Catheter-associated UTI – Prevention Strategies for a Common Healthcare-Associated Infection

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VICNISS
HEALTHCARE ASSOCIATED INFECTION SURVEILLANCE

VICTORIA State Government

Doherty Institute
THE UNIVERSITY OF MELBOURNE
The Royal Melbourne Hospital

A joint venture between The University of Melbourne and The Royal Melbourne Hospital

The Royal Melbourne Hospital

Urinary catheters

How common are they?

- Point prevalence studies in Australia
  - 12-26% hospitalised patients
  - 8% aged care residents
- Managed in different settings
  - Hospital clinicians
  - Community nursing services
  - Nurses in aged care homes
  - Patients,clients
- Types
  - Urethral, intermittent, suprapubic

Giles M et al. J Clin Nurs. 2019; 28(23-24): 4572-4581.
Gardner A et al. BMJ Open 2014;4:e005099.
Australian National Aged Care Classification (AN-ACC) funding model data

Urinary catheter complications

Complications

- Many
  - Urethral – pain and discomfort, local trauma (causing bleeding, strictures false passage), infection, fistulae, haematuria, blockage from encrustation, bladder stones etc
  - Suprapubic – local skin irritation, cellulitis, overgranulation, infection, bladder stones, bladder cancer etc

HAI, HA-UTI and CAUTI

- Point prevalence studies
  - Internationally and Australia
    - 13 - 18% HAI are HA-UTI
    - HA-UTI was the third most common HAI in an Australian study
    - The majority of HA-UTI are CAUTI (65%)

Australia and New Zealand Urological Nurses Society guidelines (2014).
Tandogdu Z, Wagenlehner FM. Curr Opin Infect Dis. 2016 Feb: 29(1);73-9.
Russo et al. AMR and IC. 2019 Jul: 8;114.
Gardner A et al. BMJ Open 2014;4:e005099.

Evidence-based practice recommendations

1.**Who** should receive urinary catheters?

2. What are the best **insertion** practices?

3. What are best **maintenance** practices?

4. Role of **antimicrobials** in preventing CAUTI

CDC Guideline for Prevention of CAUTI

- Written in 2009, updated in 2017

Recommendations graded according to evidence

- Category IA,B or C – Strong recommendation. 1A based on high or 1B low to very low-quality evidence. 1C based on regulatory requirement.
- Category II – Weak recommendation
- No recommendation / unresolved issue

Who should receive urinary catheters

Recommendation	Category
Use for appropriate indications – examples Acute urinary retention or bladder outlet obstruction Measuring urine output in critically ill patients Perioperative use for *selected* surgical procedures Assist healing of open sacral or perineal wounds in incontinent patients Prolonged immobilization Comfort for end-of-life care	IB
Minimise need for use and duration of use	IB
Avoid use for management of incontinence	IB
Use in operative patients only as necessary, rather than routinely - examples Urology or genitourinary tract procedures Long procedure anticipated Large–volume infusions during procedure For monitoring urine output intra-operatively	IB

CDC Guideline for Prevention of CAUTI 2009 updated 2017.

Inappropriate uses of indwelling catheters

Examples

•As a substitute for nursing care for patient/resident with incontinence

•For obtaining urine for culture or other diagnostic tests when the patient can voluntarily void

Catheter materials

Recommendation	Category
Hydrophilic (hydrogel) catheters for intermittent catheterisation *Might* be preferable to standard catheters	II
Silicone catheters for long-term catheterisation *Might* be preferable to other materials to reduce the risk of encrustation	II
Catheter valves in reducing CAUTI risk and other complications	Unresolved issue
Silver-coated catheters	No recommendation

ANZUNS
Hydrogel or silicone catheters recommended for long-term urethral and suprapubic catheterisation. Can be left in for up to 3 months.

Silver coated catheters - Can reduce and delay onset of ASB. Can consider for short-term use.

CDC Guideline for Prevention of CAUTI 2009 updated 2017.
Australia and New Zealand Urological Nurses Society guidelines (2014).

Techniques for urinary catheter insertion

Recommendation	Category
Hand hygiene Before and after insertion, manipulation of device or site	IB
Aseptic technique for insertion (in hospitals) Sterile gloves, drape, sponges, antiseptic or sterile solution for periurethral cleaning, single use lubricant	IB
Clean technique for intermittent catheterisation (in non-acute settings, e.g. performed by patients) Focus on hand hygiene training, cleaning of genital area, no touch technique especially tip of catheter*	IA
Antiseptic lubricant Not routinely required	IB
Properly secure after insertion	IB

* Additional recommendation Australia New Zealand Urological Nurses Society guidelines

CDC Guideline for Prevention of CAUTI 2009 updated 2017.
Australia and New Zealand Urological Nurses Society guidelines (2014).

