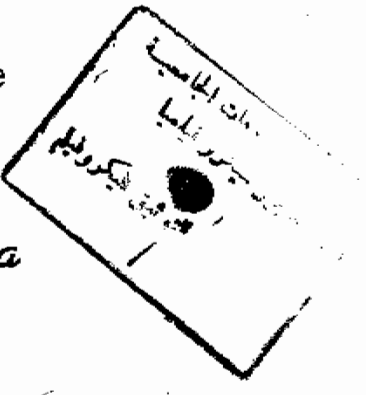
Asymptomatic Bacteriuria in Haemodialysis Patients

Thesis
Submitted in partial fulfilment for
Master Degree in Internal Medicine



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1994

Acknowledgement

I am greatly honoured to express my sincere thanks and deepest gratitude to my **Prof. Dr. Wahid M. El-Said,** *Professor of Internal Medicine, for his fatherly concern, kind supervision and valuable instructions, without which this work could not have been accomplished.*

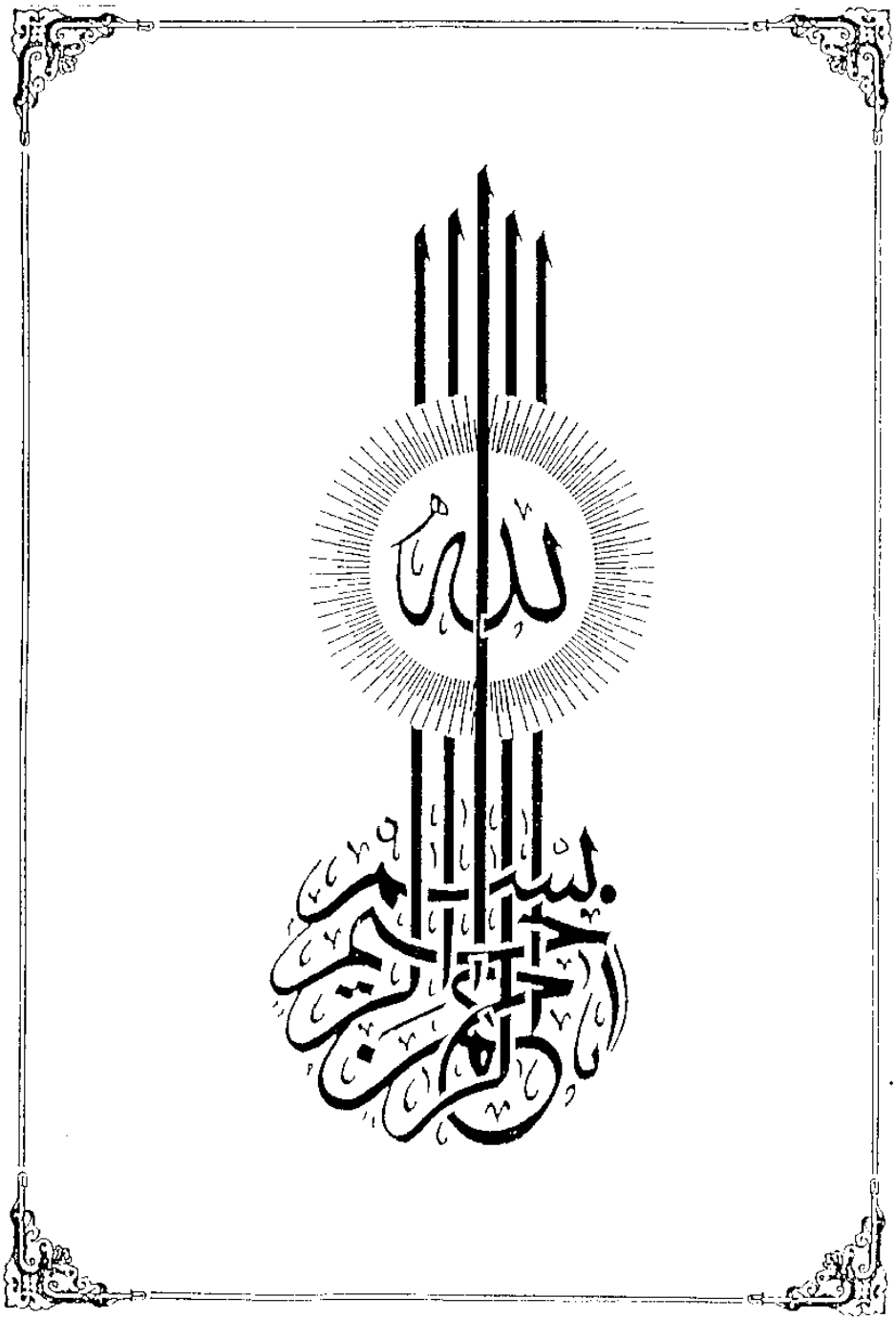
I am greatly indebted to **Dr. Yehia A.R. Awadalla,** *Assist. Professor of Microbiology & Immunology, for his remarkable and considerable attitude. He sacrificed much of his valuable time in teaching me the principles of scientific research.*

