Special Edition of
Perspectives
Recovery Strategies from the OR to Home

Expert Review:
Best Practices in Managing the Indwelling Catheter

Moderator
Mikel Gray, RN, PhD, CUNP, CCCN, FAAN
Professor and Nurse Practitioner
Department of Urology and School of Nursing,
University of Virginia
Charlottesville, VA

Panelists
Diane K. Newman, RNC, MSN, CRNP, FAAN
Co-Director, Penn Center for Continence and Pelvic Health
Division of Urology, University of Pennsylvania Health System
Philadelphia, PA

Carol J. Einhorn, RN, MS, CURN, GNP, APRN, BC
Gerontological Nurse Practitioner
Jesse Brown VA Medical Center
Chicago, IL

B.J. Reid Czarapata, RN, CRNP, CUNP
Urology Wellness Center
Fairfax, MD

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Expert Review:
Best Practices in *Managing the Indwelling Catheter*

An indwelling urethral (Foley) catheter is a closed sterile system that is inserted through the urethra to allow for bladder drainage. In the 1930's Frederick Foley designed a rubber tube with a separate lumen used to inflate a balloon which holds the catheter in place in the bladder. Historically, indwelling catheters primarily have been used in chronic, medically compromised elderly patients. As the number of elderly patients continues to increase, particularly in such settings as home care, the use of indwelling catheters is increasing. Nurses caring for patients with urinary incontinence, neurogenic bladder, and/or urinary retention manage these catheters. However, most nurses will agree that managing this type of system poses multiple medical and nursing care problems. In fact, Foley catheters are associated with several complications and side effects that increase patient morbidity and mortality.*

Please direct your correspondence to:

Saxe Healthcare Communications
P.O. Box 1282
Burlington, VT 05402
info@saxecommunications.com

www.perspectivesinnursing.org

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* Overview from Diane Newman's article entitled *Managing indwelling urethral catheter* and was published in Ostomy, Wound Management in December 1998

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Despite significant progress in our understanding of the physiology of the lower urinary tract and range of effective treatment options, placement of an indwelling catheter remains an important and frequently used treatment option. For example, approximately 25% of patients cared for in acute care hospitals will have an indwelling catheter during some portion of their hospital admission [1] and 7% of nursing home residents are managed by long-term indwelling catheterization.[2] While the initial directive to place a catheter is typically initiated by a physician, it is the nurse who primarily manages the indwelling catheter. A panel of clinical experts in urologic and gerontological nursing convened to examine the management of the indwelling catheter in acute and long-term care settings.

Gray: *What are the differences between long-term and short-term catheterization? What are the implications for nursing practice?*

Czarapata: Short-term catheters are those that are placed for less than 30 days, although they typically remain in place for up to 2 weeks. Long-term catheterization is usually defined as more than 30 days.

Newman: The indications for short term catheters include management of acute urinary retention, postoperative bladder decompression, and monitoring urinary output in the acutely ill patient. Long-term use (>30 days) is indicated when:

- urethral obstruction or urinary retention is present but surgical intervention or the use of intermittent catheterization is not feasible
- comorbid medical conditions are present, e.g., end-stage disease, advanced metastatic cancer, coma
- significant pressure ulcers (Stage III and IV) cannot heal due to continual urine leakage
- a caregiver is not present to provide incontinence care, e.g., in home-care settings[4,5.]

Long-term catheter use is associated with significant complications, particularly infection and encrustation of the catheter by Proteus mirabilis,[6] which may lead to urethral trauma or the formation of bladder stones that block the catheter. These bacteria colonize the internal surface of the catheter, forming a biofilm, which binds organic and nonorganic material and may resist antibiotic therapy.

Despite recommendations for short-term use, the median time of indwelling-catheter use in home care is reported as 3 to 4 years.[7] Most indwelling catheters are

Long-term catheter use is associated with significant complications, particularly infection and encrustation of the catheter by Proteus mirabilis,[6] which may lead to urethral trauma or the formation of bladder stones that block the catheter.

- Newman-

inserted into the bladder via the urethra. Few clinical studies describe the use, indications, and complications of suprapubic catheterization.[8] The risk of catheter-associated urinary tract infection (CAUTI) depends on the method and duration of catheterization, quality of catheter care, and patient susceptibility.

