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ICON

Carcinoma ofgenito-urinary tract

1. Introduction

Urinary tract cancers include those of the urinary bladder, kidney and renal pelvis, ureter, and other urinary structures, such as the prostate. The bladder provides short-term storage for urine, which is then released outside the body through the urethra via muscular contractions. Bladder cancer is typically a nonaggressive cancer that occurs in the transitional cell layer of the bladder. It is recurrent in nature. Less frequently, bladder cancer is found invading deeper layers of the bladder tissue. In these cases the cancer tends to be more aggressive.

2. Causes

- Tobacco use continues to be a leading cause of all urinary tract cancers.
- The predominant cause of bladder cancer today is cigarette smoking. Cancers arising from the prostate, colon, and rectum in males and from the lower gynecologic tract in females may metastasize to the bladder

3. Risk factors

- ✦ Exposure to industrial chemicals (paints, textiles),
- ✦ History of cyclophosphamide use
- ✦ Smoking increase the risks for bladder cancer.
- ✦ Age (over 40)
- ✦ Chronic bladder infections or bladder stones
- ✦ Family or personal history of bladder cancer

- ✦ Parasitic infections
- ✦ Gene mutation diseases, obesity
- ✦ High blood pressure, high-fat diet, family history, or long-term dialysis.
- ✦ A risk factor for transitional cell carcinoma is long-term prescription or over-the-counter analgesia (pain medication) use.

4. Incidence

- Men are three to four times more likely than women to have bladder cancer
- Caucasians are more prone to develop bladder cancer than African-Americans, Hispanics, or Asians.

5. Types of genitor urinary tract Cancer

5.1 Bladder carcinoma

- **Transitional cell (urothelial) carcinoma** represents 90% of all cases of bladder cancer. It begins in the cells that line the bladder.
- **Squamous cell carcinoma** represents 6-8% of all bladder cancer cases. Squamous cells are those found on the surface of the skin as well as in the lining of the bladder.
- **Adenocarcinoma** is cancer that begins in a glandular organ (e.g., lung or breast) and then metastasizes to the bladder. It represents only 2% of all cases of bladder cancer.

5.2 Renal carcinoma

Renal cell carcinoma begins in the cells that form the lining of the small tubules of the nephron and accounts for 90% of all kidney cancers. The most common type of renal tumor is renal cell or renal adenocarcinoma, accounting for more than 85% of all kidney tumors (Hock et al., 2002). These tumors may metastasize early to the lungs, bone, liver, brain, and contralateral kidney.

One third of patients have metastatic disease at the time of diagnosis. The incidence of all stages of kidney cancer has increased

Transitional cell carcinoma (urothelial carcinoma) represents only 5% to 10% of all kidney cancers. These tumors start in the renal pelvis, where the ureter joins the kidney.

Wilm's tumor is a malignant tumor of the kidney composed of embryonic elements that mostly affects young children. Approximately 5% of kidney cancers are Wilm's tumors. Renal sarcomas begin with the kidney's connective tissue and represent less than 1% of all kidney tumors.

5.3 Prostratic cancer

The prostate is a gland that secretes an alkaline fluid called seminal fluid that carries sperm outside the body through the urethra during ejaculation. The prostate gland is only about the size of a walnut and is located in front of the rectum and under the bladder.

Prostate cancer occurs when cells grow abnormally in the prostate gland to form tumors. Prostate gland tumor growth can be fueled by the male sex hormone, testosterone.

- More than 70% of all prostate cancers are diagnosed in men over the age of 65.
- African-American men have a 60% higher risk of prostate cancer than Caucasian men.
- Due to rigorous screening, 86% of all prostate cancers are found while they are still localized or regional (in the prostate or nearby). Therefore, the five-year survival rate with treatment for these individuals is nearly 100%.

5.4 Testicular cancers

- According to the National Cancer Institute, testicular cancer represents only about 1% of all cancers in men, making it a fairly rare form of cancer.

- Nevertheless, testicular cancer is the most common form of cancer in men between the ages of 15 and 34.
- The disease is four times more common in Caucasian men as compared to African-American men.
- Fortunately, if caught early, 97% of these cancers are curable.

Types of Testicular Cancer

There are two main types of testicular tumors: seminomas and nonseminomas. Both seminomas and nonseminomas are types of germ cell tumors (GCTs) and represent 95% of all testicular cancer. Other extremely rare forms of testicular cancer are classified as sarcomas or lymphomas.

