

Appropriate Urinary Catheter Use and Management

Nursing Education Material

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This presentation

- This presentation targets all nurses with patient care responsibilities including the unit manager and the clinical nurse leader of the unit involved. A test to evaluate knowledge post-presentation is also available.

Outline

- The urinary catheter
- Urinary catheter utilization
- Catheter-associated urinary tract infection
- Indications for urinary catheter utilization
- Non-indications for urinary catheter utilization
- Insertion and Maintenance of urinary catheters

Urinary Catheter

- Developed in the 1920s by Dr. Frederick Foley
- The urinary catheter was originally an open system with the urethral tube draining into an open container.
- In the 1950s, a closed system was developed in which the urine flowed through a catheter into a closed bag.

Closed System Urinary Catheter



Urinary Catheter Utilization

- About 25% of patients during their hospitalization
- Almost all of them are placed the same admission
- A large number is placed in ED
- Intensive care → medical-surgical units

Urinary Catheter Prevalence

- On medical-surgical units: 10-30%
- Intensive care units: 60-90%

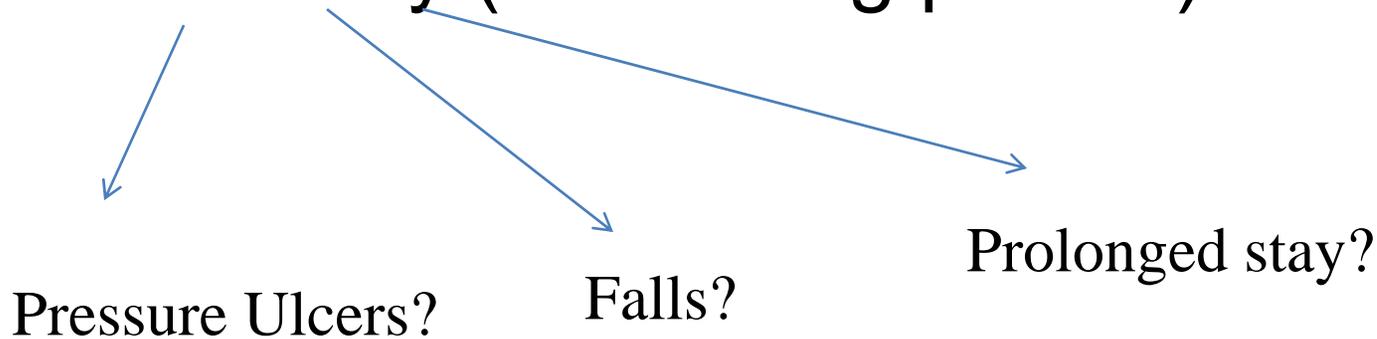
Gokula, Am J Infect Control 2004;32:196-9
Apisarnthanarak, Am J Infect Control 2007;35:594-9
Edwards, Am J Infect Control 2007;35:290-301

Urinary Catheter Utilization

- About 15-25% of patients during their hospitalization will have an urinary catheter placed
- Many are placed either in the intensive care or Emergency Department
- 40% - 50% of these patients do not have a valid indication for urinary catheter placement

Urinary catheters are not harmless...

- Urinary tract infection
- Mechanical trauma to urethra and bladder
- Immobility (restraining patient)*



