W20: Urologic Catheters, Products and Devices for Lower Urinary Tract Dysfunction

Workshop Chair: Diane Newman, United States
12 September 2017 13:30 - 15:00

Start	End	Topic	Speakers
13:30	13:35	Introduction and Session Organization	Diane Newman
13:35	13:50	Draining and Containing the Bladder: Urethral Devices and Absorbent Products	Diane Newman
13:50	14:05	Bladder dysfunction and indications for catheterization during the intra-partum and post partum period	Angela Rantell
14:05	14:15	Break	None
14:15	14:30	Nurse's knowledge of urinary catheterization and CAUITIs	Tamara Dickinson
14:30	14:45	Use of catheters post urologic surgical procedures	Tomas Griebling
14:45	15:00	Discussion	All

Speaker Powerpoint Slides

Please note that where authorised by the speaker all PowerPoint slides presented at the workshop will be made available after the meeting via the ICS website www.ics.org/2017/programme Please do not film or photograph the slides during the workshop as this is distracting for the speakers.

Aims of Workshop

The aim of this workshop is to provide attendees up-to-date on clinical use of urologic catheters, products and devices, providing a comprehensive and multidisciplinary review and perspective. Intermittent and indwelling catheters, absorbent products and internal/external urethral devices will be discussed. Current technology and evidence-based guidelines with translation to clinical practice will be presented. The use of catheters in surgical cases, particularly in the older adult, will be detailed. Use of catheterization in a specific population of women will be reviewed. A knowledge-based survey of nurses who perform catheterization will be presented. The workshop will be interactive.

Learning Objectives

1. To describe the composition and use of internal urethral inserts and external meatal devices.
2. To describe the technology of incontinence absorbent products.
3. To consider indications for catheterization in the intra and post-partum period.
4. To detail the current use of urologic catheters used for urinary incontinence and retention.
5. To differentiate the various catheterization techniques, indications, complications and nursing knowledge of catheterization.
6. To understand the perioperative use of catheters for incontinence surgery with a discussion of protocols for discontinuing catheters.

Learning Outcomes

1. Explain uses and complications of urethral and bladder catheters, products and devices.
2. Translate bladder management techniques based on current technology.
3. Apply an appropriate catheter, device or product that is appropriate for the patient's urologic condition.
4. Understand use of urologic catheters, devices and products in specific populations.

Target Audience

Physicians, nurses, physical therapists/physios, medical trainees, basic scientists

Advanced/Basic

Advanced

Conditions for Learning

This course will be interactive by seeking attendee input to discuss their knowledge and use of urologic catheters, devices and products. The audience will be involved in an interactive question and answer game called "Catheter Jeopardy" that will expand their knowledge. The course will not be restricted in the number of attendees.

Suggested Reading

1. Dickinson, T, Advanced Assessment of the Patient with Urinary Incontinence and Voiding Dysfunction, in Wound Ostomy and Continence (WOC) Nurses Core Curriculum (Doughty D, Moore K editors), Lippincott Williams and Wilkins, 2015.

2. Parker WP, Griebling TL. Nonsurgical Treatment of Urinary Incontinence in Elderly Women. Clin Geriatr Med. 2015 Nov;31(4):471-85
3. Griebling TL, DuBeau CE, Kuchel G, Wilde MH, Lajiness M, Tomoe H, Diokno A, Vereecke A, Chancellor MB. Defining and advancing education and conservative therapies of underactive bladder. Int Urol Nephrol. 2014 Sep;46 Suppl 1:S29-34
4. Lamin, E & Newman, DK. (2016) Clean intermittent catheterization revisited. Int J Nephrol Urol. Jun;48(6):931-9.
5. Newman, D.K., Rovner, E. S. & Wein, A.J. (2017). Clinical application n of urologic catheters, devices and products, First Edition. New York: Springer (in press).
6. Newman, D.K. (2017). Devices, Products, Catheters and Catheter-Associated Urinary Tract Infections. In D.K. Newman, J.F. Wyman, V. W. Welch (Eds). Core Curriculum for Urologic Nursing. Society of Urologic Nursing & Associates;439-66.
7. Roberts, L., Rantell, A. and Cardozo, L., 2016. Antepartum voiding symptoms following prior tension-free vaginal tape (TVT) operation: A case report. Journal of Obstetrics and Gynaecology, pp.1-2.
8. Rantell, A., Dolan, L., Bonner, L., Knight, S., Ramage, C. and Toozs-Hobson, P., 2016. Minimum standards for continence care in the UK. Neurourology and urodynamics, 35(3), pp.400-406.

Other Supporting Documents, Teaching Tools, Patient Education etc

Draining and Containing the Bladder: Urethral Devices and Absorbent Products
Diane Newman

- External urethra occlusive devices (may be referred to as a meatal barrier) have been developed to block urinary leakage by creating a seal or barrier over the urethral meatus. There have been several models developed to adhere to the meatus through the use of adhesive or mild suction. The current one available is a small, single-use disposable foam shield or patch that is worn externally over the urethral meatus. This barrier is held in place over the meatus by an adhesive hydrogel and is easily removed for voiding. Voiding may also dislodge the device.
- A urethral insert is a device that is temporarily inserted into the urethra to stop incontinence. Usually these devices have a means to prevent intra-vesical migration (a tab at the meatus), a mechanism to maintain the device in its proper place at the bladder neck (e.g., balloon), and a device or mechanism to permit removal for voiding (e.g. string, pump).
- Absorbent products that collect and contain urine and fecal loss due to bladder and bowel dysfunction are commonly utilized as a first-line defense and daily management option for those experiencing incontinence. Absorbent products are also useful in mitigating the potential clinical complications from incontinence, such as skin irritation, breakdown and the development of wounds in the perineal area. High-performing products are also vital in supporting individuals in dealing with the psycho-social implications of incontinence, such as embarrassing visible leakage, unpleasant odors, and even social isolation. These products are particularly useful in supporting persons who are unable to benefit from other treatments or interventions and therefore remain incontinent, such as disabled individuals, the elderly or the very ill. To meet the varied needs of individuals and their lifestyles, these products include a variety of designs, absorbency levels and options for use, and are utilized across the continuum of care, from the active and independent consumer at home, to the mostly immobile or bed-bound dependent patient in a clinical care setting.

