

**A COMPARATIVE STUDY BETWEEN ROUTINE  
CATHETERIZATION AND NON-CATHETERIZATION IN  
ELECTIVE CAESAREAN DELIVERY**

**BY**

**DR SUHAIZA BINTI ABDULLAH**

**MD (UKM)**

**Dissertation Submitted In Partial Fulfillment of the  
Requirement for the Master of Medicine  
(Obstetrics and Gynaecology)**



**USM**

**UNIVERSITI SAINS MALAYSIA**

**UNIVERSITI SAINS MALAYSIA**

**2006**

## **ACKNOWLEDGEMENT**

**Bismillahirrahmanirrahim,**

**Firstly I would like to thank my supervisor Associate Professor Mohd Shukri Othman for giving me an idea and motivation to conduct this study.**

**Not forgetting my co supervisor Dr Habsah Hassan a microbiologist and microbiology laboratory technician Puan Maimunah for great help and support in conducting the laboratory investigation.**

**Dr Sharina Dir now a community medicine specialist in Ministry of Health who always spare me her time during data entry and analysis.**

**My beloved husband, Dr Mohd Shukrimi Awang who give me endless advice and full support and also being my inspiration. Our two sons, Mohd Syaqaer Hakimi and Muhd Syaheed Alimi who gave me strength to go through this master programme and complete this dissertation.**

**Finally to both of my parents for replacing me and shower my children with care and love during my limited time with them during my master programme.**

**Last but not least all lecturers and colleagues in O & G Department and all the supporting staff during the running of this study.**

TABLE OF CONTENTS	Page
ACKNOWLEDGEMENT	ii
CONTENTS	iii
LIST OF TABLES AND FIGURES	iv
ABBREVIATIONS	vi
ABSTRAK (VERSI BAHASA MALAYSIA)	vii – x
ABSTRACT (ENGLISH VERSION)	xi – xiii
INTRODUCTION	1 - 3
LITERATURE REVIEW	
• Historical background of caesarean delivery	4 - 5
• Indications of caesarean section	5
• Economic impact of caesarean section	7
• Morbidity and Mortality associated with caesarean section	8 – 9
• The indwelling urinary catheter	10 - 11
• Urinary Tract Infection (UTI)	12 - 14
• Route of bacterial entry into urinary tract system	14 - 20
• Acute Urinary Retention (AUR) in postoperative period	21 - 23
• Continuous bladder catheterisation as a safety precaution in caesarean section	23 - 24
• Role of Dipstick Test in Urinary Tract Infection	25

## **OBJECTIVES**

- **General objective** 26
- **Specific objectives** 26
- **Research Hypothesis** 27

## **METHODOLOGY**

- **Inclusion criteria** 28
- **Exclusion criteria** 28
- **Subjects** 29
- **Consent** 29
- **Randomisation** 30
- **Methodology** 30 - 33
- **Flow Chart** 34
- **Sample size calculation** 35

## **RESULTS**

- **Demographic data** 36 - 37
- **Difficulty encountered during caesarean section** 38
- **Discomfort at first void** 39
- **Method of first void after caesarean section** 40
- **Need of catheterisation at first void** 41
- **Urine Culture** 42

• Type of organisms cultured in urine sample	43 - 44
<b>Significance test</b>	
• Duration of operating time	45
• First void time after operation	46
• Ambulation time	47
• Length of stay in ward after operation	48
<b>DISCUSSION</b>	49 - 59
<b>LIMITATION</b>	59
<b>RECOMMENDATION</b>	60
<b>References</b>	61 - 68
<b>Appendix</b>	
• Borang maklumat dan keizinan pesakit	69 - 72
• Data collection form	73 - 74

## **ABBREVIATIONS**

<b>CBD</b>	<b>Continuous Bladder Drainage</b>
<b>CS</b>	<b>Caesarean Section</b>
<b>OT</b>	<b>Operation Theatre</b>
<b>LR</b>	<b>Labor Room</b>
<b>HUSM</b>	<b>Hospital Universiti Sains Malaysia</b>
<b>RCT</b>	<b>Randomised Controlled Trial</b>
<b>UFEME</b>	<b>Urine Full Examination and Microscopic Examination</b>
<b>C + S</b>	<b>Culture and Sensitivity</b>
<b>UTI</b>	<b>Urinary Tract Infection</b>
<b>POD</b>	<b>Post Op Day</b>
<b>UR</b>	<b>Urinary retention</b>
<b>GA</b>	<b>General Anesthesia</b>
<b>RA</b>	<b>Regional Anesthesia</b>
<b>LA</b>	<b>Local Anesthesia</b>
<b>SA</b>	<b>Spinal Anesthesia</b>
<b>Hpf</b>	<b>High power field</b>

## **ABSTRAK**

Pada pesakit yang akan menjalani pembedahan caesarean secara elektif, beberapa persediaan sebelum pembedahan dibuat ke atas pesakit seperti memasukkan tiub pada pundi kencing yang juga dikenali sebagai tiub Foley's untuk mengalirkan air kencing semasa dan selepas pembedahan.

