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Priapism in the Oncology Setting

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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 mm^3 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 21, and creatinine 1.6. A bone marrow biopsy showed 95% celluarity, 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 and injection with phenylephrine. Leukapheresis and oral hydroxyurea were used to decrease the circulating white cells, but the priapism persisted. Induction chemotherapy was initiated with high-dose cytosine arabinoside and imatinib mesylate (Gleevec®, Novartis Pharmaceuticals, East Hanover, NJ), but the priapism remained. N.L. then received localized radiation therapy of 1,200 cGy in four fractionated doses to the penis, which ultimately resolved the priapism.

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 mm^3. 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 (Cherian 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).

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 cell 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, Dogra, Seftel, & Mohamed, 2004).

High-flow priapism results from increased arterial inflow into the cavernosal sinusoids, which overwhelms venous outflow. Clinical presentation is painless erection; irreversible cellular damage and fibrosis are rare. High-flow priapism often is the result of penile or perineum trauma and is not an emergency because treatment is elective (Sadeghi-Nejad et al., 2004).

Hyperleukocytosis causes priapism in patients with leukemia. Hyperleukocytosis can occur as a result of mechanical pressure on the abdominal veins by splenomegaly, causing venous congestion of the corpora cavernosa, sludging of leukemic cells in the corpora cavernosa and dorsal veins of the penis, infiltration of the sacral nerves with leukemic cells, or infiltration of the central venous system with leukemic cells (Chang et al., 2003).

Signs and Symptoms

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

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