Urethral Catheterisation for the Male

W35, 16 October 2012 14:00 - 15:30

Start	End	Topic	Speakers
14:00	14:05	Opening speech	• Dajue Wang
14:05	14:35	Overview of catheterisation for the male	• Helmut Madersbacher
14:35	14:55	Problems with catheterisation for the male in China	• Tie Chong
14:55	15:10	Catheterisation is more traumtic than you think - a personal expericence	• Dajue Wang
15:10	15:30	Discussion	All

Aims of course/workshop

Urethral catheterisation is probably the most commonly used and simplest procedure in urological care of patients with nervous disease. Controversy remains among users (professionals, patients and carers alike). Lack or insufficiency of education leads to misuse or disuse of the procedure, particularly in the developing world.

Considering urethral catheterisation as a technique without much substance of science and technology is a total misunderstanding. This has to be rectified. This workshop is to offer comprehensive knowledge instead of just the technical side of the procedure.

Educational Objectives

All users of catheterisation must have a good command of the knowledge related to the procedure. There is much to be desired in selecting the method, the material and the execution of the techniques. It is hoped that such a workshop will contribute to its improvement, particularly in the world's most populated region: Asia. Travelling to an ICS meeting in China is more affordable for regional people who rarely attend such meetings in the developed world.

WS 35 TUESDAY, OCTOBER 16, 2:00 PM – 3:30 PM

URETHRAL CATHETERIZATION FOR THE MALE

DILEMMA WITH INDWELLING URETHRAL CATHETERIZATION

H. Madersbacher (Innsbruck, Austria)

An indwelling catheter should only be placed when there is a clear indication and should be removed as soon as possible. Mostly a catheter is the last resort, when other options have failed or proved to be insufficient and it should not only be inserted for the comfort of the nursing staff.

The indications for indwelling urethral catheterization are several: acute and chronic urinary retention, to maintain a continuous outflow of urine for patients with voiding difficulties, as a result of neurological disorders in the acute phase (should be removed as soon as possible and substituted e.g. by intermittent catheterization), need for accurate measurements of urinary output in critically ill patients, perioperative use for selected surgical procedures, patients undergoing urological surgery or other surgery on contiguous structures of the genitourinary tract, anticipated prolonged duration of surgery, need for intra-operative monitoring of urinary output, to assist in healing of open sacral or perineal wounds in incontinent patients, to allow bladder irrigation/lavage, to facilitate continence and maintain skin integrity (when other incontinence aids have been unsuccessful), to improve comfort for end of life care if needed and to manage intractable incontinence if other conservative means failed. [1]

*There are also **contraindications** for urethral catheterization such as acute prostatitis and suspicion of urethral trauma.*

There are **two methods** for indwelling catheterizations: **transurethral** and **suprapubic**. *Transurethral indwelling catheterization* is defined as passage of a catheter into the urinary bladder via the urethra, *suprapubic catheterization* is the insertion of a catheter into the bladder via the anterior abdominal wall.

The advantages of suprapubic catheterization are less risk of urethral trauma or catheter-induced urethritis/epididymitis, a reduced risk of catheter contamination, greater comfort, especially for the chair bound patient, easier access for catheter change and cleansing, more appropriate regards to sexual activity and can be blocked off with the ability to void per

urethram to check postvoid residual urine. However, suprapubic catheterization comprises an invasive procedure with the risk of bleeding and visceral injury [3], the patient may still leak urine via the urethra. Changing of a suprapubic catheter needs some training, moreover, patients with implants may require antibiotic therapy prior to insertion, and there are also contraindications: The **main contraindications for suprapubic catheterization** are known or suspected tumor of the bladder, when the bladder cannot be filled up or can not be located either by palpation or with echography prior to puncturing, coagulopathy and ascites. Relative contraindications are prosthetic devices in lower abdomen and previous lower abdominal surgery.