Namun begitu, tujuan sebenar kaedah ini yang dilakukan secara rutin adalah tidak diketahui . Kaedah ini selama ini difikirkan dapat memudahkan pembedahan serta mengelakkan retensi kencing selepas pembedahan. Walaupun begitu, prosedur ini juga boleh menyebabkan ketidakselesaan pada pesakit, meningkatkan risiko jangkitan kuman, melambatkan tempoh ambulasi serta membabitkan kos tambahan kateter dan beg kencing

**Objektif:** Kajian ini telah dijalankan yang bertujuan untuk mengenalpasti serta membuat perbandingan antara kepentingan dan risiko yang timbul antara pemasangan tiub foley's secara rutin dan tanpa kateter Foley's semasa dan selepas pembedahan caesarean.

**Tatacara kajian:** Kajian ini merupakan kajian kes kontrol yang di jalankan dalam jangkamasa 9 bulan mulai Januari 2005 dan September 2005 bertempat di Hospital Universiti Sains Malaysia . Semua pesakit yang menjalani pembedahan Caesarean secara elektif telah dimasukkan dalam kajian ini. Pesakit dibahagikan kepada 2 kumpulan iaitu kumpulan kontrol yang mengandungi 70 pesakit di mana tiub kencing di masukkan sebelum pembedahan dan dibiarkan semasa pembedahan sehingga hari pertama selepas pembedahan manakala kumpulan kes pula turut mengandungi 70 pesakit di mana tiub kencing tidak dimasukkan sebelum pembedahan caesarean sebaliknya pesakit di dorong untuk membuang air kecil satu jam sebelum pembedahan bagi memastikan pundi kencing di kosongkan.

Kedua-dua kumpulan terbabit di bandingkan daripada tempoh pembedahan, kesukaran menjalankan pembedahan, serta kesan selepas pembedahan dari segi ketidakselesaan semasa pertama kali kencing selepas pembedahan, tempoh ambulasi dan kadar jangkitan kuman pada saluran kencing serta tempoh tinggal di dalam wad selepas pembedahan caesarean. Maklumat pesakit telah dimasukkan di dalam borang kutipan data yang telah disediakan. Data terkumpul seterusnya dianalisis dengan menggunakan system SPSS versi 12.0 dan perbandingan secara statistik telah dilakukan dengan menggunakan ujian Khi-square dan ujian t.



**Keputusan:** Dalam kajian ini, di dapati bangsa Melayu adalah majoriti pesakit iaitu 93.6% diikuti Cina (3.6%), India (0.7%) dan Siam (2.1%). Indikasi utama pembedahan caesarean dalam kajian ini adalah ulangan pembedahan caesarean (40%) diikuti bayi songsang (19%) dan Placenta Praevia (12.4%).

Sebanyak 82.9% pesakit telah diberi bius separa berbanding bius keseluruhan 17.1%.

Tiada perbezaan yang signifikan didapati daripada tempoh pembedahan caesarean (46.47 minit bagi kontrol manakala 44.49 minit pada kumpulan kes kajian), kesukaran semasa melakukan pembedahan caesarean serta tempoh tinggal didalam wad selepas pembedahan antara kedua-dua kumpulan pesakit (3.10 hari pada kontrol dan 3.17 hari pada kumpulan kes).

Walau bagaimanapun, didapati bahawa terdapat perbezaan yang signifikan secara statistik pada ketidakselesaan semasa kencing pertama kali selepas pembedahan, tempoh ambulasi selepas pembedahan serta jangkitan kuman pada saluran kencing antara kumpulan kajian ini.

