URINARY TRACT INFECTION IN GYNAECOLOGICAL CASES

(A Bacteriological Study)

by

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Introduction

In the past few years there has been increased awareness of the high incidence of urinary tract infection in certain gynaecological conditions, like genital prolapse causing urinary stasis. Operations on the bladder (urinary stress incontinence or fistulae, repair of cystocele, etc.) are followed by continuous drainage for several days and are likely to produce infection of the lower urinary tract. A single catheterisation to empty the bladder before gynaecological examination, before operation or to measure residual urine may also lead to this infection. It is a time-proven axiom in urology that obstruction to the flow of urine predisposes to and facilitates the progression of infection within the urinary tract. It is also a fact that there are individuals who have recurrent or persistent infection in whom no evidence of obstruction can be demonstrated with currently available diagnostic techniques (Murphy *et al*, 1965). Despite the many advances during the last two decades in the treatment and control of infection generally and of gram-negative infections, in gynaecological conditions due to Esch. coli, pseudomonas, proteus, has remained unsatisfactory. This is no doubt largely due to the fact that in many such cases the primary cause of the infection is obstruction, stasis, catheterisation or a neurological deficit which is difficult to eradicate. Another important factor is the multi-resistance to antibiotics found in most of the strains encountered. Hence, search still continues for better and newer drugs in the treatment of urinary tract infections. Successful clinical trials with methenamine mandalate (mandalamine) a urinary tract antiseptic, have been reported by several workers. (Kass, 1960; Ullman, 1964). Several authors (Mehrotra and Jain, 1969; Bhujwala, 1969; Das Gupta and Sharma 1969; Sengupta *et al.* 1972) have tested the *in vitro* sensitivity of various urinary tract pathogens against this drug and emphasised the usefulness of this drug in urinary tract infection.

The purpose of the present communi-

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Received for publication on 19-5-74.

cation is to outline the bacteriology of 570 samples of urine received from suspected cases of urinary tract infection over a period of 5 years from 1969 to 1973, at the Department of Pathology and Bacteriology, Medical College, Aurangabad.

Material and Methods

The midstream 570 samples received from clinically suspected urinary tract infections in gynaecological cases were routinely examined for pus cells as well as bacteria in the wet preparation and cultured on blood agar and Mac Conkey's media. The method of innoculation and the detail procedure has been described in a previous communication from this department (Deshmukh and Sharma, 1970).

The isolates were characterised and their antibiotic sensitivity determined by the disc diffusion technique using the following concentrations of drugs per disc.

Penicillin	10 units/disc
Streptomycin	25 microgram/disc
Tetracycline	25 microgram/disc
Chloramphenicol	25 microgram/disc
Nitrofurantoin	100 microgram/disc
Mandelamine	250 microgram/disc
Sulpha	300 microgram/disc

Results

Of the total 570 samples of urine cultured, 292 samples (52.2 per cent) yielded pathogenic bacteria. Two hundred and seventy-eight samples were either sterile or yielded only saprophytic contaminants. Table 1 shows the incidence of urinary tract infection in different gynaecological cases. Table II shows incidence and nature of organisms observed and Table III summarizes the antibiotic pattern of 292 isolates.

TABLE I

Incidence of Urinary Tract Infection in 570 Gynaecological Cases Studied

Types of cases	No. of cases	Percentage of positive culture
Prolapse uterus	65	35.4
Vesicovaginal fistulae	8	62.5
Dysfunctional uterine haemorrhage	100	6.8
Fibroid uterus	80	4.5
Chr. cervicitis and pelvic infections	125	23.6
Primary and secondary sterility	102	25.0
Postoperative cases	80	56.6

TABLE II

Incidence and Nature of Organisms Observed

S.N.	Organisms	Single	Mixed	Total	Percentage
1.	Esch. coli	115	23	138	47.1
2.	Coagulase positive staphylococci	50	12	62	21.6
3.	Pseudomonas pyocyaneous	28	16	44	15.0
4.	Streptococcus foecalis	20	—	20	6.8
5.	Klebsiella aerogenes	16	—	16	5.4
6.	Proteus	9	3	12	4.1
	Total	238	54	292	100.0

TABLE III
The Antibiotic Sensitivity Pattern of 292 Isolates

S.N.	Organisms	Percentage sensitivity of different antimicrobial agents tested							
		Mandala mine	Nitro-furan-toin	Sulpha	Strepto-mycin	Tetracy-cline	Chloram-phenicol	Penicillin	Resistant to all
1.	Esch. coli	82.5	42.6	1.5	28.4	32.0	40.2	2.6	28.2
2.	Coagulase positive staph.	52.8	22.0	0.7	22.6	56.6	72.8	30.0	46.0
3.	Pseudomonas pys.	38.4	20.5	0.5	21.8	40.6	42.6	—	18.5
4.	Streptococcus foecalis	90.8	40.6	6.2	10.6	58.6	60.2	10.8	—
5.	Klebsiella aerogenes	97.6	58.4	10.2	24.0	40.6	58.4	3.6	—
6.	Proteus	64.8	30.6	10.4	15.6	20.2	40.6	1.8	1.2