*Saint S, Ann Intern Med 2002; 137: 125-7

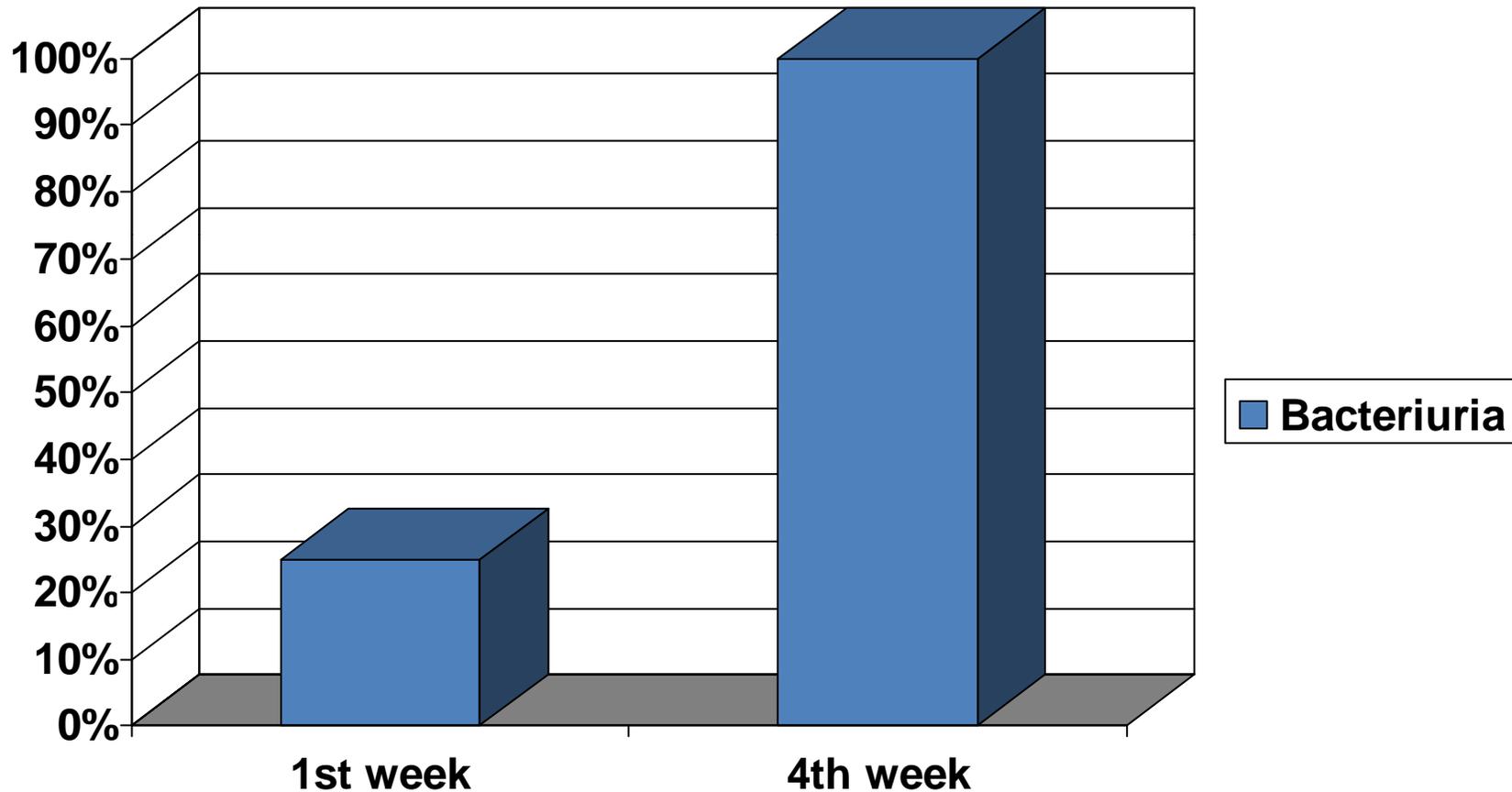
Hospital-Acquired UTI: Prevalence

- 600,000 patients develop hospital-acquired UTI's per year
- Catheter-associated infections (CAUTI) comprise 80% of these cases
- UTIs account for 40% of all hospital-acquired infections

