Catheter-Associated Urinary Tract Infection Prevention

Last updated 2015
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
- Review CAUTI surveillance definitions
UTI Epidemiology

- Accounts for >30% of all HAI reported to NHSN by hospitals
- Leading cause of secondary bloodstream infection (BSI)
- 10% mortality rate (13,000 attributable deaths annually)
- Increases length of stay by 2-4 days
- Results in antimicrobial overuse and antimicrobial resistance

Gould C., Catheter-Associated Urinary Tract Infection (CAUTI) Toolkit, CDC
Urinary Catheter Use

- Medical surgical unit: 10-30%
- ICU: 60-90%
- Nursing home: 5-10%
- 40-50% of catheters on non-ICU hospital wards do not have a valid indication for use
- Physicians frequently unaware of use
  - In recent study, >50% did not know which patients were catheterized
  - 75% did not know duration of use or discontinuation
CAUTI Etiology

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

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

• Risk of bacteriuria with catheterization
  – Daily: 3% - 10%
  – By day 30: 100%

Pathogens Associated with CAUTI

- *E. coli* 26%
- Enterococci 16%
- *P. aeruginosa* 12%
- Candida species 9%
- *K. pneumoniae* 6%
- Enterobacter species 6%

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC
Historical Perspective

What we did

- IP typically
  - Reviewed CDC guidelines on prevention of UTI
  - Educated staff, mainly nursing, on the guidelines
  - Performed surveillance of UTI
  - Reported findings to Infection Control and Executive Committees
  - Reported our “success” to The Joint Commission
Historical Perspective - 2

And What Happened

• Many thousands of patients developed hospital-acquired UTIs per year
• 80% were urinary catheter-associated
• Approximately half of the patients with a urinary catheter did not have a valid indication for placement
• Each day the urinary catheter remained, the risk of CAUTI increased 5%

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC
Current Perspective on HAI Prevention

- Consumer awareness of the impact of HAI
- Costs of healthcare
- Population with decreased access to medical care
- Demand for accountability by regulatory agencies, advocacy groups, and legislative mandates
- Infection PREVENTION has become a clear mandate

It takes a village (or at least a health care team) to prevent HAI
New Tenets of Infection Prevention

IP expected to

• Review the evidence-based (CDC) guidelines
• Evaluate your facility’s adoption of recommended practices
  – What is actually going on versus what is recommended?
  – Collect data to understand current practice
• Implement recommended practices
  – Educate staff --- ALL healthcare stakeholders
  – Change patient care practices where necessary
• Educate patients regarding infection risks and their role in prevention
New Tenets of Infection Prevention - 2

• Perform standardized surveillance for infections
  – Understand the current state
  – Set prevention target (% reduction goal or elimination)
  – **Monitor progress** in reducing infections
• Monitor compliance until the prevention target has been reached
  – Feedback observational data to all stakeholders
• Monitor process measures periodically to ensure sustainability of prevention target outcome measures
CAUTI Prevention

- With currently recommended infection prevention practices, estimated up to 69% CAUTI can be prevented
  - 380,000 infections prevented annually
  - 9,000 lives saved
- National CAUTI 5-year prevention goal:
  - 25% decrease from 2009 baseline

CAUTI Prevention Strategies

Core Strategies

- Higher levels of scientific evidence
- Demonstrated feasibility

Supplemental Strategies

- Some scientific evidence
- Variable levels of feasibility

- Standard practice
- Implement in addition to Core when infections persist or rates are high
CAUTI Core Prevention Strategies

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

CAUTI Supplemental Prevention Strategies

- Alternatives to indwelling urinary catheters
- Portable ultrasound devices to assess urinary retention, reduce unnecessary catheterizations
- Antimicrobial/antiseptic impregnated catheters

Use Indwelling Urinary Catheters for Appropriate Indications

- Acute urinary retention or obstruction
- Peri-operative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospice, comfort care, palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling urinary catheter on admission
- Accurate measurement of urinary output in critically ill patients (intensive care)

**CDC 2009 CAUTI Guideline:**
(www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf)
CAUTI Insertion Bundle

- Verify need prior to insertion
- Insert urinary catheter using aseptic technique.
- Maintain urinary catheter based on recommended guidelines

CAUTI Maintenance Bundle

- Daily assessment and documented need for catheter
- Tamper evident seal is intact
- Catheter secured with securement device
- Hand hygiene performed before patient contact
- Daily meatal hygiene with soap and water
- Drainage bag emptied using a clean container
- Unobstructed flow maintained

Preventing CAUTI: A patient-centered approach; (Autumn 2012) APIC Prevention strategist: (apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)
Not Recommended

No evidence to support an effect on 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

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC
UTI Prevention Process Measures

**Measure HCW compliance** using one or more of the following:

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

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC
UTI Prevention Outcome Measure