Maintenance of urinary catheters

Recommendation	Category
Maintain a closed drainage system	IB
Maintain unobstructed urine flow	IB
Keep catheter and tubing free from kinking	IB
Keep collecting bag below level of bladder. Do not rest bag on floor.	IB
Use standard precautions including gloves and gown as required when manipulating catheter or collecting system.	IB
Empty collecting bag regularly using separate, clean container for each patient. Avoid splashing. Prevent contact of spigot with non-sterile container.	IB
Cleaning periurethral area while catheter in place Routine hygiene eg cleansing meatal surface during shower is appropriate. Additional cleaning with antiseptics not required.	IB
Clamping prior to removal not necessary	II
If break in aseptic technique, disconnection, leakage Replace catheter and collecting system	IB

CDC Guideline for Prevention of CAUTI 2009 updated 2017

Maintenance of urinary catheters

Recommendation	Category
Bladder irrigation Not routinely recommended Recommended when obstruction anticipated eg bleeding post bladder or prostate surgery) - Use closed continuous irrigation	II

CDC Guideline for Prevention of CAUTI 2009 updated 2017.

Antimicrobials in preventing CAUTI

Recommendation	Category
Antimicrobials Routine irrigation with antimicrobials not recommended Routine instillation of antiseptic or antimicrobials into drainage bags not recommended Systemic antimicrobials to prevent CAUTI not recommended*	 II II IB
Antimicrobial / antiseptic-impregnated catheters Not enough evidence to support use in standard patient populations If high CAUTI rates despite comprehensive strategy to address, could consider**	Unresolved issue IB

*Therapeutic Guidelines
For catheters inserted for surgery, do not administer an antibiotic to cover CAUTI (e.g. gentamicin) at the time of catheter insertion or removal, or continue antibiotic prophylaxis until catheter removal.

Antibiotic impregnated catheters

**ANZUNS - Can reduce and delay onset of ASB. Can consider for short-term use.

** NSW - Equivocal evidence that they minimise CAUTI risk. Do not routinely use. When considering, consult ID or urology teams.

CDC Guideline for Prevention of CAUTI 2009 updated 2017.
Therapeutic Guidelines: Antibiotics.
Australia and New Zealand Urological Nurses Society guidelines (2014)
NSW Government. Insertion and management of urethral catheters in adult patients (2021)

Antimicrobials in preventing CAUTI

Recommendation	Category
Antimicrobials for patients requiring short-term catheterisation Use of urinary antiseptic e.g. methenamine to prevent UTI	Unresolved issue
Antimicrobials for patients requiring long-term catheterisation Use of bacterial interference (bladder inoculation with a nonpathogenic strain)	Unresolved issue

In addition:
Therapeutic Guidelines
Antibiotics penetrate poorly into catheter biofilm. Antibiotic therapy for CAUTI is often only transiently effective if the device is not removed or replaced.

CDC Guideline for Prevention of CAUTI 2009 updated 2017.
Therapeutic Guidelines: Antibiotics.

CAUTI Prevention Strategies at an organisational level

- Policies, guidelines and protocols regarding use of urinary catheters
- Roles and responsibilities of clinicians (and patients, clients, residents)
- Education and training
- Documentation of device insertion, maintenance, removal
- Surveillance and data for action