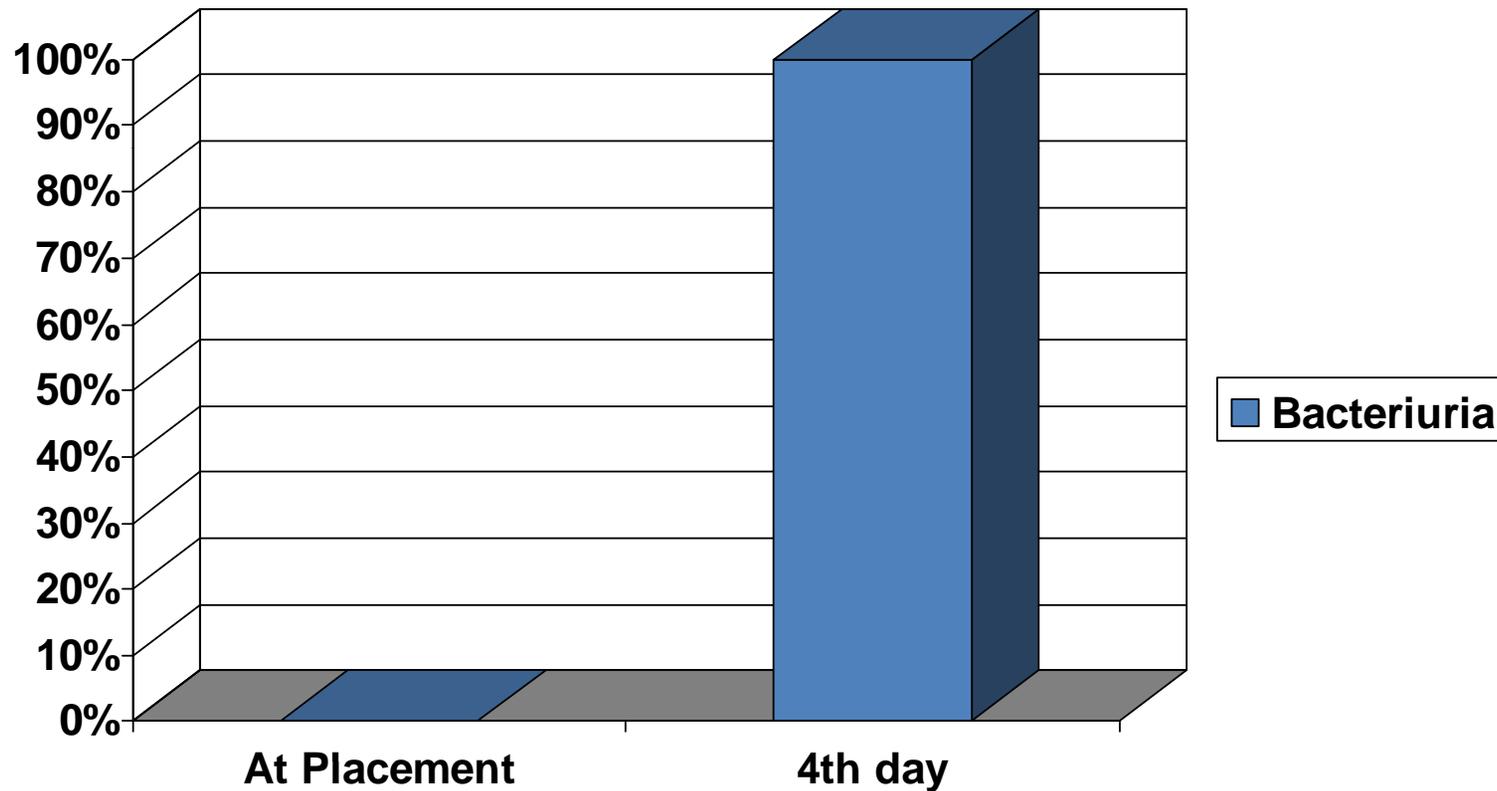
Catheter Associated UTI (CAUTI)

- Catheter-risk of bacteriuria increases each day of use:
 - Per day: 5%
 - 1 week: 25%
 - 1 month: 100%

Catheter-Associated Bacteriuria (Closed Drainage System)



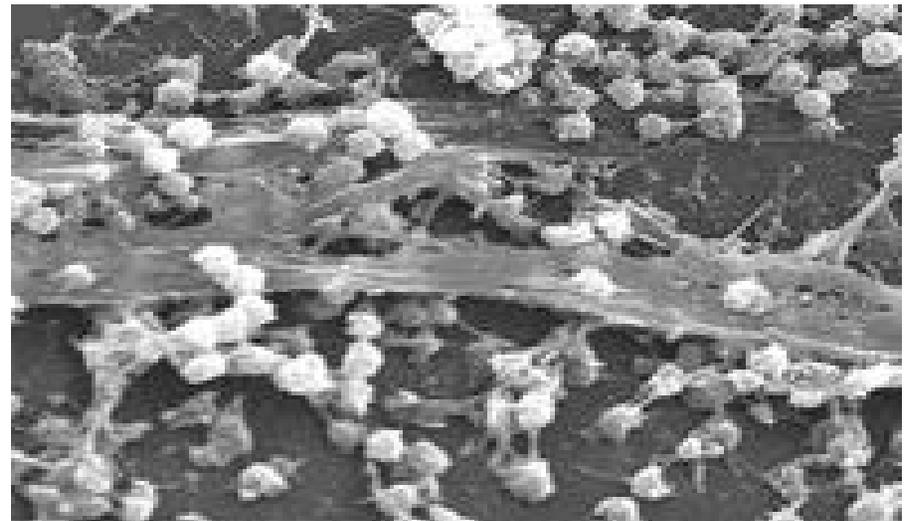
Catheter-Associated Bacteriuria (Open Drainage System)



