Undiagnosed extreme essential thrombocythemia as cause of miscarriages and pseudo-electrolyte abnormalities in young female

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Introduction

- Essential thrombocythemia (ET) is the most common type of myeloproliferative neoplasm, defined as a platelet count more than 450K/mcl in the presence of Janus kinase 2 (JAK2), Calreticulin (CALR) or myeloproliferative leukemia virus oncogene (MPL) mutation, lacking other causes
- ET is a rare disease; the incidence is estimated at 1.2 to 3.0 per 100,000 population per year
- The average age of diagnosis is 60 years old, mostly occurring in females
- The diagnosis of ET may be missed as patients with an elevated platelet count may remain asymptomatic or thrombocytosis may be attributed to reactive causes
- Platelet counts greater than 1,000K/mcl are associated with thrombosis, pseudo-electrolyte abnormalities, recurrent miscarriages, acquired von Willebrand Disease, or transformation to hematological malignancy

Case Description

- We demonstrate the case of a 22-year-old G3P0 pregnant female with a past medical history of two miscarriages, menorrhagia, and easy bruising who presented to the emergency department with new onset epistaxis
- No history of strokes, thrombosis, blurry vision, burning of feet. Patient did state she bruises easily
- CBC: elevated platelet count of 4,250K/mcl, with repeat count at 3,767K/mcl
- The patient was admitted to the hospital with consult to hematology/oncology, and workup for myeloproliferative neoplasia initiated

Results

- ANA, anti-phospholipid panel, HIV, ESR, CRP, HIV, coagulation panel, von Willebrand factor activity, antigen, factor VIII activity and multimers were negative
- Review of peripheral blood smear showed excessive amount of different size and shape platelets
- Bone marrow biopsy from the iliac bone: 80% cellular bone marrow and marked increase in megakaryocytogenesis with many enlarged, hyperlobulated megakaryocytes
- A diagnosis of ET was made
- Nephrology was consulted for hypercalcemia (11.1) and treatment resistant acute hyperkalemia (6) with new peaked T-wave changes on EKG
- Venous blood gas level potassium showed normal potassium levels (3.6), and PTH, ionized phosphorus, and ionized calcium were also within normal limits, confirming pseudo-electrolyte derangements secondary to ET

Conclusion

- As the patient was currently pregnant at approximately 8 weeks, cytoreduction with hydroxyurea or anagrelide was not recommended
- Our facility was unable to perform plateletpheresis; therefore, the patient was discharged once medically stable with outpatient hematology/oncology follow up for interferon treatment

Discussion

- ET can be stratified into low, moderate, and high risk categories using the international prognostic score of thrombosis (IPSET)
- Our pregnant patient had a low IPSET score; however, because of her extremely high platelet count and recurrent miscarriages, she was clinically upgraded to the high risk category and therefore, required cytoreduction therapy

Table 1. The revised IPSET model for thrombotic risk stratification in ET

Risk	Attributes	Management
Very low	Age ≤60 years, JAK2 wild type, no prior thrombosis	Observation or low-dose aspirin, unless contraindicated*
Low	Age ≤60 years, JAK2V617F, no prior thrombosis	Low dose aspirin, unless contraindicated; twice-daily aspirin if CV risk factors present
Intermediate	Age ≥60 years, JAK2 wild type, no prior thrombosis	Cytoreductive therapy + low dose aspirin; or twice-daily aspirin without cytoreductive therapy if no CV risk factors present
High	Age ≥60 years, JAK2V617F, or prior thrombosis	Cytoreductive therapy + low-dose aspirin

*Aspirin is generally contraindicated in the presence of acquired von Willebrand disease

- Treatment for ET can be challenging during pregnancy; standard therapies such as hydroxyurea can be teratogenic and unsafe, particularly in the first trimester
- In these cases, we look to secondary and tertiary treatment options with appropriate risk management for miscarriage and future complications
- This case provided a rare clinical scenario with varying complications in an uncommon, smaller, niche patient population - a younger, pregnant female