Discussion

The close relationship between disease of the female genital tract and the urinary system was appreciated by the ancient Egyptians who laid the foundation of present day urology. Today the subject of the female urology is one which is of necessity important to all obstetricians and gynaecologist and to those concerned with female patients. It is well known that any condition causing obstruction to free flow of urine favours bacterial growth. In genital prolapse difficulty in emptying the bladder is often present due to cystocele. Fibroids may occasionally give rise to dysuria. Depending on the size of the bladder fistula, its mucosa may be exposed or prolapsed into the vagina or there may be bladder neck obstruction due to scarring (Bhasker Rao *et al*, 1969). Bacteriuria inevitably follows insertion of an in-laying catheter into the urinary bladder (Kass, 1956). The single passage of a catheter into a healthy bladder carries an appreciable, though small risk of causing urinary infection (Probably about 3 per cent—Kass, 1957). The risk is greater with repeated catheterization or when there is underlying abnormality or damage of the urinary tract. Slade and Linton (1960) reported 29.0 per cent of urinary tract infection with single catheterization. With an indwelling catheter and open drainage, the incidence of infection is even greater and approaches 100 per cent (Gillespie *et al*, 1960). In the present study the postoperative cases where catheterization was done showed a high incidence (56.6 per cent) of urinary tract infection. These facts indicate serious stage of affairs, but its gravity should not be exaggerated. Kaye *et al*, (1962) showed that most infections apparently clear up fairly quickly. However, an important

minority suffer permanent harm and justify serious attempts to prevent catheter infections. It is obviously important, therefore, to avoid unnecessary catheterization. Perfectly satisfactory midstream specimen can usually be obtained for laboratory tests, and the procedure can be simplified by means of a sterile collecting tube to direct the flow of urine (Leather and Hutchings, 1960). But there still are occasions when intermittent catheterization would be advantageous if infection could be avoided. It is therefore important to realize that the risk of catheter induced infection can be greatly reduced by the use of local antiseptics and by special arrangements for bladder drainage (Gillespie *et al*, 1962).

Upadhyay and Verma (1968) reported positive urine culture in 66 per cent of genital prolapse, 77.6 per cent vesicovaginal fistulae, 36.4 per cent of myomas and 22.2 per cent of dysfunctional uterine bleeding. In our series, pathogenic organisms were grown on urine culture in 62.5 per cent of fistulae, 35.4 per cent of prolapse cases and 56.6 per cent in postoperative cases as compared to 26.6 and 25 per cent of chronic cervicitis and pelvic infection and sterility cases, respectively. Bhasker Rao *et al*, (1969) reported a high incidence of urinary tract infection in V.V.F. as 88.8 per cent, prolapse cases as 42.8 per cent and F.U.H. and sterility as 21.5 per cent.

The most frequent isolate was Esch. coli. This organism was isolated either alone or in association with other organisms from 138 of the 292 significant cultures, that is in 47.1 per cent of the significant cultures. The other organisms were coagulase positive staphylococci (21.6 per cent), and pseudomonas pyocyaneous (15 per cent). Mixed infection were found in 11.4 per cent of cases.

It is apparant from the antibiotic sensitivity pattern of the isolates (Table III) that on the basis of in vitro study mandalamine ranks as the best urinary antiseptic out of the agents employed in the present study. The over all sensitivity to this drug turned out to be 82 per cent. The efficacy of this agent in the treatment of urinary tract infection has been emphasised by several workers (Mehrotra and Jain, 1969; Bhujwala, 1969). Pseudomonas pyocyaneous shows a remarkable sensitivity to mandalamine in contrast to its low sensitivity to nitrofurantoin whose efficacy to other gram negative bacilli is next to that of mandalamine. However, it should be emphasised that these results indicate the in vitro sensitivity of the organisms to mandalamine and may not be true reflection of in vivo sensitivity.

In our study as well as in several other studies (Naidu and Rao, 1967; Mehrotra and Jain, 1969; Bhasker Rao *et al*, 1969; Pathak *et al*, 1968; Upadhyay and Verma, 1968) chloramphenicol and streptomycin range next in sensitivity to mandalamine and nitrofurantoin. The other antibiotics have not been found to be of much value. However, chloramphenicol remains the drug of choice for coagulase positive staphylococci. The present observations seem to confirm the opinion expressed in some recently published clinical and bacteriological reports that mandalamine is probably one of the most effective drugs in the treatment of urinary tract infection, especially in chronic cases. Clinical trials with this drug are necessary to evaluate its effectiveness in the treatment of urinary tract infection in gynaecology.

Summary

The results of the bacteriological examination of urine from clinically suspected cases of urinary tract infection in gynae-

cology have been presented. Esch. coli was the most frequent isolate (47.1 per cent) either as a single pathogen or in mixed infection. Coagulase positive staphylococci and pseudomonas pyocyaneous were the other organisms found in 21.6 per cent and 15.0 per cent, respectively. The antibiotic sensitivity pattern of the isolated strains of bacteria was determined. Mandalamine was found to be the most effective drug against the urinary pathogens. However, chloramphenicol remains the drug of choice in resistant cases of coagulase positive staphylococcal urinary tract infection.

Acknowledgement

We are thankful to Dean, Medical College, Aurangabad for his permission to publish this paper.

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