection. Out of these, only 1 had the history of repeated urinary tract infection with repeated abortions. The other 2 cases neither gave the history of urinary tract infection nor was their obstetrical carrier affected.

#### Summary

The bacteriological status and morphological abnormalities of the urinary tract, as remote residual effects of pregnancy and labour, were studied in 100 non-gravid parous women. The incidence of infection was found to be 13 per cent. *Esch. Coli* was the commonest organism (84.6 per cent). Only 50 per cent had specific urinary symptoms and of these

urine culture was positive in 26 per cent of cases. No significant difference was observed as regards haemoglobin percentage, blood pressure and blood urea levels between culture positive and culture negative cases. Renal radiological and cystoscopic abnormalities were detected in 12.5 and 36 per cent cases respectively.

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See Figs. on Art Paper VI-VII