Bladder dysfunction and indications for catheterisation during the intra-partum and post-partum period
Angela Rantell, PhD, RN

Urinary retention occurs in up to 14.1% of women after vaginal delivery[1] and can result in bladder over-distension injuries. Over distension injuries may result in long term morbidity such as upper urinary tract damage and recurrent urinary tract infections secondary to permanent voiding difficulties.[2,3,4,5] Complete bladder rest is required for a period of weeks rather than days if there has been an over distension injury to the bladder. Urinary retention may also present following catheter removal. Therefore, once the Obstetric team has decided that a catheter can be removed, an appropriate Trial Without Catheter (TWoC) algorithm should be followed to reduce the likelihood of an over-distension injury. This presentation aims to discuss the physiological changes to the pelvic floor and bladder during pregnancy and causes of injury during delivery. Indications for catheterisation intra-partum and post-partum will be discussed along with a review of risk factors of urinary retention along with measures to prevent and manage this. The role of the midwife / nurse will be considered along with recommendations for documentation and examples of national guidelines. Examples of Measures to prevent and manage urinary retention intrapartum include

- During labour and following birth the midwife should observe the frequency of bladder emptying.[6,7]
- Each woman should be encouraged to void every 3 hours. If she cannot void or if there is a palpable bladder on abdominal examination then a catheter should be passed to empty the bladder using an aseptic technique and the volume emptied recorded.
    - A woman undergoing an instrumental delivery should have her bladder emptied immediately prior to the procedure.[8]
    - If receiving a general or a regional anaesthetic, (in the operating theatre or the delivery room,) the woman should have an indwelling urethral catheter which should be kept in situ until she is fully mobile.

- FGM is not a contraindication to catheterisation. Indeed, it may be beneficial during perineal repair to assist in identification of anatomy. This possibility of catheterisation should be highlighted during antenatal discussion of plans for vaginal delivery.
- In cases of significant perineal trauma, especially affecting the anterior aspect of the vagina, the woman should be offered careful assessment and consideration to insert an indwelling catheter to prevent developing urinary retention.

References

1. Humburg Postartum urinary retention - without clinical impact? Ther Umsch. 2008 Nov;65(11):681-5.
2. Leppilahti M, Hirvonen J, Tammela TL. Infuence of transient overdistension on bladder wall morphology and enzyme histochemistry. Scand J Urol Nephrol 1997; 31: 517 ± 522.
3. Silver JR. Early autonomic dysreflexia. Spinal Cord 2000; 38: 229 ± 233. Conn Med 1997; 61: 459 ± 460.
4. Hvarness H, Jakobsen H, Hermansen F, Marving J, Meyhoffb HH. Effect of a full bladder on urine production in humans. Scand J Urol Nephrol 1999; 33: 386 ± 391.
5. Lee TM, Su SF, Suo WY, Lee CY, ChenMF, Lee YT, Tsai CH. Distension of urinary bladder induces exaggerated coronary constriction in smokers with early atherosclerosis: Am J Physiol Heart Circ Physiol 2000; 279: H2838 ± H2845.
6. NICE Guideline - Intrapartum care, September 2007
7. NICE Guideline - Routine postnatal care of women and their babies, July 2006.
8. RCOG Green top Guideline 26- Operative Vaginal delivery, January 2011.

Nurse's knowledge of urinary catheterization and CAUITIs
Tamara Dickinson, MSN NP

Catheter associated urinary tract infections (CAUTI) is one of the most common nosocomial infections. Prevention of hospital acquired infections (HAI) has become a focus of not only the Institute of Medicine (IOM) as well as the Center of Medicare Services (CMS) over the last several years as part of a focus on safe quality patient care. Not only is infection prevention important for safe patient care, it is a cost containment measure. Since CMS enacted policies regarding reimbursement for CAUTI considerable attention has focused on the need for indwelling urinary catheters (IUC) and their removal. A greater focus has shifted towards that of prevention initiatives. The research hypothesis was that despite ongoing education, hospital-based nurses continued to lack basic knowledge of evidence based knowledge related to urinary catheters and IC. A survey project was implemented at a medical center in the U.S. through the office of nursing education. A ten question survey was developed and was sent to approximately 1200 members of the nursing staff via email. In the email along with a brief introduction and a Survey Monkey® link. Responses totaled 273 as not all surveys were completed in their entirety. The majority of responders worked in critical care and medical-surgical areas and had been a nurse for more than 10 years. One quarter of the responders believed that IUC was an appropriate management for urinary incontinence. Knowledge of evidence based practice also was not obvious approximately half believing it to be continued standard practice to test the balloon before insertion of an indwelling catheter. Knowledge continued to deteriorate regarding the current use and practice of IC. Improvements in IC systems and their purposes were significantly unclear to the respondents. The majority did not know the benefit of the introducer tip passing the initial area of urethral bacteria or that utilization of a closed system meant the catheterization could be performed without touching the catheter. The research project proved the hypothesis about the need for education not only in evidence based catheter knowledge but the advances in technology surrounding intermittent catheterization and its role in bladder management.

Use of Catheters Post-Urologic Surgical Procedures
Tomas L. Griebling, MD, MPH

Urinary catheters are widely used during all types of surgical procedures. This is most common in urologic procedures where catheter drainage may be a crucial part of the intraoperative or postoperative care of the patient. However, despite this widespread use, there has been relatively little scientific research on the specifics related to catheter use in this setting. Decisions about catheter use in urologic surgery are typically left to the discretion of the attending urologic surgeon. Major questions which deserve detailed scientific consideration include: 1) The purpose of the catheter during or after surgery; 2) The size and configuration of the catheter; 3) Location of the catheter (transurethral, suprapubic, percutaneous nephrostomy, indwelling ureteral stent, etc.); 4) Catheter material properties (latex, non-latex, silicone, silver-coated, balloon design, drainage design, etc.); 5) Duration of use following surgery (temporary, indefinite, left until certain criteria are met, etc.); 6) Methods of catheter maintenance (closed system, irrigation of catheter, hand irrigation or continuous irrigation, etc.); 7) Mechanisms of catheter securement and outcomes (influence on urethral trauma, tissue erosion, urinary tract infection, etc.); 8) Criteria for discontinuation of catheter drainage or indication for catheter exchange; 9) Methods for prevention of catheter associated urinary tract infections (CAUTIs); 10) Details regarding catheter removal protocols (prophylactic antibiotics, fill and remove for voiding trial, etc.). This presentation will highlight the current literature on these topics and raise hypothesis generating questions for potential future research.