Einhorn: The definition of what constitutes short- and long-term catheterization varies in the medical literature. Madigan et al[3] infer that long-term urinary catheterization lasts more than 90 continuous days, Toughill[9] concludes that it constitutes placement for more than 7 days, and Gray[10] defines it as lasting more than 2 weeks. Perhaps the first area of consideration for nursing practice is to agree on the same definition of short- and long-term use. As Newman notes, catheterization is frequently used to provide temporary urinary drainage during postoperative recovery, to monitor urinary output during periods of critical illness, and to manage urinary retention that fails other therapeutic options. It also may be used in the palliative care setting to provide comfort if the patient has difficulty moving to the toilet, and in selected cases for people with severe physical or mental impairments.[10,11]

While we have no material that prevents encrustation, emerging research suggests that certain materials may delay this process and may impact other important features, such as patient comfort

- Gray -

Nurses can be very proactive for patients with indwelling catheters, whether short- or long-term. The patient's physician usually determines the time frame for post-surgical urinary catheterization. However, it is important to note that documented studies have shown that physicians are often unaware that their patients still have catheters in place.[14] Nurses are patient advocates who must take an active role in monitoring the use and when appropriate, the removal of catheters. For patients who require long-term catheterization, nurses can have an impact by evaluating the risk factors, need for continuing therapy, alternatives, catheter selection, and the use of accessory equipment. For example, if the patient is experience leakage (catheter bypassing) around an indwelling catheter, the nurse must determine the cause and not just fix the immediate problem by inserting a larger diameter catheter or one with a larger retention balloon. The latter course of action may paradoxically aggravate the leakage by increasing pressure on the urethral outlet, stretching the urethra, and reducing the efficiency of the catheter to ensure ongoing bladder drainage.[15] Retention catheter balloons should be inflated to the appropriate size; otherwise, the balloon assumes a nonsymmetrical shape that partly blocks the drainage eyes, leading to bladder spasms, irritation, and incomplete bladder emptying.[15]

The judicious selection of catheter size and balloon size and material can reduce catheter-related complications, such as encrustation and blockage.[3] It is important for nurses to identify patients who are prone to blockage as this factor determines how often catheters are changed and influences the choice of catheter material. Patients who block usually have *P. mirabilis* or urease infections, which form a biofilm that ultimately leads to catheter encrustation. No material prevents encrustation[16,17]

Gray: *I agree Carol. However, while we have no material that prevents encrustation, emerging research suggests that certain materials may delay this process and may impact other important features, such as patient comfort. What is the optimal construction material for long-term catheters?*

Einhorn: Yes, the composition of the catheter is emerging as an important nursing consideration. The different materials of indwelling Foley catheters have various impacts, which need to be considered for the individual patient.[30]

Latex catheters are soft and inexpensive. However, there are multiple reports of latex allergy, which can affect the patient or nurse. Latex has also been implicated in causing toxicity to mucosal tissue, resulting in inflammation and urethral strictures in long-term catheterization.[31,32] The chemical properties of latex cause it to swell due to absorption of body fluids, decreasing the drainage lumen and increasing the outside diameter.[12] If the latex catheter is coated with Teflon (polytetrafluoroethylene), this problem is resolved. Nevertheless, latex catheters have been associated with a higher rate of encrustation, which leads to blockage of catheter eyes and impedes drainage.

Silicone catheters have a larger lumen than latex catheters. While silicone causes less tissue irritation and potential damage, the catheter balloon has a tendency to lose fluid content due to evaporation, thus increasing the risk that the catheter may dislodge prematurely. Parkin and associates[22] found that silicone catheters may develop a cuff when deflated. This may cause trauma or stricture, or result in more uncomfortable catheter removal.

Newman: Surprisingly few changes have occurred in the design of catheters over the last 40 years. Different materials, which prevent encrustation and infection, or alternative methods of draining urine directly from the bladder would be valuable.[8] Catheter types include[4,12,18-21]:

- silicone elastomer-coated, latex catheters, which have a chemically bonded coating of silicone elastomer or Teflon that prevents urethral contact with latex
- Teflon-coated catheters, which are felt to reduce the rate of water absorption
- all-silicone catheters, which are thin-walled, more-rigid, larger-diameter lumen catheters
- Hydrogel-coated latex catheters, which absorb water to produce a slippery outside surface
- Silver alloy-coated or antimicrobial-coated catheters

Czarapata: The optimal catheter is easy to insert, comfortable, cost effective, and painless to remove. It should reduce the risk for or prevent infection and encrustation or hypersensitivity. The search for the ideal catheter continues and available catheters perform better in certain areas than others. For example, some construction materials result in a stiffer catheter

that is easy to insert, but patient comfort is often compromised. Nevertheless, they may be easier to insert in men, because they resist curling. Well lubricated, stiffer catheters navigate the urethra more easily than do softer ones.