**Rumusan:** Penggunaan tiub kencing secara rutin pada pesakit yang akan menjalani pembedahan caesarean secara elektif adalah tidak perlu dibuat secara

rutin kerana ia tidak memberi perbezaan yang signifikan secara statistik dari segi tempoh pembedahan, kesukaran semasa pembedahan, ketidakselesaian semasa pertama kali kencing dan tempoh tinggal di wad selepas pembedahan sebaliknya ia serta melambatkan tempoh ambulasi malahan turut memberi risiko yang tinggi kepada jangkitan kuman pada saluran kencing melalui tiub kencing.

## **ABSTRACT**

In the patients who were undergoing elective caesarean section, several preoperative preparation were made such as insertion of Foley's catheter for urinary drainage intra operative and postoperatively. The indication for the regular practice however was of doubtful benefit even though some may think that the procedure facilitates surgery on the lower segment during caesarean section. This routine practice however entails the cost of Foley's catheter and urine bags, urinary symptoms in patients and antibiotic therapy if urine microscopy suggests infection.

**Objectives:** To evaluate role of routine Foley's catheter during and after caesarean section and compare the outcome of routine use of urinary catheterisation and non catheterisation in patient undergoing elective caesarean section.

**Methods:** This study was a case control study conducted from 1st January 2005 until September 2005. All patients who underwent elective caesarean section were included in this study.

The patients were divided into 2 groups i.e. control group containing 70 patients who had Foley's catheter inserted preoperatively and were kept during and until day 1 postoperatively and another 70 patients Foley's catheter were not inserted prior to caesarean section but instead the patients were asked to pass urine one hour before start of caesarean section to empty the bladder. The two groups of patients were compared in terms of duration of caesarean section, intra-operative difficulty and also post operative outcome namely time of first void, discomfort at first void, duration of ambulation time postoperatively and incidence of urinary tract infection after caesarean section.

**Results:** In this study, the main ethnic group involved was Malay 93.6% followed by Chinese (3.6%), Indian (0.7%) and Siamese 2.1%. The commonest indication for elective caesarean section was repeat caesarean section (40%) followed by breech (19%) and placenta praevia (12.4%). Regional anaesthesia was given in 82.9% of patients while 17.1% were given general anaesthesia.

There was no significant difference in terms of duration of caesarean section (46.67 minutes in control versus 44.49 in patients without Foley's catheter in situ), difficulty encountered during performance of caesarean section and mean length of hospital stay after operation (3.10 day in control as compared to 3.17 day in

case group) .There was however significant difference in discomfort at first void, mean ambulating time and incidence of urinary tract infection in both groups.

**Conclusion:** Continuous urinary catheter by using Foley's catheter is not necessary in patients undergoing elective caesarean section as it does not show any significant difference in terms of mean operating time, difficulty in performing caesarean section but it creates discomfort at first void, delay mean ambulating time and higher risk to urinary tract infection related to CBD.

## **CHAPTER 1**

### **INTRODUCTION**

Caesarean delivery is defined as the birth of the fetus through incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy). This definition does not include removal of the fetus from the abdominal cavity in the case of rupture of the uterus or in the case of an abdominal pregnancy.

Caesarean delivery remains the most common major operation in United States being performed approximately one million times annually (National Hospital Discharge Survey 1992). It's also performed in 25-30% of patients who delivered for the first time in the United States. In Hospital Universiti Sains Malaysia, caesarean section rate is up to 15-20% per year. The total live births per year was 6510 and caesarean section rate was 1052 (16.1%) (Delivery Data Labor Room HUSM 2003)

One of routine preoperative preparations for caesarean delivery is placement of indwelling bladder catheter. However, there is inadequate scientific evidence to the efficacy or safety of its routine use in caesarean delivery. Cochrane database has even rated obstetrics as the least scientifically based specialty within medical practice.

Therefore, the prophylactic use of routine urinary catheter should be scientifically evaluated to justify its adoption as well as to ascertain whether or not complications which may arise in its application outweigh the benefit.

Urinary bladder catheter is an essential part of modern medical care. It is used widely to relieve temporarily anatomic or physiologic obstruction and facilitate surgery.

Though one should avoid catheterisation during caesarean section, the procedure may facilitate surgery on the lower segment; thus it appears justified to drain the bladder via a catheter during surgery.

In making the uterine incision, the loose reflection of peritoneum above the upper margin of the bladder and overlying the anterior aspect of uterine segment is grasped in the midline with forceps and incised with scalpel or scissors. A pair of scissors is used to make a cut between the serosa and myometrium of the lower uterine segment and is pushed laterally from the midline, while partially opening the blades intermittently, to separate a 2-cm-wide strip of serosa, which is then incised. As the lateral margin on each side is approached, the scissors are aimed somewhat more cephalad. The lower flap of peritoneum is elevated and the bladder is gently separated by blunt or sharp dissection from the underlying

myometrium. In general, the separation of the bladder should not exceed 5 cm in depth and usually less.