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14:45	15:00	Discussion	All

Educational Objectives

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- To describe the composition and use of internal urethral inserts and external meatal devices.
- To describe the technology of incontinence absorbent products.
- To consider indications for catheterization in the intra and post-partum period.
- To detail the current use of urologic catheters used for urinary incontinence and retention.
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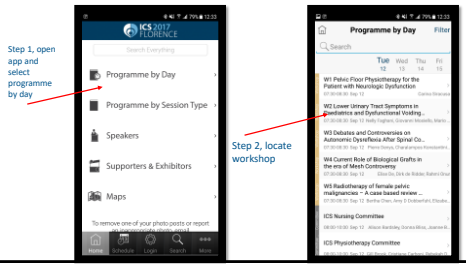

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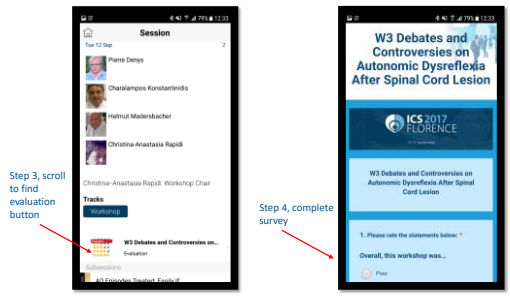

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- A shortened version of the handout has been provided on entrance to the hall
- A full handout for all workshops is available via the ICS website.
- Please silence all mobile phones
- Please refrain from taking video and pictures of the speakers and their slides. PDF versions of the slides (where approved) will be made available after the meeting via the ICS website.

Draining and Containing the Bladder: Urethral Devices and Absorbent Products

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Diane K. Newman, DNP, ANP-BC, FAAN

Co-Director, Penn Center for Continence and Pelvic Health
Division of Urology, University of Pennsylvania Health System

Adjunct Professor of Urology in Surgery
Research Investigator Senior, Perelman School of Medicine
Philadelphia, Pennsylvania

Diane K. Newman, DNP

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Affiliations to disclose†:

National Institutes of Health (NIH) – grant recipient
National Institute on Aging (NIA) – grant recipient

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- ☐ Self-funded
- ☒ Institution (non-industry) funded
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Educational Objectives

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Review recent evidence-based data including recommendations for catheter use

- To describe the composition and use of internal urethral inserts and external meatal devices.
- To describe the technology of incontinence absorbent products.

External Urethral Barrier

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External urethral occlusive devices (meatal barrier)

- Blocks urinary leakage by creating a seal or barrier over the urethral meatus
- Small, single-use, disposable
- Contains an adhesive hydrogel
- Easily removed for voiding

Will Not Absorb Urine

External Urethral Barrier

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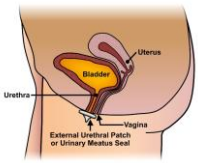
Indications



- Episodic use
- Slight leakage
- Application:
  - Majority (62%) placed it correctly on the first attempt
  - 5% required a second attempt
  - 13% required three attempts (Brubaker, 1999).

External Urethral Barrier.....Then

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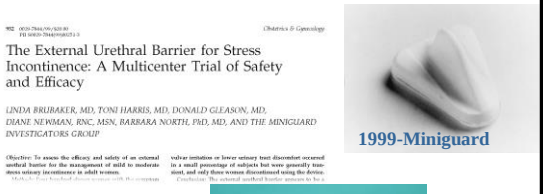

The External Urethral Barrier for Stress Incontinence: A Multicenter Trial of Safety and Efficacy

LINDA BRUBAKER, MD, TONI HARRIS, MD, DONALD GLEASON, MD, DIANE NEWMAN, RNC, MSN, BARBARA NORTH, PhD, MD, AND THE MINIGUARD INVESTIGATORS GROUP

And Now.....

Brubaker, Harris, Gleason, Newman, North. Miniguard Investigators Group. (1999). The external urethral barrier for stress incontinence: A multicenter trial of safety and efficacy. *Obstetrics & Gynecology*. 93(6),932-937

External Urethral Barrier.....Now

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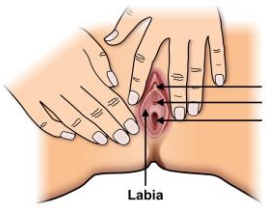
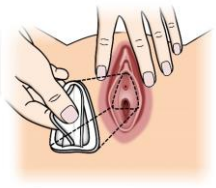
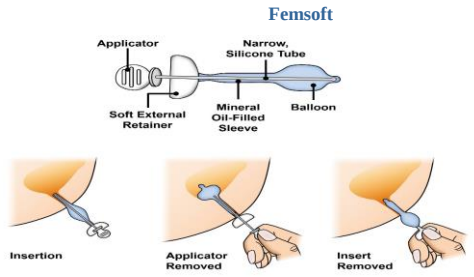




Internal Urethral Occlusive Device.....Then

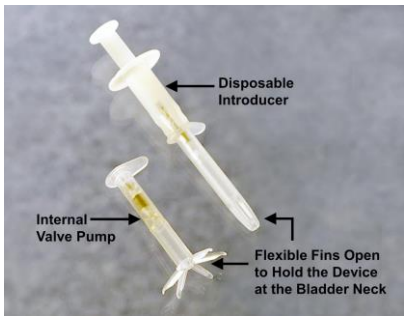


Internal Urethral Occlusive Device

Internal- intraurethral

- Female urinary prosthesis
- Single-use, intraurethral pump and activator
- 9 sizes and lengths of 3 cm to 7 cm in length
- 24 Fr and 28 Fr
- Fixed in position at base of the bladder
- Measure urethral length using a graduated indwelling catheter

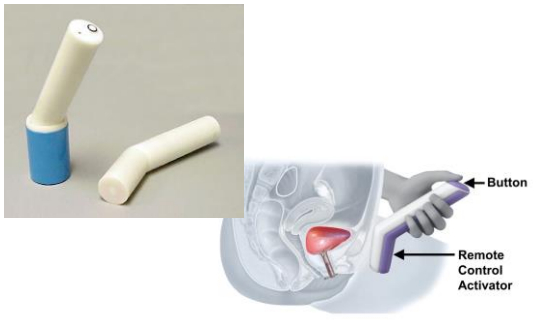
Internal Urethral Occlusive Device



In-Flow™

- Sits on the toilet
- Activator is held against the lower pelvic area (symphysis pubis) and the "on" button is pushed
- Valve opens and the miniature rotor spins at 10,000rpm, generating a urine flow of 10-12 ml/s.
- "on" button released, the activator beeps and its magnet automatically counter-spins in order to close the valve
- Activator is powered by two 3V lithium batteries that needs to be replaced every 4-6 weeks.