Latex catheters are softer, but they are associated with the risk of a hypersensitive response or allergic reaction, whereas silicone catheters do not produce this effect. While silicone catheters avoid hypersensitivity responses, they may develop a cuff, crease or ridge around the balloon when deflated that sometimes leads to painful removal.[29]

Hydrogel silver-coated catheters resist bacterial adhesion more than all-silicone catheters.[3] Gray has estimated that silver-coated catheters may reduce the incidence of symptomatic urinary tract infection (UTI) by 47% and urosepsis by 44%.[10] He has reported that switching to silver-alloy catheters may save $98,000 or more in healthcare costs.

In addition to considerations, I also advise colleagues to carefully consider catheter size. Nurses should use the smallest catheter as possible. Sizes from 14 to 16 French (FR) are recommended. Catheter sizes larger than 18 FR may create discomfort, increase the risk of blockage, and lead to UTI, urethral irritation, and erosion.[9] On the whole, I would rather use a silicone-coated, 14-FR, latex catheter, unless a suprapubic tube is indicated. In that case, I would prefer a larger catheter. Silver-impregnated catheters may be preferable for patients who are managed by short-term catheterization and who are susceptible to infection.

Gray: *Does construction material affect the risk for catheter associated urinary tract infection?*

Newman: There is debate and very little evidence-based research as to which catheter may decrease catheter-related UTI. It is felt that catheter material can influence the rate of biofilm development. The large diameter and thin wall of all-silicone catheters may prevent the formation of biofilm, thus decreasing blockage. They are more compatible with the urethral lining and do not allow build-up of protein and mucous. Parkin and coworkers[22] recommend hydrogel-coated latex catheters for long-term urethral and suprapubic use. An increase in latex allergies and reactions in patients with indwelling catheters has been reported.[23]

Silver-coated catheters are believed to cause less inflammation and have a bacteriostatic effect, when used on a short-term basis.[18,24] In this context, they may decrease CAUTI.[25,26] Some catheters are also been coated with an antibiotic in an attempt to prevent CAUTI. The outer wall and inner drainage lumen are usually impregnated with an antibacterial agent, such as nitrofurazone, which exudes from the catheter over a period of days after insertion.[27] It is unclear if these catheters, which are more expensive, have any effect on CAUTI. The protective coatings tend to narrow the catheter lumen, reducing urine flow if used long term, patients may develop antibiotic resistance.

Einhorn: Johnson and colleagues[33] did a systematic analysis of antimicrobial urinary catheters for the prevention of nosocomial bladder infections. Their literature review identified 12 studies (13,392 patients) from 1966-2005 that used randomized, quasi-randomized trials of nitrofurazone-coated or silver alloy-coated antimicrobial urinary catheters for less than 30 days. The test catheters (both types) suggested that there was some protection from bacteria in all 12 of the qualifying trials. The studies had several limitations, as many did not have data on clinical endpoints and did not compare treated or silver-coated catheters head-to-head. None of the studies addressed outcomes such as symptomatic UTI. They concluded that fair-quality evidence suggests that short-term catheterization with treated catheters (both silver-impregnated prior to 1995 and Nitrofurazone coated after 1995) can prevent bacteriuria in hospitalized patients. Cost savings and effects on morbidity and mortality are not yet evident.

Srinivasan's group[34] reported a prospective trial of 3,036 patients that compared a silicone-based, silver-coated Foley catheter impregnated with silver to a silicone-based, silver-coated Foley catheter to prevent nosocomial UTI. The rate of infection was 14.19/1,000 Foley days for the silver-impregnated catheter versus 16.15/1,000 Foley days for the non-impregnated catheter. Both groups developed an UTI in about 4 days. No significant differences were found in outcomes, but the two groups were not identical. The silver-impregnated group had more men, larger number of catheters inserted in a medical ward, median time of catheterization was shorter by one day (statistical significance), and fewer urine cultures. The results were fewer UTIs in the silver coated catheter, but the results were not statistically significant.

