

# ASYMPTOMATIC BACTERIURIA IN ADULT WOMEN

by

HARI SAXENA,\*\* M.D.

and

PRATIBHA ROHATGI,\*\*\* D.G.O., M.S.

"Asymptomatic bacteriuria" is defined as the presence in "cleanly collected urine of more than 10,000 living bacteria per millilitre without producing symptoms referable to the urinary system. Asymptomatic infections of the urinary tract occur much more frequently than is generally supposed. The condition has been known to occur in pregnancy for many years but only recently attention has been drawn to a possible important relationship between asymptomatic bacteriuria and progressive renal damage (Kass 1960; Little, 1966). William *et al* (1969) studied unsuspected bacteriuria in non-pregnant subjects and showed that the incidence (5.4%) was similar to that found in pregnant women and further demonstrated evidence of occult renal disease in 42% of the pyelograms done in women with asymptomatic bacteriuria. Little (1966) reported that 25% of pregnant women with asymptomatic bacteriuria developed acute pyelonephritis

during pregnancy and the puerperium.

There has been no such survey of adult women in India; hence the present investigation was undertaken with the primary aim of finding out the incidence of asymptomatic bacteriuria in adult pregnant and non-pregnant women and to study the effect of age and parity in this condition and lastly to determine the efficacy of existing methods suitable for mass screening.

## *Material and Methods*

A total of 1000 adult women in the age group of 21-60 years form the subject of this report. The patients were chosen at the time of their first visit to the antenatal and gynaecological out patient departments of Upper India Sugar Institute Maternity and Gynaecological Hospital attached to G.S.V.M. Medical College, Kanpur, during the period January-December, 1968. All patients were thoroughly interviewed and their obstetric history, marital status, history of presenting symptoms in gynaecological patients, history of operations, diagnostic and therapeutic instrumentation, past or present symptoms pointing to urinary tract infection, especially dysuria, burning during micturition, loin pains and low grade fever, were recorded. We have de-

\*\*Reader in Pathology.

\*\*\*Lecturer in Gynaecology & Obstetrics.

From the Department of Pathology & Bacteriology and Obstetrics and Gynaecology, G.S.V.M. Medical College, Kanpur.

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liberately excluded obvious cases of urinary tract infection from the report to correctly assess the incidence of asymptomatic bacteriuria.

A "clean catch" midstream specimen of urine was collected into 2 sterile test tubes under the supervision of a trained staff nurse, after a preliminary cleaning of the perineum, vulva and labia with sterile saline. The specimens were sent within half hour of collection to the Bacteriology department which is fortunately within 5 minutes walking distance. One of the samples of urine was utilised for culture. Uncentrifuged urine was inoculated on to fresh blood agar and MacConkey's agar plates employing a standard bacteriological loop of 0.01 ml. capacity following the suggestion of McGeachie and Kennedy (1963). Significant bacteriuria was considered positive when more than one side of the inoculation box showed moderate to heavy growth. The identification of the microorganism grown was made by routine morphological, biochemical and serological properties. Pure strains obtained were tested for bacterial sensitivity against penicillin, streptomycin, chloromycetin, terramycin, and furadantin by using impregnated discs.

The other specimen of urine was used for microscopy of the wet preparation of the centrifuged deposit for presence of white cells. A count of more than 3 cells per high power field in a total of 10 fields was taken as suggestive of urinary tract infection.

### Results

Altogether 1000 samples of urine from an equal number of women

TABLE I  
Incidence of asymptomatic bacteriuria

Clinical diagnosis.	No. of pts.	Age in years.					Marital status.			Parity.				No. with bacteriuria	Incidence in %
		21-30	31-40	41-50	51-60	Mar.	Widow	1.	2.	3.	4 or more.				
Pregnancy	360	204	118	38	—	360	—	51	98	126	85	25	6.9		
Menstrual disorders	210	124	65	17	4	169	41	31	65	90	24	15	7.1		
Cervical erosion	163	31	56	64	12	145	18	26	81	34	22	13	7.9		
Infertility	104	71	28	5	—	104	—	—	—	—	—	16	15.3		
Fibrosis	80	23	29	21	7	63	17	12	28	13	27	13	16.2		
Carcinoma cervix	57	—	15	38	4	49	8	6	21	19	11	3	5.3		
Menopausal disturbance	26	—	—	26	—	20	6	3	18	2	3	1	3.8		

were cultured. Of this number significant bacteriuria was observed in 86 samples (8.6%). Of 1000 patients investigated 360 were pregnant women and 640 gynaecological patients. Twenty-five, of the 360 pregnant women tested showed significant bacteriuria (6.9%) and 61 gynaecological patients gave positive bacteriuria (8.5%). The age, marital

bacteriuria the white cells were less than 3 cells per high power field, and conversely in 10 patients white cells in the range of 3-5 cells were present in the urine when bacteriological findings were negative.

All urines in which more than 5 cells were present in the urine showed the presence of microorganisms in culture.

TABLE II  
Correlation of white cell excretion in urine with significant bacteriuria

No. of patients investigated	No. with bacteriuria	No. with cells in urine more than 3	No of cells per high power field			
			3-5	6-10	11-15	More than 15
1000	86	92	17	15	36	24

status, parity and reasons for attending hospital are shown in Table I.

The average age of the patients in the pregnancy group was 28 years, and the average age of patients in the gynaecological group was 39 years. The primary causes of attending hospital in younger women were infertility and menstrual disorders, while in older women, they were menopausal disturbances, cancer and erosion of the cervix. The bacteriuria was more prevalent in the child bearing period and a direct relationship was observed with parity. In gynaecological patients, the highest incidence of bacteriuria was seen in patients with fibroids (16.2%) and infertility (15.3%).