Biofilm: Extracellular Polymers

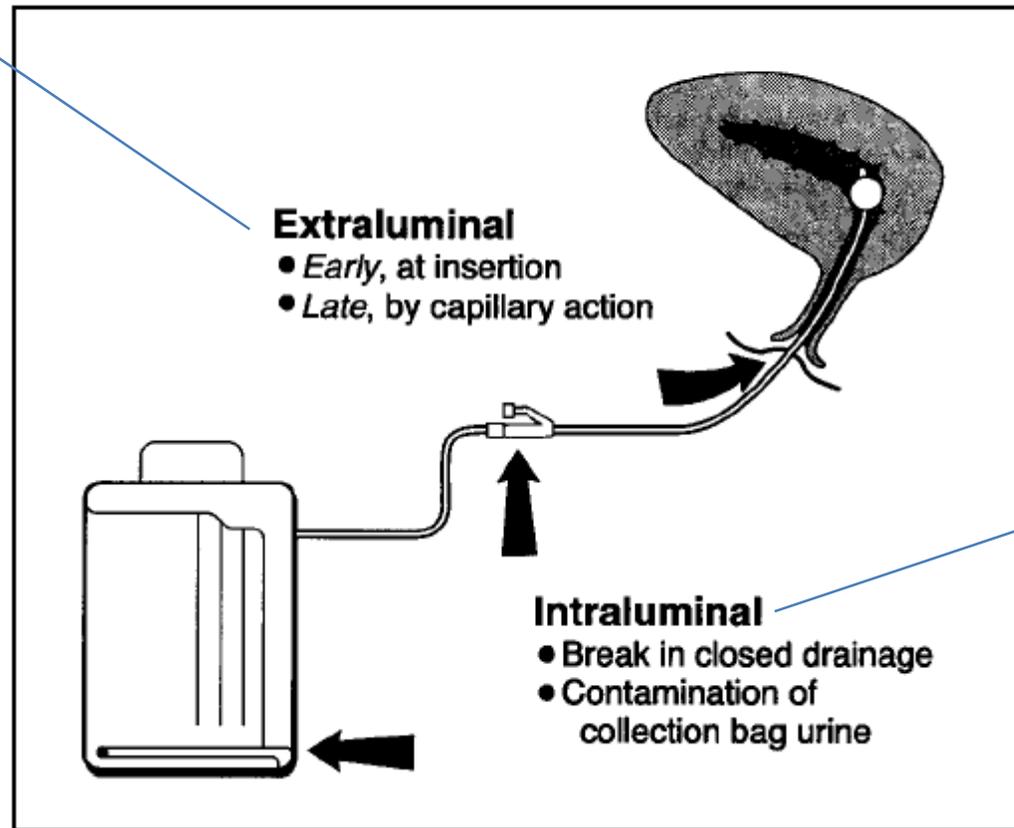
(Donlan, CID 2001; 33:1387–92, Liedl, Curr Opinion Urol 2001;11: 75-9)

- Organisms attach to and grow on a surface and produce extracellular polymers
- Intraluminal ascent (48hours) of bacteria faster than extraluminal (72-168 hours)
- Most catheters used >1 week have biofilms
- Extraluminal more important in women



Staphylococcus aureus biofilm on
an indwelling catheter.
CDC Public Health Image Library

Usually females



Usually males

Figure 1. Routes of entry of uropathogens to catheterized urinary tract.

Maki, *Emerg Infect Dis* 2001; 7: 1-6

Table 3. Risk factors for catheter-associated urinary tract infection, based on prospective studies and use of multivariable statistical modeling (27-30)

Factor	Relative risk
Prolonged catheterization >6 days	5.1-6.8
Female gender	2.5-3.7
Catheter insertion outside operating room	2.0-5.3
Urology service	2.0-4.0
Other active sites of infection	2.3-2.4
Diabetes	2.2-2.3
Malnutrition	2.4
Azotemia (creatinine >2.0 mg/dL)	2.1-2.6
Ureteral stent	2.5
Monitoring of urine output	2.0
Drainage tube below level of bladder and above collection bag	1.9
Antimicrobial-drug therapy	0.1-0.4

Maki, *Emerg Infect Dis* 2001; 7: 1-6

Bacteriologic Monitoring

- Not recommended for asymptomatic patients.
- Only culture the urine if the patient has symptoms of an UTI such as fever, chills, and abdominal pain
- Cloudy urine ≠infection
- Sediment in urine ≠infection

Asymptomatic Bacteriuria

- No benefit from treatment
- Increased risk of resistance and *C. difficile* disease with treating asymptomatic bacteriuria
- Pyuria does not equate infection when catheter present
- Avoid urine cultures unless patient is symptomatic or if it is a part of sepsis workup in a catheterized patient

Clear Urine



Keep the urinary catheter bag lower than the patient!!!

Acceptable Indications for Urinary Catheter Placement

- Acute urinary retention or obstruction
- Perioperative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospice/comfort/ palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling on admission

Acute urinary retention or obstruction

- Outflow obstruction: examples include prostatic hypertrophy with obstruction, urethral obstruction related to severe anasarca, urinary blood clots with obstruction
- Acute urinary retention: this may be medication induced, medical (neurogenic bladder) or trauma to spinal cord.