Testicular lymphomas -- more common than primary testicular cancer in men over 50 -- are called secondary tumors because the cancer starts in another organ (the prostate, for example) and then migrates to the testicle(s).

Seminomas

Seminomas represent about 60% of GCTs. They are made up of immature germ cells, the cells that in a normal case would eventually become sperm. These are slow growing tumors that tend to remain in the testicle for a long period of time.

More than 95% of seminomas are classical (or typical) occurring in men between their late 30s and early 50s. Spermatocytic seminomas occur in men 55 or older, grow very slowly, and tend not to spread to other parts of the body.

Nonseminomas

Nonseminomas are germ cell cancers that tend to occur in men in their late teens to early 40s. Most nonseminomas have more than one cell type and so are known as "mixed germ cell tumors".

Nevertheless, there are four primary cell types that are found in most cases of nonseminoma testicular cancer:

- **Embryonic carcinoma**—About 40% of testicular cancers have some cells that are embryonal in origin; only about 3% to 4% nonseminomas are comprised of just embryonic carcinoma cells).
- **Yolk sac carcinoma**—Yolk sac carcinoma is the most common form of testicular cancer that occurs in children. These tumors are also referred to as endodermal sinus tumors, infantile embryonic carcinoma, or orchidoblastoma..
- **Choriocarcinomas**—A very rare and aggressive form of testicular cancer that occurs in adults, and is more likely to spread to distant organs.
- **Teratomas**—A type of nonseminoma that include components that under a microscope appear to be derived from the three layers found in a developing embryo.

5.5 Urethral cancers

Urethral cancer is a rare cancer that occurs in the cells that line the urethra, and accounts for less than 0.1% of all genitourinary (kidney, bladder, penis, prostate, testicles) cancers. This disease affects women more often than men.

Types of Urethral Cancer

The type of cancer will depend on which cells the cancer arises in (squamous, carcinoma, transitional, or adenocarcinoma), and the location of the cancer (whether it is closer to the bladder or closer to the outside of the body). Anterior urethral cancer is when the cancer is closest to the outside of the body, and posterior urethral cancer is when the cancer is closest to the bladder.

6. Clinical manifestations

- Visible, painless hematuria is the most common symptom of bladder cancer.
 - Painful or frequent urination
 - Pelvic pain.
 - Infection of the urinary tract is a common complication, producing frequency, urgency, and dysuria.
 - Any alteration in voiding or change in urine, however, may indicate cancer of the bladder.
- Pelvic or back pain may occur with metastasis. The classic triad of signs and symptoms, which occurs in only 10% of patients, comprises hematuria, pain, and a mass in the flank. The usual sign that first calls attention to the tumor is painless hematuria, which may be either intermittent and microscopic or continuous and gross.
 - There may be a dull pain in the back from the pressure produced by compression of the ureter, extension
 - Colicky pains occur if a clot or mass of tumor cells passes down the ureter.
 - Unexplained weight loss
 - Painful or frequent urination
 - Extreme tiredness.
 - anemia.

7. Diagnosis

- ✓ Urine and blood lab work
- ✓ cystoscopy (the mainstay of diagnosis- Cystoscopy in which a flexible tube with viewing capability is inserted through the urethra in order to look for obstructions such as a tumor
- ✓ Excretory urography
- ✓ CT scan
- ✓ Ultrasonography
- ✓ Bimanual examination with the patient anesthetized.

- ✓ Biopsies of the tumor and adjacent mucosa are the definitive diagnostic procedures.
- ✓ Intravenous pyelogram (type of x-ray to check your blood flow to kidney and bladder and detect possible abnormalities)
- ✓ Bladder tumor marker studies that look at cellular substances that a bladder tumor could release into the urine
- ✓ Annual prostate-specific antigen (PSA) test
- ✓ Digital rectal examination (DRE)

8. Medical Management

Treatment of bladder cancer depends on the grade of the tumor (the degree of cellular differentiation), the stage of tumor growth (the degree of local invasion and the presence or absence of metastasis), and the multicentricity (having many centers) of the tumor. The patient's age and physical, mental, and emotional status are considered when determining treatment modalities.

Pharmacologic therapy

Chemotherapy with a combination of methotrexate, 5-fluorouracil, vinblastine, doxorubicin (Adriamycin), and cisplatin has been effective in producing partial remission of transitional cell carcinoma of the bladder in some patients. Intravenous chemotherapy may be accompanied by radiation therapy.