Rupp and associates[35] examined the efficacy, cost, and antimicrobial resistance of silver-alloy, hydrogel-coat-

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- Czarapata -

Dover Silver Catheter (Tyco Healthcare Kendall)

ed urinary catheters. Control data included in the cost analysis came from a historical cohort collected over 2 years. The study enrolled consecutive hospitalized patients in a 600-bed hospital over the next 2 years. The study compared uncoated catheters (type of catheter not stated) and silver-coated catheters from the same manufacturer. The outcome showed that the rate of CAUTI fell from 6.13/1,000 Foley days to 2.62/1,000 with the silver-alloy catheter. Cost savings varied, depending on the cost estimates for catheters and the incidence of catheter-related infections.

Karchmer's group[24] conducted a randomized, 12-month, crossover study to compare the rates of infection for silver-coated and uncoated catheters. The infection rate dropped 32% in patients with silver-coated catheters. They concluded that the cost of these catheters is justified, as they reduce added hospital costs from nosocomial UTIs.

Gray: A study has been reported in abstract format suggesting that use of a particular catheter securing device may reduce UTI risk, although design limitations preclude the reader from drawing any firm conclusions from the data. Two review articles on catheter securing devices and UTI risk are being written.

Gray: *What other interventions can be recommended to nurses to reduce the risk of catheter-related urinary tract infection (CAUTI)*

Czarapata: Patient education is a very important nursing measure, whether the patient is independent, in home care or in a long-term care facility. For people with long-term catheterization, basic concerns need to be addressed, including:

- catheter selection
- risk of catheter dislodgment
- risk of infection, blockage, and bypass
- impact on sexuality
- importance of hand washing and hygiene
- importance of meatal cleansing (men)
- importance of avoiding constipation
- instructions with regard to fluid intake
- instructions on observing color/volume of urine
- expectations of patient/caregiver
- support from the healthcare team
- whom to contact if problems arise
- how to empty, change, and dispose of bags
- how to obtain new supplies of drainage bags
- how often to change the catheter[36]

Choosing the correct catheter requires nursing awareness of catheter availability, the needs of individual patients, and knowledge of evidenced-based studies and best-practice literature. Nurses should periodically reassess patients with long-term catheters to determine whether they still need an indwelling catheter.[3] Hand washing and changing of gloves should be done between patients when providing perineal catheter care, handling catheter system and emptying catheter drainage bags.[37] Patients should practice good hygiene. There is no need to apply bactericidal solution or gel to the meatus because studies have shown that this practice does not reduce the risk for CAUTI.[50-52] Maintaining a closed system decreases infection, but this may not be possible when the patient is managed by long-term indwelling catheterization. Drainage bags need to be emptied at least every four hours or when the urine volume reaches 400 mLs.[37] Prevention of constipation, which irritates the bladder and may cause blockages, is important.

Newman: CAUTIs are the most common infection in hospitals, nursing homes, and home-care settings. In hospitals, it is estimated that 600,000 patients are affected per year. In the acute-care setting, 21% of catheter insertions are unjustified and 44.7% of continued catheterizations are unjustified.[38] From 5 to 10% of residents at LTC facilities have indwelling catheters.[39]

CAUTIs develop between the catheter and urethra (extraluminal or periurethral), secondary to irritation from traumatic catheterization, tugging of improperly anchored or secured catheters, and cross-contamination when emptying drainage bags.[40] Bacteria can travel within the catheter lumen (endoluminal) from the drainage tubing, due to improper sampling technique, and touching container to tip of drain spigot.[4,8,41,42]

Gray[10] provides an excellent review of evidence-based nursing interventions to prevent CAUTI, but many catheter-care interventions in clinical practice have not been studied in randomized, controlled trials.[43,44] The following recommendations may not be evidence-based but are considered best practices for catheter care:

- Reconsider the risks and benefits of continuing the long-term use of an indwelling urinary catheter and remove it as soon as possible.[43,45]
- Hand washing and the use of disposable gloves when handling the catheter system to prevent transmission of pathogens by contact and the fecal-oral route. Scientific evidence and ease of use support the use of routine hand rubbing with waterless, alcohol-based, rub-in cleansers.[45]
- Catheters that are so encrusted that urinary outflow is blocked should be changed immediately.[46,47]
- Disconnection of the catheter and drainage bag is the leading cause of bacterial contamination. Connecting the catheter to an aseptic, closed system (catheter, bag and tubing form a continuous unit) and maintaining the closed system assists in reducing infection.[12,48]
- Use catheter sizes of 14FR or 16 FR, as larger diameter catheters have higher UTI rates, resulting in greater leakage, and are more likely to obstruct normal urethral secretions.
- Use a small balloon size (10 cc), as a larger balloon (30 cc) will increase the volume of urine that pools below the level of the catheter lumen, thus increasing the risk of infection.[42]
- Drainage bags should be maintained in a dependent position and emptied at least every 4 to 5

