

# URINARY CATHETER CARE

## INTRODUCTION

Urinary catheter care is a very important skill, and it is a skill that many certified nursing assistants (CNAs) must know. Competence at providing urinary catheter care requires the CNA to understand and apply: (1) basic information about the anatomy and physiology of the urinary tract and urinary system; (2) concepts of prevention of infection and sterility, and; (3) specific techniques that are used to care for the patient who has a urinary catheter.

The word catheter is a medical term that refers to a tube that can be inserted into a body cavity, a body duct, or a blood vessel. There are several types of catheters that can be used to drain urine from the bladder: in-dwelling catheters, sheath (a.k.a. condom or Texas) catheters, and catheters that are inserted to obtain a urine specimen and then removed (these are commonly called straight catheters). This module will discuss in-dwelling catheters. These catheters are inserted into the bladder and left in place; the duration of how long they remain in the bladder depends on several factors. Some in-dwelling urinary catheters (suprapubic catheters) are inserted into the bladder through a small incision that is made in the abdominal wall, but most are inserted into the bladder through the urethra; this module will focus on this type of in-dwelling urinary catheter. These catheters are commonly referred to as Foley catheters, or a Foley: Foley was the physician who first designed the type of urinary catheter that is in common use today.

**Learning Break:** Some patients who do not have voluntary control of urinary function and need a urinary catheter may be managed using intermittent catheterization. This module will not discuss intermittent catheterization.

## OBJECTIVES

After completing this module, the learner will be able to:

1. Identify the components of the urinary system and the urinary tract.
2. Identify the primary function of the urinary system.
3. Identify the primary function of the components of the urinary system/urinary tract.
4. Identify how the urinary system maintains a healthy internal environment.
5. Identify two tests used to evaluate kidney and urinary tract functioning.
6. Identify the basic components of the in-dwelling urinary catheter system.
7. Identify the two basic reasons for insertion of an in-dwelling urinary catheter.
8. Identify the risks of urinary incontinence.
9. Identify complications associated with in-dwelling catheters.
10. Identify CNA responsibilities of in-dwelling urinary catheter care.

## ANATOMY AND PHYSIOLOGY OF THE URINARY TRACT AND THE URINARY SYSTEM

The urinary system forms urine, and the urinary tract stores and transports urine. The urinary tract and the urinary system are comprised of these organs and structures:

- **Kidneys:** There are two **kidneys**, they are located on the right and left sides of the abdominal cavity, and they are approximately at the level of the navel. The kidneys perform several important functions, but their primary role is the production of urine.
- **Ureters:** The **ureters** are short, narrow tubes that originate at the bottom of the kidneys. Each kidney is supplied with one ureter and the function of the ureters is to carry urine from each kidney to the bladder.
- **Bladder:** The **bladder** is a thin-walled, hollow organ, similar in shape and size to a small balloon. It is located in the abdominal cavity above the pubic area and below the navel. The function of the bladder is to collect and store the urine that is produced by the kidneys. The bladder can stretch quite a bit, and it can store approximately 700-800 mL of urine (This is approximately 23-26 ounces). The bladder walls have three layers of smooth muscle. (The importance of these muscles will be discussed later)
- **Urethra:** The **urethra** is a small diameter tube that begins at the bottom of the bladder. The purpose of the urethra is to carry the urine from the bladder to external environment. In women the end of the urethra - the **urethral meatus** - is located above the opening of the vagina. In men the urethra travels through the penis and the urethral meatus is located at the tip of the penis.

The primary function of the urinary system is to make and transport urine and the formation and excretion of urine is one of the ways that the body maintains a healthy internal environment. For example, (1) excess acids and other waste products that are produced by metabolism are excreted in the urine, and (2) depending on whether the body needs more or less fluid to function properly, the kidneys will produce more or less urine and we will urinate more or less often during the day. Proper functioning of the urinary system is critical. If the kidneys cannot filter out waste products and conserve water or get rid of excess water, and if the urinary tract cannot transport the urine and eliminate it, it is impossible for the brain, the circulation, the heart, and other vital organs to function properly.

