

Just an Urinary Day – George Davie



Fig 1

This article is dedicated to my erstwhile partner Hein van der Westhuizen, who insisted that no matter how smart or caring you were, if you did not carefully examine your patient's urine yourself, you were lost to the cause of true holistic primary care.

Dr George Davie

GP Pretoria

Summary

The author describes a few patients with different urinary tract infections, stressing the importance of carefully and correctly examining their urine.

Interesting statistics from his general practice is also given.

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I smiled and said mock earnestly, "There are only two possible explanations for what we have grown from your urine. Either you have developed a stone in your bladder or you have become a practising homosexual." He hesitated but knew that I was teasing. What had been cultured from his midstream urine was a mixed growth of various inhabitants of the rectal canal; *E coli*, *Proteus*, and *Strep faecalis*. I had seldom before cultured anything but a pure growth of the offending organism in an otherwise healthy young man with his first attack of acute pyelonephritis.

Mr Brewer was a highly successful businessman who had just recently returned from America after one of his numerous international jaunts. He was also a very fit runner in his early forties and his acute severe illness had been a surprise to both of us. I had previously examined him regularly. He was very health conscious and had never shown any signs of urinary pathology whatsoever, not even the occasional red blood cell in the spun urine, which I have seen so many

times in healthy men without an adequate explanation. The usual prerequisites for pyelonephritis, like obstruction to urinary flow by congenital abnormalities or an enlarged prostate gland, was never detected.

I did not expect Mr Brewer to offer an explanation for the findings in his urine but he seemed to be considering whether he should in fact tell me something. Eventually he confided that the reason for his infection now seemed obvious to him. While he was in America he had been informed by his more intimate associates that heterosexual couples, where the wife was multiparous, were indulging in anal coitus to utilise the advantage of the less stretched anal sphincter. When he returned home he had discussed the matter with an initially unenthusiastic wife but they had decided to experiment with this newly acquired knowledge. Soon afterwards he developed a fever, dysuria and loin and lumbar pain. He will have to be followed carefully to ensure that resistant colonisation of his prostate does not occur.¹

Mr Brewer had not been my only puzzlement this morning while reading the cultures of yesterday's patients. Mrs Dalton had very nearly been misdiagnosed. She had complained of perineal discomfort and an urgency to micturate for the last few days. The urine she had voided in the receptacle in my rooms had hardly changed the colour of the Combur 9 strip used routinely and after centrifuging, the concentrated sediment had contained only two leucocytes per high field magnification and nothing else. I had examined her vaginally, suspecting a monilial vulvitis but the introitus and vagina were healthy. Bimanual

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palpation had elicited mild tenderness over the bladder area and the same perineal discomfort she had complained of, however, and I had decided to catheterise and culture the urine. Seeing the crystal clear urine trickling out of the infant feeding tube I knew this was a waste of time. The prophylactic 100mg of nitrofurantoin that I prescribed, often very reluctantly, for the less than one per cent chance of causing a catheter induced cystitis, was certainly warranted in this case to protect the abused bladder's epithelium from any stray virulent E coli with P fimbriae ready to react with receptors on the uroepithelium.² I even regretted having only done my usual perfunctory wipe of the urethral vestibule instead of trying to thoroughly sterilise the area before slipping in the thin soft plastic tube. On asking her how much water she had drunk she had replied, "Gallons and gallons from yesterday. It

reduced my discomfort when voiding."

I was quite startled to see the significant growth this morning on the bloodagar plate as well as on the Mueller-Hinton agar (Fig 2). Being a Staphylococcus, the MacConkey agar did not allow it to grow too well. I have never bothered to subtype the Staphs that I culture because it is time consuming and I am really just interested in the antibiotic sensitivity of the organisms. Staph saprophyticus seems, according to modern literature, to be a culprit often implicated in young sexually active women.^{3,8} The growth was also not as lush as would be expected from 10^5 colonies per milliliter of urine, but this cut off point for significant growth was also being questioned of late. Many believing that in women with acute dysuria the presence of at least 10^2 organisms of a single coliform species in a clean

Table 1.

The appearance of different bacterial species cultured from 583 urine specimens of my patients from 1981 to 1989, expressed as a percentage of the total number.