Also, I would like to express my gratitude to the Continuous help afforded to me by **Dr. Mohamed A. Ibrahim,** *Lecturerr of Interanal Medicine.*

I would like to express my obligation and sincere thanks Prof. Dr. Shadia Barakat, Professor of Physiology for helping me in the preparation of this thesis.

Also, I would like to thank Dr. Amany Moustafa Kamal, Lecturer of Microbiology, for helping me in accomplishing the practical part of this work.

Romany Rashid



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INTRODUCTION

Patients with renal failure on maintenance hemodialysis have an increased incidence of infections due to defect in cellular immunity, neutrophil function and neutrophil response to infection **[Lazarus et al., 1991]**. Moreover, with decrease urine output, these patients can lose the flushing effects of urine and become Vulnerable to colonization or tissue invasion of the urinary tract **[Abdul Chaudhry et al., 1993]**.

Pyuria and bacteriuria are common problem in asymptomatic end stage renal disease patients on hemodialysis who still produce urine. The clinical significance of bacteriuria in End Stage Renal Disease (ESRD) patients may be determined by long-term follow up, repeated cultures and urine analysis **[Abdul Chaudhary et al., 1993]**.

Urinary tract even in ESRD, represents a potential reservoir for infection that could lead to pyocystitis, pyonephrosis and perinephric abscess **[Lees et al., 1985]**.

AIM OF THE WORK

The aim of this work was to determine the prevalence of significant bacteriuria in asymptomatic hemodialysis patients and correlate it with relevant factors including; causes of renal failure, residual kidney function, schedule of dialysis used as well as tests of immune system (Humoral and cell mediated).

REVIEW OF LITERATURE

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CHAPTER I

URINARY TRACT INFECTION

The urinary tract, like the respiratory and digestive tract, ends on the body surface and therefore can never be sterile throughout its length. However, when the tract is anatomically and physiologically normal, local and systemic defense mechanisms are intact, organisms are confined to the lower end of the urethra. Stasis of urine in any part of the tract is thus an important cause of urinary tract infection **[Lambile et al., 1987]**.

Urinary tract infection refers to microbial colonization of the urine and tissue invasion of any structure of the urinary tract. Bacteria are most commonly responsible, although fungi and viruses may produce urinary infections. Urinary tract infection may be relatively mild such as the "honeymoon cystitis" syndrome or catastrophic such as a perinephric abscess **[Andriole, 1988]**.

Bacteriuria:

It is defined as bacteria in the urine, the probability of the presence of infected urine in the bladder can be ascertained by means of quantitating numbers of bacteria in voided urine and in urine obtained via urethral catheterization **[Sobel and Kaye, 1989]**.

Microbiologically, urinary tract infection exists when pathogenic micro-organisms are detected in the urine, urethra, urinary bladder, kidney or prostate.

In most instances, growth of more than 10^5 organisms per milliliter from properly collected mid stream "clean catch" urine sample indicates infection **[Gratin et al., 1985]**.

However, significant bacteriuria may be absent in some circumstances when true urinary infection exists. A smaller number of bacteria (10^2 to 10^4 per milliliter of mid stream urine) may accompany infection especially in symptomatic patients. Conversely, colony counts in excess of 10^5 per milliliter of mid-stream urine are occasionally due to specimen contamination **[Platt, 1983]**.

In most cases, significant bacteriuria is due to single bacterial strain, the presence of more than one species usually indicates urethral or perineal contamination. Multiple strains may, however, become established in patients with indwelling urethral catheters. Infections associated with urethra, paraure-thral tissue and kidney may be poly-microbial and may include anaerobic or fastidious organisms **[Leigh, 1990]**.