Topical chemotherapy (intravesical chemotherapy or instillation of antineoplastic agents into the bladder, resulting in contact of the agent with the bladder wall) is considered when there is a high risk for recurrence, when cancer in situ is present, or when tumor resection has been incomplete. Topical chemotherapy delivers a high concentration of medication (thiotepa, doxorubicin, mitomycin, ethoglucid, and BCG) to the tumor to promote tumor destruction. **BCG** is now considered the most effective intravesical agent for recurrent bladder cancer because it enhances the body's immune response to cancer. Intravesical BCG is an immunotherapeutic agent that is given intravesically and is effective in the treatment of superficial transitional cell

carcinoma. The optimal course of BCG appears to be a 6-week course of weekly instillations, followed by a 3-week course at 3 months in tumors that do not respond. In high-risk cancers, maintenance BCG administered for 3 weeks every 6 months may limit recurrence and prevent progression.

The patient is allowed to eat and drink before the instillation procedure, but once the bladder is full, the patient must retain the intravesical solution for 2 hours before voiding. At the end of the procedure, the patient is encouraged to void and to drink liberal amounts of fluid to flush the medication from the bladder.

The use of **biologic response modifiers such as interleukin-2 (IL-2)** and topical instillation of bacillus Calmette-Guerin (BCG) in the renal pelvis continue to be studied, with both treatments currently used in clinical practice. This may be used alone or in combination with lymphokine-activated killer cells, which are WBCs that have been stimulated by IL-2 to increase their ability to kill cancer cells.

Interferon, another biologic response modifier, appears to have a direct antiproliferative effect on renal tumors.

9. Surgical management

Transurethral resection or fulguration (cauterization) may be performed for simple papillomas (benign epithelial tumors). Patients with benign papillomas should undergo cytology and cystoscopy periodically for the rest of their lives because aggressive malignancies may develop from these tumors.

A **simple cystectomy** (removal of the bladder) or a **radical cystectomy** is performed for invasive or multifocal bladder cancer. Radical cystectomy in men involves removal of the bladder, prostate, and seminal vesicles and immediate adjacent perivesical tissues. In women, radical cystectomy involves removal of the bladder, lower ureter, uterus, fallopian tubes, ovaries, anterior vagina, and urethra. It may include removal of pelvic lymph nodes. Removal of the bladder requires a urinary diversion procedure.

A **radical nephrectomy** is the preferred treatment if the tumor can be removed. This includes removal of the kidney (and tumor), adrenal gland, surrounding perinephric fat

and Gerota's fascia, and lymph nodes. Radiation therapy, hormonal therapy, or chemotherapy may be used along with surgery. Immunotherapy may also be helpful.

For patients with bilateral tumors or cancer of a functional single kidney, nephron-sparing surgery (**partial nephrectomy**) may be considered. Favorable results have been achieved in patients with small local tumors and a normal contralateral kidney.

Renal Artery Embolization. In patients with metastatic renal carcinoma, the renal artery may be occluded to impede the blood supply to the tumor and thus kill the tumor cells. After angiographic studies are completed, a catheter is advanced into the renal artery, and embolizing materials (Gelfoam, autologous blood clot, steel coils) are injected into the artery and carried with the arterial blood flow to occlude the tumor vessels mechanically. This decreases the local blood supply, making removal of the kidney (nephrectomy) easier. It also stimulates an immune response because infarction of the renal cell carcinoma releases tumor-associated antigens that enhance the patient's response to metastatic lesions. The procedure may also reduce the number of tumor cells entering the venous circulation during surgical manipulation.

10. Radiation therapy

Radiation of the tumor may be performed preoperatively to reduce microextension of the neoplasm and viability of tumor cells, thus reducing the chances that the cancer may recur in the immediate area or spread through the circulatory or lymphatic systems. Radiation therapy is also used in combination with surgery to control the disease in patients with an inoperable tumor. The transitional cell variety of bladder cancer responds poorly to chemotherapy. Cisplatin, doxorubicin, and cyclophosphamide have been administered in various doses and schedules and appear most effective.

11. Nursing management

After surgery, the patient usually has catheters and drains in place to maintain a patent urinary tract, to remove drainage, and to permit accurate measurement of urine output. Because of the location of the surgical incision, the position of the

patient during surgery, and the nature of the surgical procedure, pain and muscle soreness are common.

The patient requires frequent analgesia during the postoperative period and assistance with turning. Turning, coughing, use of incentive spirometry, and deep breathing are encouraged to prevent atelectasis and other pulmonary complications. The patient and family require assistance and support to cope with the diagnosis and uncertainties about the prognosis.