	%
Eschericia coli	86
Proteus	5,5
Staphylococcus	5
Streptococcus	1,4
Pseudomonas	1,2
Klebsiella	0,5
Other	0,4

voided specimen of urine is a better predictor of infection.⁴

The antibiogram of a staphylococcus is of course completely different to that of a Gram negative bacillus, so that if I had been foolhardy enough to guess at an appropriate antibiotic I would have been way off the mark in this instance. Since the beginning of this decade, of the close to six hundred positive urine cultures that I have done in my laboratory, only 5% were staphs as opposed to E coli (86%), Proteus (5,5%) Pseudomonas (1,2%), Klebsiella (0,5%), Streptococci (1,4%) and non lactose fermentors and others (0,4%). (Table 1)

I have recently become pre-occupied with the problem of accurately detecting urinary tract infections with the minimum of laboratory equipment. I had aspired to offering a statistically valid simple approach to the problem that was cost effective at the same time. I should have relished proving that by using a catheter specimen of urine and employing dipsticks to detect nitrites and/or leucocytes or even by using a microscope and Gram's stain,



Fig 2. *The deceptively clear catheter urine specimen with the incriminating growth on all three bacterial culture plates.*

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one could reliably predict the presence of a urinary tract infection.

The incident of Mrs Dalton has finally made me realise that the definition of a urinary tract infection has all along contained the only logical answer to my dilemma. In other words, "the diagnosis of urinary tract infections is based on the isolation of significant numbers of bacteria on urine culture."² Direct culture of catheter urine in the female, meticulous midstream urine in the male and perhaps suprapubic puncture in the very small, is thus the only answer where there is any reasonable suspicion of infection.

With Mrs Dalton's staphylococcus in mind, what would be the antibiotics of choice to include in the original culture? In my practice, statistics over the last nine years have yielded the following pattern. Undifferentiated, the organisms have been sensitive to ampicillin 53% of the time; to tetracyclines 51% of the time; and to cephalosporins 71% of the time. The figures for nitrofurantoin are 88%;

for pipemidic acid 75%; for naladixic acid 74% for cinoxacin 76% and for noroxin 89% (Table 2). I hesitate to give you my figures for co-trimoxazole for fear of bringing the wrath of the combined medical and pharmaceutical industries upon me. Being a coward I thus asked a friendly pathologist for her figures and she gave me some recent statistics from her laboratory. I will quote the figures for a number of antibiotics to give a better perspective. The sensitivity percentage in this case applies only to cultures of E coli. (Table 3). Ampicillin 36%; tetracycline 52%; cephalosporin 79%; nitrofurantoin 96%; pipemidic acid 99,5%; naladixic acid 98%; cinoxacin 100%; co-trimoxazole 59%; nitroxoline-sulphamethizole 89%.

During antenatal examinations, test the first morning specimen as well because the nitrate test may only be positive if the urine is kept in the bladder for a number of hours

I have used various media to try and improve my co-trimoxazole figures because I have assumed that it must be as a result of faulty technique, but all to no avail. An interesting phenomenon on my plates however, is the fact that the zone around the co-trimoxazole disc is very often clear except for a few colonies which grow unperturbed. I consider this a resistant organism and not a contaminant because of the fact that I only culture catheter specimens. Perhaps my criteria are too stringent. Another omission that needs to be

Table 3

A specialist pathologist's antibiogram for Escherichia coli expressed as the percentage of E coli cultures sensitive to a particular antibiotic.

	%
Tetracycline	52
Ampicillin	36
Cephalosporin	79
Naladixic acid	98
Pipemidic acid	99
Cinoxacin	100
Nitrofurantoin	96
Co-trimoxazole	59
Nitroxoline-sulphamethizole	89

explained is that of nitroxoline-sulphamethizole from my list. Many years ago I discovered that although this product looked very good in vitro, many patients for whom it was prescribed did not respond to treatment, and I eventually had to come to the conclusion that there was no correlation between the in vitro and the in vivo situation in my particular experience. Testing with it on my plates was thus stopped and I have never been motivated enough to retest my original premise.

When there is ample evidence for an infection I start treating tentatively with pipemidic acid in adults and cephalosporins in children. For males the penetration of the quinolones into the prostatic tissue enhances their effectiveness.⁵ According to the literature trimethoprim is the drug of choice in this regard, especially for the chronic infection.^{2,6} In pregnant women one needs to be very careful not to use potentially harmful drugs and thus sulfas, trimethoprim, tetracyclines and nitrofurantoin should be steered clear of.⁷

Table 2.

Antibiotic sensitivity, of nondifferentiated cultures of 583 urine specimens, expressed as a percentage of the total number tested for, with that specific antibiotic.