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- Czarapata -

hours or when the bag is half to two-thirds filled. Large amounts of urine left for long periods in the drainage bag can result in stasis and over-production of biocontaminants. In acute-care settings, drainage bags may be emptied more frequently to monitor fluid status and renal function.[49] The collection bag should not lie on the floor, where it can be contaminated by bacteria. Separate graduated containers for each patient and each patient drain. For multiple drainage tubes or devices in one patient, keep drainage tubes or devices on opposite sides of the bed. Keep patients with drainage devices in semi-private rooms on opposite sides of the room, maintain a separate graduated container for each drain, and label (patient name, type of excrement). When emptying the bag, the spigot on the drainage bag should not be allowed to touch the sides of the graduated container.

- Recurrent symptomatic UTI in a catheterized patient should lead the nurse to ensure that perineal hygiene is performed consistently to remove fecal soiling in accordance with accepted practices and catheter care.
- Urine acidification through ingestion of cranberry juice, tablets or ascorbic acid is controversial but often recommended in clinical practice.[53] Urine acidification has been proposed to prevent or slow catheter encrustation and diminish bacteriuria.
- Maintain a uniform and adequate daily fluid intake (30 ml/kg body weight/day) to continuously flush the system can decrease catheter blockage and subsequent infection.[54]
- Receiving a short course of antibiotics (daily for 3 days) at the time of catheter removal may decrease the likelihood of CAUTI.

Gray: *Should catheters be routinely secured and, if so, how?*

Newman: Securement of catheters with some type of anchor strap or device to stabilize the catheter and prevent catheter tension on the distal urethra at the meatus is recommended.[60] Several best-practice models in the nursing literature recommend that the catheter be secured or anchored to the upper thigh in women and upper thigh or abdomen in men.[4,8,9,15] The male lower urinary tract benefits from having the urethra in a straight position. If the catheter is not secured, tension occurs at the meatus and bladder neck, leading to inadvertent dislodgement or erosion of the bladder neck or urethra.

The recommended type of securement device appears to be a strap that does not use adhesive.[4] Pomfert[12] suggests that adhesive should not contact the catheter, as the tape could damage the core of latex-coated catheters.

Czarapata: I agree that catheters should be routinely secured. While the evidence states that there is no significant reduction in infections due to securing, there is an increase in comfort and less bladder neck irritation and inadvertent catheter removal. Catheter straps are now more comfortable, as they are wider and made of more comfortable materials. Catheters should be secured to the thigh in women. There is some disagreement as to whether the strap should be secured to the abdomen or thigh in men.[57]

Stabilizing the indwelling urinary catheter can prevent or reduce the risk for multiple adverse events, such as accidental dislodgement, as well as tissue trauma and inflammation induced by excessive traction of the tubing or drainage bag. Although stabilization cannot prevent all complications associated with urinary catheter, the value of this practice is exemplified by its inclusion as a category 1 (strongly recommended for adoption) recommendation in the 1981 CDC Guidelines for Prevention of Catheter-Associated Urinary Tract Infections.[56]

Einhorn: I think it is important to consider the rationale for and benefits of securing a catheter. In a literature review from 1966-2003, Gray[10] did not find any study to support or deny the use of securing devices on the risks of UTI. Nevertheless, Toughill[9] asserts that securing avoids tension on the bladder neck and accidental dislodgement. Little evidence exists on the dislodgement of urinary catheters, but anecdotal experiences supports this ongoing clinical opinion. Hanchett[58] discussed securing a catheter by taping the drainage tube to the patient's thigh, a method that is familiar to most nurses. Tape can be applied several different ways but, for the most part, it does not stay on well and may cause further problems. Promfret [12] advocates that adhesive tape not touch the catheter surface as it may have negative effect on the core of latex coated brand catheters. The sticky residue of the tape can allow the accumulation of microorganisms, which may cause contamination and allow bacteria to migrate up the outside of the catheter into the bladder, leading to UTI. Also, many patients may be allergic to adhesive tape which can cause blisters and breaks in the skin which may also have deleterious effects.