Genitourinary Tract Injuries

1. Introduction

Various types of injuries of the flank, back, or upper abdomen may result in trauma to the kidney, ureter, bladder, or urethra. Trauma to the kidney accounts for about half of all cases of genitourinary. Trauma About 10 percent of all injuries seen in the emergency room involve the genitourinary tract, including the kidneys, bladder, genitals, ureters and urethra.

2. Classification

Genitor-urinary tract trauma may be classified by the mechanism of injury

Blunt or penetrating.

Blunt renal trauma accounts for 80% to 90% of all renal injuries

Penetrating renal trauma accounts for the remaining 10% to 20% Blunt renal trauma is classified into one of four groups, as follows:

- **Contusion:** bruises or hemorrhages under the renal capsule; capsule and collecting system intact
- **Minor laceration:** superficial disruption of the cortex; renal medulla and collecting system are not involved
- **Major laceration:** parenchymal disruption extending into cortex and medulla, possibly involving the collecting system
- **Vascular injury:** tears of renal artery or vein

3. Clinical manifestation

- Pain, renal colic (due to blood clots or fragments obstructing the collecting system), Hematuria is the most common manifestation of renal trauma; its presence after trauma suggests renal injury.
- Mass or swelling in the flank
- Ecchymoses
- Lacerations or wounds of the lateral abdomen and flank.
- Signs and symptoms of hypovolemia and shock are likely with significant hemorrhage.

4. Diagnosis

Many injuries to the genitourinary tract are subtle and difficult to diagnose. Therefore, an early diagnosis and great diagnostic expertise are essential to prevent serious complications.

A **physical examination** will then be performed to check for any symptoms associated with injuries to the genitourinary tract.

If injuries are suspected, the following tests may be recommended to make a definite diagnosis:

- **Catheterization** — Urinary catheters are tubes placed into the bladder to drain the urine. Catheterization will not be performed if there is blood at the opening of the urethra, a sign of injury to the urethra.
- **Abdominal Computed Tomography (CT)** — A computed tomography (CT) scan uses X-rays to produce detailed pictures of the body's internal structures, such as the abdomen. An abdominal CT scan is used to help identify injuries to the kidneys.
- **Retrograde Cystography** — During this test, contrast dye is injected into the bladder through the urethra. X-rays are then taken of the bladder, which helps to identify injuries to the bladder.

- **Urethrography** — This test involves taking X-rays of the urethra to identify any injuries or obstructions in this area.
- **Arteriography** — Arteriography involves taking an X-ray of blood vessels. Before X-rays are taken, a dye is injected into surrounding arteries so that the blood vessels are visible on the X-ray. In cases of suspected genitourinary injuries, arteriographies are useful in examining the blood vessels of the kidneys to check for injuries in that area.
- **Intravenous Urography** — This test involves taking an X-ray of the urinary tract. Before X-rays are taken, a dye is injected to make urine visible on the X-ray, which shows any blockages in the urinary tract or problems with the kidneys.

Treatment of genitourinary injuries can be complex and depends on a number of factors, including the severity, location and type of injury, the patient's health and whether the patient has any other injuries.

Short-Term Management

Short-term management may be performed before a definitive treatment plan is developed. Short-term management may include:

- **Urethral Catheter** — A tube is placed into the bladder through the urethra to drain urine.
- **Suprapubic Catheter** — A tube is placed through the abdominal wall into the bladder to drain urine.
- **Nephrostomy Tube** — A tube is placed through the patient's flank (side) to drain urine directly from the kidney.
- **Ureteral Stent** — A temporary tube is placed through the ureter to connect the kidney to the bladder.

Kidney Injuries

Treatment for kidney injuries depends on the type and severity of the injury, and whether the patient has any other injuries.

- **Blunt Injuries** — In 85 percent of cases, injuries to the kidneys are minor, caused by a blunt trauma and do not require surgery. Treatment aims to stop any bleeding from the kidney. Hospital admission, bed rest and hydration are required until bleeding from the kidney stops and urine is clear.
- **Penetrating Injuries** — Surgery is more likely for penetrating injuries, such as those from a gunshot wound, which can cause serious bleeding from the kidney. Patients also may have serious injuries to other parts of the abdomen, such as the bowel and liver.

In these instances, surgical exploration and repair of the kidneys may be performed at the same time as surgery for other injured parts. Surgery aims to repair and preserve the injured kidneys. However, if the kidney is severely injured and beyond repair, surgical removal may be required.

Ureteral Injuries

Penetrating trauma and unintentional injury during surgery are the major causes of trauma to the ureters.