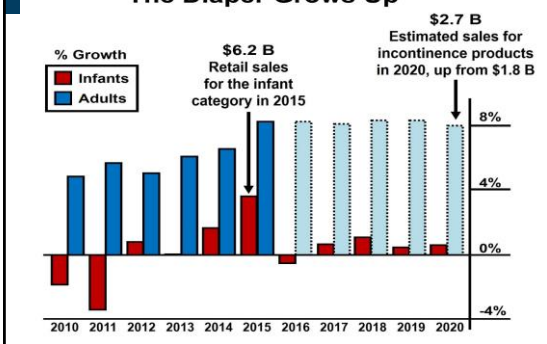
Internal Urethral Occlusive Device.....In-Flow™



Use of Absorbent Incontinence Products

- Definition:
  - Absorbent incontinence products absorb or contain urine leakage and are either disposable or reusable.
- Objective:
  - To contain urine or stool leakage.

The Diaper Grows Up



Data from *Euromonitor International*

Absorbent Products Assessment

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Assess :

- ✓ Severity of UI
- ✓ Gender
- ✓ Fit
- ✓ Functional ability to ambulate, toilet, disrobe, use of assistive devices
- ✓ Ease of use

Assess product for:

- ✓ Containment of urinary leakage
- ✓ Comfort, impact on dignity

Selection of Absorbent Products

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- Product should be chosen based on its:
  - **Quantity of urine leakage**
  - **Ability to minimize or prevent exposure to urine and feces.**
  - **Absorbing properties**
    - **Products containing "super-absorbent polymer" (SAP) are recommended as this technology can prevent IAD and pressure ulcers.**
      - **Products with SAP are "skin-friendly" which means they provide a surface area against the perineum which collects and transmits the urine to the inner core that holds more urine than fluff pulp found in other products.**

Disposable Product Technology- SAP

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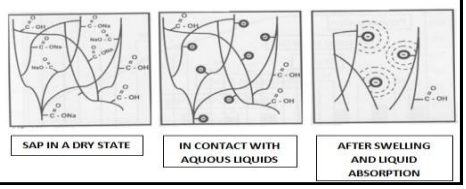
- Wicks urine into the product to contain it
- Minimizes wetness against the skin
- Allows for absorbency of multiple voids or UI episodes into the product
- Keeps the skin surface dry



Incontinence Products

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Absorbent Reusable Products: Then.....

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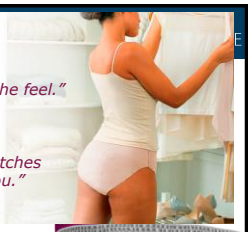
…….. And Now

Absorbent Disposable Products: Then….

…….. And Now

Domtar



"I love the feel."

"It stretches with you."

First Quality

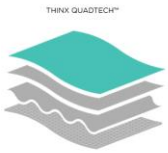
KC

SCA

THINX/icon *"SexyBack"*

the SMARTEST UNDERWEAR

in your drawer



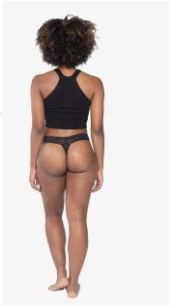
THINX QUADTECH™

Moisture Wicking Layer

Anti-microbial/Stain-resistant Layer

Absorption Layer

Leak-Proof Layer



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Co-Chairman

Bladder dysfunction and indications for catheterisation during the intrapartum and post partum period

Angie Rantell
Lead Nurse / Nurse Cystoscopist
Department of Urogynaecology
King's College Hospital, London

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Affiliations to disclose†:

Allergan, Astellas, Bard, Cogentix, Coloplast, Ferring, Hollister, SEP.

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

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- [x] Institution (non-industry) funded
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Aims of Presentation

- To understand the physiological changes to the bladder and pelvic floor during pregnancy
- To identify mechanisms of injury intra-partum
- To discuss catheter use in labour and post partum

The problem with human childbirth!

"A large object must pass through a constricted channel with both the object and the channel emerging unscathed...."

Evolution of the pelvic floor

- Original function of levator ani was tail-wagging
- Primary function in bipeds is support of pelvic organs and maintaining continence
- Gradual evolution from muscle to connective tissue
- Major component of the pelvic floor became ligamentous

Evolution of the fetal brain

- The human brain has tripled in size over 2 million years
- In comparison with other primates, humans have disproportionately large brains
- Average great ape brain weighs 300 to 500 g
- Average human brain weighs approximately 1300 g

Evolution of the fetal skull

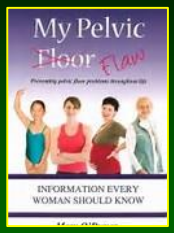
- The human body has changed little in size over the same period
- Both adult and newborn humans need larger heads than other primates
- Due to the imbalance between brain and body development during pregnancy, however, the heads of babies are much larger than those of adults

Pregnancy

- Pregnancy and delivery are the most stressful and dangerous events affecting the pelvic floor during a woman's lifespan
- Muscle, connective tissue and nerves are subjected to anatomical, morphological, functional, hormonal changes
- Most pregnant women gain between 8-14kg (18- 30lb)

Delivery

- Pelvic floor undergoes enormous stretching to allow passage of the newborn
- The levator hiatus distends between 25% and 245% to allow the passage of the average fetal head!
  Albrich et al 2011
- The functions of the pelvic floor often fail



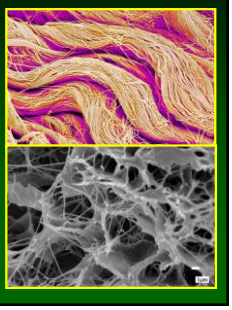
Pregnancy and pelvic floor function
Relaxin

- Hormones affect the biochemical composition of collagen
- Placental hormone relaxin
- Levels are highest during the second trimester

Mclennan et al 1986

Pregnancy and Pelvic Floor Function

- Remodelling changes organisation, orientation and diameter of collagen fibres
- Uterus, cervix, pelvic floor, pelvic girdle
- Viscolelastic properties of vaginal wall, pubovisceral muscles, perineal body
- Activation of collagenases and collagen peptidases
- Greater bladder neck motility



Pathophysiology

- During pregnancy elasticity changes, resulting in an increased bladder capacity
- First desire to void 250–400 ml
- Maximum urinary urge often 1000–1200 ml in the supine position
- The gravid uterus exerts pressure on the bladder which disappears postpartum.
- Without the weight of the pregnant uterus to limit its capacity the postpartum bladder tends to be hypotonic

Iosif et al, 1980

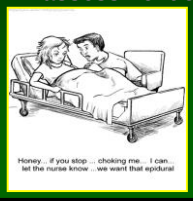
Delivery and pelvic floor

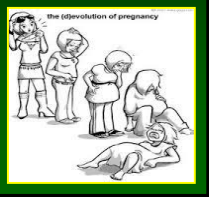
Vaginal delivery might contribute to pelvic floor trauma by several mechanisms:

- Muscle trauma
- Connective tissue damage
- Nerve injury
- Vascular damage

Question?

