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INCIDENCE OF BACTERIAL URINE CONTAMINATION AFTER INDWELLING CATHETER IN CASES OF CAESAREAN SECTION

THESIS
Submitted for partial fulfilment
of The Master Degree in
Obstetrics and Gynaecology

618.86
W.M

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1987

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ACKNOWLEDGEMENT

I wish to express my deepest gratitude and respectful thanks to **PROFESSOR DR. MOHAMED B. SAMMOUR**, Professor of Obstetrics and Gynaecology, Ain Shams University, for his guidance, fatherly help and supervision which enabled me to realise this work.

I am deeply grateful to **DR. MAHMOUD YOUSSEF**, Lecturer of Obstetrics and Gynaecology, Ain Shams University, for his constructive criticism and correction of the manuscript.

I also wish to thank and express my gratitude to **PROFESSOR DR. SAMIHA EL BAGOURY**, Chairman of Microbiology Department, Faculty of Medicine for Girls, Al Azhar University for her help and direction as to the completion of the microbiological studies in this thesis.

A special word of gratitude should go to **MAGDY RIAD** for his technical help in the microbiological studies.

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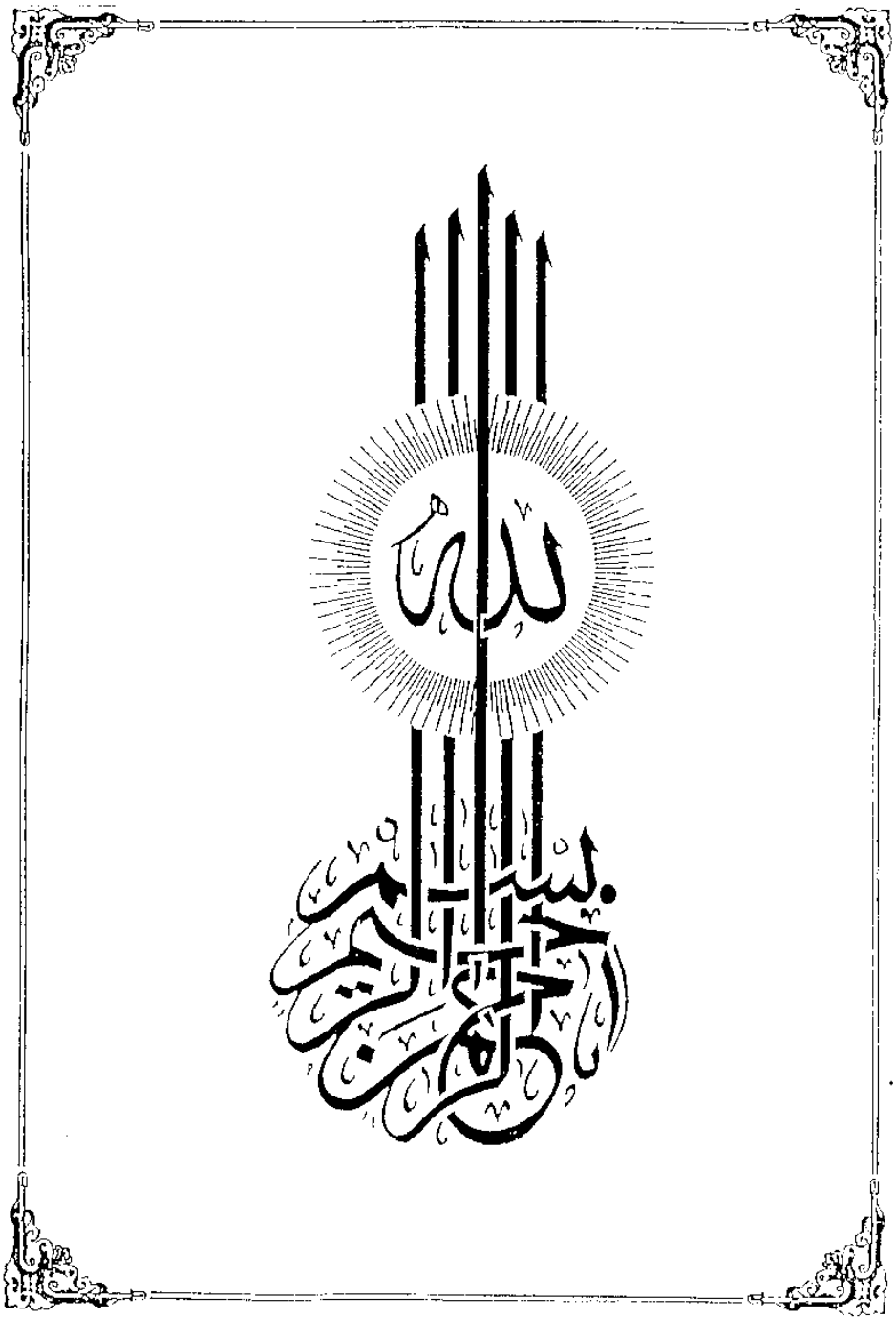

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INTRODUCTION

Urinary tract infection is considered as one of the major medical disorders met within obstetrical practice. Since urinary catheterization is one of the most important factors that predispose to urinary tract bacteriuria and infection, so several authors have reviewed, investigated and discussed the problem of urinary catheterization and its effect on urinary tract infections such as Marple, 1941; Shackman and Massent, 1954; Kass, 1957; Beeson, 1958; Ansell, 1962; Desautels, 1962; Gillespie, 1972; Stamm, 1975; Kunin, 1977; Akiyama et al., 1979; Turck and Stamm, 1981; Krieger et al., 1983 and Klasvskov et al., 1986. The results of these studies, however, did not provide reliable preventive methods of bacteriuria after indwelling catheterization.

