Priapism in the Oncology Setting

Case Study: N.L. is a 20-year-old Caucasian man with no significant medical history. He presented to the hospital with a two-day history of feeling ill with intermittent nausea, vomiting, blurred vision, and headache. He also noted slurred speech and left-upper-quadrant fullness for almost a month.

Evaluation of the patient included laboratory studies. On presentation, N.L.’s white blood cell count was 708,000 mm³ with 34% segmented neutrophils, 1% blasts, 19% metamyelocytes, 13% myelocytes, and 6% promyelocytes. His hematocrit was 20, and his platelet count was 141,000. Other laboratory values were lactate dehydrogenase 768, uric acid 9.0, phosphorus 5.0, blood urea nitrogen 9.0, creatinine 1.6. A bone marrow biopsy showed 95% cellularity, consistent with chronic myeloid leukemia (CML) in chronic phase. A computed tomography scan of the head revealed multiple acute superior and inferior infarcts.

The patient course was complicated by the development of painful priapism, which persisted after unsuccessful treatment with aspiration of the shaft of the penis, or infiltration with phenylephrine. Leukapheresis and oral hydroxyurea treatment is not initiated within 24–48 hours. Low-flow priapism results from decreased penile venous outflow causing stasis and presents as a painful, rigid erection. More common than high-flow priapism, low-flow priapism is a medical emergency because irreversible cellular damage and fibrosis can occur if treatment is not initiated within 24–48 hours. Low-flow priapism can be drug induced or caused by hematologic disorders and tumor infiltration (Sadeghi-Nejad et al., 2004).

Pathophysiology

Priapism is low flow (ischemic) or high flow (nonischemic). Low-flow priapism results from decreased penile venous outflow causing stasis and presents as a painful, rigid erection. More common than high-flow priapism, low-flow priapism is a medical emergency because irreversible cellular damage and fibrosis can occur if treatment is not initiated within 24–48 hours. Low-flow priapism can be drug induced or caused by hematologic disorders and tumor infiltration (Sadeghi-Nejad et al., 2004).

Signs and Symptoms

Signs and symptoms vary based on whether the patient is experiencing low-flow or high-flow priapism. Obtaining a

Definition

CML accounts for 15%–20% of adult leukemias (Jemal et al., 2006). The most common presenting symptom of CML is neutrophilic leukocytosis. The white blood cell count often can be in excess of 100,000 mm³. A rare complication that can occur in male patients with an excessive white blood cell count is priapism, which is defined as a penile erection that persists beyond sexual stimulation (Chehriz et al., 2006). Approximately 20% of priapism cases are related to hematologic disorders, and the incidence of priapism in adult patients with leukemia is about 1%–5% (Chang, Tang, & Chang, 2003).
thorough history and physical examination is key to determining proper treatment. According to Sadeghi-Nejad et al. (2004), “the presence or absence of pain is a fairly reliable predictor” (p. 434) to differentiate between the two types. Low-flow priapism is characterized by a painful, rigid erection, whereas high-flow priapism usually is painless (Sadeghi-Nejad et al.). Low-flow priapism is a veno-occlusive state; therefore, its symptoms are similar to that of a compartment syndrome and the patient usually seeks evaluation immediately because of the pain. Patients with high-flow priapism may not seek treatment for days or weeks after noticing the erection because of the lack of discomfort. Treatments and prognoses for low- and high-flow priapism are different, so distinguishing them is important. A detailed history, physical examination, gas analysis of the blood within the corpora cavernosa, and Doppler ultrasound studies are useful in determining whether priapism is low flow or high flow.

Assessment

A detailed history includes an assessment of medications, especially antihypertensives, antipsychotics, medications for erectile dysfunction (e.g., Viagra® [Pfizer, Inc., New York, NY], Levitra® [Bayer Healthcare, West Haven, CT], Cialis® [Lilly ICOS, LLC, Indianapolis, IN]), and illicit drug use. Assessment also should include evaluation for malignancy, trauma, and sickle cell disease. When performing a physical examination, the extent of the rigidity and corporal body involvement must be evaluated. Along with the penile examination, abdominal, perineal, and rectal examinations also should be performed to rule out trauma or malignancy. Several laboratory tests should be evaluated, including a complete blood cell count to rule out infection or white blood cell abnormality, reticulocyte count to assess for sickle cell disease, and urine toxicology to assess for illicit drug use such as cocaine and ecstasy (Burnett, 2005; Sadeghi-Nejad et al., 2004).

