CONDITION

Traumatic injury of the bladder and urethra

Traumatic bladder or urethral injury is damage to the lower urinary tract caused by an accident, wound, pelvic fracture, or medical procedure.

WHAT IT IS
Traumatic damage to the bladder or urine channel

BODY SYSTEM
Urinary system

MAIN SYMPTOMS
Blood in urine, pelvic pain, difficulty urinating, urine leakage

WHAT CAUSES IT
Blunt or penetrating trauma, pelvic fracture, medical procedures

HOW IT IS DIAGNOSED
Contrast bladder imaging, urethral X-ray, or cystoscopy

MAIN TREATMENT
Catheter drainage, surgical repair, or urinary diversion

CAN IT BE CURED?
Sometimes - healing or repair restores function

IS IT AN EMERGENCY?
Yes - especially after major pelvic trauma

LONG-TERM OUTLOOK
Most recover, but narrowing or bladder problems may persist

Overview

The bladder stores urine. The urethra is the tube that carries urine from the bladder out of the body. Trauma can bruise, tear, or completely disrupt either structure.

These injuries are uncommon compared with many other traumatic injuries, but they matter because leaked urine and blocked urine flow can damage nearby tissues. Bladder and urethral injuries also often occur with pelvic fractures, abdominal injuries, or damage to blood vessels and other organs.

A bladder injury may be a bruise or a tear. Doctors classify bladder tears according to where urine leaks:

Urethral injuries can be partial or complete. Injuries near the prostate and bladder are often

linked to pelvic fractures. Injuries farther forward can follow a direct blow to the area between the legs, a penetrating wound, or damage during a medical procedure.

Suspected bladder or urethral trauma needs prompt medical assessment. The injury may not be obvious from symptoms alone.

- Extraperitoneal rupture: urine leaks into tissues around the bladder, usually after a pelvic fracture
- Intraperitoneal rupture: urine leaks into the abdominal cavity, often after a blow to a full bladder
- Combined rupture: leakage occurs in both areas

Symptoms

Blood in the urine is the most common warning sign of a significant bladder injury. The urine may look pink, red, or brown. Sometimes blood is found only during laboratory testing.

Other possible symptoms include:

A person with a partial urethral injury may still be able to urinate. Being able to pass urine does not rule out an injury.

Symptoms can be difficult to notice after a serious accident, particularly if there are more obvious injuries, pain medicines, or loss of consciousness. Blood at the urethral opening, an unstable pelvic fracture, or difficulty passing urine may prompt testing before a urinary catheter is placed.

- Pain or swelling in the lower abdomen, pelvis, groin, or area between the legs
- Difficulty starting urination or being unable to urinate
- Passing only a small amount of urine despite a strong urge
- Blood at the opening of the urethra
- Urine leaking from a wound
- Abdominal swelling or tenderness
- Bruising of the genitals or area between the legs

Causes and risk factors

Blunt trauma does not break the skin. Common examples include a road collision, a fall from

height, a crush injury, or a forceful blow to the lower abdomen or pelvis.

A full bladder is easier to rupture from a sudden blow because its wall is stretched. Pelvic fractures can tear the bladder or pull the urethra apart. Broken bone fragments may also injure nearby urinary structures.

Penetrating trauma includes gunshot and stab wounds. These injuries may damage the bladder, urethra, bowel, blood vessels, or reproductive organs at the same time.

A direct "straddle" injury can damage the forward part of the urethra. This may happen when the area between the legs strikes a bicycle bar, fence, beam, or similar object.

Medical procedures can occasionally injure the urethra or bladder. Possible causes include difficult urinary catheter placement, surgery, or an instrument passed through the urethra. Previous urethral narrowing or altered anatomy may make instrumentation more difficult.

Diagnosis

Assessment begins with the circumstances of the injury, symptoms, and a physical examination. The trauma team also looks for pelvic, abdominal, genital, rectal, or vaginal injuries.

Urine and blood tests can show bleeding and help assess kidney function, blood loss, and the effects of major trauma. These tests cannot confirm or exclude a tear by themselves.

A bladder tear is usually confirmed with retrograde cystography . For this test, contrast liquid that shows on imaging is placed into the bladder through a catheter. Images are taken while the bladder is full and sometimes after it drains. The test may use a CT scanner or standard X-rays.

An ordinary abdominal CT scan may not fill the bladder enough to reveal a small tear. A dedicated CT cystogram uses controlled filling and is different from simply waiting for contrast to reach the bladder through the kidneys.

A suspected urethral injury is commonly assessed with a retrograde urethrogram . Contrast is gently introduced at the urethral opening while X-rays are taken. The images show whether contrast stays within the urethra or leaks through a tear.

Cystoscopy may also be used. This involves passing a thin camera into the urethra and bladder. It can help assess certain injuries, including injuries related to medical procedures. Examination under anaesthesia and cystoscopy are often important when urethral injury is suspected in a woman.

Treatment and management

Immediate care focuses first on breathing, circulation, bleeding, and other life-threatening injuries. Treatment of the urinary injury then depends on its location, severity, and associated damage.

A bladder bruise without a tear may need observation and short-term bladder drainage.

Many uncomplicated extraperitoneal bladder ruptures can heal while a urinary catheter keeps the bladder empty. A catheter is a soft tube that drains urine into a bag. Follow-up imaging may be used to confirm healing before the catheter is removed.