AIM OF THE WORK

This is a controlled study aiming at identification of the influence of urinary catheterization as a pre-operative preparatory ritual in caesarean section and its relation to post-partum bacteriuria and urinary tract infection. It also aims at identification of differences between catheterized and non-catheterized females as regards incidence, severity and progress. Furthermore, identification of the possible predisposing factors and aetiological organisms related to the problem.

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REVIEW OF LITERATURE

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REVIEW OF LITERATURE

CHAPTER I

CLINICAL ASPECTS OF THE URINARY TRACT IN PREGNANCY

The changes occuring in the urinary tract during pregnancy are so extensive that non-pregnant norms are inappropriate for the management of antenatal patients. The problem becomes even more complicated as pregnancy progresses because the normal baseline alters. So urinary tract changes during pregnancy can be summarised as follows:

Kidneys:

The kidneys almost certainly enlarge during pregnancy because both vascular volume and interstitial space increase. Evidence from excretory urography performed immediately after delivery reveals that renal size is consistently greater than that predicted by standard height/weight nomograms, and repeated investigation 6 months later indicates a decrease in renal length by approximately 1 cm (Bailey and Rolleston, 1971 and Kauppilla, Satuli and Vuorinen, 1972).

A retrospective analysis of autopsy material has shown that the average weight of two normal kidneys in 137 women dying during or shortly after pregnancy was 307 gms, compared with an average non-pregnant value of 250 gms. Histological assessment indicated that glomerular size, but not cell number, was

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increased in pregnancy (Sheehan and Lynch, 1973). Examination of renal biopsy material obtained at caeserian section has been interpreted as showing that the microscopic structure of the kidney is similar in pregnant and non-pregnant women (Pollak and Nettles, 1960).

Animal work seems to confirm that renal enlargement is caused by increased water content and that there is no accelerated growth during pregnancy. This is similar to the compensatory hypertrophy that occurs after unilateral nephrectomy (Davison and Lindheimer, 1980).

Ureters:

The most striking anatomical change in the urinary tract is dilatation of the calyces, renal pelvis, and ureter. These changes, invariably more prominent on the right side, can be seen as early as the end of the first trimester and by the third trimester are present in 90% of women (Dure-Smith, 1970; Kauppilla, Satuli and Vuorinen, 1972; and Roberts, 1976). The cause of the dilatation is disputed. Some advocate a hormonal effect, and others obstruction (Feinstat, 1963; Roberts, 1976 and Lindheimer and Katz, 1981). There is no doubt that as pregnancy progresses a supine or upright posture may cause partial ureteric obstruction as the enlarged uterus compresses the ureter at the pelvic brim. Some proponents of the obstructive theory attribute a major role to pressure from a dilated ovarian venous plexus (Bellina, Bougherty and Mickal, 1970), especially on the right

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side, the uterine veins (Kauppilla, Satuli and Vuorinen, 1972), or the iliac vessels (Dure-Smith, 1970). Ureteric dilatation terminates at the pelvic brim where the ureter crosses the iliac artery, and at this point a filling defect termed the iliac sign can be seen in an excretory urogram. Failure to see dilatation below the level of the pelvic brim is not necessarily evidence in favor of an obstruction at that level, because the connective tissue sheath (Waldeyer's sheath), which surrounds the ureters as they enter the true pelvis, hypertrophies during pregnancy and could prevent hormonally induced dilatation at this level.

Dilatation of the collecting system has been assumed to be accompanied by hypotonicity and hypomotility of the ureteric muscle as well as reduced urine flow. Modern urometry, however, has demonstrated that there is increased tonicity in the upper ureter and no decrease in the frequency and amplitude of the ureteric contraction complex in pregnancy (Rubi and Sala, 1968; Mattingly and Borkowf, 1978). Furthermore, there is hypertrophy of the ureteric smooth muscle and hyperplasia of its connective tissue so that the concept of toneless, floppy ureters, their smooth muscle paralysed by the hormonal milieu of pregnancy is erroneous.

This ureteric dilation occuring during pregnancy may persist until the sixteenth post partum week and in up to 11% of porous

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women ureteric dilatation may persist with no history of urinary tract infection (Spiro and Fry, 1970).