Age and sex distribution of urinary tract infection:

The incidence of bacteriuria in infants up to 6 months is about 2 cases per 10,000 live births and is much more common in boys secondary to an increased incidence of urogenital congenital anomalies in males **[Mc Cracken, 1987]**.

During the preschool years, urinary tract infection is more common in girls than boys. The prevalence of significant bacteriuria in this age group is 4.5% for girls and about 0.5% for boys. Infections during this period often are symptomatic **[Randolph and Green Feld, 1964].**

Among school girls, **Kunin and Gillenwatter [1979]** reported that bacteriuria is common, often asymptomatic and frequently recurs with a prevalence rate 1.2%. Bacteriuria is rare in school boys (prevalence 0.03%). Once adulthood is reached the prevalence of bacteriuria increases in the female population. At least 10- 20% of female populations experience asymptomatic urinary tract infection at sometime during their life. Both sexual intercourse and pregnancy are risk factors for urinary tract infection in women **[Sobel and Kaye, 1989].** Pregnant women are predisposed to develop renal infection, this is probably as a result of dilatation of the ureters and pelvis of the kidney secondary to pregnancy related hormonal alterations.

Pyelonephritis is associated with increased risk of pre- eclampsia, foetal mortality, congenital defects and prematurity **[Montogomerie, 1989].** The prevalence of bacteriuria in adult men is low 0.1% or less until the latter years, it rises.

At least 10% of men and 20% of women over 65 years have bacteriuria. In both sexes the prevalence of bacteriuria rises substantially with age due to obstructive uropathy from the prostate and loss of bactericidal activity of prostate in male, poor emptying of bladder due to prolapse of uterus in women, neuromuscular disease increase instrumentation and bladder catheter usage in

activity of prostatic secretions which reduces host defense against urinary infections **[Sobel, 1987]**.

If bacteria infect the prostate, it may become a nucleus for reinfection of the urinary tract **[Meares, 1987]**.

In fact, the predominant syndrome of urinary tract infection in men is recurrent infection, and thought to be its major cause is chronic bacterial prostatitis **[Smith et al., 1979]**.

It was found that prostatic infection is presumed to occur by retrograde migration of bacteria from the bladder through the prostatic ducts with the intra-prostatic reflux of urine **[Meares, 1987]**.

Finally, prostatic calculi frequently occur in older men, these "foreign bodies" contribute to the risk of these men to develop an infection, by becoming secondarily infected. Prostatic calculi add to the difficulty of eradicating infection from the urinary tract.

Another study of elderly men found that those who were bacteriuric were significantly more likely to be using a urethral or condom catheter, have urinary incontinence or have a history of previous urinary tract infection **[Nordenstan et al., 1986]**.

Because sexual intercourse is associated with urinary tract infection in women, a similar relation has been considered in men some men harbor the same uropathogens in their urethra that their sexual partners carry in their vaginal introitus **[Stamy, 1980]** and a few cases have been reported in which a man's

urinary tract infection was almost certainly hetero-sexually acquired **[Bailey et al., 1986]**.

Also sexual intercourse is thought to facilitate migration of the organisms from the urethra into the bladder before initiation of infection. Continuing ascending spread is thought to result in pyelorephritis **[Nicolle et al., 1982]**.

Haematogenous route:

Fungi and mycobacteria usually invade the kidney, bladder, or prostatic gland by haematogenous spread from a distant focus of infection. Renal and para-renal abscess due to staphylococci or group A streptococci are frequently the result of bacteremia associated with extensive infection of other organ sites. It would appear that infection of the kidney with Gram negative bacilli rarely occurs by the haematogenous route **[Schaeffer 1991].**

Lymphatic route:

Evidence for significant role for renal lymphatics in the pathogenesis of pyelonephritis is unimpressive and consists of the demonstration of lymphatic connection between the ureters and kidney in animals and the fact that increased pressure in the bladder can cause lymphatic flow to be directed toward the kidney **[Sobel and kaye, 1989]**.

Host Susceptibility Factors:

A number of lines of evidence suggest that impaired host susceptibility factors play a major role in predisposing to recurrent urinary tract infection