Urological fistulas

Classification

- **Urogenital:**
  - Ureterovaginal and ureterouterine.
  - Vesicovaginal and vesicouterine.
  - Urethrovaginal.

- **Urointestinal:**
  - Vesicointestinal.
  - Urethrorectal.

- **Uroarterial:** ureteroaortical (the most common).

Ureterovaginal fistulas

- **Etiology:** can be caused by all gynecological surgery, but is most frequently the result of abdominal hysterectomy. The latency period indicates the mechanism of the injury.
  - **1-2 days:** direct injury to the ureter (vaginal urine immediately after surgery).
  - **1 week:** pressure necrosis (ureteral pinching or sutures).
  - **2 weeks:** devascularization and ischemic necrosis.

- **Symptoms:**
  - **Direct injury:** vaginal urine immediately after surgery with/without normal voiding.
  - **Necrotic injury:** postsurgical lumbar fossa pain with nausea, paralytic ileus, fever, and malaise until fistula is created.
  - **Devascularization injury:** fistula appears after 14 days with fever and pelvic pain.

- **Diagnosis:** there is usually a history of gynecological surgery.
  - **Dye test:** Indigo carmine or Methylene blue dye is injected into the bladder and a tampon is placed in the vagina. Staining of the proximal third indicates a vesicovaginal or vesicouterine fistula; staining of the distal third indicates a urethrovaginal fistula (or stress incontinence). If the pad is unstained, dye is injected intravenously; the appearance of color indicates a ureterovaginal or ureterouterine fistula. Vaginoscopy is used to differentiate between the two.
  - **IVU:** ureteropyelocaliectasis appears 90% of the time.
  - **Ascending pyelography:** passes to the vagina from the ureter without ureteral filling.
  - **Vaginography:** shows the fistula only if sufficient pressure is achieved to fill it.

- **Treatment:**
  - **Expectant:** spontaneous healing is rare, but a 14-day ureteral catheterization (Double J) and subsequent follow-up can be an option if the following criteria are met: unilateral injury with normal contralateral kidney, no damage to the affected kidney, resorbable suture material, ureteral continuity, and normal infravesical ureter.
  - **Surgical reparation:**
    - In the distal ureter: ureteral reimplantation with/without psoas hitch or Boari flap.
    - In medial 1/3: spatulated end-to-end anastomosis, transureteroureterostomy, partial replacement with ileum (ureteroileoneocystostomy), or autotransplant.

Ureterouterine fistulas

- **Etiology:** result of complicated cesarean section or ureteral ligation.

- **Symptoms:** same as for ureterovaginal fistulas.

- **Diagnosis:**
  - **Dye test:** vaginoscopy shows the exit of dyed urine to be the cervical orifice.
  - **IVU:** supravesical dilation.
  - **Ascending pyelography:** with a trajectory to the uterus.
  - **Hysteroscopy:** occasionally, the ureter fills.

- **Treatment:** same as for ureterovaginal fistulas.
**Vesicovaginal fistulas**

- **Etiology:** the most common fistulas. The most frequent causes are:
  - **Gynecological surgery:** hysterectomy, previous colpoperineorrhaphy, vaginal cysts, vaginal reconstruction atresia, cervical carcinoma. These fistulas tend to be high and small.
  - **Obstetric complications:** long labor and use of forceps. Low, large fistulas.
  - **Urological surgery:** endoscopic surgery or surgery for incontinence.
  - **Other:** radiotherapy (causes fistulas in 1-5% of cases), pelvic trauma, congenital defect.

- **Symptoms:**
  - **Postsurgical necrotic injury:** fever, ileus, abdominal distention, hematuria, or bladder symptoms until incontinence appears after 7-10 days.
  - **Post-radiotherapy injury:** the fistula appears between 5 months and 30 years later. There is a history of radiating cystopathy that disappears with fistulization.
  - **Incontinence:** total if the orifice is large and partial if it is smaller. If the fistula is close to the neck, this may present as stress incontinence.

- **Diagnosis:**
  - **Fluid analysis:** to differentiate urine from lymphatic fluids or vaginal exudate.
  - **Dye test:** a vaginal tampon is inserted and the bladder is filled with dye. In vesicovaginal and vesicouterine fistulas, the proximal 1/3 of the pad will be stained. **Vaginoscopy** helps visualize the exit of dye through the vaginal wall or cervix.
  - **IVU:** identifies the fistula and evaluates the degree of renal function.
  - **Cystography/vaginography:** help visualize the fistula.
  - **Cystoscopy:** essential for checking the size, location, and tissue surrounding the fistula.