Perioperative use in selected surgeries

- Urologic surgery or other surgery on contiguous structures of the genitourinary tract
- Anticipated prolonged duration of surgery, large volume infusions during surgery, or need for intraoperative urinary output monitoring
- Spinal or epidural anesthesia may lead to urinary retention; prompt discontinuation of this type of anesthesia should prevent need for urinary catheter placement

Assist healing of perineal and sacral wounds in incontinent patients

- This is a relative indication when there is concern that incontinence is leading to worsening skin integrity in areas where there is skin breakdown

Hospice/ comfort care/ palliative care

- This is a relative indication. In end-of-life situations, it is reasonable to accommodate the patient's wishes on what provides them with the best comfort

Required Immobilization for Trauma or Surgery

- This includes:
 1. unstable thoracic or lumbar spine
 2. multiple traumatic injuries such as pelvic fractures
 3. Acute hip fracture is risk for dislocation

Chronic Indwelling Urinary Catheter upon Admission

- Patients from home or extended care facility with a chronic urinary catheter

Unacceptable Reasons for Placement

- Urine output monitoring **OUTSIDE** intensive care
- Incontinence
- Morbid obesity
- Immobility
- Confusion or dementia
- Patient request

Urine Output Monitoring OUTSIDE Intensive Care

- This includes:
 1. Close urinary output monitoring by nephrology in patients with renal failure
 2. Monitoring of urine output in patients with congestive heart failure on diuretics
- Potential solutions:
 1. Use urinals for men and hats for women (to monitor output)
 2. Accurate daily weights.

Urine Output Monitoring OUTSIDE Intensive Care

- For patients with congestive heart failure, consider involving the patient
- Provide patients with information regarding how to document their output and daily weights (consider pamphlets)
- This will also help the patient learn to accurately measure their output.

Incontinence

- Incontinence should not be a reason for urinary catheter placement. Patients admitted from home or from extended care facilities with incontinence managed their incontinence without problems prior to admission. Mechanisms to keep the skin intact need to be in place and avoid urinary catheter placement in that population.

Incontinence: Potential Solutions

- Use Skin Barrier Creams for protection
- Start Toilet Training:
 - Offer use of bedpan or assist patient up to commode regularly
- Evaluate for any wet bed linen and change if wet at the time patient is being turned in bed

Patients Transferred from Intensive Care to Floor

- The intensive care is an area where high prevalence of urinary catheter utilization is present.
- Evaluating those who are transferred to non-intensive care units for need of urinary catheter and discontinuation of those not needed may significantly reduce unnecessary utilization

Morbid Obesity and Immobility

- Morbid obesity should not be a trigger for urinary catheter placement. Patients that are morbidly obese have functioned without a urinary catheter prior to admission. The association of immobility and morbid obesity may lead to more inappropriate catheter placement. This may result in more immobility with the urinary catheter being a “one point restraint”

Immobility: Potential Solutions

- Start toilet training every 2 hours
- Offer bedpan, urinal or assist patient out of bed
- Of 145 hospitalized patients with a high risk for pressure ulcers, urinary catheter presence was associated with 1.8 times risk of pressure ulcer compared to those without urinary catheter ($p=0.03$). The most significant association was between urinary catheter use and stage 2 pressure ulcer.

Confusion or Dementia

- Patients with confusion or dementia should not have a urinary catheter placed unless there is an indication for placement

The Very Elderly Patients

- Disproportionate use inappropriately in the very elderly.
- It may be a marker of immobility, incontinence, and dementia?

Patient Request

- Although healthcare workers may report that patients want the urinary catheter in, this is infrequently documented. The only exception is in patients that are end of life or palliative care.
- Patient's Convenience:
 - Example: patient on diuretics and does not want to move out of bed multiple times
 - Education is key! Provide reasons to patient of increased risk of urinary catheter : urine infection, skin breakdown, deep venous thrombosis and/or pneumonia due to immobility

Increased Work Load for Healthcare Workers (HCW)

- Increased acuity of patients or reduction of the nurse to patient ratio
- e.g., patient is incontinent and immobile and requires multiple changes of sheets
- Potential solution: link it to other initiatives (eg. pressure ulcer prevention requires frequent repositioning of patients), evaluate the nurse to patient ratio, shift resources to support the HCW that has more responsibilities

Obtaining Urinary Specimens

- Discourage urinary catheter use for specimen collection
- Consider straight catheterization if the patient is unable to void or is incontinent