In doing this procedure, the surgeon will prefer to have the urinary catheter in situ to empty the bladder hence facilitate bladder push-down.

A similar justification cannot be made for the introduction of an indwelling catheter postoperatively. Though many centers no longer practice this, certain centre still continues the practice. It is based on the belief that bruising and edema of the bladder caused by surgery near the uterovesical area and lower abdominal pain will lead to retention of urine. Retention of urine may lead to atony of the bladder and infection if not identified and relieved.

The lack of adequate staff to help patients pass urine at regular intervals after surgery may also lead to retention and failure in identifying retention.

Based on this fear it is routine in our hospital to have an indwelling catheter for 24 hours or more after surgery.

However, this routine practice entails the cost of the Foley's catheter and urine bag, urinary symptoms in the patient and antibiotics if the urine microscopy suggests infection.

Hence, this study aimed to justify routine use of catheter in patient undergoing elective caesarean delivery.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Historical background of caesarean delivery:**

The origin of the term cesarean is obscure. Three principle explanations have been suggested

1. According to legend, Julius Caesar was born in this manner, with the result that the procedure became known as the Caesarean operation.
2. It has been widely believed that the name of the operation is derived from a Roman law, supposedly created by Numa Pompilius (8<sup>th</sup> century BC), ordering that the procedure be performed upon women dying in the last few weeks of pregnancy in the hope of saving the child. This explanation then holds that this lex regia, as it was called at first, became the lex caesarea under the emperors and the operation itself became known as the caesarean operation. The German term Kaiserschnitt ("Kaiser Cut") reflect this derivation.
3. The word caesarean was derived sometime in the middle Ages from the Latin verb caedere which means "to cut". An obvious cognate is the word

caesura, a cutting or pause, in a line of verse. This explanation of the term caesarean seems most logical, but exactly when it was first applied to the operation is uncertain. Because “section” is derived from the Latin verb *seco*, which also means “cut”, the term caesarean section seems tautological.

Traditionally, caesarean sections have been divided into elective and emergency procedures. However, this fails to identify the degree of urgency required in undertaking the operation. In order to enable clear communication between healthcare professionals, four categories of urgency have been recommended by National Confidential Enquiry into Patient Outcome and Death (NCEPOD), and endorsed by the Royal College of Obstetricians and Gynaecologist and the Royal College of Anesthetist. These are as follows:

- An immediate threat to the life of the woman or fetus;
- Maternal or fetal compromise that is not immediately life threatening;
- No maternal or fetal compromise but early delivery required; and
- Delivery timed to suit woman and staff.

In the National Sentinel Caesarean section Audit published in 2001, misclassification was uncommon using this system and it should be adopted in all maternity units.

For the planned procedure or elective cases, there is adequate time to give information regarding the procedure including risks and benefits. If there are associated medical or surgical conditions, expert opinion can be sought from other specialists. This includes referral to anesthetic colleagues where difficulties are anticipated with regional or general anaesthesia. (Simm A., 2005)

### **Indications for caesarean section**

The four most frequent indications for caesarean delivery are (1) repeat cesarean, (2) dystocia or failure to progress in labour, (3) breech presentation, and (4) those performed out of concern for fetal well-being.

Repeat caesarean deliveries and those performed for labour dystocia together account for approximately half of all such operations, both in the United States and other western industrialized countries (Notzon et al 1994, Rosen et al 1991, Soliman et al, 1993).

## **Economic impacts of caesarean section**

Economic impact of caesarean birth is significant. In 1993, the average total cost for a caesarean birth was \$11000 compared with \$6430 for vaginal delivery (American College of Obstetricians and Gynecologist, 1995b)

Currently there is even increasing number of caesarean delivery. The rate for caesarean delivery increased from 4.5 percent in 1965 to almost 25 percent in 1988 (Taffel et al, 1991). The reasons for quadrupling of the caesarean rate over the past two decades are not completely understood, but some explanation including reduced parity, older women are having children, use of electronic fetal monitoring, breech presentation and socioeconomic and demographic factors.

Coincidental with the increase in caesarean delivery in the United States has been a decline in the perinatal mortality rate.