Gunshot wounds account for 95% of ureteral injuries, which may range from contusions to complete transection. Unintentional injury to the ureter may occur during gynecologic or urologic surgery

clinical features

- There are no specific signs or symptoms of ureteral injury;
- Many traumatic injuries are discovered during exploratory surgery. If the ureteral trauma is not detected and urine leakage continues
- Fistulas are likely to develop.

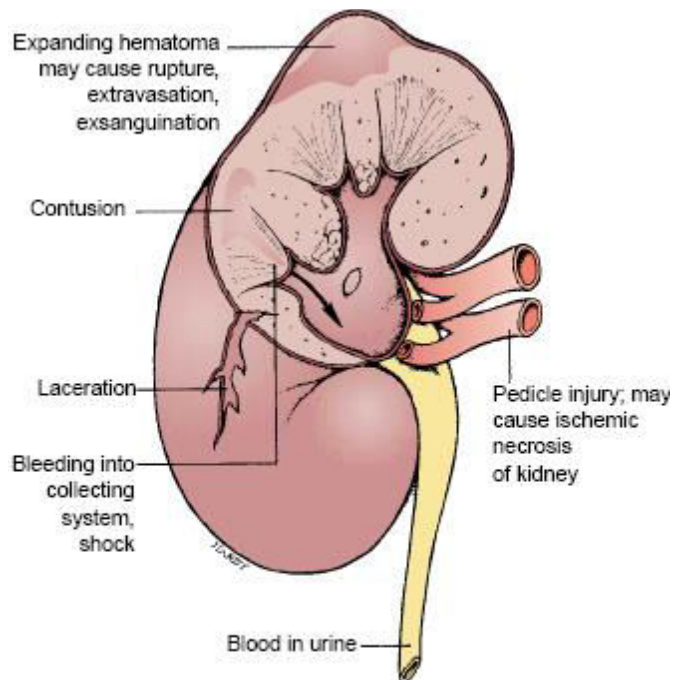


FIGURE 45-8 Types and pathophysiologic effects of renal injuries: contusions, lacerations, rupture, and pedicle injury.

Injuries to the ureters are rare and usually occur during a difficult pelvic surgical procedure or from a gunshot wound. Treatment depends on the type and severity of injury.

- **Complete Disruption** — Ureteral injuries that cause complete disruption, meaning that the ureter is torn into two pieces, require emergency surgical repair. The best outcome for surgical repair is prompt treatment at the time of injury.
- **Partial Injuries** — Partial ureteral injuries, such as those that occur during a pelvic operation, often can be managed by a ureteral stent. Ureteral stents are thin tubes, called catheters, which are inserted into parts of the ureter that carry urine, produced by the kidney, either down into the bladder, or to an external collection system.

Ureteral stenting may be placed on a long-term basis, ranging from months to years, to bypass ureteral obstruction. Short-term stenting, ranging from weeks to

months, may be placed during an open surgical procedure of the urinary tract to provide a mold around which healing can occur, or to divert the urinary flow away from areas of leakage.

- Surgical repair with placement of stents (to divert urine away from the anastomoses) is usually necessary.

Bladder Injuries

Bladder injuries are most often **caused by an accident**, such as a car accident, **serious fall or a heavy object falling on the lower abdomen**. Treatment depends on the type of injury.

- **Contusion Injury** — In these types of injuries, the bladder wall is only bruised and does not rupture. Contusion injuries can be managed with a urethral catheter, which is a tube inserted into the bladder through the urethra, so that blood clots pass. Once the urine is clear and the patient stable, the catheter can be removed.
- **Extraperitoneal Rupture** — These types of injuries can be managed with a urethral catheter, which is a tube inserted into the bladder through the urethra, to keep the bladder empty and allow the urine and blood to drain out into a collection bag. In most instances, a patient will heal within 10 days. However, large blood clots in the bladder or injuries involving the bladder neck require surgical repair.
- **Intraperitoneal Rupture** — These ruptures require surgical repair to prevent urine from leaking into the abdomen. The repair is performed by making an incision in the abdomen and then sewing the tear closed. A catheter is left in the bladder for a few days to rest the bladder after surgery.
- **Penetrating Injuries** — Penetrating injuries usually require surgical repair of any holes made in the bladder. In most instances, surrounding organs are injured and

also require repair. A catheter is left in the bladder to drain the urine and blood as described above.