When a woman presents in labour, what assessment of bladder function should be undertaken?





Intra-partum Bladder Care

- **Initial Assessment**
  - Document when the woman last voided and record on the partogram
  - Enquire about previous history of urinary incontinence, bladder injury, urinary retention and constipation
  - Assess fluid balance

Intra-partum Bladder Care

- **During Labour**
  - Ensure an appropriate fluid intake
  - Encourage the woman to void every 3 hours
  - If she has not passed urine within 6 hours insert an in and out catheter to assess bladder volume
  - If bladder volume over 200mls insert a Foley catheter

Question?

With a Foley in situ, should the balloon be deflated prior to active pushing to prevent injury to urethra and bladder neck?

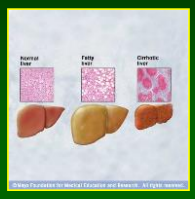
Question?

What are the indications for inserting a indwelling catheter intra partum and post partum?

Indications for Indwelling Catheter

Intrapartum

- Epidural or spinal analgesia
- High risk conditions
  - Severe pre eclampsia
  - Ante partum haemorrhage
  - Acute fatty liver



Indications for Indwelling Catheter

Postpartum

- Significant postpartum haemorrhage
- Monitoring of any high risk condition
- Documented bladder injury
- Operative delivery with spinal or epidural
- Significant perineal trauma – extensive 2nd degree tears, all 3rd or 4th degree tear, vulval or vaginal haematoma, urethral and clitoral tears
- Manual removal of placenta

How long should the catheter remain insitu?

- No consensus
- It can take up to 8 hours following epidural anaesthesia to regain bladder sensation
- NICE guidelines recommends 12 hours after epidural / spinal
- Local policy / guidelines

Postpartum Urinary Retention (PUR)

- Defined as the sudden onset of painful or painless inability to void adequately within 6 hours after delivery
- Covert PUR – asymptomatic women unable to pass more than 50% normal bladder capacity or with PVR>150mls
- Overt PUR – the inability to void spontaneously within 6 hours of vaginal delivery or removal of a catheter after birth

Kekre et al 2011

Prevalence of Post-Partum Urinary Retention

- Under diagnosed
- 0.07-37%

Glavind 2003

- 0.5- 45% of women

Blomstrand et al 2015

- 14.1% after vaginal delivery
- 24.1% after caesarean section

Humburg 2008

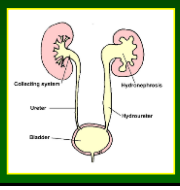
Signs and Symptoms

- Small frequent voids
- Weak urine stream
- Lack of bladder sensation
- Urinary incontinence
- Abdominal pain
- Constant sensation to void
- Palpable bladder
- Abnormal bleeding
- Abnormal fundal height

WHO, Leach 2011, Lim 2010

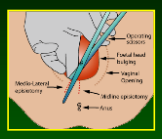
Sequelae of Overdistension Injury

- Damage to detrusor muscle leading to long term voiding difficulties
- Atonic bladder
- Incomplete emptying – infection, bladder stones
- Diverticulae in bladder wall
- Incontinence
- Frequency and Nocturia
- Hydronephrosis



Risk Factors Associated with Post Partum Overdistension Injury

- Instrumental delivery
- Epidural anaesthesia
- Prolonged labour
- Primiparity
- Caesarean section
- Episotomies
- 1st, 2nd, 3rd and 4th degree perineal trauma
- Manual removal of placenta
- Rapid diuresis following discontinuation of oxytocin



Pifarottie 2014, Mulder 2016, Blomstrand 2015

NICE Guidelines

NHS National Institute for Health and Clinical Excellence

- Midwives should
  - document the frequency of micturition and voided volume during labour and post partum on the partogram
  - enquire about urinary incontinence and the return of bladder sensations post partum
  - Ensure that catheters remain in situ for a minimum of 12 hours following instrumental delivery, manual removal of placenta or repair of 3rd or 4th degree tear

Tricks for TWOC's

- If unable to void
  - Encourage mobilisation
  - Suggest alternative voiding position
  - Try voiding in the bath or shower
  - Pour water on the perineum
  - Ensure adequate analgesia
  - Run taps
  - Review fluid balance
  - Ensure privacy

Question?

When assessing residual volume should you use an in and out catheter or a bladder scanner?

Is one better than the other?

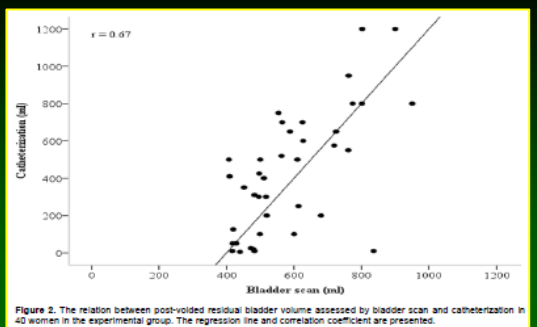


Figure 2. The relation between post-voided residual bladder volume assessed by bladder scan and catheterization in 40 women in the experimental group. The regression line and correlation coefficient are presented.

Blomstrand et al 2015

Question?

When discharging women with post partum retention should they go home with an indwelling catheter or perform ISC?

Is one better than the other?

When to Discharge with an IDC

- Residual volume > 500mls on first TWOC
- Bladder injury during labour or LSCS
- Overdistension injury (residual >1000mls)
- Two previous failed TWOC's

Implications of pregnancy related pelvic floor dysfunction

Pregnancy and urinary incontinence

- Postpartum UI within 3 months 33%
- Prevalence of UI after
  - vaginal delivery 31%
  - caesarean section 15%

Thom et al 2010

- Caesarean section decreases risk of postpartum UI but protective effect diminishes over time and disappears after multiple deliveries

Rortveit et al 2003

Data for rate of incontinence after elective and emergency caesarean are mixed and further studies required

Does mode of delivery matter?

versus

Urinary incontinence & mode of delivery

Epicont study

- 15,307 women enrolled
- Data linked to medical birth registry Norway
  - UI in nulliparous women 10.1%
  - UI in CS group 15.9%
  - UI in VD group 21%

Rortveit et al 2003

Urinary incontinence 20 years after childbirth

- National cohort study in 5236 singleton primips
- 20 years after VD vs CS [with no further births]

- UI 40.3% vs 28.8% OR 1.67
- UI >10years 10.1% vs 3.9% OR 2.75
- No difference in the prevalence after an emergency or an elective caesarean section