Catheter materials

Nowadays, catheters are available in various materials; the availability may be different in various countries/geographical areas. If there is a choice one should consider the ease of use, tissue compatibility, allergy (latex), the tendency for encrustation and formation of biofilm, the comfort for the patient in some special designs. The ***silicone catheter* (100% silicone)** is very gentle, hypoallergenic, has a relatively large lumen compared to its outer diameter (see below) and has a reduced tendency to encrustation. However, the catheter balloon has a tendency to lose fluid, which can be prevented by using a glycine solution for balloon filling. Although there is no evidence in the literature [4]. From clinical experience we know that a silicone catheter might be preferable to other catheter materials, especially to reduce the risk of encrustation in long-term. ***Silver coated catheters*** significantly reduce the incidence of asymptomatic bacteriuria, but only for less than 1 week. There is some evidence for a reduced risk for symptomatic UTI [5]. There are also ***nitrofurazone-coated catheters.*** Nitrofurazone is a bactericidal compound which is used as an antibiotic. Such a catheter may again decrease the frequency of asymptomatic bacteriuria within 1 week. However, there is no evidence that this catheters decrease symptomatic infection.

The **inner lumen of the catheter** varies quite a lot within different catheter material, the flow through a 12 French silicone is the same as of a 16 French latex catheter, so inserting a large Charrier catheter does not necessarily ensure a larger drainage channel [6].A so-called “closed catheter drainage system” is an aseptic system in which the path from the tip of the catheter inserted into the bladder, to the bag which catches urine, is closed and should not

be disconnected. This is to eliminate inoculation of the urinary tract with bacteria via the catheter drainage tubing and/or from the collection bag [2].

Catheter valves are small devices which are connected to the catheter outlet and can be used instead of a bag. However, most valves are designed that they can be connected to a drainage bag, for example during night-time. The valves provide a well-accepted system of bladder emptying for patients able to manipulate the valve mechanism and empty the bladder regularly to avoid overfilling. It has been shown that using a catheter valve, allowing emptying of the bladder every two to four hours has been associated with reduced catheter blockage [7]. Contraindications for the valve are severe cognitive impairment, poor manual dexterity and an acute urinary tract infection.

Catheter associated urinary tract infection (CAUTI)

40 % of all hospital acquired infections are caused by urinary tract infection (UTI), especially with indwelling catheters with the duration of catheterization being a significant risk factor [8]. **Catheter associated urinary tract infection (CAUTI)** is defined as bacteriuria or funguria with a count of more than 103 CFUs/ml. [9]. Bacterial colonization with catheterization is inevitable with an estimated risk of 5 % per day with almost 100 % colonization between Day 7 and 10. The incidence of bacteriuria is estimated to be about 3 % to 10 % higher each day after catheter insertion [10].

Especially long-term care setting carries a high risk of developing a catheter-related urinary tract infection and associated problems [11]. Bacteruria is therefore almost always found. Bacteriuria itself does not require therapy in asymptomatic individuals. Suprapubic catheters are less prone to cause symptomatic infection compared to urethral catheterization [12].

Sources for CAUTI

There are two main sources for catheter associated bacteriuria/UTI: (1) **extra-luminal contamination** occurring when the catheter is inserted or later by micro-organisms ascending from the perineum and find an ideal culture medium (secretion) between urethral mucosa and catheter surface and (2) when, often **multidrug-resistant bacteria***,* being in the urinary drainage **ascend to the bladder** by-passing host defences. Contributing to CAUTI is a **biofilm**, a thin layer of micro-organism adhering to the surface of a structure, which may be organic or inorganic, together with the polymers that they secrete [18].

Measures recommended to reduce CAUTI

The following measures have shown to reduce the risk of CAUTI: the use of **closed urinary drainage systems**, the use of silver coated catheters, however, only for less than a week, the use of stop orders and **daily assessment of the need for urethral catheterization**, by avoiding drainage tube occlusion, by using small lumen catheters and adhere to common place hand-washing policy [13, 14].