The microscopy of a wet preparation of the centrifuged deposit of urine showed a good correlation with bacteriological findings. White cells, more than 3 per high power field, were reported in 92 patients (9.2%). This included 82 positive cases of significant bacteriuria. In 4 cases of

The commonest organism grown on culture was *Escherichia coli* (89.5%), followed by *Klebsiella aerogenes*, *Proteus mirabilis* and *Staphylococcus aureus*, coagulase positive. Table III shows the sensitivity pattern and incidence of these organisms.

#### Discussion

This study on a group of pregnant and non-pregnant adult women has supported the results of pioneer workers that the incidence of asymptomatic significant bacteriuria is fairly high. Our figures of 6.9% incidence in pregnancy compares favourably with the 10% incidence of Kass (1960) and 5.3% incidence reported by Little (1966). The 8.5% incidence in gynaecological patients is also in agreement with the results of Sussman *et al* (1969) who gave 7.1% incidence and Williams *et al* (1969) 5.4% incidence.

The rôle which asymptomatic infection plays in the development of

TABLE III  
Sensitivity of Micro-organisms

Organisms grown.	No. of Patients.	%	Penicillin 1.5 unit.		Streptomycin. 30 mcg.		Chloromycetin 30 mcg.		Furadantin. 200 mcg.		Terramycin. 30 mcg.	
			No.	%	No.	%	No.	%	No.	%	No.	%
Esch. Coli.	77	89.5	2	2.6	1	1.3	2	2.6	70	90.9	2	2.6
Kleb. aerogenes	5	5.8	—	—	—	—	1	20	4	80	—	—
Proteus Mirabilis	3	3.5	—	—	1	33.3	2	66-6	—	—	—	—
Staph. aureus.	1	1.2	1	100	—	—	—	—	—	—	—	—

progressive renal pathology is not very clear but evidence is now accumulating to show that the condition represents an early stage in the natural history of urinary tract infection and that if undetected and untreated in its asymptomatic stage, it leads to acute infection, chronic infection and eventual death. Kass (1960) suggested that in pregnancy asymptomatic bacteriuria, if untreated, leads to 40% incidence of pyelonephritis. He also stressed the fact that complications of pregnancy such as eclampsia, hypertensive renal disease, neonatal mortality and premature birth, can be attributed etiologically to effects of untreated asymptomatic bacteriuria of pregnancy. Little (1966) reported that 25% of 141 women with untreated bacteriuria developed acute pyelonephritis during pregnancy or puerperium. Gower (1968) published a follow-up of 164 patients with bacteriuria of pregnancy and observed that 6 out of 17 (35%) who developed acute pyelonephritis had an abnormal pyelogram. Williams *et al* (1969) carried out similar studies in gynaecological patients. They reported 82 (5.4%) cases of asymptomatic bacteriuria among 1506 patients so investigated. Of these 82 women, 46 were further investigated for occult renal disease by pyelography, level of blood pressure and blood urea examination. They showed that as many as 19 (41%) had abnormal pyelograms and higher values of blood pressure and blood urea. Sussman *et al* (1969) in a similar study reported 7.1% incidence of asymptomatic bacteriuria and of these 34% patients showed abnormal pyelograms.

The importance of early detection

or urinary tract infection in its reversible asymptomatic stage in the natural history of progressive renal damage is indisputable. The high incidence in women of urinary tract infection has been attributed to shortness of the female urethra, effects of sexual intercourse, pregnancy and relative unhygienic cleaning of perineum (Asscher *et al* 1966). The urine of woman is at an optimum condition to support the growth of *Escherichia coli* because of its suitable pH and osmolality.

The need for routine screening of the urine of antenatal patients and gynaecological adult patients for bacteriuria is keenly felt. Collection of a proper and satisfactory specimen of urine for bacteriological examination is the most difficult and inconvenient part of a survey of this type. Dangers of catheterisation are well known. Catheterisation requires expert supervision, utmost sterile procedures and willing and co-operative nursing staff and carries an added risk of introducing infection.

Many criticisms have appeared from time to time in favour of mid-stream collection of the specimen which is often the only suitable method of choice in the busy antenatal and gynaecological out patient departments. Kincaid Smith *et al* (1964) even suggest that prior vulval cleaning is not necessary.

Routine screening for asymptomatic bacteriuria by cultural methods of any large number of women is not an easy task. This requires a well trained staff for collection of the specimen, speed and accuracy of bacteriological methods, dependent on a well equipped laboratory with ample

funds for media and sensitivity tests. The ideal resources are often wanting even in a medical college and hence we stress the value of a simple screening test to be established as a routine and that is the simple examination of a fresh wet preparation of the centrifuged deposit of urine within an hour of its collection. In our hands in the present study, 96.4% correlation was seen in bacteriuria and white cell excretion. Only in 1% of cases, white cells were present in urine without bacteriuria. It is therefore, suggested that all adult women must be screened for bacteriuria on the basis of a simple microscopy of the wet preparation of the centrifuged deposit of urine and culture may only be done when the cytology suggests bacteriuria. This would obviously reduce the load on cultural requirements.

#### Summary

A thousand women chosen at random from the antenatal and gynaecological out patient departments were investigated for asymptomatic bacteriuria.

In 86 (8.6%) women, asymptomatic bacteriuria was detected. The incidence was 6.9% in pregnancy and 8.5% in non-pregnant women.

In gynaecological patients, the highest incidence was in patients with infertility and fibroids.

The commonest organism isolated was *Escherichia Coli* (89.5%).

The white cell excretion in simple microscopy of wet preparation of centrifuged urine compared very well with the bacteriological methods and is recommended as the first mass screening method for detection of asymptomatic bacteriuria.

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