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- Newman -

Foley Catheter Holder (Dale Medical Products Inc.)

In contrast to Hatchett's assertions, Tracy[59] reported a quasi-experimental study with postoperative urological patients using an adhesive tape and safety pin versus a commercial catheter-securing device. Twenty patients in each group wore the devices until the indwelling catheter was removed. While the commercial device did not remain in place 100% of the time, the adhesive device did. No difference was found with respect to comfort associated with use of the commercial device as compared to the adhesive tape/ clothes pin system.

Gray: One issue that has been raised and should be addressed is that securing devices can contribute to deep vein thrombosis (DVT). While the DVT produced by a catheter-securing device involving a leg strap holder is a theoretical risk, I am unaware of any case where this has occurred, and have never identified a published case report associating a leg strap catheter securing device with a DVT.

Newman: I concur with Mikel. Certain "tourniquet-like" leg straps may pose a problem with venous compression and skin occlusion if they are not properly used. However, there have been no reports in the medical or nursing literature of these occurring.

Gray: *Is it preferable to secure the Foley catheter at the y-port or directly on the catheter itself?*

Newman: Secure the catheter at the bifurcation of the tubing.[40] This practice allows for movement with activity. Pulling on the catheter contributes greatly to urethral irritation and inflammation, promoting the entry of bacteria through the urethral wall.

Einhorn: I have not found any evidence that persuades that one method is necessarily better than the other. Catheters should be secured, so that there is no kinking, bending, or ability to occlude the lumen.

Czarapata: One device has been developed that supports the indwelling catheter by placing it above the Y port. [58] It has been suggested that this type of device may reduce postoperative pain associated with malposition during surgery.[58]

Gray: *What are the characteristics of an optimal drainage system?*

Czarapata: The optimal drainage system is a closed system with a one-way valve between the bag and tubing. It should have a bag or cover to hold the system off the floor and to protect the emptying valve from contamination. It should hang from a wheelchair or the patient's waist below the level of the bladder.

Einhorn: There is considerable evidence for short-term indwelling urinary catheters, but not much is written about long-term catheterization. The closed system reduces UTI for patients with a short-term indwelling urinary catheter[60], but it is not feasible for patients managed by long-term catheterization. Some suggest connecting a sterile leg bag to the catheter during the day for long-term patients.[12] At night, the catheter is connected to a large or bedside drainage bag, which is changed every 5 to 7 days. Patients who are bed bound or choose to use large-capacity drainage bags should change the bags on a 5- to 7-day basis. The use of an antireflux valve that prevents urine moving from drainage system back into the bladder has also been examined. Wille and colleagues[61] evaluated the onset of bacteria and incidence of infection in 180 patients randomly managed with a closed drainage system with an antireflux valve (as well as several other features designed to reduce bacterial contamination), or a system without an antireflux system. Catheters remained in place for at least 48 hours and urine samples were taken every 24 hours. They found no difference in the in the incidence of bacteriuria when the systems were compared.

Leone and al[62] compared the effectiveness of two urinary drainage systems in an intensive care unit, using a randomized prospective trial. Some 311 patients required an indwelling urinary catheter for longer than 48 hours. There was no statistical difference in the rate of bacteriuria between two groups of patients: one used a complex, closed drainage system; the other, a two-chamber drainage system.

For patients with long-term catheterization, Dille and Kirchhoff[63] found that leg bags and drainage bags could be used for 4 weeks with no increase in UTI in community-dwelling adults who cleansed their bags daily with 1:10 bleach solution. Alternatively, a vinegar solution can be used.

Newman: The nurse should also consider issues of appearance and comfort when considering the opti-

The sticky residue from adhesive tape can allow the accumulation of microorganisms, which may cause contamination and allow bacteria to migrate up the outside of the catheter into the bladder, leading to UTI.