Measures not recommended to reduce CAUTI

On the other hand there are practices, which are not recommended, such as cleansing with 0.05% chlorhexidine gluconate, addition of chlorhexidine to drainage bags, using povidine iodine to wash the genital area, regular bladder washouts (mostly more bacteria are brought in than out…), regular catheter bag changing. **Systemic antimicrobial prophylaxis** should not be routinely used in patients with short-term or long-term catheterization because of the concern about selection of antimicrobial resistance. Antibiotic prophylaxis should only be used before changing the catheter for patients with a history of CAUTI following catheter change. In regards to suprapubic catheterization infection may occur at the site of an SPC insertion which may present as cellulites, requiring antimicrobial pharmacotherapy depending upon severity; such infections are seen in immune-compromised patients. In patients with symptomatic UTI the catheter should be a changed and only afterwards antibiotic therapy should be initiated. Therefore only patients with symptomatic UTI should receive antibiotic treatment based on pure isolated organism with a count of more than 10^3 organisms per HPF.

Prevention measures against CAUTI

In regards to prevention and treatment the Cochrane review suggests there are no high level evidence studies on prevention, however, from clinical experience, potassium citrate supplementation, increased fluid intake and lemon juice supplements may reduce the incidence and severity of catheter encrustation.

For infection prevention **drinking sufficient fluid** with its flushing affect (with an output of 50-100 ml/h) and cranberries are recommended. However, a Cochrane review comparing cranberry products with placebo, juice or water found that cranberries can prevent

recurrent infection in women, but there is no evidence that cranberries are effective in people who need catheterization [21]. Moreover, cranberry juice did not produce urine that was inhibitory to the development of biofilms. More important is hand hygiene as hand-mediated transmission is a major factor in increasing the risk of infections to patients. Antibiotic prophylaxis is not recommended as a routine, however, in patients with an increased risk for CAUTI, as with diabetic mellitus, a long-term low-dosage prophylaxis varying with two or three substances can be beneficial, especially in patients with neurogenic LUT dysfunction due to impaired defense mechanism and disturbed wash-out of bacteria.

Other complications associated with a transurethral indwelling catheter

Epididymitis as a complication to urethral catheterization is seen significantly more often in patients with indwelling catheters compared to intermittent catheterization. Almost 5 % of spinal cord injury patients with long-term indwelling catheters develop epididymitis.

However, also **patient-related factors** (personal hygiene, fluid intake and catheter care) may play a role [15].

Problems with **lumen blockage** are observed in 40-50 % of patients with indwelling catheters [16] caused by debris or encrustation. In over 70 % blockage is due to encrustation and over 60 % of them are associated with bladder stones [17]. One should also take into consideration that a dependent free draining catheter bag may exert significant siphoning pressure resulting in severe catheter reaction within the bladder urothelium. This inflammation in turn may block the catheter holes and result in blockage. Elevation of the catheter bag to eliminate such pressure and intermittent drainage every two to four hours may alleviate this risk and reduce the rate of catheter blockage.

Encrustation is a result of bacteria, most commonly of “Proteus” which produce urease, which splits urinary urea into ammonia and carbon dioxide. This increases alkalinity, providing ideal conditions for development of crystals (struvite).

Catheter bypassing is a symptom, the treatment of which should be aimed at the underlying cause, which can be catheter blockage, bladder overactivity, constipation, pulling on the catheter or a too large diameter of the catheter.

If **bladder spasms** occur they are best managed with aniticholinergic medication or, since recently, also with Botulinum toxin A injection into the bladder wall.

The **risk of developing bladder carcinoma**, especially in spinal cord injured patients with long-term indwelling transurethral catheterization, has been somewhat overestimated in the past as shown by Pannek, 2002 [20].

Alternatives to an indwelling catheter

As alternatives to indwelling catheterization one should consider: a male external (condom) catheter, intermittent catheterization by a nurse or family and intermittent catheterization by the patient and continence pad or containment products.

Summary

There are numerous complications associated with an indwelling transurethral and suprapubic catheter and numerous proposals for solutions were given in the past, only few are really effective and evidence based. However, none can prevent the core complication, and this is CAUTI.

Any innovation and new design of a catheter which could at least reduce significant UTI is very welcome. In the next lecture Prof. Due Wang present such an innovation and he will explain how it works and why it should decrease CAUTI.

