Case Report

Reversed Halo Sign in Leukemia? Don't Forget Tuberculosis!

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Abstract

The Risk of TB has been reported as increased with diabetes and leukemia. We report the case of a 44-year-old patient with coexisting diabetes, acute myelocitic leukemia and TB. He was admitted in septic shock. A chest High Resolution Computed Tomography Scan (HRCTS) showed the reversed halo sign.

Keywords: Tuberculosis; Reversed halo sign; Leukemia; Diabetes

Case Presentation

A 44 year-old men presented with a 3 week history of 24 hours with nausea, vomiting, fever and malaise. He was diagnosed with type 2 Diabetes 8 years earlier and he was receiving metformin and Insulin. No respiratory symptoms were reported. He had a 5 kg weight loss. There was no previous TB exposure. Physical examination revealed a critically ill man with fever 101°F and hypotension, 80/40 mmHg. Diffuse bilateral pulmonary crackles were found. A 2 cm abscess was found in the left foot. Blood cell count showed pancytopenia. A bone marrow aspirate revealed 80% of blastic myeloid cells. Diagnosis of Acute Myeloid Leukemia (AML) was established. Serum glucose was 284 mg/dL. A chest HRCTS showed bilateral diffuse consolidations mainly at the lower fields, and the reversed halo sign was observed in the left lower lobe (Figure 1). The patient was admitted to intensive care unit and underwent a bronchoscopy. AFB stain from Bronchoalveolar Lavage (BAL) was positive. No other microorganism was found neither in the BAL, abscess nor hemocultures. Serum and BAL galactomannan were negative. He was started on cefepime and vancomycin. Chemotherapy for AML was initiate with a 7 plus 3 regimen with cytarabine 100 mg/m^2 in a 24-hours infusion through days 1 to 7 and doxorubicin 50 mg/m^2 days 1 to 3. TB treatment included four first line drugs: Isoniazid (300 mg/d), Rifampin (600 mg/d), Ethambutol (1,200 mg/d) and Pirazinamide (1,600 mg/d). Patient improved quickly and he was discharged from the hospital after seventeen days. Diagnosis of TB was confirmed by means of a pan sensitive culture. At six-month follow-up, he was on complete remission of the AML, diabetes was under control and he was considered cured of TB.

Discussion

The coexistence of diabetes, AML and TB makes our case noteworthy, in addition to the presence of the Reverse Halo Sign, which is not among the most common findings of TB. TB continues

to be a public health problem and is one of the leading causes of death worldwide [1]. Diabetes increases the risk of TB by 3-4 times [2], while leukemia does it by 2-40 times [3,4]. Mexico reports over 15,000 new cases and 2,500 deaths by TB every year. Diabetes is the most common co-morbidity of TB in this country, but leukemia is not [5]. Pulmonary infections are common complications on hematological malignancies and a leading cause of death in these patients. TB is not one of the most frequent infections in that setting [6]. TB in patients with leukemia presents with acute/sub-acute fatigue and/or malaise with febrile syndrome and unspecific pulmonary infiltrates. Suspicion of TB arises when a patient with a presumptive diagnosis of pneumonia does not respond to broad-spectrum antibiotics. Usual radiological findings of TB include fibrocavitary infiltrates in the upper lobes, but findings are diverse in immunosuppressive conditions such as leukemia and diabetes [7]. The Reversed Halo Sign describes a central ground-glass opacity surrounded by denser consolidation in the shape of a ring or crescent, and it has been associated with many

Figure 1: Subpleural reversed halo sign in the left lower lobe.

diseases. Even thought TB is one of them, it is not at the top of the list [8]. Since this finding is not pathognomonic of any disease, a broad diagnostic workout is needed to find the etiology. Early treatment of both TB and AML was mandatory in this case. Leukemia therapy should be started simultaneously with an adequate TB treatment that includes at least four effective drugs [9]. Induction chemotherapy was initiated with a 7 plus 3 regimen with cytarabine and doxorubicin according to guidelines [10]. There is no contraindication for the use of first line oral drugs for TB in association with cytarabine and doxorubicin [11]. Our patient was carefully monitored and he did not present any adverse event. Metformin and Rifampin interaction may cause low metformin levels [12]. While in the hospital, the patient received insulin to successfully achieve diabetic control.

Co-existence of those three diseases implies a diagnostic and therapeutic challenge. Reversed Halo Sign finding in the scenario of diabetes and leukemia may help the clinicians by narrowing the differential diagnosis. In endemic settings, TB must be considered and ruled out when Reversed Halo Sign is observed.

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