Diagnostic Tests

The primary test to diagnose and differentiate priapism is blood-gas testing of a penile aspirate. In low-flow priapism, the aspirated blood is dark in appearance and the blood gas reveals acidosis and a decrease in oxygen tension. In high-flow priapism, the aspirate appears bright red and has normal blood-gas values (Burnett, 2005).

Color duplex ultrasonography is the “most reliable radiographic method for differentiating between ischemic and nonischemic priapism” (Burnett, 2005, p. 452). In low-flow priapism, the flow in the cavernosal arteries and corpora cavernosa is minimal, whereas in high-flow priapism, blood flow is normal to high. Other radiologic tests such as penile arteriography can be used, but the color duplex is the test of choice (Burnett).

Treatment Options

Treatment of priapism is based on a distinction between the forms and duration of priapism (Burnett, 2005). First-line treatment of priapism is aspiration of blood from the base of the corpora cavernosa. The success rate with aspiration alone is approximately 30% (Cherian et al., 2006). Aspiration allows for a blood-gas analysis to distinguish between low-flow and high-flow priapism (Cherian et al.; Vilke, Hargigan, Ufberg, & Chan, 2004). If the treatment is unsuccessful, instillation of the sympathomimetic agent phenylephrine hydrochloride is used until the swelling of the penis has reduced, subsided, or lessened. If the treatment is done in the first 12 hours of an onset of priapism, its success rate is almost 100% (Cherian et al.; Sadeghi-Nejad et al., 2004). Common side effects of phenylephrine include headache, acute hypertension, and bradycardia; therefore, patients should have their blood pressure monitored closely and continuous electrocardiogram monitoring should be considered (Rosenstein & McAninch, 2004).

In cases of priapism related to hematologic malignancies, leukapheresis or cytotoxic therapy such as hydroxyurea and cytosine arabinoside may be used to reduce the number of circulating white blood cells (Ponniah, Brown, & Taylor, 2004). The tyrosine kinase inhibitor imatinib is used specifically to treat CML (Savona & Talpaz, 2006). Recommendations for treatment of priapism in sickle cell disease include IV hydration with hypotonic fluids, supplemental oxygen, and IV pain medications (Ponniah et al.). Oral gabapentin and baclofen also may be used to treat recurrent idiopathic priapism (Cherian et al., 2006).

If medical management fails, surgery can be considered. Surgical management of priapism includes placing a shunt between the corpora cavernosa and glans, which allows for blood to flow in and out of the corpora cavernosa (Cherian et al., 2006; Bochinski, Deng, & Lue, 2003). Localized external radiation to the penis also may be administered to reduce the number of cells in the region (Dutta, Purohit, Vaidyanathan, Gupta, & Rao, 1979).

Nursing Interventions

Nursing interventions for priapism focus on early symptom recognition, pain management, and psychosocial support. Nurses should educate patients and their significant others about priapism’s early signs and symptoms. If an erection lasts longer than four hours, medical attention should be sought immediately (Pryor et al., 2004). Patients may be reluctant to report priapism because of embarrassment, resulting in delayed medical treatment (Rosenstein & McAninch, 2004). Early treatment is encouraged and decreases the risk of long-term impotence and penile dysfunction. Pain management is essential in patients presenting with low-flow priapism. Patients should be assessed for pain frequently, and pain medications should be administered as needed to ensure that adequate pain control is achieved.

Low-flow priapism is a medical emergency and can affect patients’ psychological well-being. Patients may experience anxiety about the condition and body image.

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alterations, fear recurrence, and suffer from long-term ramifications associated with impotence and erectile dysfunction. Oncology nurses should be sensitive to the needs of patients with priapism and incorporate appropriate counseling therapy into the plan of care (Pryor et al., 2004).

Case Study Follow-Up

N.L. responded well to imatinib mesylate therapy and had a normalization of his blood counts. Although his priapism eventually resolved after eight days, he experienced embolization of the arteries to the penis, resulting in decreased blood flow and permanent erectile dysfunction. He has been managed successfully with sildenafil citrate (Viagra).

Author Contact: Megan B. Manuel, RN, BSN, OCN®, can be reached at mmanuel@wfubmc.edu, with copy to editor at CJONEditor@ons.org.

References


