

CASE STUDY

41-YEAR-OLD MAN WITH ACUTE MYELOID LEUKEMIA UNDERGOING HEMATOPOIETIC STEM CELL TRANSPLANT

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BACKGROUND

A 41-year-old man was in his usual state of health until he began experiencing fatigue, bleeding of the gums, and shortness of breath on exertion. After presenting to his primary care physician, he was noted to have a white blood cell (WBC) count of 40 000 cells/mm³, with 60% blasts, a hemoglobin (Hgb) of 5 g/dL, and a platelet count of 110 × 10⁹/L. He was diagnosed with M4 acute myeloid leukemia with normal cytogenetics and received standard leukemia therapy with successful remission induction. Three years later he developed decreased WBC and platelet counts and a bone marrow biopsy was consistent with relapse. After re-induction, he quickly relapsed. Cytoreductive therapy produced good results, and the decision was made to proceed to allogeneic hematopoietic stem cell transplantation (HSCT). The patient was admitted for the preparative regimen, which consisted of high-dose cyclophosphamide and fractionated total body irradiation.

WORKUP

Initial laboratory studies pre-transplant showed: WBC count, 2130 cells/mm³; Hgb, 8 g/dL; platelets, 60 × 10⁹/L; albumin, 2.1 g/dL; creatinine, 0.8 g/dL; sodium, 138 mEq/L; potassium, 4.5 mEq/L; glucose, 95 mg/dL; magnesium, 2.1 mEq/L; calcium, 9 mg/dL; and total bilirubin, 0.7 μmol/L. Pulmonary function tests were within normal limits. Echocardiogram revealed an ejection fraction of 60%.

MEDICAL HISTORY

Medical history was remarkable for osteoarthritis, obstructive sleep apnea, and a deep vein thrombosis in the left leg, which was diagnosed 7 months previously and for which he was taking coumadin 5 mg daily. A melanoma on the right arm was resected 5 years ago without recurrence.

PHYSICAL EXAMINATION

The patient was an obese Caucasian male. Karnofsky performance status was 90%. Vital signs were as follows: blood pressure, 130/78 mm Hg; pulse, 90 beats/minute; respirations, 22 breaths/minute; temperature, 37°C; and oxygen saturation, 99% on room air. He was awake, alert, and oriented to person, place, and time. Pupils were round, equal, and reactive to light and accommodation. Extraocular muscle movements were grossly intact. The sclerae were anicteric, and conjunctivae were pink and appeared moist. The oropharynx was clear and poor dentition was noted. The neck was without lymphadenopathy. The lungs were clear bilaterally, and the abdomen was soft and nontender. Bowel sounds were active in all quadrants. No peripheral edema was noted. Neurologic examination was within normal limits.

TREATMENT PLAN

The patient's treatment plan included cyclophosphamide 50 mg/kg intravenous (IV) for 4 days followed by fractionated total body irradiation for 4 days. On HSCT day 0 he received an allogeneic stem cell infusion. For the prevention of acute graft versus host disease he was given methotrexate 15 mg/m² IV on HSCT day 1, followed by methotrexate 10 mg/m² IV on HSCT days 3, 6, and 11. Tacrolimus 1 mg IV daily was also administered.

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TREATMENT COURSE

The patient did well during the preparative regimen with mild complaints of moderate nausea and vomiting, which were treated with serotonin antagonists, dexamethasone, and lorazepam. He tolerated the stem cell infusion without difficulty. On HSCT before day 2 he developed pain with swallowing and inability to eat solid foods. He reported oral pain ratings from 5/10 to 10/10. The oral cavity was erythematous and edematous with white patches suggestive of an oral candida. Normal saline mouth rinses and frequent oral hygiene were instituted. Antifungal therapy for oral thrush was started. Because of a history of herpes simplex virus the patient also received prophylactic valacyclovir hydrochloride (HCl).

The mucositis progressed with ulcerations, and the patient was started on IV hydromorphone HCl through patient-controlled analgesia, with which he reported some pain relief. Delirium developed secondary to the opioids and lorazepam. Because of the severe mucositis, the patient began central parenteral nutrition and was intubated to protect his airway. On day 9 of the HSCT the patient developed febrile neutropenia. A chest X-ray, urinalysis, and pancultures were obtained, and an anaerobic blood-stream infection was identified. The patient underwent a course of IV antibiotics that was complicated by a severe allergic drug rash and diarrhea. Despite WBC and platelet count recovery, the patient's hospital stay was extended as a result of oral mucositis complications.

DISCUSSION

Severe oral mucositis is a debilitating toxicity of cancer treatment associated with pain, anorexia, inability to swallow, speak, and eat, and infections. The damage that occurs to the mucous membranes is often present from the oral cavity, esophagus, and gastrointestinal lining to the perirectal area. Mouth sores have been reported as the single most debilitating side effect of HSCT therapy.¹ Poor oral hygiene, gum disease, or poor dentition predisposes patients to infection with anaerobic types of bacteria. Furthermore, oral infection may predict risk for nosocomial pneumonia.² Interventions, such as opioid analgesia and parenteral nutrition are often used; however, they are not without their own risks. Additionally, several topical treatments

have failed to show efficacy in the prevention of oral mucositis.³

A critical first step in the prevention and management of oral mucositis is an oral assessment, including any corrective and cleaning procedures, by a dental professional before receiving cancer treatment.² In addition, when there is a high risk of mucositis, initiation of palifermin is recommended. Recent clinical data have demonstrated that palifermin is clinically efficacious in the HSCT setting, resulting in reduced incidence and duration of oral mucositis, in addition to statistically significant improvements in daily functioning ($P < .001$) and significantly less need for narcotic opioids ($P < .001$).⁴

Proactive nursing interventions to reduce the risk of oral mucositis in patients with cancer can reduce the risk of infection, enhance quality of life, and decrease length and costs of hospitalization stays. Oncology nurse practitioners

(NP) and physician assistants (PA) can help reduce the incidence and severity of oral mucositis through a better understanding of the importance of oral assessments and good dentition. Patients should be taught good oral hygiene, including how and when to care for the mouth. In addition, oncology NPs and PA should have extensive knowledge of and use the most recent clinical advances in cancer supportive care. The patient in this case study required intubation for airway protection because of severe grade IV mucositis. A more thorough pre-transplant assessment of his oral health and implementation of a prevention plan would have benefited this patient. Using the most current and evidence-based prevention and treatment methods is essential to protect patients and minimize their risk of morbidity and mortality.

REFERENCES

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