Surgery is generally used for intraperitoneal bladder rupture because urine is leaking into the abdominal cavity. It may also be needed for an extraperitoneal injury involving the bladder neck, bone fragments inside the bladder, trapped bladder tissue, ongoing bleeding, or an associated rectal or vaginal injury. Penetrating injuries often need surgical exploration because nearby structures may also be damaged.

Urethral treatment may involve guiding a catheter across a partial injury, placing a suprapubic catheter through the lower abdomen into the bladder, or repairing the urethra. A suprapubic catheter allows urine to drain without passing through the injured area.

Some pelvic-fracture urethral injuries are managed initially with urine drainage, followed by reconstructive surgery after swelling and other injuries have settled. In selected cases, clinicians may attempt early endoscopic realignment, using small cameras and guidewires to line up the injured ends. The best approach is based on the injury pattern and the person's overall condition.

Pain relief, wound care, and treatment for associated injuries are also important. Rehabilitation may be needed after a serious pelvic injury.

Complications

Urine leaking into the abdomen can irritate its lining, causing inflammation known as chemical peritonitis. Infection, an abscess, and sepsis are possible if leakage is not controlled. Sepsis is a dangerous whole-body response to infection.

Scar tissue can narrow the urethra after it heals. This is called a urethral stricture . It can cause a weak stream, straining, incomplete emptying, repeated urinary infections, or an inability to urinate. A stricture may appear months or years after the original injury.

Other possible complications include:

Sexual difficulties after a pelvic fracture may result from nerve, blood vessel, or soft-tissue damage, not only from the urethral injury. Follow-up can help identify treatable causes.

- Ongoing urine leakage or an abnormal passage called a fistula
- Loss of bladder control
- Bladder stones or repeated urinary infections
- Persistent pelvic pain
- Erectile or ejaculation problems
- Reduced bladder capacity after extensive injury

Prevention

Not every traumatic bladder or urethral injury can be prevented. Accidents and necessary medical procedures can still cause injury despite appropriate care.

Measures that may reduce risk include wearing a seat belt, using suitable protective equipment for work and sport, following road and bicycle safety practices, and storing firearms securely.

Do not try to insert or replace a urinary catheter yourself unless you have been specifically trained and instructed to do so. If catheter insertion is painful, meets resistance, or causes bleeding, it needs professional assessment rather than repeated attempts.

Living with it and what to expect

Recovery ranges from several weeks for a straightforward injury to many months when there is a pelvic fracture, multiple operations, or urethral reconstruction. A catheter may be needed while tissues heal. It can cause temporary bladder spasms, discomfort, and practical concerns about washing, sleeping, work, and movement.

Most bladder tears heal after effective drainage or repair. Follow-up may include imaging, urine-flow testing, or checking how much urine remains in the bladder after urination.

Urethral injuries need longer-term attention because scar narrowing can develop later. A gradually weaker stream, straining, spraying, repeated infections, or increasing difficulty urinating should be reported during routine follow-up rather than ignored.

Return to driving, work, exercise, and sexual activity is guided by the overall pelvic injury, pain, catheter use, and any surgery. Recovery is not always steady. Mobility and comfort may

improve before bladder control or sexual function does.

Some people need further procedures for scar narrowing, leakage, or sexual difficulties. Others recover without lasting urinary problems. Keeping follow-up appointments is important even if urination initially seems normal.

When to get medical help

Seek emergency care after a significant blow, penetrating wound, or pelvic injury if there is blood in the urine, blood at the urethral opening, difficulty urinating, or lower abdominal swelling. Do not delay care while trying to pass urine repeatedly.

Call emergency services for:

If you already have a catheter, seek urgent help if it stops draining and you develop increasing bladder pain, urine is leaking heavily around it, or the catheter comes out. Do not force it back in.

Routine follow-up is appropriate for a slowly weakening urine stream, mild leakage, repeated urinary infections, discomfort during urination, or sexual problems after recovery. These symptoms are not always emergencies, but they may indicate a treatable complication.

- Inability to urinate with increasing lower abdominal pain
- Heavy bleeding or blood clots in the urine after trauma
- Fainting, confusion, pale or clammy skin, or severe weakness
- A penetrating wound to the lower abdomen, pelvis, groin, or genitals
- Severe abdominal pain, swelling, or rigid abdominal muscles

Common questions

Can a ruptured bladder heal without surgery?

Some uncomplicated extraperitoneal tears can heal with continuous catheter drainage. Intraperitoneal tears usually require surgical repair because urine is leaking into the abdominal cavity. Imaging defines the type of tear and guides treatment.

Can I still urinate if my urethra is injured?

Yes. A partial injury may still allow urine to pass, sometimes with pain, blood, or a weak stream. Normal-looking urination does not reliably exclude injury after major pelvic trauma.

Why should a catheter sometimes wait until after an X-ray?

If a urethral tear is suspected, clinicians may perform a retrograde urethrogram before passing a catheter. This shows the location and extent of the injury and helps avoid disrupting injured tissue.

How long will I need a catheter?

The time depends on whether the bladder or urethra was injured, whether the tear was partial or complete, and whether surgery was required. The care team may use imaging or other tests before deciding that removal is safe.

Can this injury affect sex or fertility?

Bladder injury alone does not usually cause infertility. Pelvic fractures and urethral injuries can be associated with erection, ejaculation, pain, or continence problems because nearby nerves, blood vessels, and tissues may also be damaged. These concerns can be assessed and treated during follow-up.

Can a urethral injury cause problems years later?

Yes. Scar tissue may slowly narrow the urethra. A weaker stream, straining, incomplete emptying, repeated infections, or sudden inability to urinate can appear well after the original injury.

Sources

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