ISSN: 3033-3504

Journal of Clinical Medicine and Regenerative Medicine

SCIENTIFIC Research and Community

Case Report

Open Access

Managing Severe Acute Myeloid Leukimia with Collaborative Medical and Nursing Interventions: Case Study

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ABSTRACT

Assessment: An 82-year-old patient diagnosed with Acute Myeloid Leukemia (AML) was admitted to the Emergency Department with a hemoglobin level of 3.1 g/dL, requiring immediate blood transfusion. The assessment included routine blood lab tests, chest X-ray, ECG, physical examination, general condition evaluation, and Glasgow Coma Scale (GCS) scoring, which indicated full consciousness.

Diagnosis: Based on the assessment conducted, the nursing diagnoses identified are ineffective peripheral tissue perfusion, risk for bleeding associated with decreased red blood cell (RBC) levels, risk for infection due to compromised immunity, and risk for decreased cardiac output related to the patient's history of heart disease.

Planning: The following are the targeted implementations for the identified nursing diagnoses. Ineffective peripheral tissue perfusion, nurse would administer blood transfusion as per the physician's advice. Risk for bleeding, nurse would monitor for any signs of bleeding, report if bleeding occurs, and manage bleeding if present. To prevent infection, nurse would measure temperature at each shift, apply aseptic techniques, and ensure proper nutritional management. Risk for decreased cardiac output, nurse would collaborate with a cardiovascular specialist and monitor for symptoms of shortness of breath or chest pain.

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Received: January 29, 2025; **Accepted:** February 06, 2025, **Published:** December 27, 2025

Keywords: Acute Myeloid Leukimia, AML, Anemia, Nursing Interventions, Interdisciplinary Collaboration

Introduction

Acute Myeloid Leukemia (AML) is a condition characterized by an excessive number of myeloblasts in the blood and bone marrow. AML can spread beyond the bloodstream to areas such as the lymph nodes, spleen, liver, brain, spinal cord, skin, gums, and testicles [1].

This case study provides insights into the management of an 82-year-old patient with AML. The case report explores the patient's clinical presentation, assessment, nursing diagnoses, interventions, and evaluation of actions taken. The nursing process is a standard in nursing practice that enhances quality of care, with a foundation in addressing the patient's biophysiological, psychological, social, and spiritual needs [2].

Description of Case

An 82-year-old male patient admitted to the Emergency Department (ED) with complaints of weakness. The physician diagnosed him with Acute Myeloid Leukemia (AML). Upon arrival, the patient's hemoglobin (Hb) level was 3.1 g/dL. He received one unit of blood transfusion in the ED. The general physician recommended a total of four units of packed red cells (PRC) for transfusion. The patient's Glasgow Coma Scale (GCS) score was 15, with a breakdown scores of E4V5M6, indicating full consciousness. After receiving one unit of PRC, the patient was transferred to the general care ward, where he received three packs of additional blood transfusions. After three days of hospitalization, his Hb level increased to 4.7 g/dL, with a leukocyte count of 7.6 ×103/µL, an erythrocyte count of 1.93 ×106/µL, and a hematocrit of 15.1%.

Assessment

Respiratory Status

The patient is breathing spontaneously, with a respiratory rate of 16 breaths per minute. Peripheral oxygen saturation is 91%, and the patient is on 3 liters per minute of oxygen via nasal cannula.

Cardiovascular

The patient's blood pressure is 109/62 mmHg, with a heart rate of 120 beats per minute. The ECG shows sinus tachycardia. A chest X-ray reveals cardiomegaly, while the lungs appear within normal limits.

Fluid and Nutrition

The patient was started on an infusion of 0.9% NaCl at a rate of 30 drops per minute upon admission to the Emergency Department. The patient weighs 65 kg and is 165 cm tall, with a Body Mass Index (BMI) of 23.8. The patient has spontaneous urination, with a urine output of 500 cc over the past 7 hours.

Physical Examination
Abdominal examination shows a flat and supple abdomen. The patient's self-care is assisted by his son. The patient reports experiencing diarrhea more than three times, and stool analysis indicates an amoebic infection (Entamoeba coli). The patient is receiving Metronidazole injections at 500 mg every 8 hours.

Ultrasound examination
Ultrasound examination of the patient revealed splenomegaly and gastritis. No abnormalities were observed in the liver, gallbladder, pancreas, both kidneys, or the urinary bladder.

Chest X-ray
Chest X-ray reveals cardiomegaly, while the lungs appear within normal limits.

Diagnoses
The diagnoses above are ordered according to priority. The nurse arranges the diagnoses based on what will be implemented first.

