Genital Infections

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Common case presentation

A 52-year-old man with a history of poorly controlled diabetes mellitus, obesity, hypertension, and alcohol abuse presents to the emergency department with a two-day history of a painful scrotum and a "boil" that is enlarging. He admits to feeling "feverish" at home and now has an edematous, erythematous, tender scrotum with palpable crepitus and a foul odor.

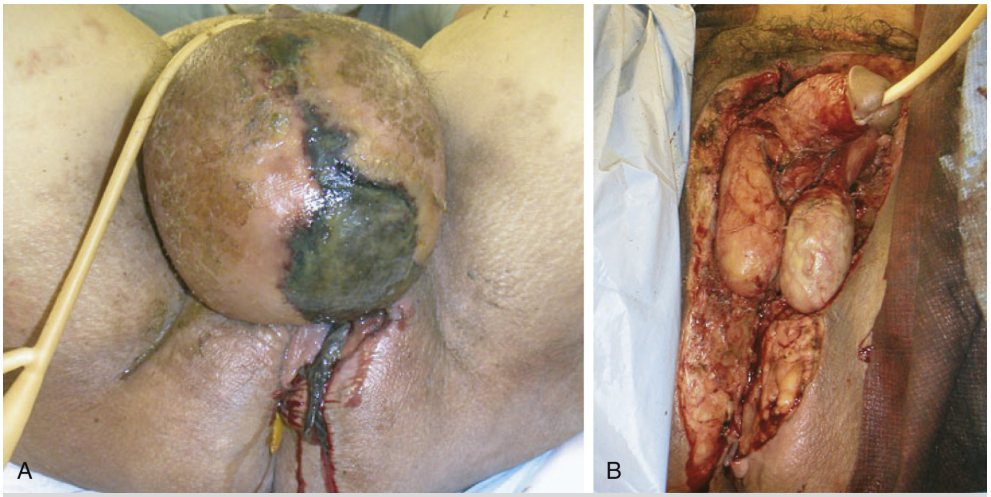

Figure 1: Figure 59.25A Campbell-Walsh-Wein Urology, 12th Edition

I. Receiving the phone call and initial thoughts

a. While there may be a variety of reasons for a call about genital infections (valid or invalid), the most severe cases can be life threatening so all calls should be taken seriously and a high index of suspicion maintained.

b. **Is the patient hemodynamically stable?**
The presentation of genital infections is variable and some patients arrive to the emergency

department complaining only of scrotal pain. However, these infections can spread rapidly and create a systemic illness.

c. **Does the patient have any comorbid conditions?**
   An immunocompromised state puts patients at risk for faster spread of infectious processes. Diabetes mellitus is one of the most common conditions to cause a decreased immune response. Poor glucose control at baseline can impact outcomes. Alcohol abuse and HIV/AIDS are other conditions that can cause an immunocompromised state.
d. **Is the patient able to urinate?**
   In addition to cutaneous and colorectal sources, Fournier's gangrene and necrotizing soft tissue infections (NSTI) can result from urinary obstruction, such as urethral strictures, which can result in transmission of a urinary tract infection to surrounding soft tissues. Expeditious urinary drainage may be necessary during initial evaluation.
e. **Has the patient had any recent surgical operations or genital trauma?**
   Although most patients present with spontaneous infections, patients with recent genital surgeries or genital trauma should be evaluated for possible post-operative or post-traumatic infection. Because of the concern for Fournier's gangrene, the provider seeing the patient in the emergency department may not elicit recent surgical or trauma history.

II. Differential Diagnosis

a. **Fournier's Gangrene**
   A necrotizing soft tissue infection (NSTI) that involves the genitalia and perineum and is usually polymicrobial in nature. Typically, these travel along the fascial planes (Dartos, Colles and Scarpa) and may rapidly spread into the torso and thighs. A delay in the diagnosis of Fournier's Gangrene increases the risk of mortality, so expeditious exam and care is necessary.
b. **Furuncles and abscesses**
   Soft tissue infections which are walled off and contain pus. Abscesses occur anywhere on the skin surface while furuncles, by definition, are abscesses associated with hair follicles.
c. **Cellulitis**
   An infection limited to the dermis and subcutaneous tissues, usually caused by gram-positive organisms.
d. **Balanitis or Balanoposthitis**
   Balanitis is an inflammation of the glans penis. Balanoposthitis is an inflammation involving the glans and prepuce in uncircumcised patients.
e. **Post-operative infections**
   Any genital or inguinal surgery can result in spreading edema, erythema, and concern for infection. Common surgeries include: circumcision, vasectomy, hydrocelectomy, penile prosthesis placement, and inguinal herniorrhaphy.
f. **Hidradenitis Suppurativa**
   A chronic inflammatory skin disease that involves sweat or apocrine glands. Painful lumps can

form under the skin, become infected and collect pus, and subsequently rupture leading to inflammation, irritation, and scarring.

g. **Sexually Transmitted Infections**
   Certain sexually transmitted infections can present with cutaneous manifestations including: lymphogranuloma venereum, chancroid, granuloma inguinale, syphilis, herpes simplex, human papilloma virus, and molluscum contagiosum.
h. **Intertrigo**
   A candidal infection of skin folds where the macerated skin becomes red and inflamed.
i. **Epididymo-orchitis**
   Combined inflammation/induration of the epididymis and testicle that can arise from infectious and noninfectious sources.
j. **Non-infectious genital ulcers**
   Examples include fixed drug eruption and Behcet's disease (inflammatory disorder that can result in oral and genital ulcerations, ocular disease, and skin lesions).