- Einhorn-

Drainage Bag (courtesy of Tyco Healthcare Kendall)

mal drainage system. A drainage bag can be quite difficult to accommodate discretely on the body and can present problems with appearance and noise from urine movement. More recent innovations include a bag strapped onto the abdomen ("belly bag"). A leg bag is a smaller collection bag for use in the ambulating patient, as it allows more freedom of movement. This smaller bag is more discreet and can be attached to the calf and concealed under clothing. Leg bags come in different sizes (horizontal or vertical) and are made from a variety of materials. The calf is usually the easiest place on which to strap a leg bag, but women who wear skirts will need to use a thigh bag or waist belt. The smaller bag can be strapped to the leg (thigh or calf) or held in place with a net sleeve or stocking and is easy to hide under clothing. Straps that are too tight can restrict circulation, resulting in lesions.[5]

Attention also must be paid to the selection of the drainage port, as some patients may be able to manipulate a flip-flow valve but not a sliding type. Two modifications, the addition of a urine sampling port in the drainage tube and the pre-connected catheter/collecting tube system seem to have advanced the design, since they discourage or prevent disconnection of the system, which can predispose the patient to infection.[8]

Gray: *Thank you for sharing these insights on the management of indwelling catheters. While we have certainly come a long way from the original descriptions of catheterization by the ancient Egyptians (who used hollowed out reeds) to negotiate the urethra, the placement of a short- or long-term indwelling catheter is still associated with an increased risk for multiple adverse outcomes. Nevertheless, advances in catheter construction have led to materials that slow the process of bacterial adherence to the catheter, bacteruria and encrustation. Similarly, the development of commercially available catheter straps are hypothesized to reduce the risk of accidental dislodgement and discomfort associated with traction against the bladder neck, while avoiding potential adverse side effects associated with application and removal of adhesive tape. Nurses are principally responsible for decisions regarding the type of catheter to be inserted and application of a securement device. Therefore, it is essential that we remain knowledgeable of the latest evidence concerning these issues and routinely apply this knowledge as we care for the tens of thousands of patients who continue to be managed by an indwelling catheter.*

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I have never identified a published case report associating a leg strap catheter securing device with a DVT.

-Gray -

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Provider approved by the California Board of Registered Nursing. Provider #CEP1447

After reading this article, the learner should be able to:

1. List the indications for long-term use of urinary catheters.
2. Describe the optimal characteristics of long term urinary catheter.
3. List at least 5 nursing interventions to prevent catheter-related UTI.
4. Explain why urinary catheters should be secured.

Instructions

1. Read both articles.
2. Complete the post-test on page 8. (You may make copies of the answer form).
3. Complete the participant evaluation.
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5. To earn 1.0 contact hours of continuing education, you must achieve a score of 70% or more. If you do not pass the test you may take it one more time. ***You may also take this test online at www.saxetesting.com***
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1. **Indications for short-term catheter use include:**
   a. management of acute urinary retention
   b. post operative bladder compression
   c. monitoring urinary output in acutely ill patients
   d. all the above

2. **Potential complications of long-term catheter use are:**
   a. infection
   b. there are no complications associated with long-term use
   c. encrustation of catheter with *Proteus mirobilis*
   d. A&C

3. **The nurses role in caring for a patient with a short or long-term catheter include:**
   a. evaluate risk factors of using urinary catheter
   b. evaluate continued need for catheter
   c. evaluate and determine appropriate catheter selection and accessory equipment
   d. all the above

4. **Improperly inflated retention catheter balloons have been associated with the following complications:**
   a. the balloon assumes a non-symmetrical shape
   b. blockage of drainage eye
   c. bladder spasms, irritation and incomplete emptying of bladder
   d. all the above

5. **The use of Hydrogel silver-coated catheters have linked to a reduction in symptomatic UTIs by_____.**
   a. 27%
   b. 47%
   c. 35%
   d. 50%

6. **The smallest catheter size recommended for use is?**
   a. 18-20 Fr
   b. 14-16 Fr
   c. 12-14 Fr.
   d. 16-18 Fr

7. **Nursing interventions to prevent catheter associated UTIs include**
   a. good hand washing and patient hygiene
   b. infrequent assessment of on-going need for catheter
   c. allowing the drainage spigot to come in contact with the graduated container
   d. maintaining the catheter bag above the level of the bladder

8. **Catheter drainage bags should be emptied at least:**
   a. once every 24 hr
   b. once every 8 hrs
   c. once every 4-5 hrs
   d. only when the bag is full

9. **When assessing patients with recurrent UTIs the nurse should:**
   a. change the catheter
   b. do nothing
   c. ensure that perineal hygiene is done consistently
   d. switch to a different type of collection bag

