Managing Urinary Catheters and CAUTIs
Sharon Eustice, Nurse Consultant, Peninsula Community Health
A Webber Training Teleclass

Managing Urinary Catheters and CAUTIs

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Hosted by Maria Bennallick
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Objectives

- Increased understanding of the problems/ issues of indwelling urinary catheters (IUC)

- Discussed strategies to reduce catheter-associated urinary tract infection (CAUTI)

- Discussed how to improving safety and care

Indwelling urinary catheter (IUC)

- 1 in 4 patients admitted to hospital have an IUC
  - Some may require antibiotics
  - A few may experience life-threatening complications

Saint (2000) Clinical and economic consequences of nosocomial catheter-related bacteriuria Am J Infect Control 28: 68-75

Definitions

- **Healthcare acquired CAUTI**
  - **The patient has an IUC at the time of onset of UTI or**
  - **The patient had IUC removed in the 48hrs prior to onset of UTI**
- **CAUTI**
  - **at least 1 of the following signs or symptoms with no other recognised cause:**
    - **fever (>38°C) or chills**
    - **new flank or suprapubic pain**
    - **or tenderness**
    - **change in character of urine**
    - **worsening of mental or functional status**

http://www.hps.scot.nhs.uk

Loeb et al (2001) Development of minimum criteria for the initiation of antibiotics in residents of long-term care facilities: results of a consensus conference. *Infection control and hospital epidemiology* 22:120-124

SIGN (2006) Management of suspected bacterial urinary tract infection in adults: a national clinical guideline. *Scottish Intercollegiate Guidelines Network*. http://www.sign.ac.uk/guidelines

Pathogenesis

- Urethral flora is regularly flushed away during micturition (scouring action)
- IUC circumvents this mechanism
- Perineal and urethral flora can migrate into bladder between the outside of the IUC and urethral mucosa
- Urine drainage incomplete due to catheter balloon

Nicolle L (2001) The chronic indwelling catheter and urinary infection in long-term care facility residents Infection Control and Hospital Epidemiology Vol 22; No 5: 316-321

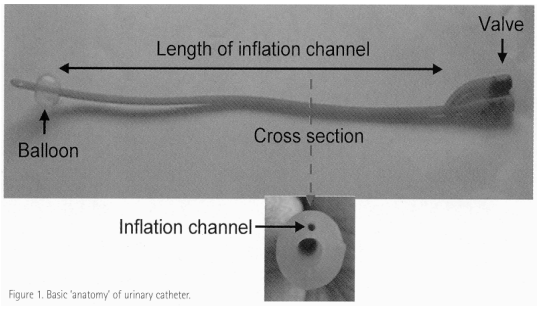

Figure 1. Basic 'anatomy' of urinary catheter.

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Indications for Use

- Acute urinary retention or obstruction
- Accurate measurements in critically ill patients
- Selected surgical procedures e.g. urologic
- Healing of open sacral or perineal wounds
- End of life comfort
- Prolonged immobilisation

http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/CAUTI_Guideline2009final.pdf

Why inappropriate use?

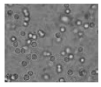
- Urinary incontinence
- Immobility
- Use of diuretics
- Ignorance of published guidelines
- Clinical uncertainty of the patient's medical course
- Convenience of staff

Jain et al (1995) Overuse of the indwelling urinary tract catheter in hospitalised medical patients Arch Intern Med 155:1425-9

Infection is a significant problem

- 40% of all nosocomial infections are urinary tract infections (UTI)
  - 80% of these are related to IUC
- For every CAUTI the length of hospital stay and cost increases

Saint (2000) Clinical and economic consequences of nosocomial catheter-related bacteriuria Am J Infect Control 28: 68-75



CAUTI - Bacteriuria

- Defined as the presence of bacteria in the urine
- By the 20th day, bacteriuria is nearly universal (5% growth per day)
- Bacteriuria alone should not be treated with antibiotics

Stamm W (1991) Catheter-associated urinary tract infections: Epidemiology, pathogenesis, and prevention Am J Med 16: 91

CAUTI - Bacteraemia

- Defined as viable bacteria in the blood (occurring when bacteria enter the bloodstream)
- Can occur spontaneously
- In long-term care facilities, those with IUC are 30 times more likely to have bacteraemia