Gyhagen et al 2013

Urinary incontinence 20 years after childbirth

- VD associated with
  - 67% increased risk of UI,
  - 275% increased risk of UI>10 years
- To avoid one case of UI extra 8-9 CS
- 8% increased risk of UI per current BMI unit
- Age at delivery increases the UI risk by 3% annually

Gyhagen et al 2013

Role of Oestrogens: Postpartum

Conclusions

- Pregnancy and delivery put enormous stress on the pelvic floor
- There are many different indications for cathterisation intrapartum and post partum
- Postpartum urinary retention is common
- Appropriate assessment of bladder function and return to normal function is fundamental

Survey of Evidence Based Catheter Knowledge

Tamara Dickinson, MSN, AGPCNP-BC, CURN, CCCN

Department of Radiation Oncology
Genitourinary Disease Team
Dallas, TX

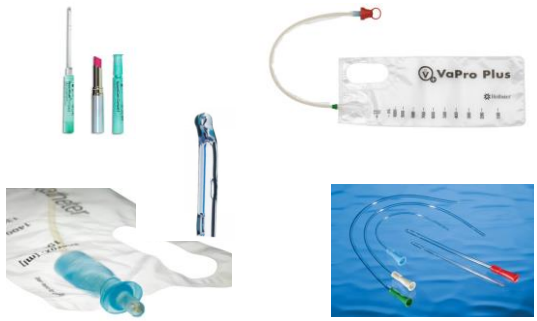
UT Southwestern Medical Center

Catheter Associated Urinary Tract Infection (CAUTI)

- One of the most common nosocomial infections
- Prevention has become a focus of the Center for Medicare Services (CMS) and the Institute of Medicine (IOM)
- Alternatives to indwelling urethral catheterization include condom catheters, suprapubic catheters, intermittent catheterization as well as the use of absorbent products and toileting programs
- HICPAC guidelines recommend that intermittent catheterization is preferred over indwelling urethral catheters in patients with incomplete bladder emptying

UT Southwestern Medical Center

Advances in Catheters



UT Southwestern Medical Center

Collaboration

- Despite ongoing education about catheters and CAUTI the research hypothesis was that hospital-based staff nurses continued to lack basic knowledge about urinary catheters and intermittent catheterization.
- A survey project was implemented at UT Southwestern Medical Center
- A 10 question survey was sent to approximately 1200 members of the nursing staff via a Survey Monkey ® email link.

UT Southwestern Medical Center

Response & Demographics

- 273 responses
- Not all surveys were completed in their entirety
- The majority of responders worked in critical care and medical-surgical areas
- The majority had been a nurse for 10 or more years

UT Southwestern Medical Center

The Survey Questions

And the results

UT Southwestern Medical Center

1. Where do you work?

Options included:

- Emergency Room
- Medical-Surgical
- Surgical Specialty
- OB-GYN
- Cardiology
- ICU
- Mental Health
- Neurology
- Rehabilitation
- Bone Marrow Transplant
- Other

- The majority of responders worked in a critical care area (66.49%)
- Other was chosen by 81 responders and included procedure units, surgical areas, transplant units, oncology, administration, float pool, imaging services and some outpatient clinics

UT Southwestern Medical Center

2. How many years have you been a nurse?

Options included:

- Less than 1 year
- 1-2 years
- 3-5 years
- 6-10 years
- Greater than 10 years

55.51% of the responders had been a nurse for more than ten years

UT Southwestern Medical Center

3. Select only one of the following that is NOT an indication for insertion of an indwelling catheter.

Options included:

- To monitor strict intake and output
- To assist in healing of sacral skin breakdown
- Acute urinary retention
- Management of urinary incontinence

Despite CAUTI initiatives and education 28.31% of responders believed that the management of urinary incontinence WAS an appropriate indication for an indwelling catheter.

UT Southwestern Medical Center

4. Prior to inserting an indwelling catheter, which of the following would have the MOST influence on how you perform the insertion?

Options included:

- History of indwelling catheter use
- History of benign prostatic enlargement in a male patient
- History of recurrent urinary tract infections in a female patient

UT Southwestern Medical Center

5. Which of the following should NOT be done when inserting an indwelling catheter?

Options included:

- Perform pericare cleansing before insertion
- Scanning the bladder for residual before insertion
- Testing the balloon before insertion

50.57% believed it to be continued standard practice to "test" a balloon before the insertion of an indwelling catheter

UT Southwestern Medical Center

6. If I am unsure about the need to reinsert an indwelling catheter, I should do the following:

Options included:

- Consult a nursing colleague
- Review the decision tree for urinary catheters
- Obtain an order from the patient's physician
- Review the patient's voiding history

UT Southwestern Medical Center

7. I prefer that a patient with urinary incontinence have an indwelling catheter.

Options included:

- True
- False

8. Why is the introducer tip of an intermittent catheter useful?

Options included:

- To aid with insertion
- To decrease meatal trauma
- To bypass the initial area of colonized bacteria

79.5% did not know the benefit of the introducer tip of a intermittent catheter system

9. How many times can you perform intermittent catheterization on an individual patient?

Options included:

- Depends on the physician's order
- Only 4 times
- There is no limit to the number of times

Only 56.20% knew that there was no limit to the maximum number of times for intermittent catheterization on a single patient

10. A closed system for intermittent catheterization means the procedure can be performed without touching the catheter.

Options included:

- True
- False

60.70% did not know what a closed system meant for intermittent catheterization

Urinary Catheters: Surgical Issues

ICS 2017 FLORENCE

Tomas L. Griebling, MD, MPH

Senior Associate Dean for Medical Education
Acting Dean for Continuing Medical Education (CME)

John P. Wolf 33° Masonic Distinguished Professor of Urology
Faculty Associate – The Landon Center on Aging

The University of Kansas School of Medicine
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Third and Alfred M. Landon Center on Aging

Tomas L. Griebling, MD, MPH

ICS 2017 FLORENCE

Affiliations to disclose†:

National Institutes of Health (NIH) – grant recipient
National Institute on Aging (NIA) – grant recipient
Donald W. Reynolds Foundation – grant recipient

† All financial ties (over the last year) that you may have with any business organisation with respect to the subjects mentioned during your presentation

Funding for speaker to attend:

- [x] Self-funded
- [ ] Institution (non-industry) funded
- [ ] Sponsored by:

Educational Objectives

ICS 2017 FLORENCE

Review recent evidence-based data including recommendations for catheter use

- Intraoperative / perioperative concepts
- Catheter technology
  - Silver coated catheters
  - Antibiotic coated catheters
  - Nanotechnology
- Urethral reconstruction and duration of catheter use
- Antibiotic administration at the time of catheter removal or manipulation
- Discuss the relationship between catheter use and risk of perioperative delirium in geriatrics