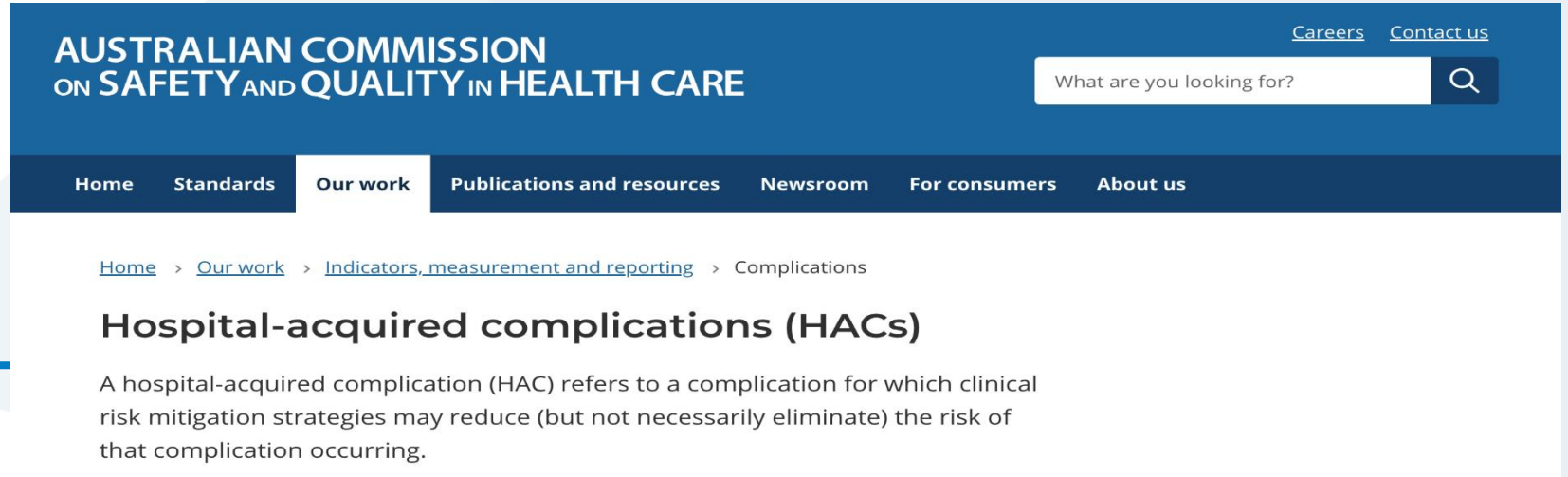
Patel et al. SHEA/IDSA/APIC CAUTI Practice recommendation. ICHE 2023:44;1209-1231.

Policies, guidelines and protocols

- To ensure **appropriate utilisation** of urinary catheters
  - Insertion, maintenance, removal
- To ensure compliance with **hand hygiene** and proper **care of device**
- Consider
  - Protocols for management of urinary retention
  - Guidelines and protocols for nurse-directed removal of unnecessary urinary catheters
- Hospitals
  - Guidelines for appropriate peri-operative catheter management
  - Surgical procedure–specific guidelines for catheter use and removal

Surveillance

- Process measures – some examples
  - Compliance with documentation
  - Compliance with insertion checklist
  - Compliance with regular review of device
  - Compliance with removal when no longer needed
- Outcome measures
  - HAUTI or CAUTI
  - Hospitals - UTI is a Healthcare-acquired complication (HAC)



HA-UTI surveillance

- Use of administratively-coded data or ICD-10 codes
  - Risks: Missed cases (up to 70%) when compared to lab-based definitions
  - Risks: Overcalling (1) community-acquired UTI or (2) ASB as HA-UTI (up to 32%)

Mitchell BG, Ferguson JK. The Use of clinical coding data for the surveillance of HA-UTI in Australia. Inf D Health 2016: 21(1); 32-35.
Marshall C, Maglinao K. Is it reasonable to apply ICD-10 coding diagnoses to identify HA-UTI? Inf D Health 2018: Vol 23(S16).

Examples of surveillance aligned with CDC/NHSN

Hospital CAUTI

- Setting: Ward Type: Point prevalence
- Metrics
  - Number of CAUTI per 1000 catheter-days
  - Number of bloodstream infections secondary to CAUTI per 1000 catheter-days
  - Catheter utilisation ratio: (urinary catheter days / patient days)
- Criteria for CAUTI events
  - Device: IDC
  - Symptoms / signs
  - Urine culture

Available via VICNISS

RACH HAUTI

- Setting: Facility Type: Continuous e.g. 3-months
- Metrics
  - Number of UTI events per 1,000 resident days
  - By symptomatic catheter-associated, symptomatic non-catheter-associated, bacteraemic UTI (with no urinary symptoms or fever)
  - Catheter utilisation ratio: (urinary catheter days / patient days)
  - Urine culture rate: (No. urine cultures ordered / total resident days)
  - UTI antibiotic treatment ratio: (New antibiotic start for UTI / total no. of UTI events)
- Criteria for HA-UTI events
  - With or without device
    - Symptoms / signs
    - Urine culture

Available via NISPAC

VICNISS. VICNISS Healthcare Associated Infection Surveillance. VICNISS.org.au
NISPAC. National Infection Surveillance Program for Aged Care. NISPAC.org.au

HA-UTI and CAUTI surveillance

- Suggestions
  - Measure what matters for your setting
  - Prospective surveillance for specific patient groups or units
  - Use standardised methodology that is preferably validated
    - Don’t count ASB
    - Hospitals – don’t count patients with community-acquired UTI
  - Plan to use the data for quality improvement
    - Have a mechanism for feeding data back to units and clinicians

Thank you.
Any questions?

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