Several investigators have documented the feasibility of achieving significant reductions in institutional caesarean rate without increased perinatal morbidity or mortality.

Programs aimed at reducing unnecessary caesarean section are generally focused upon educational efforts and peer review, encouraging a trial of labor after prior transverse caesarean and restricting caesareans for labour dystocia to women with strictly defined criteria. Such efforts along with increased

understanding of the proper use of electronic fetal heart rate monitoring should further reduce the frequency of caesarean delivery.

Maternal mortality has decreased dramatically in the past 50 years, from 650 per 100,000 births in 1940 to 14.1 per 100,000 live births in 1988.

### **Morbidity and Mortality associated with caesarean section**

Traditionally the major sources of operative mortality in women undergoing caesarean delivery were anaesthetic accidents, hemorrhage and infection. However, with improved anaesthetic techniques and training, availability of antimicrobial agents and modern blood-banking techniques, death from aspiration, infection and hemorrhage are much less common now.

In the United States, maternal death associated with caesarean delivery is rare.

In 1990, Lilford et al, while documenting a 7-fold relative risk for maternal mortality associated with caesarean delivery, they observed that most deaths were associated with complicated non elective procedure.

Indeed, the relative risk of death for elective caesarean under epidural analgesia was actually lower than that associated with vaginal birth.

Although maternal death is an infrequent complication of caesarean birth, morbidity is increased dramatically compared with vaginal delivery.

As with any surgical procedure, both intra and post-operative complications can occur. Some complications however can be anticipated. For elective procedures particularly, it beholds the practitioner arranging the surgery to ensure that an appropriate work-up has been undertaken and experienced personnel are available in the theatre during the surgical procedure.

Among other quoted intra operative complications of caesarean section were bladder and ureteric injury which incidence 0.1% and 0.03% respectively. (Simm A, 2005) The incidence may increase in patient with previous caesarean sections.

A Retrospective study of intra operative and postoperative maternal complications of caesarean section during a 10 year period by Maiike et al (1997) has shown that the overall maternal postoperative morbidity was 35.7%.

Among all the postoperative morbidity, fever (24.6%), blood loss 1000-1500ml (4%), haematoma (3.5%) and urinary tract infections (3.0%) were the four most frequent complications.

Another study by Rochelle et al (2000) showed that the most common infection among caesarean patient was genitourinary infection which occurred in 1.7 per

1000 caesarean deliveries. The most probable bacterial entry route is by the urinary catheter.

### **The indwelling urinary bladder catheter**

The urethral indwelling catheter is one of the most commonly used instruments in hospitals. It is inserted in about 10% of all patients admitted to general hospital.

The risk of infection and its sequelae however depends upon the duration of catheterization, age, sex and presence of associated disease. Foley's catheter is one of various types of urinary catheter available.

It's named after the man who developed the design i.e. indwelling catheter with retention bag. It's made of soft rubber. The size is measured by French Scale (F), which defines the external diameter (not the length) The French size may be converted to millimeters by dividing by 3. Thus, size 18 French is 6mm in diameter. Sizes 16-18 French are commonly used in adults. Smaller sizes are available for children and for special purposes.

Clinical practice in catheter management however varies widely and frequently not evidence based.

Senanayake in 2005 conducted a pilot study to determine feasibility and safety of carrying out elective lower segment caesarean section without urethral catheterization. He found out that the mean volume of urine collected at the

beginning and at the end of caesarean section was only 25.5 ml and 42.8ml respectively which accommodated in spheres of 4.0 and 4.6 cm in diameter respectively. He concluded that it does not affect the safety of doing caesarean section and no cases of bladder injury noted in his study subjects.

Another comparable study was also conducted by Joseph F.L. (2001). He concluded in his study that the absence of the catheter had no effect on surgical exposure of the lower uterine segment and rarely urinary retention was encountered postoperatively. The patient without catheter also ambulated within hours of the caesarean section.

Catheter associated urinary tract infection account for more than 40% of all nosocomial infections and can be associated with significant complication Smith JM (2003). Over the last few decades research done showed 3 main ways in which organisms may gain access to the urinary tract of the catheterized patients:

- i. During the insertion of catheter into the bladder should complete asepsis not be observed
- ii. By traveling along the urethra in the small fluid-filled cavity between catheter and mucosa
- iii. Following contamination of drainage system, along the inside of catheter directly into the bladder



## **Urinary tract infection (UTI)**

The epithelial surfaces of the urinary tract are in contact with, extending from the site at which urine is formed in the renal glomerulus to its exit at the urethral meatus. In the absence of infection, these structures are bathed in a common stream of sterile urine. The infectious process may involve the kidney, renal pelvis, ureters, bladder and urethra. All these structures are at risk of acquiring infection from the common urinary stream.