Intraoperative / Perioperative

ICS 2017 FLORENCE

Intraoperative / Perioperative

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Timing of catheter placement
- Prior to preparation of the patient
- After preparation on sterile surgical field

Limited scientific data

Often associated with surgeon preference or specific surgical procedure
- Will the catheter be manipulated during surgery?
- Urologic versus other surgical procedures?
- Anesthesia monitoring of urinary output
- Temperature monitoring

Timing of catheter removal
- Need for prolonged bladder drainage
- Use of catheter as a bridge / strut for tissue healing
- Protocol removals

Intraoperative / Perioperative

ICS 2017 FLORENCE

Transurethral catheter (Foley) versus other options (suprapubic or other drains)
- Dependent on specific surgical procedure and surgeon preference
- Will catheter be manipulated postoperatively?
- How long is catheter drainage required?
- Is the catheter necessary as a bridge across a reconstructive repair?

- General lack of evidence-based data

Intraoperative / Perioperative

ICS 2017 FLORENCE

Transurethral versus suprapubic tube

- Systematic review and meta-analysis
  - 12 Randomized controlled trials
  - 1,300 women undergoing gynecologic surgery
  - Primary outcome – urinary tract infections
  - Secondary outcomes
    - Need for recatheterization
    - Duration of catheterization
    - Catheter-related complications
    - Duration of hospital stay

Healy EF et al: Obstet Gynecol 2012, 120: 678-687

Intraoperative / Perioperative

ICS 2017 FLORENCE

- SP tubes reduced infection (20%) vs. Foley (31%)
  - OR 0.31, 95% CI 0.185-0.512, p < 0.01
- SP tubes increased complications (29% vs. 11%)
  - OR 4.14, 95% CI 1.327-12.9, p = 0.01
  - Mostly due to tube malfunction
  - No visceral injuries
  - No increased hospital stay
- Not procedures requiring urethral bridging
- Patient satisfaction and cost data lacking

Healy EF et al: Obstet Gynecol 2012, 120: 678-687

Catheter Technology

ICS 2017 FLORENCE

Catheter Technology

ICS 2017 FLORENCE

Systematic review of 8 studies

- Mostly men with spinal injury on CIC for retention
- Gel reservoir and hydrophilic catheters vs. others
- Somewhat lower rates overall UTI with gel reservoir and hydrophilic catheters, but otherwise NO overall differences.
- Cost was higher with the special catheters
- Cost effectiveness not demonstrated
- But recommended giving patients options

Bermingham SL, et al: BMJ 2013, 345: e8639

Catheter Technology

ICS 2017 FLORENCE

Cochrane review of 23 trials

- 5,236 hospitalized adults in 22 parallel group trials
- 27,878 adults in a cluster randomized cross-over trial
- Silver or antibiotic treated catheters compared to control
- Silver alloy catheters reduced asymptomatic bacteriuria
  - < 1 week (RR 0.54); > 1 week (RR 0.36)
  - Economic benefit is unclear
- Antibiotic catheters showed short term effects only
  - < 1 week (RR 0.36-0.52); > 1 week (no difference)
- No differences between different standard catheters

Schumm K, Lam TBL: Neurourol Urodyn 2008, 27: 738-746

Catheter Technology

ICS 2017 FLORENCE

Do silver coated catheters increase strictures?

- Retrospective review – single institution
  - Men undergoing robot assisted laparoscopic radical prostatectomy for prostate cancer
  - Two 12 month intervals with specific catheters
  - 188 men standard & 217 men silver alloy catheters
  - Median followup 18 months
  - 0 strictures standard vs. 6 strictures with silver alloy
  - Rate 0% vs. 2.8% (p = 0.03)
  - Limitations – nonrandomized, retrospective

Liu XS et al: Urology 2011, 78: 365-367

Catheter Technology

Do antimicrobial or silver alloy catheters decrease infection?

- Prospective, randomized, multicenter trial
- 24 hospitals in UK
- Adults requiring catheter ≤ 14 days
- Equally randomized 1:1:1 to silver alloy, nitrofural, or control catheters
- Primary outcome was symptomatic UTI
  - 3.3% reduction would be considered useful clinically
- Secondary outcomes were comfort

Pickard R et al: Lancet 2012, 380: 1927-1935

Catheter Technology

- 7,102 subjects randomized – but 10% (708) excluded
- Of those catheterized, UTI occurred:
  - 228 (10.6%) of 2,153 with antibiotic catheter
  - 263 (12.5%) of 2,097 with silver alloy catheter
  - 271 (12.6%) of 2,144 with standard catheter (control)

- No statistically significant difference between groups
- Reduction of UTI in antibiotic group did not meet threshold
- Patients with antibiotic catheter had more discomfort
- Concluded that neither treated catheter was superior

Pickard R et al: Lancet 2012, 380: 1927-1935

Catheter Technology

Antibiotic nanotechnology

- 1,150 subjects randomized to catheter sprayed with sterile saline vs. antibiotic nanoparticles
- Daily catheter care used same sprays
- 7 days of indwelling catheterization
- Outcome was bacterial colonization
  - Incidence of bacteriuria was reduced by treatment
  - 4.52% treated vs. 13.04% controls ($p < 0.001$)
- Catheters also tested in an *in vitro* assay
  - Reduced biofilm in treated vs. controls ($p < 0.001$)

He W, et al: J Translational Med 2013, 10(Suppl 1): S14

Catheter Duration and Removal

Urethroplasty

- Survey of 40 international reconstructive urologists
- Questionnaire specific to urethroplasty
- 85% response rate
- Extensive variability in actual practice
  - 71% preoperative urine cultures (? timing)
  - 41.8% treat for 10^5 CFU – 35% for 7 days
  - 58.8% would NOT delay surgery if not treated
  - Most give 2 antibiotics perioperatively
    - 42% aminoglycoside + penicillin
  - 18-24% give antibiotics > 24 hour after surgery
  - 61% continue antibiotics until catheter out
    - 2-4 weeks + additional at removal

McDonald and Buckley: *Urology* 2016; 94: 237-245

Urethroplasty

- Catheter duration after urethral reconstruction?
- Wide variability
  - Surgeon preference and technical aspects
  - Vascularized flap? Graft? What materials?
- Prospective study 219 patients – catheter duration
  - ≤ 10 days (n = 86) or > 10 days (n = 133)
  - 3.5% postoperative extravasation in group 1
  - 8.6% postoperative extravasation in group 2
  - Strictures: longer and more complex in group 2
- Catheters can be safely removed at 8-10 days in most