Muder RR et al (1992) Bacteremia in a Long-Term-Care Facility: A Five-Year Prospective Study of 163 Consecutive Episodes *Clinical Infectious Diseases* Vol. 14, No. 3 647-654

Hobyd-Leduc et al (2007) The relationship of indwelling urinary catheters to death, length of hospital stay, functional decline and nursing home admission in hospitalised older medical patients J American Geriatrics Society 55:227-233

CAUTI - Urosepsis

- Defined as a systemic inflammatory response to infection that appears to originate for a urinary tract source
- More common in:
  - >60 yrs of age
  - Extended length of hospital stay
  - Extended duration of IUC

Rosser et al (1999) Urinary tract infections in the critically ill patient with a urinary catheter Am J Surg 177(4):57-62

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IUC problems/issues

- Infection
- Encrustation
- Urethral trauma
- Bypassing of urine
- Pain
- Bladder calculi
- Bladder cancer
- Quality of life
  - Sexuality
  - Adjustment

Infection

Causes:

Prolonged IUC (> 6 days)
Female
Diabetes
Hospitalisation
Malnutrition
Breach of aseptic technique at insertion
Poor catheter care

Maki & Tambyah (2001) Engineering out the risk for infection with urinary catheters *Emerg Infect Dis.* 2001 Mar-Apr; 7(2): 342-347

Counter-measures:

Supra-pubic compared to urethral?
Coated catheters? (silver or antimicrobials)
Cranberry juice/capsules?
Aseptic non-touch technique
Removal of IUC as soon as possible
Optimum care of the catheter
Hygiene
Renew the catheter at the start of antimicrobial therapy

Raz R, Schiller D & Nicolle L E (1998) Replacement of catheter improves the outcome of patients with permanent urinary catheter and symptomatic bacteriuria. Abstracts, 38th. Annual ICAAC, San Diego, California.
http://guidance.nice.org.uk/CG139 (2012)

Encrustation

Causes:

Biofilm formation
Mineral deposits in 50% of IUC users
Critical pathogen is Proteus Mirabilis

Note: no catheter material is currently resistant to biofilm formation and encrustation

Kunin CM et al (1987) Formation of encrustations on indwelling urinary catheters in the elderly: a comparison of different types of catheter materials in "blockers" and "nonblockers". J Urol Oct;138(4): 899-902.

Counter-measures:

Catheter change regimes
Citrate based drinks to manipulate the nPh
Catheter maintenance solutions?
Valves?

Sabbuba NA et al (2005) Does the valve regulated release of urine from the bladder decrease encrustation and blockage of indwelling catheters by crystalline Proteusmirabilis biofilms? The Journal of Urology; 173 (262-266)

Suller MT et al (2005) Factors modulating the pH at which calcium and magnesium phosphates precipitate from human urine. Urol Res Aug 33(4):254-60

Getliffe KA et al (2000) The dissolution of urinary catheter encrustation. BJU Int Jan;85(1):60-4

Hagen S, Sinclair L & Cross S (2010) Washout policies in long-term indwelling urinary catheterisation in adults Cochrane Database of Systematic Reviews Issue 3.

Urethral trauma

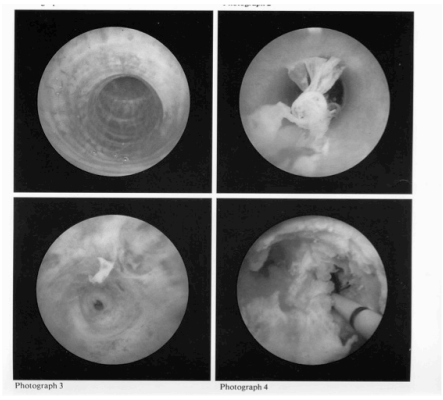
Causes:

Poor insertion technique
Inadequate catheter care

Counter-measures:

Use a sterile lubricant

http://guidance.nice.org.uk/CG139 (2012)



Photograph 3 Photograph 4

Bypassing of urine

Causes:

Catheter size
Underlying neurogenic bladder
Encrustation
Blocking of eyelets with bladder mucosa
Urinary tract infection
Bladder spasm

