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ACUTE PROMYELOCYTIC LEUKEMIA PRESENTING AS FOCAL NEUROLOGIC FINDINGS AND DETERIORATING MENTAL STATUS

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☐ **Abstract—Background: Acute promyelocytic leukemia (APL) is a rare but particularly malignant form of acute leukemia that is characterized by a rapid progression to fatal hemorrhage. Survival rates of patients with APL have increased with the introduction of all-*trans* retinoic acid (ATRA), but early deaths caused by hemorrhage still persist. Case Report: A man with undiagnosed APL presenting with focal neurologic findings and deteriorating altered mental status caused by an intracranial hemorrhage is discussed. Why Should An Emergency Physician Be Aware of This?: It is important to consider APL when diagnosing etiologies for intracranial hemorrhage. In addition to standard care, early administration of ATRA is recommended upon clinical suspicion of the disease.** © **2016 Elsevier Inc. All rights reserved.**

☐ **Keywords—acute promyelocytic leukemia; all-*trans* retinoic acid; APL; ATRA; hemorrhage; intracranial hemorrhage; leukemia**

INTRODUCTION

Acute promyelocytic leukemia (APL) was first described by Norwegian hematologist Lief Hillestead in 1957 (1). It is a unique subtype of acute myeloid leukemia (AML) caused by a translocation between genes on chromosomes 15 and 17, which results in arrested differentiation of myeloid cells at the promyelocyte stage. The disease accounts for 10% of AMLs in adults, with the age of onset ranging between 20 and 60 years of age (2). In a 2012 population-based study of APL by Yiming et al., with results from the Surveillance, Epidemiology and End Results (SEER) database, they found a total of 1400 cases in the United States over a 30-year period (1975–2008) (3).

APL is historically one of the most malignant forms of acute leukemia, and it is characterized by a rapidly fatal course (2,3). This morbid prognosis has changed in recent years with the discovery of all-*trans* retinoic acid (ATRA), a revolutionary chemotherapeutic agent that has tripled survival rates from the disease since its introduction (3). Given the rapid progression of symptoms associated with the disease, if the diagnosis is suspected in a patient, it should be treated as a medical emergency (4). Early death is most commonly caused by intracranial hemorrhage (ICH) as a result of coagulopathy caused by the disease (5). In this report, we discuss a man who presented with ICH in the setting of undiagnosed APL.

CASE REPORT

Emergency Department Evaluation

A 53-year-old man presented to our emergency department (ED) after transfer from a satellite hospital

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reporting minor complaints of right upper extremity weakness and paresthesias. According to reports from the outside facility, his symptoms began around 10:00 AM, which was 5 h before his arrival in our ED. He denied having had a headache. He further denied any recent trauma. A contrast computed tomography (CT) scan of the head and neck at the satellite hospital at 2:30 PM showed a 6-cm left frontoparietal hemorrhage and midline shift concerning for transtentorial herniation and lateral brainstem compression (Figure 1A). The patient was transferred to our tertiary care center for further management.

His neurologic examination markedly deteriorated from his initial presenting symptoms during the transfer. Upon arrival at our ED, his neurologic assessment revealed garbled speech, a leftward gaze preference (still maintaining ability to cross midline), a right-sided facial droop, tongue deviation to the right, and both right upper and lower extremity plegia for a National Institutes of Health Stroke Scale score of 27. He was immediately intubated for airway protection. Examination of the skin revealed multiple ecchymoses over the upper extremities and chest wall, which were noted to be new from all previous documentation. The complete blood cell count and coagulation test results were still pending at the outside facility laboratory at the time of transfer.

A second CT scan performed in our ED 2 h after the initial scan revealed worsening left frontoparietal hemorrhage with left-to-right midline shift increasing from 4 mm to 9 mm (Figure 1B). Shortly after the results of his CT scan were provided, the laboratory called with concerning results of a platelet count of 7000/μL, a hemoglobin level of 27.8 g/dL, and a white blood cell count of 18,200/μL. His white blood cell differential showed 3% neutrophils, 5% lymphocytes, 2% myelocytes, and 89% blasts. The prothrombin time was 13.3, correlating to an international normalized ratio of 1.20, and the partial thromboplastin time was 20.7. His electrolytes, blood urea nitrogen, and creatinine levels were normal. Further testing was sent. His fibrinogen was 154 mg/dL and his d-dimer was 10.09 mg/L. Analysis of the peripheral blood smear showed a unique and pathognomonic abnormality (Auer rods).

Given the severe thrombocytopenia and coagulopathy in patients with active ICH, platelets and cryoprecipitate were emergently transfused. Mannitol and hypertonic saline were administered for impending herniation. Neurosurgery was consulted immediately for intracranial hemorrhage, but severe thrombocytopenia precluded surgical candidacy. The abnormal findings documented on peripheral smear triggered the laboratory for a critical finding concerning for APL. Hematology was consulted and established the diagnosis based on the findings of Auer rods seen on peripheral blood smear. ATRA was emergently administered, and the patient was admitted to the intensive care unit.

Hospital Course and Further Care

The patient's platelet count rose to 16,000/μL after the initiation of ATRA but subsequently fell to 7000/μL despite repeated transfusions. A repeat CT scan performed 20 h after symptom onset (Figure 1C) showed no significant interval change in left frontoparietal hemorrhage or midline shift, but confirmed uncal and descending transtentorial herniation. Given his catastrophic neurologic injury, the patient was placed on a morphine infusion and terminally extubated on hospital day 2.

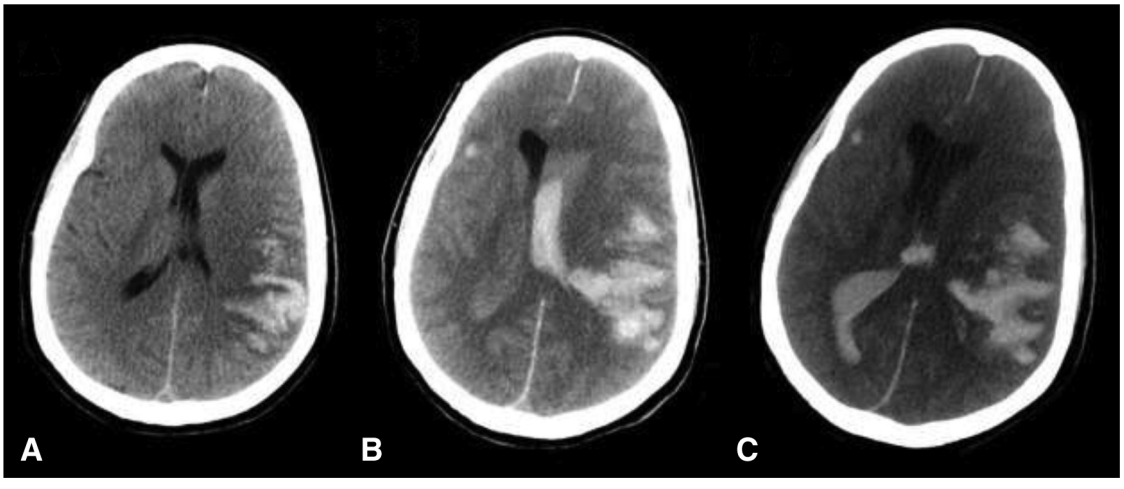

Figure 1. Computed tomography scans of the head at 4.5 h (A), 6.5 h (B), and 20 h (C) after symptom onset.