Reminder for Appropriate Urinary Catheter Use

- Avoid urinary catheter use if not indicated
- Try to discontinue the catheter promptly when not needed
- The longer the catheter is present, the higher the risk of infection!
- The urinary drainage system should always remain a closed system

Additional Tools to Reduce Inappropriate Urinary Catheter Use

- Bladder scanner: if available, may check if patient had urinary retention. This may avoid urinary catheter insertion or straight catheterization
- Condom catheters: may be used for men with incontinence with risk of skin breakdown (e.g., pressure ulcers), or for accurate urine output monitoring in intensive care. Condom catheters cannot be used if the patient has urinary retention

Insertion and Maintenance of Urinary Catheters

- Hand hygiene before and after placement
- Aseptic technique and use of sterile equipment
- Use sterile gloves, drape, an antiseptic solution for periurethral cleaning, and a single packet of lubricant for insertion.

Maintain Sterile Technique



Good hand hygiene
before and after
procedure.



Don sterile gloves
before procedure.

Placement of Urinary Catheter

- Use smallest catheter size effective for patient (14 or 16F)
- Catheters should be properly secured to prevent movement and urethral traction



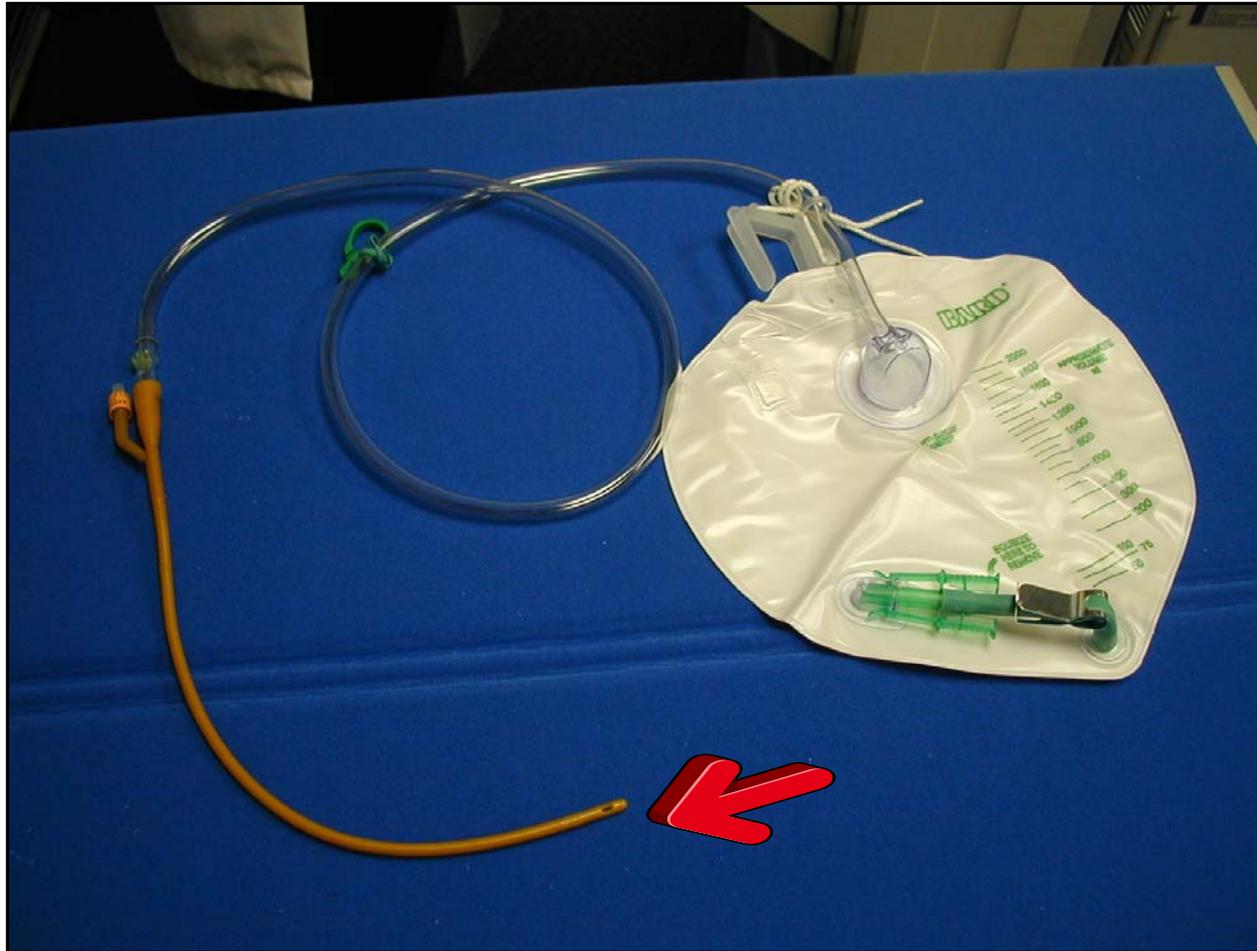
Maintenance of Urinary Catheters

- If there is a break in sterile technique, or leak from the closed system, replace the urinary catheter and the drainage system
- Make sure the urinary flow is not obstructed
 - 1.No kinks of catheter
 - 2.The urinary bag should always be lower than the bladder
 - 3.Regular emptying of urinary bag

Maintenance of Urinary Catheters

- Do not change urinary systems routinely
- Consider changing urinary system if:
 1. Infection
 2. Obstruction
 3. Break or leak of the closed system

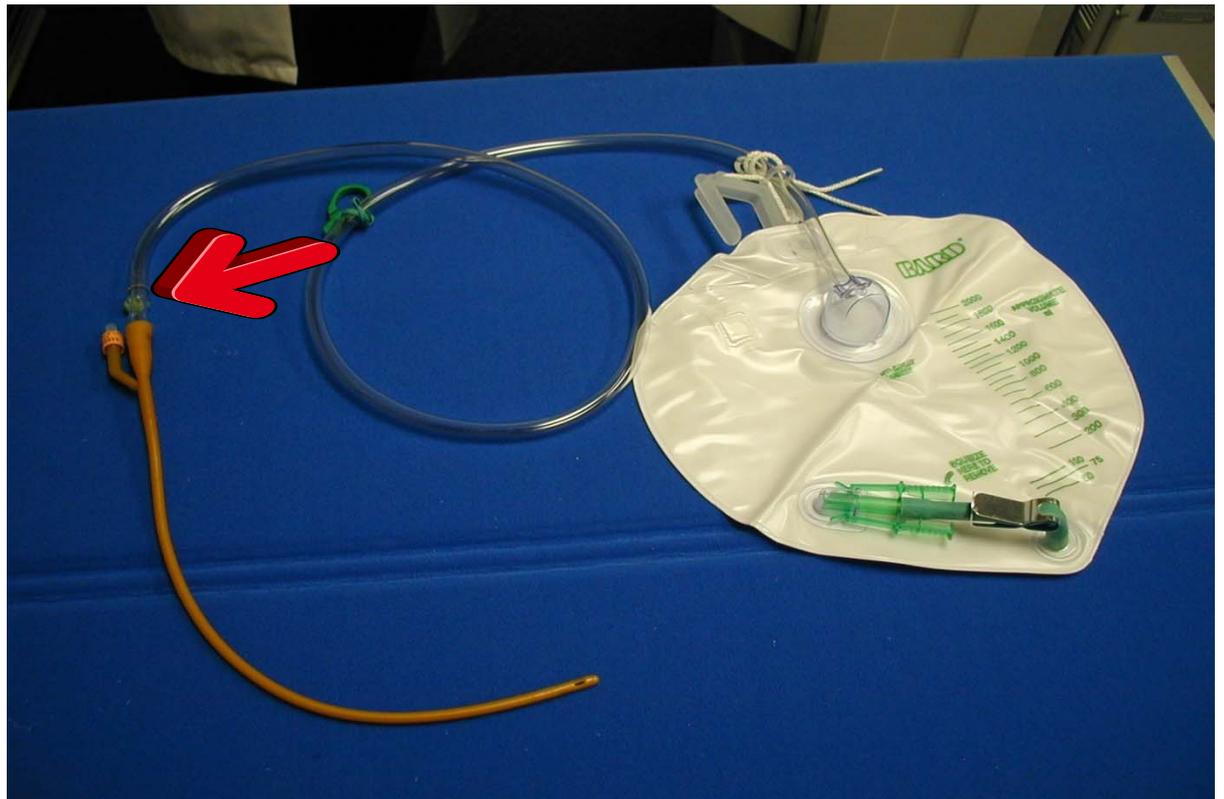
Potential Site for Contamination



Sterile technique must be used when inserting the catheter. Do not use aggressive cleaning once urinary catheter is in place.