Urinary tract infection encompasses a wide variety of clinical entities. These entities include urethritis, prostatitis, epididymitis, cystitis, acute and chronic pyelonephritis and perinephric abscess.

Urinary tract infection is a broad term used to describe infection of the structures of urinary tract. In clinical practice however, one defines this entity in relation to the number of bacteria in a voided urine sample. Significant bacteriuria is defined as equal to or greater than  $10^5$  of the same organism per ml of urine.

Symptomatic bacteriuria is defined as equal to or greater than  $10^2$  coliform organisms per ml of urine plus pyuria, greater than or equal to  $10^5$  to the power of 5

of other pathogens per ml, or any growth of pathogens from a supra pubic aspirate of urine.

Asymptomatic bacteriuria is defined as equal to or greater than  $10^5$  pathogens per ml in two consecutive samples. This definition is used because it is recognized that there will be a 40% false positive rate with just a single sample, due to difficulty in obtaining a clean catch and avoiding vaginal contamination. Some investigators use supra pubic aspiration to confirm the presence of bacteriuria.

Pyuria is defined as the presence of an abnormal number of inflammatory cells in the urine. Urine normally contains a small number of leucocytes ( $<10/\text{mm}^3$  /  $<5/\text{hpf}$ ). Larger numbers indicate that inflammation is present somewhere in the urinary tract or adjacent structures, or that the urine is contaminated with vaginal or preputial secretions. Polymorphonuclear leucocytes are the hallmark of acute inflammation and are the predominant cell type in urinary tract infections. Other inflammatory conditions need to be considered when monocytes, lymphocytes eosinophils, or basophiles are present.

Pyuria need to be interpreted in relation to all other clinical and laboratory information. Hence, pyuria should not be equated with urinary tract infections.

Asymptomatic infections are common but are detected readily by quantitative urine culture. The ability to arrive at specific diagnosis, detect correctable lesions, counsel the patient, and provide effective therapy makes management of urinary tract infections one of the most gratifying experiences in medical practice.

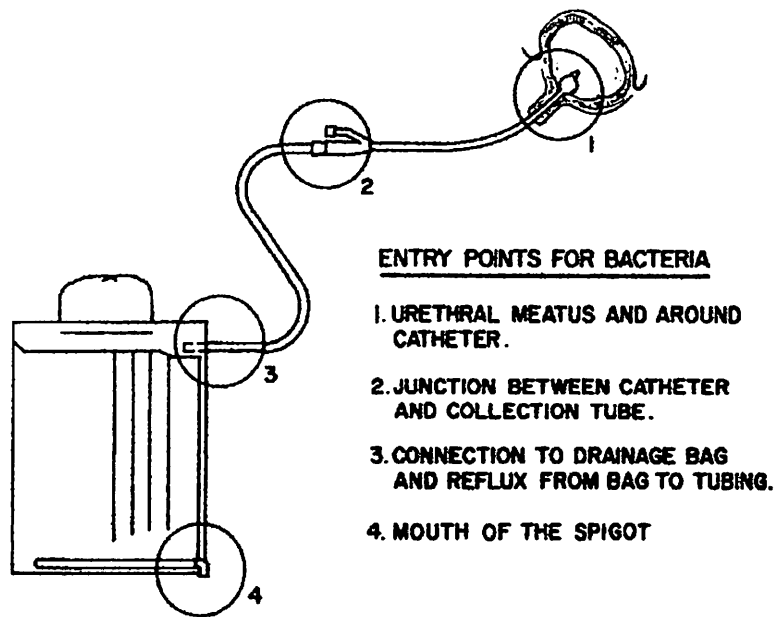
The clinical diagnosis can be readily established from the history and microscopic examination of the urine.

The laboratory hallmark of infection is the presence of the invading microbes and inflammatory cells in the urine.

### **Route of bacterial entry into urinary tract system**

The urinary tract is redundant resistant to infection. Susceptibility is increased when any one structure is damaged or when the free flow of urine is obstructed.

Microorganisms may enter the urinary tract from the distal portions of the urethra, from instruments inserted in the urethra and bladder (ascending infection), or from the blood stream (descending or hematogenous infection)



*Fig. 5-2.* Entry points for bacteria.