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*This handout is based on the **Guidelines for Catheterization – Indwelling Catheterization in Adults, Urethral and Suprapubic,** edited by **V. Geng and coauthors**, European Association of Urology Nurses (EAUN), February 2012, **with their permission**.*

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The urethral catheterisation for the male in mainland China

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Introduction

Although urethral catheterisation is widely used as a routine method not only in urology but also in almost all disciplines of clinical medicine and outside the hospital, not all users are familiar with its material, structure and its correct use. In mainland China, the most commonly used type is **indwelling catheterisation**. The catheter of choice is **latex** one, followed by silicone-coated one. The use of most biocompatible all-silicone catheter remains very rare due to its higher cost. **Intermittent catheterisation** has never been widely accepted not only in patients, but also among professionals due to cumbersomeness of repetitive insertions and the fear related to possible repeated trauma. Although hydrophilic catheter can minimise such trauma, its cumbersomeness of repetitive insertion remains and it is financially not viable due to its high price. Such a pattern of catheterisation may coincide with that of other developing countries. The comparison of catheters of various materials used for indwelling catheterisation will be discussed about by another speaker of the workshop.

Due to the inappropriate choice of indwelling catheterisation and the latex catheter in most cases, the complication rate is very high. The most common complication, urinary tract infection is 100% in patients with long-term indwelling catheterisation. In mainland China, urinary complication is the **No.1 cause of death** in spinal cord injury.[1] This high mortality is beyond any doubt associated with long-term indwelling catheterisation using latex or silicone-coated catheter.

Immediate problems associated with the use of catheter

Catheterisation is not a procedure that can be done by people without sufficient **knowledge and skills**. For long-term catheterisation outside the hospital, any user (the patient or carer) must be intensively trained with not only the technique but also all related knowledge so that they are familiar how to resolve common problems safely when they arise. The user has to be tested by an experienced person in catheterisation for his/her knowledge and skill before he/she can be qualified to carry it out independently. Apart from the knowledge about the catheter, the most important is basic anatomy and physiology of the human urethra, bladder and the genital glands associated with it. A concise graphic leaflet explaining basic knowledge, skills,

problems and how to resolve them is non-existent but highly advisable. Following are few points that are quite often neglected during catheterisation.

1. **Lubricating** the surface of the catheter alone is far from sufficient for a safe and smooth passage of the catheter. Ten ml (cc) of lubricant is necessary to lubricate not only the catheter but also the entire anterior urethra through injection.
2. **Insertion must be delicate and slow**. This is particularly important when the urethra has been anaesthetised with lubricant containing local anaesthetic, or when the patient has lost sensation of the urethra due to nervous lesion or general anaesthesia. These patients fail to feel pain when the urethra is traumatised. The speed of insertion of no more than 1mm/sec is advisable. The insertion of the catheter into the bladder should take around 3 minutes. Fast insertion can cause unnecessary pain and discomfort and should be avoided by all means. Insertion must stop and specialist be consulted when the insertion meets with unsurmountable resistance, or the patient displays strong systemic response like faintness, sweating, sudden increase of heart rate and blood pressure. Insertion of catheter in prior known patient with enlarged prostate (benign or malignant) should be left for specialists or specially trained personnel.
3. It is **wrong to secure the catheter to the thigh** because during spontaneous erection, the catheter may cut the outer orifice of the urethra causing traumatic hypospadias. The correct method is shown in Figure 1.

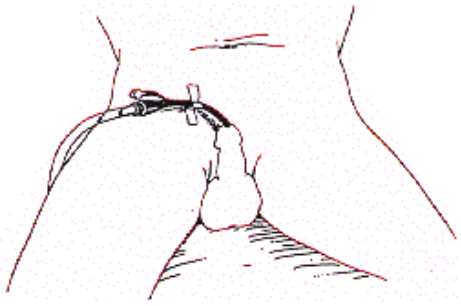

Figure 1 A catheter should be secured to somewhere between the thigh and the navel (Courtesy of William B. Baine, M.D. Guidelines for Prevention of Catheter-Associated Urinary Tract Infections 2008. http://wwwn.cdc.gov/publiccomments/comments/guidelines-for-prevention-of-catheter-associated-urinary-tract-infections-2008/239.ashx)