Urethral Injuries

Management and treatment of urethral injuries can be complex and depends on the severity and location of injury, the patient's health and whether any other injuries are present. In some cases, emergency surgical repair is recommended, but should be limited to select cases. As a general rule, initial **suprapubic cystostomy**, which involves placing a catheter in the bladder through the lower abdomen, is the safest and simplest option. Urethral injuries usually occur with blunt trauma to the lower abdomen or pelvic region. Many patients also have associated pelvic fractures. The classic triad of symptoms comprises blood at the urinary meatus, inability to void, and a distended bladder

Penile Injuries

Penile injuries can occur in various ways. For instance, penile fractures may occur during sexual intercourse and are usually surgically repaired. In other instances, placing obstructing rings around the base of the penis may lead to gangrene and urethral injuries. The obstructing objects can be removed without further damage. In addition, machinery accidents may cause damage to penile skin, which can be repaired by skin grafting.

Penile injuries often occur with urethral injuries. Therefore, when making a **diagnosis** of penile injuries, an **urethrography** — a test involving X-rays of the urethra — will be performed to identify any injuries or obstructions in this area.

Testicular Injuries

Testicular injuries often occur due to a traumatic blow to the groin or scrotum, which can cause severe pain, nausea, vomiting and in some instances, lower abdominal tenderness. In these cases, a testicular ultrasound — a non-invasive test that uses high-frequency sound waves to create images of the testicles and other parts inside the scrotum — is usually performed to evaluate possible damage to the testicle. If a testicular fracture is diagnosed, surgical exploration and repair is required.

Medical Management

The goals of management in patients with genitourinary trauma are to control hemorrhage, pain, and infection; to preserve and restore renal function; and to maintain urinary drainage.

In renal trauma, all urine is saved and sent to the laboratory for analysis to detect RBCs and to evaluate the course of bleeding. Hematocrit and hemoglobin levels are monitored closely; decreasing values indicate hemorrhage.

The patient is monitored for oliguria and signs of hemorrhagic shock because a pedicle injury or shattered kidney can lead to rapid exsanguination (lethal blood loss). An expanding hematoma may cause rupture of the kidney capsule. To detect hematoma, the area around the lower ribs, upper lumbar vertebrae, flank, and abdomen is palpated for tenderness. A palpable flank or abdominal mass with local tenderness, swelling, and ecchymosis suggests renal hemorrhage. The area of the original mass can be outlined with a marking pencil so that the examiner can evaluate the area for change.

Antimicrobial medications may be prescribed to prevent infection from perirenal hematoma or urinoma (a cyst containing urine). Patients with retroperitoneal hematomas may develop low-grade fever as absorption of the clot takes place.

Surgical management

Vascular injuries require immediate exploratory surgery because of the high incidence of involvement of other organ systems and the serious complications that may result if these injuries are untreated. The patient is often in shock and requires aggressive fluid resuscitation. The damaged kidney may have to be removed (nephrectomy).

Immediate exploratory surgery and repair of the laceration, suprapubic drainage of the bladder and the perivesical space (around the bladder), and insertion of an indwelling urinary catheter. In addition to the usual care following urologic surgery, the drainage systems (suprapubic, indwelling urethral catheter, and perivesical drains) are closely monitored to ensure adequate drainage until healing takes place. The patient with a ruptured bladder may have gross bleeding for several days after repair

Urinary diversion procedures

There are three types of urinary diversion surgeries

a) Ileal Conduit

The ureters are implanted into part of the ileum or colon that has been resected from intestinal tract. An abdominal stoma is created.

b) Cutaneous ureterostomy

Ureters are excised from the bladder and brought through the abdominal walls and stoma is created. They may be created from both the ureters or both ureters brought together and one stoma is created.

c) Nephrostomy

Catheter is inserted into pelvis of kidney. It may be temporary or permanent. It is done as a palliative procedure.

Nursing Management

Nursing diagnosis

Risk for impaired skin integrity related to problems in managing the urine collection appliance

- Acute pain related to surgical incision
- Disturbed body image related to urinary diversion
- Potential for sexual dysfunction related to structural and physiologic alterations
- Deficient knowledge about management of urinary function

Anxiety related to effects of ileal conduit on lifestyle.

The patient with genitourinary trauma (particularly renal trauma) should be assessed frequently during the first few days after injury to detect flank and abdominal pain, muscle spasm, and swelling over the flank.

During this time, patients can be instructed about care of the incision and the importance of an adequate fluid intake.

In addition, instructions about changes that should be reported to the physician, such as fever, hematuria, flank pain, or any signs and symptoms of decreasing kidney function, are provided.

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