**Learning Break:** **Blood urea nitrogen (BUN)** and **creatinine** are two waste products that are made when our bodies process proteins and by normal metabolism in the muscles. BUN and creatinine are filtered out of the blood by the kidneys and eliminated by the urine, they are produced in very large amounts, and they can be toxic if their levels in the blood get too high. Blood levels of BUN and creatinine are common laboratory

tests that are used to evaluate how well the kidneys and the urinary system are functioning.

Urine formation is done by filtering blood that passes through the kidneys. The kidneys have a large blood supply and while we are at rest our kidneys receive approximately 25% of all the blood that is pumped by the heart. As the blood passes through the circulation of the kidneys, water and metabolic waste products are filtered out from the blood and pass into collecting tubules in the kidneys; these waste products and the water are, essentially, the urine. The urine (1) moves through the collecting tubules in the kidneys; (2) from the kidneys the urine passes through the ureters and into the bladder; (3) and from the bladder the urine passes through the urethra and is eliminated.

Urination is the process of emptying the bladder and eliminating the urine. The bladder can store 700-800 mL of urine, but it rarely will hold that much. Most people feel the urge to urinate when the bladder contains 200-400 mL of urine and when the level of urine in the bladder reaches that amount, the bladder walls are stretched and this stretch sends a nerve impulse to the brain. The brain in turn sends out a message that stimulates the smooth muscles of the bladder wall *and* a message to muscles that surround the urethra near the urethral meatus. The bladder walls contract, the muscles around the urethra relax, and urine is passed. This process is referred to as the micturition reflex.

**Quick Review:** The urinary system and the urinary tract are comprised of the kidneys, the ureters, the bladder and the urethra. The primary function of the urinary system is to produce urine and the production and elimination of urine is one of the ways the body eliminates harmful wastes and conserves or eliminates water. Urine formation occurs in the kidneys, and urination is the process of elimination of urine.

## **THE IN-DWELLING URINARY CATHETER SYSTEM**

The in-dwelling urinary catheter system is comprised of the catheter and the collecting bag. In-dwelling urinary catheters are long, narrow tubes made of latex or silicone. One end of the tube has several small openings and below these openings is a small, inflatable balloon. The catheter also has two passages, one for the draining the urine and the other for inflating the balloon. This end of the catheter is inserted into the urethra and advanced until it passes into the bladder. When the catheter is in the bladder, the balloon is inflated and the catheter is gently pulled back until the balloon rests on the bladder wall: this keeps the catheter in the bladder. The other end of the catheter has a large opening that is connected to a collecting tube that is attached to the drainage bag. The drainage bag has a valve that is used to periodically empty the bag.

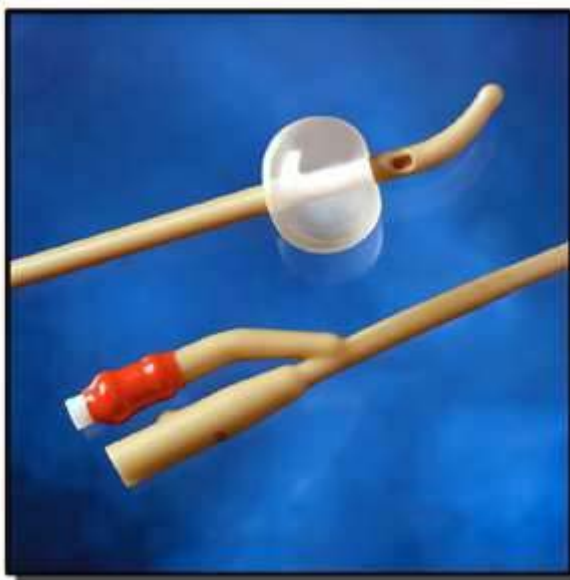
### **WHY DOES A PATIENT NEED AN IN-DWELLING URINARY CATHETER?**

There are many reasons why an in-dwelling urinary catheter would be placed. However, the two basic reasons are (1) obstruction, and (2) hygiene. An in-dwelling urinary catheter may also be placed if precise monitoring of a patient's fluid intake and output is necessary, e.g., in patients who are in intensive care.