Richard Platt (1987) described that urinary tract infection in adults can be associated with serious sequelae and asymptomatic urinary tract infection has been associated with excess mortality in adult women in general community setting and in adults in both sexes in a nursing home. Urinary tract infections that result from short-term indwelling bladder catheter in acute-care hospitals are also associated with a marked increase (relative odds equal to 2.8) in the risk of dying during hospitalization. A randomized trial of preventive measures that reduced the

risk of catheter-associated UTI demonstrated a decrease in mortality commensurate with the lesser risk of infection. These data suggest that asymptomatic UTI may increase the risk of death under certain circumstances.

Schiotz HA in 1996 carried out a prospective study to establish the risk of postoperative asymptomatic bacteriuria developing into a symptomatic urinary tract infection if left untreated. Among 454 women underwent routine gynaecology surgery using transurethral catheter for mean 1.4 day, 53.5% develop post op bacteriuria and 16.3% eventually develop urinary tract infection. Positive urine cultures showed a low predictive value for infection, even when combined with the presence of pyuria. Among 174 women discharged with asymptomatic bacteriuria, 36(20.7%) developed urinary tract infection, of which all but two were caused by Gram-negative organisms or enterococci. Hence, a set of recommendations for handling postoperative bacteriuria is proposed.

Another study by Brumfit et al (1961), it was found out that the urethral catheter as a cause of urinary tract infection in pregnancy and puerperium has been well documented.

Gerber et al in (1994) also found out that urinary tract infection were also significantly more frequent in women subjected to urinary catheter compared to no

catheter ( $p < 0.001$ ). Vaginal operation or secondary caesarean section are restated as an increased urinary tract infection rate ( $p < 0.001$ )

A study conducted by Barnes JN (1998) involving 329 patients who had either a caesarean section or hysterectomy. In this study a comparison has been made between 70 patients who were not having the urinary catheter inserted and 251 who had a urethral catheter peri operatively. He noted the absence of recognized urinary tract infection in those without a catheter was significant compared with the urinary tract infection identified in the catheterized group. Hence benefit of avoiding urinary bladder catheterization when possible ( $p < 0.05$ )

Comparing intermittent and indwelling catheterization, no statistically significant incidence of urinary tract infection in both groups were seen according to Tangtrakul S et al (1994)

A study comparing incidence of UTI by reversing the sequence of vaginal cleansing and urethral catheter by Chan YM et al in 2000 showed that there was also no difference in incidence of UTI in urine collected by urinary bladder catheterisation before vaginal cleansing or by urinary bladder catheterisation after vaginal cleansing.

T Parrot et al (1989) however showed in a prospective clinical study of post operative infection in 124 patients undergoing caesarean section, 31.5% patients developed a total of 45 infections and there was no significant difference in infection rate between elective and emergency procedure.

Among the patients 4% developed endometritis, 11.3% wound infection and 14.5% developed post-operative UTI.

Stray et al in 1989 quoted that bacteriuria was confirmed in 3.2% of puerperal women. Operative delivery (Caesarean section, forceps delivery and vacuum extraction), Epidural anaesthesia and urinary bladder catheter increased the risk of bacteriuria in post partum patients.

Jennifer A Hart et al in 1985 quoted that the risk of catheterised patient acquiring UTI was significantly high that when possible continuous bladder catheterization should be avoided. However the most important preventive measure which may be taken is to limit the duration of indwelling catheterization. In her study, she also found out that the risk increases with duration of bladder catheterization, age, length of hospital stay, immunosuppressant treatment, that it is greater in female than male patients and that a patient with a serious or fatal underlying disease is also more likely to develop bacteriuria.

She concluded that the next step is to formulate criteria for the care of patients with continuous bladder catheter to reduce the risk of infection to the absolute minimum and will hopefully go some way towards diminishing the unsatisfactory high levels of UTI that are currently associated with indwelling bladder catheterization.

In another prospective randomised controlled trials comparing continuous bladder drainage with continuous bladder catheterisation at abdominal hysterectomy by Dobbs SP et al(1997), he quoted that 29% of patients with continuous bladder catheter had urinary tract bacteriuria as compared to 13% in patients without continuous bladder catheter group ( $p < 0.025$ )

However, in his study he found out that in-out urinary bladder catheterisation at the time of routine abdominal hysterectomy was associated with a significantly higher incidence of post-operative urinary retention compared with indwelling catheterisation which he assumed probably may have implications for long-term bladder function.