Table 1: Nursing Diagnoses

Diagnose	Evidence
Ineffective peripheral tissue perfussion	HB: 3,1 g/dl, decreased oxgyen saturation
Decreased cardiac output	The patient has history of heart disease, cardiomegali
Risk of bleeding	Low HB levels, decreased erythrocytes
Risk of infection	Immunosupression related to anemia, invasive prosedures

Nursing Care Plan
The interventions to be implemented according to the nursing diagnoses can be found in Table 2:

Table 2: Planning of Care

Problem	Intervention	Outcome
Ineffective Peripheral Tissue Perfusion	**Vital Sign Monitoring:** 1. Monitor blood pressure, pulse, temperature and respiration 2. Monitor hemoglobin levels 3. Monitor sign of anemia in the eyelids 4. Monitor capilary refill	**Vital Sign Status Outcomes:** 1. Sistole upper 100 mmhg 2. Oxygen saturation upper 93 % 3. The patient has no fever 4. Capilary refill less than 2 seconds 5. Normal pulse range 60-80x per minute
Decreased Cardiac Output	**Activity Theraphy:** 1. Colaboration with family in activity daily living 2. Monitor vital sign 3. Monitor for chest pain or tightness 4. Comfort position	**Physical Activity Outcomes:** 1. The family actively participate in activity daily living 2. Normal vital sign 3. No chest pain or tightness 4. Patient feels comfort
Risk for Bleeding	**Bleeding Precautions:** 1. Monitor hemoglobin levels 2. Using soft toothbrush 3. Monitor bleeding 4. Educate to the patien if there is bleeding, immediately report 5. Collaboration with doctor to give bood tranfusion	**Bleeding Control Outcomes:** 1. No bleeding 2. Normal vital sign 3. The family actively participates in preventing bleeding 4. Normal coagulation parameters
Risk for Infection	**Infection Control:** 1. Wash hand 2. Educate to take rest 3. Educate for eating 4. Collaboration with doctor to give antibiotic 5. Monitor leukocytes level 6. Monitor temperature	**Infection Control Outcomes:** 1. Normal temperature 2. Patient has enough sleeping 3. Patient has enough eating 4. Normal leukocytes 5. No shivering

Discussion
This case involves an 82-year-old patient with Acute Myeloid Leukemia (AML). The patient had a hemoglobin (Hb) level of 3.1 g/dL upon admission to the Emergency Department. The peripheral oxygen saturation (SpO2) level of the patient was 91%. This discussion addresses the assessments made, the diagnoses, and the interventions that will be implemented by the nurses.

The low Hb level of 3.1 g/dL indicates that such a deficiency in the blood can lead to acute severe anemia. Both acute and chronic anemia can result in damage to the brain [3]. Anemia in the elderly occurs in 60% of cases in hospital admissions. The most common causes are iron deficiency anemia and anemia due to inflammation [4].

The incidence of anemia is higher in men than in women. Inadequate nutritional intake due to anorexia is one of the causes of anemia. Anorexia can occur in patients with chronic illnesses. Addressing malnutrition involves nutritional screening of patients, albumin testing, and body composition analysis. Serum albumin is one of the parameters for assessing the nutritional status of patients [5].

The risk of decreased cardiac output in the patient is managed through collaboration with a cardiovascular specialist. An echocardiogram was performed, revealing that the global segmental left ventricular (LV) systolic function was within normal limits, with an ejection fraction (EF) of 74%.

Monitoring for signs of bleeding in the patient is conducted to ensure that the Hb level does not decrease further. After the administration of the fourth unit of blood transfusion, blood tests were evaluated, showing the patient's Hb level at 4.7 g/dL. The patient subsequently received another four units of packed red cells (PRC). After the completion of the blood transfusion (eight units total), laboratory evaluation indicated an Hb level of 8.9 g/dL. Throughout the treatment, no signs of bleeding were observed.

The patient was placed in a separate area from other patients to stabilize their condition. Immunocompromised patients require special care and education regarding adequate nutritional intake to maintain clinical stability.

Nurses also conducted assessments of nutrition and fluid balance. The patient consumed half a portion of food, and the nurse educated the patient to consume a full portion to reduce the risk of nutritional deficit. Fluid intake and output must also be monitored.

Radiological examination as chest x-ray revealed cardiomegaly, with no signs of pleural effusion. The cardiovascular system is affected by anemia. Anemia can lead to increased cardiac output as a compensatory mechanism, resulting in left ventricular hypertrophy. Left ventricular hypertrophy can be observed in chest X-ray and echocardiography findings. The increase in cardiac output is a compensatory mechanism to enhance systemic oxygen supply [6].

Abdominal ultrasound revealed splenomegaly. The sign of splenomegaly is an enlarged spleen, which is a clinical manifestation of systemic diseases such as hematological disorders, including leukemia, lymphoma, and idiopathic thrombocytopenic purpura (ITP). Some patients with iron deficiency anemia also experience splenomegaly. The occurrence of splenomegaly is noted in 50% of patients with severe anemia [7].

Holistic care is essential for optimizing the determined outcomes for the patient. The patient expressed satisfaction during their hospital stay due to the involvement of various responsible care professionals, including nurses, nutritionists, internists, cardiologists, pharmacists, and other professionals.

Conclusion

An 82-year-old patient with a diagnosis of Acute Myeloid Leukemia (AML) has a hemoglobin level of 3.1 g/dL. The patient requires immediate blood transfusion and oxygen supplementation to maintain oxygen saturation above 93%. Nursing diagnoses include ineffective peripheral tissue perfusion, risk for decreased cardiac output, risk for bleeding, and risk for infection. The nurse collaborates with an internist and cardiologist. Interprofessional collaboration is essential to achieve optimal healing and treatment outcomes for the patient.

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