- **Obstruction:** The patient may have a long-standing obstruction in the urinary tract that prevents the urine from draining. Obstructions can happen at any point along the urinary tract. A patient who has a chronic obstruction may be able to pass some urine, but he/she may incompletely empty the bladder, have difficulty starting or stopping the stream, or need to urinate many times during the day. Common causes of urinary obstruction include (1) swelling of the prostate gland (in men), (2) medication side effects, (3) an infection causing damage to the urinary tract, (4) a kidney stone, (5) anesthesia used during general surgery, (6) a tumor somewhere in the urinary tract and (6) damage to the nervous system, such as a stroke. Obstructions may be acute or chronic.
- **Potential for skin breakdown:** Patients who have lost bladder control cannot voluntarily determine when they will urinate. This condition - the inability to control urinary function - is called incontinence. Having urine in constant contact with the skin is unpleasant, but the consequences of urinary incontinence are far more serious than discomfort. If a patient is incontinent of urine and his/her skin has prolonged contact with urine, skin breakdown, rashes, pressure ulcers, and other dermatologic problems can occur, and some of these can seriously impact a patient's health. Patients who have chronic urinary incontinence that is caused by a medical condition that cannot be corrected, e.g., paralysis from a stroke or an accident or an obstruction that cannot be medically or surgically corrected may need a permanent in-dwelling urinary catheter to prevent skin breakdown.

**Learning Break:** The decision to place an in-dwelling catheter should be considered very seriously. An in-dwelling urinary catheter is usually simple to insert, but the procedure can cause damage to the urinary tract, infection, and pain. In addition, an in-dwelling urinary catheter can prevent serious skin problems and their complications, but it can also *cause* serious medical problems.

## THE BASICS OF URINARY CATHETER CARE



If the patient you are caring for has an in-dwelling urinary catheter, you must know: (1) why the patient has an in-dwelling catheter; (2) concepts of sterile technique and prevention of infection; (3) the complications associated with an in-dwelling urinary catheter, and; (4) specific techniques that are used to care for the patient who has a urinary catheter. These techniques may differ depending on where you work, but they all have the same basis: to prevent complications and infections.

### Prevention of Infection and the Concept of Sterility

Sterile technique refers to specific methods that are used to prevent infection when caring for a patient: the term sterile means completely free of microorganisms such as bacteria and viruses. Sterile technique is used in many types of patient care scenarios, but the most common is when the clinical situation or the patient's condition creates a potential entry point into the body for microorganisms. For example, when a patient is undergoing a surgical procedure, the surgeon and the operating room staff will use sterile technique: everything that does or could come in contact with the patient during the surgery should not only be clean, but must be sterile because the integrity of the skin is disrupted and the skin is one of the most important barriers against infection. In a patient who has an in-dwelling urinary catheter, the urethra is the entry point for bacteria and viruses. The in-dwelling catheter enlarges the urethral opening and urination - which normally flushes out microorganisms that are in the urethra - has been disrupted. When you are caring for a patient who has an in-dwelling urinary catheter, sterile technique is seldom needed, but you must remember that the in-dwelling catheter is a break in the normal body defenses and certain parts of the system must be considered sterile. (Note: This will be discussed later)

Most aspects of care for these patients do *not* require sterile technique. However, you must always practice good infection control practices: this is no different from providing care for any patient. The presence of the catheter makes these patients vulnerable to infection and many of them, because of their advanced age or their medical condition, have a compromised immune system. It is part of your job to protect them. This module will not provide a detailed discussion of infection control and standard precautions, but you should keep in mind the following points when you are providing in-dwelling urinary catheter care.

- All of us have microorganisms on our skin, we come into contact with microorganisms all the time, and the microorganisms that cause infection can move from one person to another.
- Contact transmission: Contact transmission is the most important way that microorganisms are spread from person to person in the health care setting.
- Hand washing has been recognized by the Centers for Disease Control and Prevention as the most important way to prevent the spread of infection.
- Hand washing should be done: (1) before you start patient care; (2) when your hands are visibly soiled; (3) after contact with a patient; (4) after contact with any body secretions; (5) before and after putting on gloves, and; (6) before and after using the bathroom.
- Wear gloves when providing urinary catheter care.

