

CA-UTI: Prevention, Diagnosis and Management



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Overview:



- Epidemiology : problem statement
- Definition
- Diagnosis
- Complications and impact
- Prevention strategies (guidelines)
- Management
- Conclusion

Epidemiology:



- 20% hospital acquired bacteraemia
- Bacteriuria associated with indwelling catheter 3-8% per day
- Risk factors:
 - Duration of catheterization
 - ✦ Duration of hospitalization /ICU
 - Females
 - diabetes

Definition:CA-UTI



- UTI
 - Significant bacteriuria
 - Signs and symptoms attributable UTI
- Infection in patient
 - with an indwelling
 - Has been catheterized within previous 48 hours

Pathogenesis



- Disruption of host defense mechanism
 - Mucosal injury
- Promotes colonization – biofilm
- Facilitates bacterial access into bladder

Microbiology:



- Bacteriuria in patients with short term catheters is usually caused by a single organism
- E. coli – most frequent species isolated
- Others
 - *Klebsiella, Serratia, Citrobacter, Pseudomonas, Gram positive cocci, Enterococcus*

Microbiology:



- Long term catheterization – associated with polymicrobial pathogens
- Organisms
 - *Proteus, Morganella*

CA-UTI : implications



- Significant cost
- Longer hospital stays
- Polymicrobial infections
- Multi- drug resistant organism
- Increase incidence of calculi

Diagnosis:



- Clinical –non neurogenic
 - New onset or worsening fever
 - Altered mental status
 - Lethargy / malaise
 - Flank pain
 - Hematuria
 - Pelvic / suprapubic discomfort or pain or tenderness
 - Post removal :severe irritative symptoms

Diagnosis: clinical



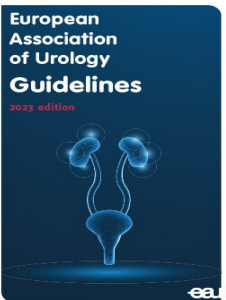
- Neurogenic patients
 - Discomfort or pain over the kidney or bladder or during urination
 - Onset of urinary incontinence
 - Fever
 - Increased spasticity, autonomic hyperreflexia,
 - Malaise, lethargy, and sense of unease

Diagnosis:



- Laboratory
 - Significant bacteriuria : $\geq 10^3$ cfu/ml of one or more bacterial species (<2)

Recommendations	Strength rating
Do not carry out routine urine culture in asymptomatic catheterised patients.	Strong
Do not use pyuria as sole indicator for catheter-associated UTI.	Strong
Do not use the presence or absence of odorous or cloudy urine alone to differentiate catheter-associated asymptomatic bacteriuria from catheter-associated UTI.	Strong



Sample collection:



- Freshly inserted catheter
- Sample collection port
- MSU – post removal

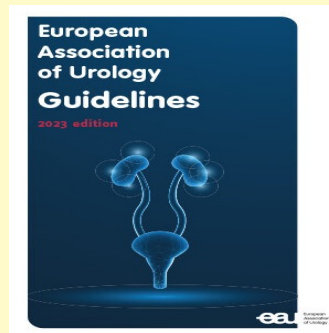


Management:



- Remove or replace catheter
- Urine culture
 - Sample from newly inserted catheter or MSU (removal) prior to AB
- AB as recommended for complicated UTI
 - Local sensitivity pattern
- Duration of treatment
 - 7-14 days dependent on response

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Recommendation	Strength rating
Treat symptomatic catheter-associated-UTI according to the recommendations for complicated UTI (see section 3.7.5).	Strong
Take a urine culture prior to initiating antimicrobial therapy in catheterised patients in whom the catheter has been removed.	Strong
Do not treat catheter-associated asymptomatic bacteriuria in general.	Strong
Treat catheter-associated asymptomatic bacteriuria prior to traumatic urinary tract interventions (e.g. transurethral resection of the prostate).	Strong
Replace or remove the indwelling catheter before starting antimicrobial therapy.	Strong

Prevention:



- **Limit the use and duration of catheter insertion**
 - Develop institutional protocol
- Consider using alternatives to IUC for chronic users
 - Intermittent catheterization
 - Condom catheter
 - Suprapubic vs indwelling : limited evidence favor SPC
- Use aseptic technique with sterile equipments
 - Inoculation at time of insertion
 - Cleansing agents : unresolved issue- antiseptic vs sterile solution

Prevention:



- Intermittent catheterization
 - Clean acceptable over sterile
 - Cleaning catheter technique – unresolved
 - Hydrophilic coated catheter – reduces
 - Single use v multiuse : reduces UTI, very high cost
 - Monitor adequate drainage - PVR
- Catheter drainage care
 - Closed drainage
 - Ensure free drainage
 - Urobag – level below, donot rest it on the floor
 - Empty regularly and prevent contamination of the exit port

Prevention:



- Catheter care
 - Timed vs clinically indicated : no recommendation
 - Silicon vs normal : reduces encrustation
 - Uncoated vs coated : silver alloy coated may reduce or delay onset of bacteriuria

Novel approaches:



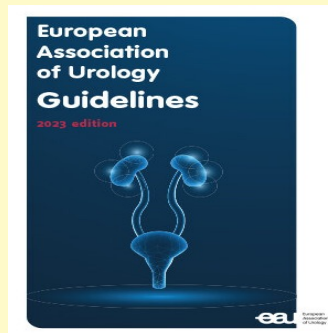
- Coated catheters
 - Nitrofurazone: inhibit growth and biofilm formation
 - Hydrogel: reduces irritation, resists adherence
 - Silver alloy: resists colonization
- Bacterial interference
 - Methenamine: antiseptic, acidification
 - Nanoparticals: drug delivery silver, gold etc inhibit growth
 - Antimicrobial peptides: positively charged particals , membrane destabilization
 - Bacteriophages: reduce biofilm formation by interfering with binding protiens
 - Probiotics: use of non pathogenic E. coli

What is not recommended!



- Antibiotic prophylaxis or treat ASB
 - Except urea splitting organism
- Routine use of antibiotic or silver impregnated catheters
- Bladder irrigation
- Bladder acidification
- Meatal sterilization or antiseptic cleaning
- Timed catheter change ?

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Do not apply topical antiseptics or antimicrobials to the catheter, urethra or meatus.	Strong
Do not use prophylactic antimicrobials to prevent catheter-associated UTIs.	Strong
Do not routinely use antibiotic prophylaxis to prevent clinical UTI after urethral catheter removal.	Weak
The duration of catheterisation should be minimal.	Strong
Use hydrophilic coated catheters to reduce CA-UTI.	Strong
Do not routinely use antibiotic prophylaxis to prevent clinical UTI after urethral catheter removal or in patients performing intermittent self-catheterisation	Weak

Conclusion:



- CA-UTI is preventable
- How and why of catheter placement is the key
 - Duration
 - procedure
- Diagnosis require both clinical symptoms and significant bacteriuria