Counter-measures:

Reduce size
Consider antimuscarinic medications
Avoid restrictive clothing
Check for constipation
Suitable fixation of catheter
Consider checking for bladder calculi

Pratt R J, Pellowe C M, Wilson J A, Loveday H P, Harper P J, Jones S R L J, McDougall C & Wilcox M H (2007) epic2: National evidence-based guidelines for the preventing healthcare-associated infections in NHS hospitals in England Journal of Hospital Infection 655 (supplement) S1-S64

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Pain

Causes:
- Urethral route
- Periods of sitting
- Latex sensitivity
- Friction
- Dislodgement
- CAUTI, spasm, calculi can also contribute to pain

Counter-measures:
- Conversion to a supra-pubic route
- Non-latex materials
- Hydrogel-coated
- Reverse the initial cause

Saint S et al (1999) Urinary catheters: what type do men and their nurses prefer? J Am Geriatr Soc Dec;47(12): 1453-7

Bladder calculi

Causes:
- High urinary pH

Counter-measures:
- Reduce IUC use
- Optimum catheter care

http://guidance.nice.org.uk/CG139 (2012)

Bladder cancer

Causes:
- Literature inconclusive, but some studies have suggested SCI patients have a higher risk

Counter-measures:
- IUC greater than 10 years insitu – annual screening

Groah SL et al (2002) Excess risk of bladder cancer in spinal cord injury: evidence for an association between indwelling catheter use and bladder cancer. Archives of Physical Medicine & Rehabilitation ;83(3):346-51

Tenke P et al (2008) European and Asian guidelines onmanagement and prevention of catheter-associated urinary tract infections. Int J Antimicrob Agents Feb;31 Sup

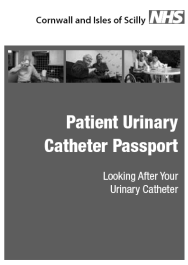
Alternatives to IUC

- Persistent urinary retention/residual
  - Close monitoring if post-void bladder volume
  - Intermittent catheterisation
- Urinary incontinence
  - Conservative measures for treatment (physical and/or behavioural therapy; pharmacotherapy)
  - Toileting assistance
  - External collection devices (sheaths in men)
  - Absorbent containment products

Newman & Wein (2009) Managing and treating urinary incontinence 2nd Ed Health Professions Press Baltimore

General measures

- Patient and carer education (catheter passport)
- Self-management opportunities
- Education for health and social care professionals
- Robust documentation
- Up to date policies and guidelines
- Surveillance



UK drivers for improved care

Winning Ways	2003	Management of urinary catheters Audit of urinary catheter care and management
Saving Lives	2005	To reduce the incidence of UTI related to indwelling urinary catheters Audit of insertion techniques and continuing care
Energising 4 Excellence	2010	To demonstrate a dramatic reduction in the rate of UTI's for patients (50% in England)
Safety Thermometer	2012	To deliver harm free care as defined by the absence of pressure ulcers, falls, CAUTI and VTE by December 2012

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Surveillance

- England uses Safety Thermometer
  - Total number of catheters
  - 1-28 days
  - > 28 days
  - Days not known
  - UTIs (new and old)
- Scotland has a well-established sophisticated approach http://www.hps.scot.nhs.uk/haiic/sshaip/cautisurveillance.aspx

Surveillance

- United States
  - Guideline for prevention of catheter-associated urinary tract infections 2009
  - http://www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf

What is best practice?

http://guidance.nice.org.uk/CG139 (2012)

- Consider alternative methods first
- Document the need for catheterisation
- Review regularly
- There is no one best catheter – patient assessment, anticipated duration and clinical experience will aid choice
- Select the type and gauge of an indwelling urinary catheter based on an assessment of the patient's individual characteristics, including:
  - age
  - any allergy or sensitivity to catheter materials
  - gender
  - history of symptomatic urinary tract infection
  - patient preference and comfort
  - previous catheter history
  - reason for catheterisation
- Smallest gauge to be used with a 10ml balloon

http://guidance.nice.org.uk/CG139 (2012)