- Perform UTI surveillance using standardized definitions and protocols
- Note: Bacteria isolated from urine alone does **NOT** meet surveillance definitions for UTI
  - **Example:** If a culture grows $> 100,000 \ (10^5) \ CFU/ml$, the patient must have symptoms described in the NHSN protocol.
CAUTI Surveillance

UTI may or may not be associated with use of a urinary catheter (CAUTI vs. UTI)

• For CAUTI:

  Catheter must be in place >2 days (Day 1 = day of insertion)

  And

  Catheter still present

  Or

  Catheter removed day of or day prior to when UTI criteria met

NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
CAUTI Surveillance - continued

• NHSN infection window period: seven days during which all site-specific infection criteria must be met

• Criteria for CAUTI include specific clinical symptoms and positive urine culture, and sometimes positive blood culture

• Includes the day the first positive diagnostic test (urine culture or blood culture for CAUTI) was obtained, 3 calendar days before and 3 calendar days after

NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
CAUTI Infection Window Period - Acute Care Facilities

<table>
<thead>
<tr>
<th>Infection Window Period:</th>
<th>3 days before first positive diagnostic test</th>
<th>FIRST POSITIVE DIAGNOSTIC TEST</th>
<th>3 days after first positive diagnostic test</th>
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• For CAUTI, the first diagnostic test will be either a positive urine or blood culture
CAUTI Infection Criteria - Acute Care Hospitals

CAUTI Diagnostic Test
• Positive urine or blood culture

Examples of Localized Signs and Symptoms
• Suprapubic tenderness
• Costovertebral angle pain
• Urgency
• Frequency
• Dysuria
• Fever
CAUTI Cannot Re-Occur in the Same Patient Within a 14-Day Period

No new CAUTI can be reported within a 14-day “repeat infection timeframe”

- The date of the CAUTI event is considered day 1
- A new CAUTI is not reported until 14 days have elapsed
- If a new pathogen is identified in the urine within the 14-day period it should be added to the CAUTI already reported
- Refer to the CAUTI protocol for more details
CAUTI Location Attribution

- Attribute CAUTI to the inpatient location where the patient was assigned on the date of infection event.
- If all elements of CAUTI are present on the date of transfer or discharge, or the next day, the CAUTI is attributed to the transferring/discharging location.

NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
Symptomatic CAUTI Surveillance Definition

**Symptomatic CAUTI** requires the patient to have both clinical and microbiologic findings within a 7-day window period:

- **Refer to written definitions frequently when performing UTI surveillance**
- **Clinical symptom criteria differ for patients with current indwelling catheters versus catheters removed day prior versus no exposure to catheter.**
- **Urine culture must grow no more than two species of organisms, at least one of which is bacteria of $> 10^5$ CFU/ml**

NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
Asymptomatic CAUTI with Bacteremia Surveillance Definition

Asymptomatic UTI with Bacteremia (ABUTI) requires the following three criteria within a 7-day window period:

• Urine culture with no more than two species of organisms, at least one of which is a bacteria of $>10^5$ CFU/ml

• Positive blood culture with at least one matching bacteria to the urine or 2 positive blood cultures with common commensal bacteria and a matching common commensal in the urine

• No clinical signs or symptoms of CAUTI
Surveillance Definitions for Long-Term Care Facilities

- LTCF UTI Surveillance available for:
  - Certified skilled nursing facilities/homes
  - Intermediate/chronic care facilities for the developmentally disabled
- Based on modified McGeer CAUTI criteria for LTCF
- Includes UTI symptoms seen with chronic catheter use and advanced age
  - Example: Acute change in mental status from baseline; acute functional decline or confusion

Surveillance Definitions for Long-Term Care Facilities - 2

Type of UTI is based on LTCF criteria and presence of device

– Three types of symptomatic UTI in patient without catheter
– Symptomatic CAUTI in patient with a urinary catheter
  • Catheter in place or removed in last two days
– Asymptomatic UTI with bacteremia
  • Occurs with or without a device
  • Microorganisms in blood and urine cultures match

CDC National Healthcare Safety Network (NHSN) training,
(http://www.cdc.gov/nhsn/PDFs/LTC/slides/LTCF-UTI-Event-training.pdf)
CAUTI Prevention

- Prevention requires commitment to evaluate urinary catheter usage
  - Begin in the emergency department
  - Avoid unnecessary catheterization!
- Reducing CAUTI incidence has been shown to result in overall reductions of MDRO infections
- Perform surveillance and feedback CAUTI rates to ICU and wards
References and Resources


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


• IDSA Guidelines (Clin Infect Dis 2010;50:625-63)

• SHEA/IDSA Compendium (ICHE 2014;35:464-479)

Questions?

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

Thank you.