	%
Tetracycline	51
Ampicillin	53
Cephalosporin	71
Naladixic acid	74
Pipemidic acid	75
Cinoxin	76
Nitrofurantoin	88
Noroxin	89

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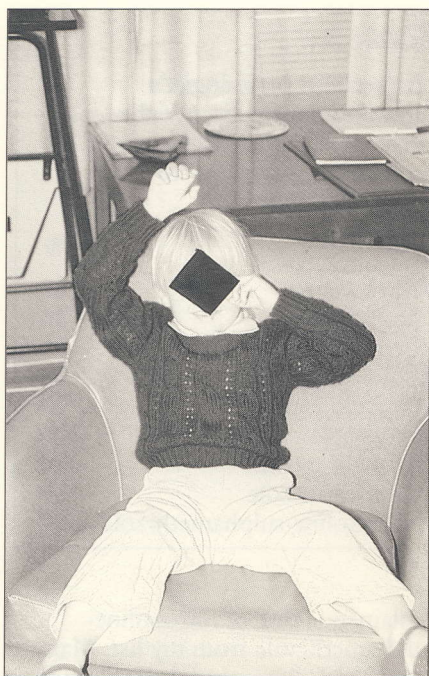


Fig 3. The four year old boy who presented with a fever and pain in the right thoracic region.

Pregnant women are a special case as far as screening for asymptomatic bacteriuria is concerned. Many authorities have stopped their initial enthusiastic hunt for asymptomatic patients amongst the general population because it was not found to be cost effective and because most of these people did not develop kidney damage. In fact it seems that without obstruction in the urinary system repeated infection does no harm to the kidney at all.⁷ Pyelonephritis during pregnancy does affect the wellbeing of the foetus however and thus bacteriuria in the potential mother should be picked up as soon as possible. I have always insisted on testing freshly voided urine during antenatal examinations but there seems to be an argument to test the first morning specimen as

well because the nitrite test may only be positive if the urine was kept in the bladder for a number of hours.

I also use the nitrite test in this way to detect reinfection in my young female patients with recurring cystopyelitis. This is important because one has to undertake further examinations in such a case to rule out reflux of a serious nature. Minor degrees of reflux do not lead to damage and in most cases resolve without interference. The high incidence of congenital abnormalities in boys presenting with urinary tract infections makes it imperative that they be further investigated after the initial attack of urinary tract infection.⁷

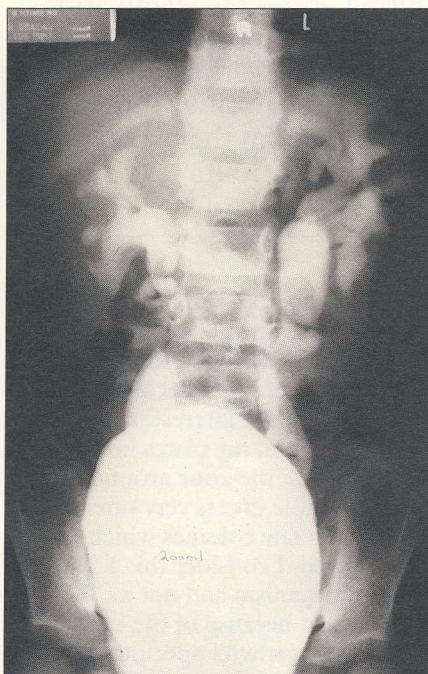
This reminds me of why I have been mulling over things urogenital. I am waiting for the mother of a four year

old boy, (Fig 3) who has the grossest reflux I have ever seen. (Figs 4a + b).

The ureters are large and tortuous and the calyces show blunting. He certainly is in danger of serious, permanent renal damage, even though his urine is kept sterile.⁷ The

Many authorities have stopped their enthusiastic hunt for asymptomatic patients

mother is unperturbed and although she has been warned about the situation, fails to keep appointments and does not want the child to be operated on because it will inconvenience her in her new job. It is easy to understand her attitude,



Figs 4a +b. The voiding cystogram of the patient in Fig 3.

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although not excusable, because her previously healthy little boy had presented only once with a fever serious enough to disturb her pre-occupation with her own young life. This was two weeks ago when Jacques developed a high fever, and complained of pain in the upper right chest area. Physical examination and

Minor degrees of reflux do not lead to damage and in most cases resolve without interference

later a chest x-ray yielded nothing of note but his spun urine, when he eventually consented to supply me with a few ml, contained 60 leucocytes and 8 red blood cells as well as visible bacilli on high field magnification. A pure growth of *E coli* was subsequently cultured.

Medical care for him is going to be a problem. It would be sad if he lands up in a dialysis unit before he reaches full adulthood and is denied the opportunity of experimenting with all the delights available to the mature condition, like Mr Brewer. Perhaps that example is in rather poor taste in this instance.

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