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This Week's Citation Classic

Stamey T A, Govan D E & Palmer J M. The localization and treatment of urinary tract infections: the role of bactericidal urine levels as opposed to scrum levels. *Medicine* 44:1-36. 1965. [Div. Urology, Stanford Univ. Sch. Mcd., Palo Alto, CA]

Techniques are presented for accurately localizing the specific site of urinary tract infections, especially the separation of bladder from renal infection and the identification of the urethra or prostate as the tissue site of bacterial persistence in the male. Additional data demonstrate that the cure of kidney infections is dependent upon the urinary concentrations of antimicrobial agents and not the serum levels. [The *SCI*® indicates that this paper has been cited *over* 300 times since 1965]

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"These data *were* collected between the years 1961 and 1964, less than 10 years after the diagnosis of bacteriuria was statistically established *on* a firm basis by counting the number of bacteria in voided urine.[1] At that time, there was a general feeling that most patients with bacteriuria had pyelonephritis, but there were no techniques available to distinguish renal from bladder infection By using the cystoscope and ureteral catheter, and by measuring the magnitude of renal contamination from bladder bacteria, we developed a technique which showed that only 50% of bacteriuric patients had renal bacteriuria and that these were equally distributed between unilateral and bilateral involvement. Several studies from different parts of the world have confirmed these results in diverse population groups[2]. "Other localization techniques were presented in this paper, including suprapubic needle aspiration of the bladder to avoid perineal bacteria. Prostatic fluid cultures were shown to be meaningless unless bacterial contamination by urethral organisms was measured and accounted for. These latter studies placed the diagnosis of bacterial prostatitis on an objective microbiologic basis for the first time, even though we were incorrect *in* believing that urethral persistence of Enterobacteriaceae was more common than prostatic persistence as the cause of recurrent bacteiuria.

'I think most of the above observations were easily accepted by the medical community, but the other half of this paper- that the cure of urinary infections was determined by urinary levels rather than serum concentrations of antimicrobial agents —met with substantial and often emotional resistance, especially by infectious disease physicians The evidence, however, was clear. We localized urinary infections to the kidneys and then treated these patients with antimicrobial agents that were bactericidal at urinary concentrations (penicillin-G, nitrofurantoin.and tetracycline hydrochloride), but non-inhibitory at concentrations achieved in the serum: the patients, of course, were cured of their infection. I am glad to note that this thesis is widely accepted in 1979, although an occasional microbiologist who never treats infections still espouses the traditional dictum that serum levels are the determinant factor

"It is humbling to read in the discussion section of this paper, 'It is unlikely that the problem of reinfection in the female is an immunological one…' and to realize that exactly 13 years later to the very month (January) and in the *same* journal, we have just published our most recent work entitled, 'The immunologic basis of recurrent bacteriuria: role of cervicovaginal antibody in enterobacterial colonization of the introital mucosa."[3]

1. **Kass E H.** Asymptomatic infections of the urinary tract. *Trans. Assoc. Amer. Phys.* **69:**56-64, 1956.
2. **Stamey T A, Fair W R, Timothy M M, Millar M A, Mihara G & Lowery Y C.** Serum versus urinary anti-microbial concentrations in cure of urinary-tract infections. *New Eng J. Med.* **291:**1159-63, 1974.
3. **Stamey T A, Wehner N, Miharal G & Condy M.** The immunologic basis of recurrent bacteriuria: role of cervicovaginal antibody in enterobacterial colonization of the introital mucosa. *Medicine* **57:**47-56, 1978. "