Goreishi (2003) conducted a prospective randomised study and found out that out of 135 women who did not receive an indwelling urinary catheter after caesarean delivery, 4.4% of the patients needed post operative urinary bladder



catheterisation.

The time of first postoperative voiding range between 8 – 11 hours in 54 (42.5%) of cases. He also found that the ambulation time in the patients without continuous bladder catheter was 6.8 hour as compared to 12.9 hour in the control group.

He finally concluded that routine use of indwelling urinary catheter in caesarean patient with a stable haemodynamic condition is not necessary.

In postpartum patient however, caution must be taken since diagnostic accuracy is affected by lochial infection. Hence, suprapubic bladder catheterization is recommended when indicated.

## **Acute Urinary Retention (AUR) During Postoperative Period**

Bladder function is controlled by supraspinal and and medullary centre via autonomic and somatic pathway. General anesthesia may cause bladder atony by interference with the autonomic nervous system and regional anesthesia may interrupt the micturition reflex leading to detrusor blockade. The effect of anesthetic technique on urinary retention has not been established by valid large-sized randomized trials.

The reported incidence of urinary retention with local analgesia (LA), regional anesthesia (RA) and general anesthesia (GA) is variable and the clinical consequence of the anaesthetic technique on urinary retention has not been reviewed before.

Peter Jannsen et al (2002) conducted a study regarding post herniorraphy UR and effect of local, regional and general anesthesia. His observation was based on analysis of available data from retro and prospective studies. His study analysis however only consider the relationship between use and anesthetic technique and the available data do not allow further separation into the potential role of surgical technique for the repair on UR.

The precise definition of urinary retention however was not given in many studies and because UR was not the primary outcome in most studies, the conclusion however should be made with caution.

His result showed that in patient underwent herniorraphy, 2.42% of patients operated under RA developed UR whereas the incidence of UR after herniorraphy under GA was 3%.

Arulkumaran et al (1986) found out those 12 out of 133 (9%) patients who had no indwelling catheter developed postoperative retention of urine. Four subjects (3%) of these responded to conservative measures and encouragement and were able to pass urine. Four (3%) had to be catheterized once after the conservative approach failed and none needed continuous bladder catheterisation twice and another 4 (3%) needed bladder catheterization for the 3<sup>rd</sup> time and in them an indwelling catheter and continuous bladder drainage was used for 24 hours. This was not significantly different from the 1.4% incidence of repeated need of bladder catheterisation and continuous drainage from the indwelling catheter group. Based on the fact that 94% of the patients had no urinary retention and 3% needed bladder catheterisation only, hence they suggested that prophylactic use of

indwelling catheter in caesarean section patients in anticipation of patient developing acute retention in the absence of other indications is not justified.

He also concluded that existing practice of prescribing antibiotics without culture and antibiotic test on basis of urine microscopy resulted in 27.2% of the indwelling catheter group being treated for urinary tract infection as opposed to 10.5% in the no catheter group.

### **Continuous bladder catheterization as a safety precaution in caesarean section**

Continuous bladder catheterisation is considered an essential safety precaution for caesarean section.

Senanayake (2005) carried out a study to determine the feasibility and safety of performing caesarean section without continuous bladder catheterisation . The study was conducted in two phases in which the first phase include 50 subjects who voided urine within one hour of elective caesarean section but they were put on continuous bladder catheter for the duration of surgery. The volume of urine collected in the bag at the time of entry into peritoneal cavity (Volume A) and at the end of surgery ( Volume B) was measured.

In the second phase of the study, 200 women underwent elective lower segment Caesarean section without catheterisation and the degree of distension of the bladder was noted. He found out that the average volume at the entry into peritoneal cavity was 25.5 ml and at the end of procedure was 42.8 ml which volume could be contained in spherical spaces of 4.0 and 4.8 cm respectively.

In the second phase of the study in the patients without bladder catheter, the bladder was not filled to be visible above the symphysis pubis in 129 and in another 71 patients it was visibly seen but was completely covered by Doyen's retractor.

He also found out that none of patients in second group had urinary tract infection, damage to the bladder or postoperative urinary retention. He concluded at the end of the study that during elective caesarean section without a urinary catheter, the bladder does not distend to a volume that compromise the ease of surgery or safety. Hence, continuous bladder catheterisation for caesarean section as a routine is unnecessary.