Vesico-ureteric reflux:

Since vesico ureteric reflux occurs sporadically and intermittently, it has not been possible to accurately assess its frequency. Vesicoureteric reflux occurs in approximately 3% of pregnant patients at or near term, but it is probably far more frequent (Heidrick, Mattingly and Amberg, 1967; Mattingly and Borkowf, 1978).

The mechanism of vesico ureteric reflux remains obscure but centers around changes that occur in the intravesical ureter. With advancing pregnancy, the enlarging uterus displaces the ureters laterally and the intravesical portions are shortened, becoming perpendicular rather than oblique, rendering the junction functionally less competent. Probably this is evident only when there is increased intravesical pressure such as during voiding.

This vesico ureteric reflux may contribute to ascending infection resulting in pyelonephritis. In one series of nine patients with pyelonephritis reflux was demonstrable in three of them either in the last trimester or the postpartum period (Heidrick, Mattingly and Amberg, 1967). Nevertheless, it was still concluded that it remains to be confirmed that vesico ureteric reflux encourages ascending infection.

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Bladder and Urethera:

Results of urodynamic investigations during pregnancy have not always been consistent. This may well be a result of variations in the degree of sophistication of equipment used and of differences in the conditions under which measurements were performed. Early studies indicated an increase in bladder capacity and a decrease in intravesical pressure as pregnancy progressed. More recent experience has suggested the opposite.

Youssef (1956) carried out single intravesical pressure recordings on 10 pregnant women using a glass catheter as a simple manometer. From the early months of pregnancy, he found that the intravesical pressure was lower than normal. The first desire to void was felt between 250 and 400 ml, and the maximum urinary urge was not reached until the bladder contained 1000 to 1200 ml. These changes persisted into the first week of the puerperium. Fancis (1960), however, performed cystometrograms on 50 women in each trimester. She found that the average bladder capacity and the intravesical pressure remained unchanged until late in the third trimester, when there was a reduction in the bladder capacity. Clow, (1975) noted an increase in resting supine intravesical pressure throughout pregnancy in 25 normal pregnant women on whom cystometry was performed. Intravesical pressure rose from a non-pregnant level of 4 to 8 cm H2O to 15 to 20 cm H2O at term. More recently, using a twin microtip transducer catheter, Losif, Ingemarsson and Ulmsten (1980)

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obtained similar results. Simultaneous bladder and uretheral pressures were measured at 12 to 16 weeks'gestation, at 38 weeks'gestation, and again 5 to 7 days after delivery in 14 healthy nulliparous women who did not experience stress in continence. They found that the bladder pressure increased from 9 to 20 cm H2O between the first and second recording and returned to its initial value after delivery.

The anatomical and functional uretheral length and maximumuretheral pressure increased during pregnancy up until 38 weeks'gestation and after that began to decline to less than the antepartum values. As a result of changes in the uretheral andbladder pressure, the uretheral closure pressure increased during pregnancy up to 38 weeks'gestation and fell thereafter. The finding of a rise in bladder pressure in late pregnancy suggests a reduction in bladder capacity.

The study of uretheral pressure changes was taken further by Van Geelen (1981), who investigated pressure changes in relation to mode of delivery, length of the second stage of labour, episiotomy and serum level of sex hormones (17 B-estradiol, progesterone, and 16 @-hydroxy-progesterone). He investigated 42 healthy nulliparous women and found that the total bladder pressure and maximum uretheral pressure increased by a similar amount in both the the sitting and supine positions and that the uretheral closure pressure hardly varied. The rapidly increasing levels of oestradiol and progesterone did not influence these

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parameters. In patients delivered vaginally almost all the parameters were significantly decreased at 8 weeks postpartum, compared with early pregnancy. This decrease did not occur in women delivered by caeserian section. The post partum changes was unaffected by the length of the second stage or by the episiotomy. The anatomical uretheral length gradually increased in pregnancy, whereas the functional uretheral length did not change. These changes act toward maintaining continence.

Bladder and Labor:

The reciprocal effect of labour itself on the bladder and urethra was carefully examined by Malpas, Jeffcoate, and Lister (1949). They studied 32 women radiologically during labour and found that as labour advanced, the bladder neck became displaced forward but not upward in normal labour, and the length of the urethera remained unchanged. The vesico uretheral junction became funnel shapped as a result of the bladder base being "rolled up" toward the lower abdomen.

Postpartum Bladder:

Bennetts and Judd (1941) performed cystoscopy and intravesical measurement on 105 patients from 36 to 60 hours after delivery. Of 94 patients in whom a residual urine volume was measured, 34% had a volume greater than 250 ml, and in 6% the volume was in excess of 500 ml. At cystometry, they found hypotonic bladders with decreased bladder sensation and increased

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capacity in over 80% of their patients. The average bladder capacity in this group was over 865 ml, and the average detrusor presure was less than 30 cm H2O. These findings were independent of the type of delivery, trauma at delivery or intra partum analgesia.

Youssef (1956), in his series of only 10 patients, had similar results, with marked hypotonia and increased bladder capacity post partum. He pointed out that this may be an important factor in predisposing patients to post partum retention and the formation of residual urine.

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