Poelaert et al: Minerva Urol Nefrol 2016; PMID 27097155

Antibiotics and Catheter Removal

- Use of antibiotics at time of catheter removal has been variable
- Often determined by surgeon / physician preference and training dogma or tradition
- Limited evidence-based data
- Theory is to reduce potential bacterial seeding from catheter biofilm or urine to reduce risk of UTI or urosepsis

Antibiotics and Catheter Removal

- Prospective, randomized trial 239 adults after elective abdominal surgery
  - 3 days of antibiotics (TMP/SMX) vs. control
  - Urine cultures before and 3 days after removal
  - Treated patients had reduced UTI incidence ($p < 0.001$)
    - 5 of 103 (4.9%) with antibiotics had UTI
    - 22 of 102 (21.6%) without antibiotics had UTI
    - Absolute risk reduction was 16.7%
    - Relative risk reduction was 77.5%
    - Number needed to treat = 6
    - Bacteriuria at 3 days also reduced (16.5% vs. 41.2%, $p < 0.001$)

Pfefferkorn U et al: Ann Surg 2009, 249: 573-575

Antibiotics and Catheter Removal

- Retrospective cohort study
  - Catheter removal 1 week after radical prostatectomy
  - 3 days of ciprofloxacin vs. no treatment
  - Single institution, two different surgeons
    - Antibiotics reduced incidence of UTI ($p = 0.019$)
    - 8 of 261 (3.1%) receiving antibiotics had UTI
    - 33 of 452 (7.3%) not receiving antibiotics had UTI
    - Number needed to treat = 24
    - Readmission for febrile UTI not significantly different
      - 0% vs. 1.1%, $p = 0.16$

Pinochet R et al: Urol Int 2010, 85: 415-420

Antibiotics and Catheter Removal

- Prospective, randomized, placebo controlled trial of 140 adults undergoing abdominal or hip surgery
- Catheter drainage for 3 – 14 days
- Bacteriuria and UTI at 12 – 14 days post removal
  - Single dose antibiotics administered at removal
    - co-trimaxazole 960 mg (n = 46)
    - ciprofloxacin 500 mg (n = 43)
    - placebo (n = 51)
  - Bacteriuria incidence was 19%, 19%, 33% ($p > 0.05$)
  - UTI incidence was 3%, 0%, 3% ($p > 0.05$)
  - Concluded antibiotics were not statistically useful

Van Hees BC et al: Clin Microbiol Infect 2011, 17: 1091-1094

Delirium

Delirium

Multifactorial syndrome

High incidence after surgery
- 10-15% of elective non-cardiac surgery
- > 50% after emergency surgery

Increased risk mortality within one year (2-3x)

Increased risk cognitive decline, nursing home

Beware underlying risks (prior episode, dementia)

Arch Intern Med 162:457-463, 2002
JAMA 291: 1753-1762, 2004

Delirium

Confusion Assessment Method (CAM)

- 1) Acute change mental status w/fluctuating course
- 2) Inattention

AND either

- Disorganized thinking or Altered level of consciousness

Sensitivity = 94 - 100%
Specificity = 90 - 95%

Inouye SK: Arch Intern Med 113:941-948, 1990
Inouye SK: NEJM 354:1157-1165, 2006

Delirium

Prevention is key

- Environmental orientation, family, sleep cycles
- Assistive devices (hearing aids, glasses, etc.)
- Avoid restraints – physical, chemical, catheters
- Avoid risky drugs
  - Narcotics 2.5 – 2.7 fold increased risk
  - Sedative hypnotics 3.0 – 11.7 fold increased risk
  - Anticholinergics 4.5 – 11.7 fold increased risk

Delirium

Computerized clinical decision support system

- Consulting geriatrician
- Removing catheter (72 & 76%, p=0.99) / restraints / avoiding anticholinergic medications
- 60 older adults admitted to ICU, cognitive impairment (baseline) mean 74.6 years
- Incidence of delirium 27-29% (p=0.85)
- This system may not be effective for these outcomes

Kahn BA et al: Am J Crit Care 2013, 22: 257-262

Delirium

Clinical intervention trial

- 60 older adults (mean age 74.6) with cognitive impairment admitted to ICU care
- Randomized to electronic prompts to staff physicians to do preventive measures
  - Consult geriatrics, remove restraints, remove Foley
  - Discontinue anticholinergic medications
- No differences observed in these 4 measures
- No difference in incidence of delirium (27% vs. 29%)
- Effectiveness of prompts?

Khan BA et al: Am J Critical Care 2013, 22: 257-262

Delirium

Clinical study examining risk factors in ICU

- 4 hospitals (1 academic, 2 community, 1 private)
- 523 patients assessed using validated measures
- Overall incidence of delirium 30%
- Strongest patient factors
  - Smoking (OR 2.04)
  - Alcohol use ≥ 3 drinks daily (OR 3.23)
  - Living alone at home (OR 1.94)
- Care factors were also highly predictive

Van Rompaey B et al: Critical Care 2009, 13: R77

Delirium

- Clinical care factors
  - Physical restraints (OR 33.84, 11.19 – 102.36)
  - Sedation (OR 13.66, 7.15 – 26.10)
  - Length of ICU stay > 2 days (OR 5.77, 3.71 – 8.97)
  - **Urinary catheter (OR 5.37, 95% CI 2.09 – 13.80)**
  - Benzodiazepine (OR 2.89, 1.44 – 5.69)
  - No visitors (OR 2.83, 1.50 – 5.36)
  - Isolation (OR 3.74, 1.69 – 8.25)
  - No normal food (OR 3.83, 2.36 – 6.22)

Van Rompaey B et al: Critical Care 2009, 13: R77

Indwelling Catheters

Indwelling Catheters

Indwelling catheters may be useful in highly selected older adults
- Primarily retention – not incontinence

May be useful when CIC is impossible
- Physical limitations
  - Morbid obesity / Lower extremity contractures
  - Urethral strictures not amenable to surgical reconstruction
- Cognitive limitations
  - Behavioral issues / dementia
  - Discomfort with CIC
- Reduce caregiver / staffing burden for CIC
- Surgical urinary diversion / reconstruction not possible

Summary

- Care is highly tailored to each individual patient, particularly for operative catheter use
- Catheter technology has not substantially changed UTI risk
- Wide variability in perioperative catheter use
- Antibiotics appear useful at time of catheter removal

Summary

- Indwelling catheters increase risk of delirium
- Use in highly select patients
- Recommendations regarding catheter use are evolving
- Research and evidence base are expanding

KU Medical Center

Theo and Alfree M. Landon Center on Aging