Unusual Side Effect of Arsenic Trioxide (ATO) in Acute Promyelocytic Leukemia (APL): A Case Report

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Introduction

- APL is a rare subtype of acute myeloid leukemia (AML), characterized by the t(15;17) translocation. Patients have a favorable prognosis upon immediate recognition and treatment. With the introduction of all-trans-retinoic acid (ATRA) and the recent development of therapies including arsenic trioxide (ATO), APL is considered the most curable form of AML. (1)

Case presentation

- We present a case of 79-year-old male, who presented to the emergency room in July 2022 with severe fatigue, dyspnea, high grade fever. His blood test showed Hb of 10 g/dl, thrombocytopenia and leukopenia (WBC 0.5 x10⁹/l) and neutrophil count of 0.2 G/L
- Admitted to the hospital with an initial diagnosis of pneumonia based on the results of a thoracic scan. After 2 days, an ecchymosis purpura extending to the upper limbs was observed with a hematoma of the left elbow. Blood test showed and Hb of 10.3 G/dl, WBC 16.8 G/L, and PLT 19 G/L. The patient received a transfusion of PFC and platelets.
- Blood analyses showed bicytopenia and hyperleukocytosis (Hb 7.5 G/dl, WBC 27.7 G/L, and PLT 25 G/ L).
- Bone marrow biopsy and flow cytometry showed a PML-RARA transcripts and a t(15;17) and 94 % blasts
- Initiation of the treatment by ATRA + arsenic per APPOLO protocol.
- J2 of administration of the arsenic trioxide, the patient had an episodes of confusion, hallucination, and alertness disorder.
- Neurologic examination showed a Glasgow 13/15, with a suspicion of a toxic encephalopathy.
- Investigation revealed the the level of arsenic trioxide in the blood was 504 nmol/L where the normal level should be N<40
- EEG and a Cerebral MRI were done and showed no adverse pathology.
- Treatment with dimercaptosuccinic acid (DMSA) succimer 600 mg TID, an antidote for arsenic toxicity
- The patient subsequently experienced clinical improvement and a decline in arsenic trioxide blood levels.

Discussion

- This case report describes a rare case of unusual Side Effect of Arsenic Trioxide (ATO)
- No reported cases in APL showed this toxicity by ATO , and also not known to cause encephalopathy in leukemic patient
- This adverse event was reversible after treatment with the arsenic chelating .

Conclusions

- Our case of a 79-year-old male with Unusual Side Effect of Arsenic Trioxide (ATO) in Acute Promyelocytic is quite unique and warrants to be reported.
- The combination of Arsenic Trioxide and the all-trans-retinoic acid demonstrate a noteworthy evolution in treatment options by offering patients the hope of living longer and experiencing significant improvement in quality of life.
- Routine patient monitoring and optimized management of patients who present special challenges will help improve patient outcomes
- There is a need to conduct more observational and experimental studies to understand the mechanisms of toxicity of Arsenic Trioxide as the mechanism of toxicity is not well understood (2)
- Monitor for signs of Toxicity , CNS toxicity and the introduction of the antidote for Arsenic

References

1. Iland HJ. Curative strategies in APL. Semin Hematol. 2019;56(2):131–138. doi: 10.1053/j.seminhematol.2018.07.004.
2. Hindmarsh JT, McCurdy RF. Clinical and environmental aspects of arsenic toxicity. Crit Rev Clin Lab Sci. 1986;23(4):315–347. doi: 10.3109/10408368609167122
3. Ratnaike RN. Acute and chronic arsenic toxicity. Postgrad Med J. 2003;79(933):391–396. doi: 10.1136/pmj.79.933.391