Hand washing and barrier protection (gloves) prevent contact transmission of microorganisms from you - or from another patient you have been caring for - to the patient who has an in-dwelling urinary catheter.

## Complications of the In-Dwelling Urinary Catheter

The most common complications associated with in-dwelling urinary catheters are (1) infection, (2) blockage, and (3) trauma. These will be discussed separately but one can often be the cause of another.

An in-dwelling urinary catheter disrupts one of the patient's normal defenses against infection, and bacterial growth in the urine is very, very common in these patients: after 30 days almost every patient who has an in-dwelling urinary catheter will have a significant amount of bacteria in the urine. Signs of a urinary tract infection include fever, bloody urine, and cloudy, foul-smelling urine. The patient may also complain of pain or irritation in/around the urethra.

Blockage of urinary catheters is relatively common, as well. These can happen if the patient becomes dehydrated and the urine becomes less dilute than it usually would be. Sediment that is normally present in the urine becomes concentrated because the urine is less dilute, and the sediment can then block the opening of the catheter. Signs of a blockage include a decrease in urine output and flow, pain, and leakage of urine around the urethral meatus. An infection can also cause a blockage.

Trauma happens when tension or traction is applied to the catheter. These mechanical forces pull the catheter back and forth in the urethra and can damage the tract. Signs of trauma include bleeding from the urethral meatus, pain or irritation, and leakage of urine.

## Specific Techniques and Responsibilities of Care for the Patient with an In-Dwelling Urinary Catheter

The following techniques and responsibilities are the *basics* of care for a patient with an in-dwelling urinary catheter.

- Cleaning the catheter insertion site: This should be done at least once a day: check the guidelines of your healthcare facility for specific instructions on how often to do this and for any specific way the procedure should be done. The basics of the procedure are: (1) wash your hands before starting; (2) wear gloves, and; (3) clean the area using soap and water. Make sure - especially for female patients - that you clean from the front towards the back to avoid contaminating the catheter insertion site with bacteria from the rectal area. Soap and water alone is sufficient: antibacterial soaps or solutions do not provide any advantage nor do anti-bacterial ointments applied to the area.
- Maintain the sterility of the system: The outside of the in-dwelling catheter system should be clean, but it is not considered sterile. The inside of the catheter, the inside of the drainage bag, and the connection between the catheter and the drainage bag are considered areas that must be kept sterile. The best way to maintain the sterility of the system *is to keep the system closed*: do not disconnect the catheter from the drainage bag tube.

**Learning Break:** If the catheter is disconnected from the collecting tubing, do not touch the tip of the catheter or the collecting tubing. Put on gloves, reconnect the catheter and the tubing and immediately notify your supervisor.

- Maintain proper position of the catheter, the drainage bag, and the collecting tube: The drainage bag should be below the level of the bladder. This will promote drainage and prevent urine from sitting in the collection tubing or moving back into the bladder. The bag should never touch the floor. The collecting tubing should be positioned so that kinks or loops will not develop; these can allow urine to pool and this will increase the risk of an infection. The catheter should be secured to the patient's leg or abdomen and it should be secured so that there is no traction or tension on the catheter: remember, tension or traction of an in-dwelling urinary catheter can be painful, and it can cause trauma and/or an infection. Securing the catheter will also prevent it from being accidentally pulled out. The catheter can be secured using commercially available devices or improvised methods, and it should be secured to either the upper thigh or the abdomen. Some authorities recommend that in-dwelling urinary catheters should be secured to the abdomen if the patient is male; check the policy at your workplace. In either case, the catheter attachment and the integrity of the skin where it is attached must be checked at least once every 8 hours.
- Urine collection: The urinary drainage bag should be emptied once every 8 hour shift *or* when the amount of urine in the bag reaches a certain level that will be specified by your workplace guidelines. Wash your hands, put on gloves, do not touch the drainage bag opening, and drain the urine into a clean container that is used for that patient alone. Take notice of the color of the urine, look for blood and/or excessive amounts of sediment, note the amount of urine that was collected, and document this information.
- Good hydration: Dehydration increases a patient's risk for developing a urinary tract infection and/or a catheter blockage. Keep close track of the patient's fluid intake and if it below what the physician has prescribed, notify your supervisor.