4. **Withdrawal of the catheter** should be done as slowly as, if not more than, insertion because the surface of a deflated balloon can be very rough and easily damage the urethra. Though rare, it has also to be reminded that it may not take long for deposit of minerals (encrustation) to be formed at the tip of the catheter. According to database of the Stoke Mandeville Hospital, the shortest time that it appears is 7 days after its insertion. Withdrawal of such a catheter is very traumatic. Sometimes, the crust has to be crushed by invasive method before the catheter can be removed without much trauma to the urethra. To prevent its happening, restraining from heavy intake of food containing high minerals (tea, mineral water, some vegetables and

fruits) is advisable.

Long-term and late consequences of indwelling catheterisation

1. **Urinary tract infection** occurs if the catheter remains in situ for longer than 7 days. It is inevitable because the catheter blocks the urethra and completely eliminates the urine flow between the catheter and the urethra to flush out the in-coming bacteria. The ways to minimise the infection are (1) increase intake of water to around 3 litres so that the infected urine is diluted and (2) bladder washing, and (3) keep hygiene of perineal region. Unfortunately, none of them can control the infection and symptomatic or systemic infection inevitably occurs. The infection can ascend and pyelonephritis ensues. Ultimately, the patient may succumb to renal failure.

2. The catheter not only blocks the urine flow but also the secretions of genital organs. They are highly alkaline substances and, under normal circumstances, they can kill the bacteria. Ultimately, the residual secretions are washed out together with the bacteria by the urine. When they are stagnated within the prostatic urethra, the protein-rich secretions break down and serve as an ideal culture medium for bacteria to multiply. This not only aggrevates the urinary tract infection but also causes **prostatitis and epidydymitis**. If not reversed, the patient can be rendered impotent.

3. **Calculus** is the second most common catheter related complication. The mechanism of formation of calculus of the upper urinary tract is different from that of the bladder. Bacteria form the core of crystalisation (calculus) and hence minimising infection and maximising dilution of minerals in the urine by sufficient intake of fluid are essential.

4. **The seemingly smooth surface of the catheter to the naked eye is in fact rough** under microscope and with interferometer, an instrument to measure surface roughness. However well the catheter is secured, there is rubbing between the urethra and the catheter when the body or part of the body is moving. Long-term rubbing between them can cause severe damage to the urethra leading to scarring and stricture of the urethra. In severe cases, the urethra can be perforated into the rectum, forming an internal fistula, or the damage can penetrate the skin to form an external fistula. For this reason, delicate use of the catheter is essential and the indwelling catheterisation is not appropriate for very active patients or for those in whom spontaneous erection and shrinking of the penis are frequent.

Summary

Obviously, there is plenty of room for improvement of urethral catheterisation for the male in China although statistics is lacking. This is evident that renal failure remains the No.1 cause of death of the spinal cord injured whilst in the developed world, the pattern of cause of death has improved to that of a general population [1, 2] Within the short space of the workshop, it is impossible to cover every aspect of urethral catheterisation for the male. The management of resulting complications are not on the agenda. Prevention is the main purpose of the talk that can be summarised very briefly as follows.

1. The procedure must be carried out by sufficiently trained and tested persons.

2. Intermittent catheterisation is the ideal and the best hydrophilic catheter is used if affordable.
3. All-silicone catheter is the catheter of choice for indwelling catheterisation. Latex or even silicone-coated latex catheter should be avoided.
4. Indwelling catheterisation must be performed with utmost care. This includes insertion, securing, withdrawal, hygiene of perineal region and sufficient fluid intake.
5. For various reasons, high intake of fluid of low minerals up to 3 litres is advisable.

