Catheter-Associated Urinary Tract Infection Prevention

Last updated 2019
Objectives

- Define the scope of healthcare-associated urinary tract infections (UTI)
- Review evidence-based clinical practices shown to prevent catheter-associated urinary tract infections (CAUTI)
- Discuss strategies to reduce CAUTI within healthcare settings
- Discuss adherence monitoring and feedback
UTI in Hospitals

- Virtually all hospital associated UTI are caused by instrumentation of the urinary tract
- Commonly leads to secondary bloodstream infection
- 10% mortality rate
- Increases length of stay by 2-4 days
- Results in antimicrobial overuse and antimicrobial resistance

IHI Catheter-Associated Urinary Tract Infection
(http://www.ihi.org/topics/CAUTI/Pages/default.aspx)
Urinary Catheter Use

• Use of indwelling urinary catheters high
  • 12-16% of inpatient adults
  • Medical surgical unit: 10-30% patients
  • ICU: 60-90% patients
  • Nursing home: 7-10% residents
• 40-50% patients with a urinary catheter in hospital non-ICU ward do not have a valid indication for placement
• Physicians frequently unaware of use

Indwelling Catheter Duration

• Risk of CAUTI increases each day the urinary catheter remains
• Risk of bacteriuria with catheterization
  • Daily: 3% - 10%
  • By day 30: 100%

NHSN Patient Safety Manual, Chapter 7, UTI CDC: Catheter Associated UTI
(https://www.cdc.gov/hai/ca_uti/uti.html)
CAUTI Etiology

• Source:
  • Patient’s colonic or perineal flora
  • Bacteria on hands of personnel

• Microbes enter bladder via one of two routes:
  • Extraluminal: the external surface
  • Intraluminal: inside the catheter

Maki D & Tambyah P. Engineering out risk of Infection with urinary catheters. Emerg Infect Dis, 2001
Common CAUTI Pathogens

- *Escherichia coli* 24%
- *Pseudomonas aeruginosa* 10%
- *Klebsiella pneumoniae/oxytoca* 10%
- *Enterococcus faecalis* 7%

NHSN Antimicrobial Resistance Report: Distribution of all Pathogens Reported by HAI Type, Appendix to Table 4, 2011-2014

CAUTI Prevention

• **69% CAUTI can be prevented with currently recommended infection prevention practices**

• National 2020 CAUTI 5-year prevention goal: **25% decrease** from 2015 baseline
  • CDPH HAI Advisory Committee recommended adoption of national goal for California hospitals
CAUTI Prevention – What works?

Best sources for evidence-based CAUTI prevention practice recommendations

- **CDC/HICPAC** CAUTI Prevention Guideline, 2009
- **SHEA/IDSA** Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals, 2014
CAUTI Prevention Practices

• Insert catheters only for appropriate indications
• Leave in place only as long as needed
• Ensure only properly trained persons insert and maintain
• Perform hand hygiene
• Use aseptic technique and sterile equipment for insertion
• Maintain closed drainage system and unobstructed urine flow
• Implement improvement program to achieve appropriate use of catheters
Appropriate Indications for Indwelling Ureteral Catheters

- Acute urinary retention or obstruction
- Need for accurate measurement of urinary output (ICU)
- Post operative use for selected (not all) surgical procedures
- Assist healing of perineal and sacral wounds in incontinent patients
- Prolonged immobilization due to unstable spine or pelvic fracture
- Hospice (end of life), comfort care, palliative care
Leave Indwelling Catheter in Place Only as Long as Needed

• Implement a process to assess daily the need for the indwelling urinary catheter
  • Physician reminders
  • Electronic medical record prompts
• Consider alternatives to indwelling urinary catheter
  • External catheters
  • Intermittent catheterization
Ensure Only Properly Trained Persons Insert and Maintain Indwelling Urinary Catheters

- Train HCW, family members, or the patient (if appropriate)
  - Correct technique of aseptic catheter insertion
  - Maintenance of the catheter
- Train HCW upon hire and at lease annually
- Make return demonstration part of the training to ensure competency
Perform Hand Hygiene

Perform hand hygiene:

• Immediately before and after catheter insertion
• Immediately before and after any catheter manipulation
  • Repositioning the catheter tubing or bag
  • Obtaining a specimen
Use Aseptic Technique and Sterile Equipment for Insertion of Indwelling Urinary Catheter

• Perform hand hygiene before and after procedure
• Ensure the following are used during insertion
  • Sterile gloves, drape, and sponges
  • Appropriate antiseptic or sterile solution for peri-urethral cleaning
  • A single use packet of lubricant jelly for insertion
Maintain Closed Drainage System and Unobstructed Urine Flow

A closed system prevents contamination and possible pathogens from entering the bladder