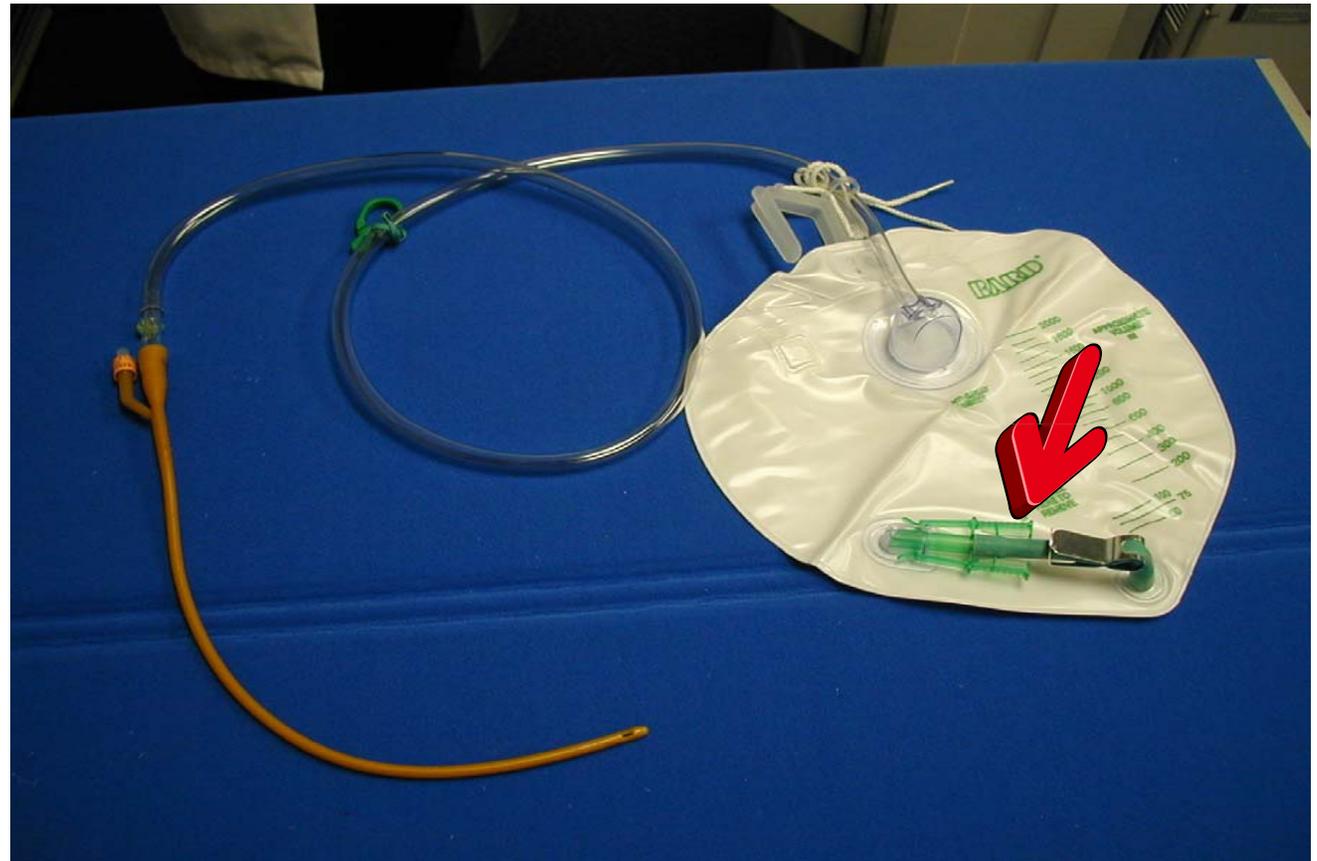
Potential Site for Contamination

Sampling Port:
Disinfect port
before sampling
urine. Also,
check site for
possible
disconnection of
catheter from
drainage bag.



Potential Site for Contamination

System may become an open system if outlet is left hanging or is unclamped



Maintenance of Urinary Catheter: Irrigation

- Avoid irrigation unless necessary (obstruction of catheter)
- Catheter tubing junction should be disinfected before irrigation
- Use the sampling port to relieve the obstruction
- Do not disconnect the closed system unless you cannot use sampling port

Periurethral or Meatal Care

- Washing meatus with povidone-iodine or soap is not associated with lower infection risk.
- Aggressive cleaning may be associated with increased infection!
- Routine hygiene during bathing is appropriate.

What Needs to be Done

- Both nurses and physicians should evaluate the indications for urinary catheter utilization.
- Physicians should promptly discontinue catheters that are no longer needed.
- Nurses evaluating catheters and finding no indication should contact physician to promptly discontinue catheter.

Urinary Catheter Use

- Place Only
When
Necessary
- Promptly
Remove When
Not Necessary

This completes the
“Appropriate Urinary Catheter Use
and Management” module.
(Optional Evaluation Test)