- **Treatment:**
  - **Expectant:** if the fistula is small, a bladder catheter is implanted for 4 weeks until healed.
  - **Fulguration/occlusion of the fistulous tract:** for small fistulas, using a Bugbee electrode or laser, with or without fibrin occlusion.
  - **Surgical:** usually vaginally. The abdominal approach is used only if there is an associated disease, small bladder, or recurrent/complex fistulas. A flap from the fat of the labia majora can be inserted (Martius flap) in vaginal interventions; in abdominal interventions an omentum flap is used. Timing of surgery:
    - **Early:** in the first 2 months to prevent established fibrosis.
    - **Deferred:** the most common approach, after 2-3 months.
    - **Delayed:** after a year if the fistula is secondary to a bladder tumor or RT.

**Vesicouterine fistulas**

- **Etiology:** Rare. Occur in cesareans, abortions, breech births, or with the use of forceps.

- **Symptoms:**
  - **Fistula between the bladder and uterine body:** the main symptom is menouria (hematuria coinciding with menstruation) and sometimes amenorrhea. Incontinence may be very discreet. **Youssef's syndrome** is pathognomonic and consists of menouria, urinary continence, amenorrhea, and a history of cesarean section.
  - **Fistula between bladder and cervix:** the main symptom is incontinence, with menouria appearing only occasionally.

- **Diagnosis:**
  - **Dye test:** the bladder is filled with dye and the proximal third of a vaginal tampon is stained. **Vaginoscopy** shows the dye coming out of the cervix.
  - **Cystoscopy:** locates the fistulous orifice.
  - **IVU:** helps rule out concomitant ureteral injury.
  - **Hysteroscopy:** the contrast medium passes to the bladder cavity.
  - **MRI:** can identify the fistulous tract in a single scan.

- **Treatment:** there is rarely spontaneous closure.
  - **Fulguration of the fistulous orifice:** may be attempted in small fistulas.
  - **Surgical** closure of the fistula and insertion of omentum tissue.
Urethrovaginal fistulas

- **Etiology**: a complication of vaginal surgery. Rarely caused by birth injury or trauma.
- **Symptoms**: proximal fistulas cause total or stress *incontinence* and can go unnoticed and be treated as a stress UI without fistulization. Those in the middle or distal third only cause *post void dribbling* or alterations to the *stream of urine*.
- **Diagnosis**: in the *dye test*, the distal 1/3 of the tampon will be stained. Checking during urination, vaginoscopy, urethroscopy, or urethrography with a double balloon probe helps differentiate between a urethrovaginal fistula and stress UI without fistulization.
- **Treatment**: marsupialization in case of distal fistulas while those in the proximal and middle 1/3 require fistulous resection and closure in two planes with insertion of fibrolabial Martius flaps, gracilis muscle flaps, or peritoneum and omentum flaps.
Vesicointestinal fistula

- **Etiology**: most frequently caused by diseases specific to the gastrointestinal tract (diverticulitis, Crohn’s disease, neoplasia). Can also result from trauma, spontaneous drainage of a pelvic abscess, or after radiotherapy.

- **Diagnosis**:
  - Pneumaturia and fecaluria.
  - Urinary tract infection.
  - Cystoscopy: generalized cystitis and perifistular bullous changes.
  - Cystography: passage of contrast medium to the intestine.
  - CT or MRI visualize the fistula in 80% of cases and help identify the cause.

- **Treatment**: bowel resection and closure of the bladder.

Urethrorectal fistulas

- **Etiology**:
  - Prostate or colon carcinoma.
  - Prostatic abscess.
  - Perineal interventions.
  - Radical prostatectomy.
  - TURP.
  - Congenital: associated with imperforate anus.

- **Symptoms**:
  - Rectal incontinence of urine.
  - Fecaluria and pneumaturia.
  - Persistent or recurrent UTI.

- **Diagnosis**:
  - VCUG: shows the fistulous tract.
  - Barium enema: can also show the fistulous tract.
  - Urethroscopy and colonoscopy: directly visualize the fistula.

- **Treatment**: conservative treatment with bladder catheter can be attempted in small fistulas. In larger fistulas or if conservative treatment fails, either the closure of the orifice or a colostomy should be considered, depending on the prognosis. The surgical approach can be perineal, transanal, posterior sagittal, anterior transanorectal, or a combination.

Uroarterial fistulas

*(See chapter on Vascular Fistulas).*