- Catheterisation is an aseptic procedure
- Clean the urethral opening prior to insertion
- Lubricant should be used
- Connect catheter to a closed urinary drainage system or catheter valves
- Ensure the connection is not broken, except for good clinical reasons
- Handwashing is fundamental (6 step method)
- Use a new pair of gloves for each patient's catheter

http://guidance.nice.org.uk/CG139 (2012)

- Urine samples should be taken from a needle-free sampling port
- Position urinary bags below the level of the bladder – but not to touch the floor
- Empty bag frequently to maintain flow and prevent reflux
- Use a separate container for each patient and avoid contact between the tap and container
- Do not add antiseptic solutions into the urinary bags

http://guidance.nice.org.uk/CG139 (2012)

- Catheters should not be changed unnecessarily
- Routine personal hygiene is all that is needed
- Bladder irrigation, instillation and washout should not be used to prevent infection
- To minimise the risk of blockages, encrustations and catheter-associated infections for patients with a long-term indwelling urinary catheter:
  - develop a patient-specific care regimen
  - consider approaches such as reviewing the frequency of planned catheter changes and increasing fluid intake
  - document catheter blockages

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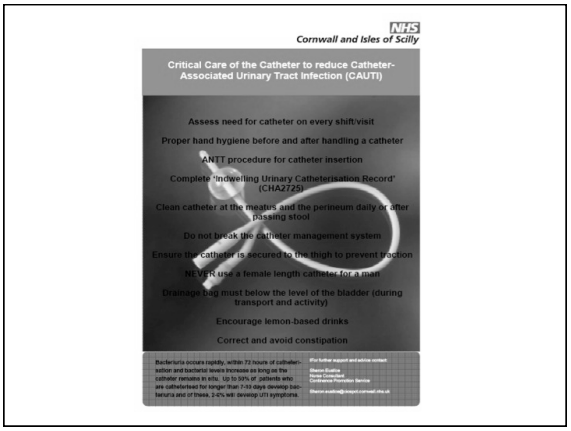
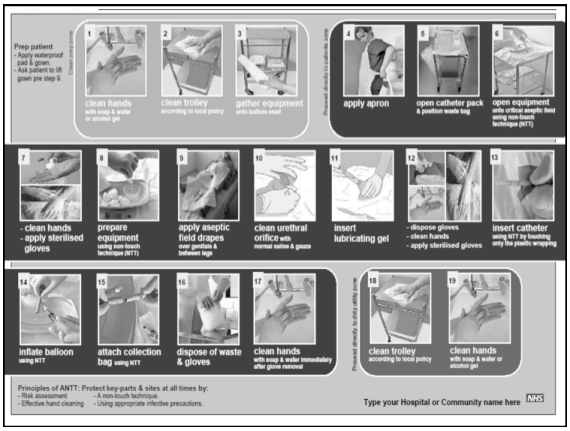
- Healthcare staff must be trained in catheter insertion and maintenance
- Patients and relatives should be educated about their role in preventing infections
- When changing catheters in patients with a long-term indwelling urinary catheter:
  - do not offer antibiotic prophylaxis routinely
  - consider antibiotic prophylaxis for patients who:
  - have a history of symptomatic urinary tract infection after catheter change **or**
  - experience trauma during catheterisation





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Summary

- IUC are significant source of all infections
- CAUTI can be the result of poor care and biofilm
- Understanding when to treat CAUTI is important
- IUC should command respect and aim to remove as soon as possible

26 April ***Clostridium difficile*** **Infection: Lessons From the Quebec Experience**
Speaker: Prof. Yves Longtin, University of Laval, Quebec City
Sponsored by Vernacare (www.vernacare.com)

03 May **Meet the Press – Tips and Techniques for Dealing With the Media**
Speaker: Jim Armour, Summa Strategies, Ottawa

07 May *(Free WHO Teleclass … Europe)* **Keeping the Hand Hygiene Agenda Alive: Acting on Data and the Influence of Global Surveys**
Speaker: Prof. Didier Pittet, World Health Organsation
Sponsored by WHO First Global Patient Safety Challenge – Clean Care is Safer Care

10 May **Best Practices for Eliminating CAUTIs**
Speaker: Robert Garcia, Stoney Brook Medical Center, New York
Sponsored by Sage Products Inc. (www.sageproducts.com)

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