10. **The recommendations for securing catheters are to:**
    a. secure to the upper thigh in women
    b. secure to the upper thigh or abdomen in men
    c. iit is not necessary to secure the catheter
    d. both A&B

11. **Potential complications associated with not securing the catheter are:**
    a. an unsecured catheter does not have the potential to cause any problems
    b. inadvertent dislodgement and erosion of the bladder neck or urethra
    c. none of the above
    d. less pain and discomfort

12. **The optimal drainage system should be:**
    a. an open system
    b. a closed system with a one-way valve between the bag and the tubing
    c. there are no special requirements for drainage systems
    d. none of the above

13. **Nurses caring for patients with long-term catheters should consider the following when selecting a drainage bag.**
    a. mobility of the patient
    b. appearance and comfort of device
    c. type of clothing the patient wears
    d. all the above

Participant's Evaluation

What is the highest degree you have earned (circle one) ? 1. Diploma 2. Associate 3. Bachelor 4. Master 5. Doctorate

Indicate to what degree you met the objectives for this program: Using 1 = Strongly disagree to 6 = strongly agree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

	Strongly Disagree					Strongly Agree
1. List the indications for long-term use of urinary catheters.	1	2	3	4	5	6
2. Describe the optimal characteristics of long term urinary catheter.	1	2	3	4	5	6
3. List at least 5 nursing interventions to prevent catheter-related UTI.	1	2	3	4	5	6
4. Explain why urinary catheters should be secured.	1	2	3	4	5	6

Name & Credentials _____
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Mark your answers with an X in the box next to the correct answer

	A	B	C	D		A	B	C	D
1	☐	☐	☐	☐	8	☐	☐	☐	☐
2	☐	☐	☐	☐	9	☐	☐	☐	☐
3	☐	☐	☐	☐	10	☐	☐	☐	☐
4	☐	☐	☐	☐	11	☐	☐	☐	☐
5	☐	☐	☐	☐	12	☐	☐	☐	☐
6	☐	☐	☐	☐	13	☐	☐	☐	☐
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Mikel L. Gray, RN, PhD, CUNP, CCCN, FAAN

Dr. Gray is currently Professor of Urology and Nurse Practitioner at the University of Virginia, as well as Director of the Center for Clinical Investigation, WOCN. He serves on the advisory panel for Shaping Future Directions for Urinary Continence Research in the Elderly, Hartford Foundation for Aging and Agency for Health Care Quality and Research. Dr. Gray has authored or coauthored hundreds of articles and books in the areas of urology, and is currently Editor-in-Chief of the Journal of Wound, Ostomy and Continence Nursing. Dr. Gray is also Past-president of the Society of Urologic Nurses and Associates.

Carol Jean Einhorn, RN, MS, CURN, GNP, APRN, BC

Ms. Einhorn is a gerontological nurse practitioner with over 30 years experience in urology and geriatrics. She has authored or co-authored many articles or book chapters on urological topics and has participated in several research projects since 1988. Currently, Ms. Einhorn is on staff at the Jessie Brown VA Medical Center in Chicago, Illinois and is an adjunct faculty member at the University of Illinois, Chicago, and Ruth University.

Diane K. Newman, RNC MSN, CRNP FAAN

Ms. Newman is a certified nurse practitioner, Co-Director of the Penn Center for Continence and Pelvic Health, Division of Urology, University of Pennsylvania Medical Center, Philadelphia, and an Instructor in the School of Medicine at the University of Pennsylvania. She was recently appointed to the planning committee of the National Institutes of Health (NIH), State-of-the-Science Conference on Fecal and Urinary Incontinence. Ms. Newman has written and presented more than 100 scientific papers, chapters, and articles on the assessment, treatment, and management of incontinence with an emphasis on the nurse's role, and is author or co-author of four books on the subject.

Betty Jean Reid Czarapata, MSN, CRNP, CUNP

B.J. Reid Czarapata is certified both as an Adult Nurse Practitioner and as a Urology Nurse Practitioner. She graduated from the Nurse Practitioner Program at George Washington University School of Medicine and Allied Health with a certificate in the Adult/Geriatric Nurse Practitioner Program. She is Past-president of the Society of Urologic Nurses and Associates and co-founder and past president of the Metropolitan Washington Chapter of the American Urologic Association Allied. She is a member of the Advisory Committee of the Urology Panel of the United States Pharmacopeial Convention, Inc. She has been on the Medical Advisory Board of the National Vulvodynia Association.

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