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Urethral catheterisation for the male could be a very invasive procedure (with special reference to a personal experience)

Dajue Wang,* Chao Cui**

To many, urethral catheterisation for the male is generally interpreted as a safe low-tech procedure and left in the hands of junior professionals or even non-professionals. It cannot be further from the truth. On the contrary, it needs sufficient knowledge of the bladder and urethra, and the properties of the catheter to carry out the procedure properly. Otherwise, it can cause damage to health if

1. the type of catheter is not properly chosen,
2. the indication for the use of catheter is not properly chosen,
3. the catheter is not properly inserted,
4. the catheter is not properly secured,
5. the catheter is not properly withdrawn,
6. the catheter stays longer than absolutely necessary.

In order to avoid the above-mentioned possible inappropriate applications and minimise their untoward consequences, intermittent catheterisation (IC) was introduced.[1] Later, catheter of less roughness (friction) like hydrophilic one was introduced to minimise repeated trauma to the urethra.[2] This has become the ideal method of catheterisation at current level of science. In the perspective of urine flow, it fulfils both functions of the bladder and urethra: storage (during interval between withdrawal and next insertion) and drainage of urine (during micturition) without leaving any foreign body in the system. Using rough-surface catheter for the purpose is undoubtedly damaging to the urethra. In a life time of 30 years since the onset of a spinal cord lesion, the patient needs to carry out IC for more than 30, 000 times. Even if in 1% of cases a minor damage is done to the urethra, the cumulative damage is 300 times more severe. They are sufficient to cause permanent damage in some cases. Hence, it is highly advisable that the best possible catheter is chosen for IC.

The problem with IC is its cumbersomeness associated with its repetitiveness of the procedure. Although the hydrophilic catheter is the ideal, its cost is high. A world-renowned German urologist said after the Credit Crunch in 2008 that even in Germany, where social welfare is guaranteed, the health system has difficulty coping with the cost. Understandably, it is even more difficult to popularise its use in developing countries. Only those who understand the utmost importance of IC and the consequences of not using it and who can afford it are willing to use it. These shortcomings have left a huge room for the indwelling catheterisation to play its role.

For more than 70 years since Foley introduced the ballooned urethral catheter for indwelling catheterisation, its structure has not changed.[3] Herein, when we talk about choice of a better or the best catheter, it concerns only the material it is made of but not the structure. In some countries even the most traumatic (highest friction) latex catheter is still being widely used. The surface coating with silicone seems to be associated with reducing allergy and roughness in mind. It is more of a wishful thinking than truth.

Let us see the elastic property of the latex first (Figure 1). When the latex is stretched, the teeth become shorter and the surface becomes relatively smooth. When the stretching force is released, the latex resumes its original shape. This is why latex is elastic and its surface can never be smooth without extreme stretching.

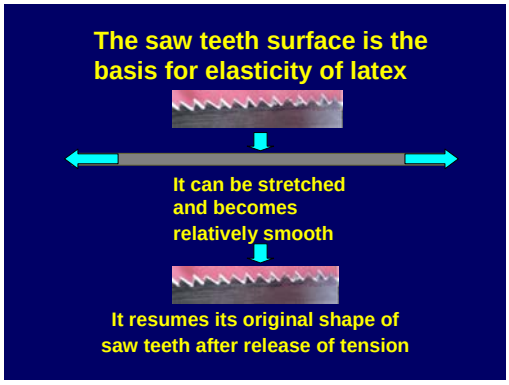
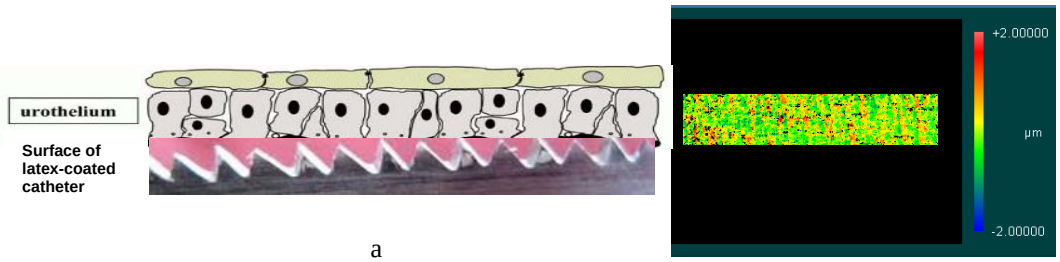


Figure 1 How does the elasticity of latex work.