III. Evaluation

a. **Physical Exam - Key Points**
   i. Patients with severe infections will often present with pain out of proportion to physical exam, anxiety, and diaphoresis.
   ii. **Vital signs:** Due to the potential life threating nature of an infection, physical evaluation should begin with vital signs.
      1. Any suggestion of early sepsis (tachypnea, tachycardia, fever) should initiate resuscitation and administration of broad-spectrum intravenous antibiotics.
   iii. **Physical examination**
      1. Examination for these conditions is usually limited to the abdomen, genitalia, perineum, rectum, and thighs.
      2. Classic findings include scrotal swelling, pain, induration, and erythema.
      3. Advanced infections can have palpable crepitus, eschar/necrosis, and malodorous purulent drainage.
      4. Physical exam can often determine source or focus of entry, such as perirectal infection in NSTI.
b. **Laboratory data**
   i. **Complete blood count**
      1. Findings include: both leukocytosis or leukopenia, anemia, and thrombocytopenia – depending on the presence of sepsis.
   ii. **Basic metabolic panel**
      1. Findings include: hyponatremia, hypokalemia, azotemia, and hyperglycemia.
   iii. **Hemoglobin A1c**
      1. Levels > 7 % are associated with longer hospital stays and higher morbidity.

iv. **Blood and urine cultures**
    1. In addition to tissue/abscess cultures (discussed later), blood and urine cultures can help guide continued antibiotic therapy and indicate the presence of bacteremia and/or UTI.

c. **Radiologic studies**
    i. **Plain film radiography**
        1. Can demonstrate subcutaneous air indicating necrotizing infection.
    ii. **Ultrasonography**
        1. Reveals thickened scrotal wall and hyperechoic areas (subcutaneous gas).
        2. Can help differentiate from incarcerated inguinal hernia which shows intrascrotal air within bowel lumen.
    iii. **Computed tomography (CT)**
        1. Reveals soft tissue thickening, inflammation, fluid collections, and subcutaneous air.
        2. Can help identify recent surgical implants such as hernia mesh or penile prosthesis in severely infected and edematous genitalia.

IV. Management

a. **Initial Management**
    i. **Fluid resuscitation**
    Fluid boluses can restore blood pressure and increase intravascular volume in volume depleted patients.
    ii. **Broad spectrum intravenous antibiotics**
    Due to the polymicrobial nature of these infections, coverage of gram positive, gram negative, and anaerobic bacteria is required.
    iii. **Preparation of the operating room**
    While the evaluation is concluding, notifying the operating room is important as NSTI can be life-threatening surgical emergencies.

b. **Specific Management Plan**
    i. **Aggressive surgical debridement**
        1. All devitalized tissue is removed, including equivocal tissue, as these infections can continue to spread in fascial planes.
        2. Copious wound irrigation with antibiotic solution is encouraged.
        3. Suprapubic tube placement may be needed in cases where urethral stricture prevents adequate indwelling urethral catheterization or in cases where the infection involves the urethra itself and upstream urinary diversion is necessary.
        4. Colorectal/General Surgery consultation may be needed if there is concern for anorectal involvement/source.
        5. Intraoperative tissue/abscess culture is encouraged to assist with continued antibiotic therapy.

6. Multiple repeat debridements may be required to ensure tissue viability.

ii. **Wound management**

1. Wet to dry dressings are typically utilized initially, especially when multiple debridements are necessary.
2. Negative pressure wound vac placement can help to reduce open wound surfaces, drain excess fluid, and promote granulation tissue in the healing wound bed.
3. Multidisciplinary management should include general surgery/colorectal surgery, plastic surgery, and potentially infectious disease specialists.
    a. In certain cases, fecal diversion may be necessary to ensure a clean, healthy wound bed.
4. The team should also consider the social needs of the patient and involve social work/case management to help with wound vac home care or other needs.

iii. **Delayed reconstruction**

1. Usually led by plastic surgery (especially in cases where delayed primary closure is not possible), but urologic assistance is helpful to ensure good function and cosmesis of genital tissue skin coverage and reconstruction.
2. Glucose control and improving nutritional status are extremely important to optimize outcomes.

iv. **Prosthetic (IPP) infections**

1. Often prosthetic related infections present with less acuity than NTSI.
2. IV antibiotics are an appropriate initial management step.
3. Removal of all components of the infected device is the gold standard treatment.
4. Salvage surgery can be considered with immediate replacement of an inflatable or malleable device after a multistep, intra-operative antibiotic irrigation protocol.
    a. Removal of the device without replacement can lead to significant corporal scarring, which would make future implant placement challenging. However, the severity of the infectious process at the time of device removal, the infectious risk of a salvage operation, and patient preference must be considered when deciding whether or not to proceed with immediate device replacement.

Key Takeaways

1. There is a long differential diagnosis list for genital infections, but the most severe cases (i.e. Fournier's gangrene) can be life threatening so all consults should be taken seriously and a high index of suspicion maintained.
2. Physical exam and pertinent labs and imaging are crucial to effective and efficient diagnosis and management.
3. For NSTI such as Fournier's gangrene, fluid resuscitation, broad spectrum antibiotics, and aggressive surgical debridement are indicated.

Presentations

Genital Infections Presentation 1

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