- Replace the catheter and collection system if breaks in aseptic technique during insertion, or disconnection, or leakage occurs
- Use urinary catheter systems with pre-connected, sealed catheter-tubing junctions
- Keep the catheter tubing below the bladder and free from kinking
CAUTI Prevention Bundle Examples

<table>
<thead>
<tr>
<th>Insertion Bundle</th>
<th>Maintenance Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Verify need prior to insertion</td>
<td>• Daily assessment of catheter need documented</td>
</tr>
<tr>
<td>• Insert urinary catheter using aseptic technique.</td>
<td>• Tamper evident seal is intact</td>
</tr>
<tr>
<td>• Maintain urinary catheter based on recommended</td>
<td>• Catheter secured to patient</td>
</tr>
<tr>
<td>guidelines</td>
<td>• Hand hygiene performed before patient contact</td>
</tr>
<tr>
<td></td>
<td>• Daily meatal hygiene with soap and water</td>
</tr>
<tr>
<td></td>
<td>• Drainage bag emptied using a clean container</td>
</tr>
<tr>
<td></td>
<td>• Unobstructed flow maintained</td>
</tr>
</tbody>
</table>

Not Recommended

**No evidence** to support UTI prevention

- Complex urinary drainage systems
- Routinely changing catheters or drainage bags
- Routine antimicrobial prophylaxis
- Cleaning the periurethral area with antiseptics
- Antimicrobial irrigation of the bladder
- Antiseptic / antimicrobial solution instillation into drainage bags
- Routine screening for asymptomatic bacteriuria
Additional CAUTI Prevention Practices

Use when adherence to practices is high, but CAUTI still occur

• Consider alternatives to indwelling urinary catheters
• Use portable ultrasound devices to assess urinary retention, reduce unnecessary catheterizations
• Consider antimicrobial/antiseptic impregnated catheters
Hospital Role in CAUTI Prevention

• Ensure policies and practice reflect current evidence based recommendations
  • CDC guidelines
• Ensure staff competency upon hire and at least annually
  • New hire orientation
  • Annual skills fair
  • Return demonstration to ensure competency
• Establish an adherence monitoring program for core care practices
  • Use tools to measure adherence
• Perform UTI surveillance
• Provide feedback to frontline staff and leaders
  • Present adherence results with CAUTI incidence to each unit
Infection (Outcome) Measure

Measure infections:

• Perform UTI surveillance using standardized definitions and protocols
• Bacteria in urine alone is not an infection
  • Must evaluate for other UTI symptoms or have supporting laboratory data

NHSN Patient Safety Module: Chapter 7 Device-Associated Module, CAUTI
Adherence (Process) Measures

Measure catheter use:

- The number of urinary catheter days/the number of predicted urinary catheter days = Standardize Utilization Ratio (SUR)*

Measure health care provider adherence:

- Hand hygiene
- Documentation of catheter insertion and removal
- Daily assessment of indwelling urinary catheter
- Documentation of indications for use

* Further explanation in the Introduction to NHSN presentation
# Adherence Monitoring Tool - UTI Prevention

<table>
<thead>
<tr>
<th>CAUTI Prevention Opportunity</th>
<th>Patient/Resident 1</th>
<th>Patient/Resident 2</th>
<th>Adherence by Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal between catheter and collecting tubing is intact.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Catheter tubing unobstructed- not twisted, kinked, or looped.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Documentation of indwelling catheter necessity – and it is appropriate.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>The urine collection bag is below the level of the bladder.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>The catheter is secured to the patient/resident.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#Yes_____ #Observed_____ #Yes/ # Observed = % Adherence _____%
CDPH CAUTI Observations, 131 Facilities, 2016

- Seal intact: 39%
- Tubing unobstructed: 60%
- Necessity documented: 95%
- Urine collection bag below bladder: 98%
- Cath secured to resident: 62%
Preventing CAUTI: The MOST Important Things

*Prevent Catheter Associated UTI - Avoid Antibiotics*

- Insert catheters only for appropriate indications
- Leave in place only as long as needed
- Ensure only properly trained persons insert and maintain
- Perform hand hygiene
- Use aseptic technique and sterile equipment for insertion
- Maintain closed drainage system and unobstructed urine flow
- Implement improvement program to achieve appropriate use of catheters
Summary

- CAUTI can lead to bloodstream infections
- Adherence monitoring to evidence based care practices will reduce CAUTI incidence
- Feedback CAUTI incidence and adherence monitoring results to staff will improve outcomes
Additional CAUTI Prevention References and Resources

- **APIC Preventing CAUTI: A patient-centered approach, 2012** (PDF)
  (http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)

- **APIC Guide to the Elimination of CAUTI, 2008** (PDF)


- **IHI Program to Prevent CAUTI**
  (http://www.ihi.org/topics/CAUTI/Pages/default.aspx)

- **SHEA/IDSA Compendium, ICHE, 35:464-479, 2014**
Questions?

For more information, please contact any HAI Liaison IP Team member

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