Figure 2 demonstrates that with a thin layer of silicone coating the contour of the surface remains like saw-teeth on cross-section and a sand paper on a plane (Figure 1a and b). These spikes rub and damage the urethelium along any movement between the catheter and the urethelium during insertion, securing and withdrawal. In fact, an indwelling catheter can never be fully secured. Some movements are inevitable.



a b

Figure 2 a.The interface between the urothelium and the saw-teeth like surface of a silicone-coated catheter. b.The surface roughness of the catheter measured by interferometer (Laboratory of Department of Material Sciences, Imperial College, London). Red represents the peak whilst blue the valley. It resembles a sand paper.

The clinical implications of the peak and valley are:
1. The peaks (spikes) damage the urethra
2. The valleys offer hiding places for the bacteria to colonise and multiply.

On the contrary, the all-silicone catheter has a quite smooth surface (Figure 3).

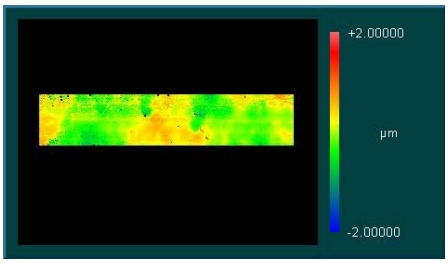


Figure 3 Much lower surface roughness of an all-silicone catheter (Laboratory of Department of Material Sciences, Imperial College, London)

Not enough attention was paid to comparing the roughness of surface of various catheters. A search on the PubMed located only four such publications.[4-7] Only one of them make comparison of catheters made of different materials.

In addition, whatever the material, an indwelling catheter is a foreign body and completely blocks the urine flow through the urethra to flush out any incoming bacteria during passage of urine between the urethra and the catheter wall. This is the reason why infection is inevitable even with all-silicone catheter despite that it is much better than the silicone-coated latex catheter. Some people believe that antiseptic or aseptic procedures during catheterisation and bladder washing can prevent infection. Such belief is totally unfounded. Bacteria keep coming into the urethra, colonise and multiple there in. It is the lack of flushing of the urethra that makes infection inevitable after a few days of the catheterisation. Otherwise, it cannot be explained why the clean technique of IC without antiseptic or aseptic procedure introduced by Lapides could succeed.[8]

The market is not only determined by biological but also social factors, such as price, patient's and carer's preference etc. If indwelling catheterisation is absolutely necessary, all-silicone catheter should be used. Cost should not be a problem because an antimicrobial agent costs much more than an all-silicone catheter if there is infection. Using silicone-coated latex catheter is simply false economy.

The author has his personal experience of using silicon-coated and all-silicone indwelling catheters for improving catheter technology. It indicates that after withdrawal of a single insertion of a silicone-coated catheter, in all 10 cases, the pain and discomfort persist for two weeks whilst in 50 cases of an all-silicone catheter, there is only discomfort without pain for 1-2 hours ($P<0.001$). Such a huge difference should be enough to convince people to **use all-silicone catheter in all circumstances.** Once the market of the latter expands, the price will fall to almost the same as the former.

People may pay some attention to insertion of a ballooned catheter but they normally neglect the importance of the technique of its withdrawal because they just think the job has already been done. That the author experienced obvious pain during quick withdrawal indicates that this last part of the procedure is as important as its first part, the insertion. With the very rough surface of a corrugated balloon after deflation, the withdrawal can be much more traumatic than insertion. Hence the withdrawal should be as slow and delicate as insertion.

It is worth reminding that urinary tract infection related to indwelling catheterisation is the No.1 in-hospital infection that costs medical service huge resources. Indwelling catheters will remain dominant in the market before most consumers round the world can afford and are willing to take on high quality intermittent catheters. **It the indwelling catheterisation is to remain in use, a radical change in the structure of the catheter that allows outflow urine to flush the urethra is indispensible.**[9]

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Notes

Record your notes from the workshop here