Children and MPN

Background

Polycythemia Vera (PV), Essential Thrombocytosis (ET), and Primary Myelofibrosis (PMF) are extremely rare disorders in children. It is thought that the diagnosis of MPNs in children may be increasing due to the increased ease and frequency of complete blood counts being checked. However, true incidence rates are hard to calculate due to the overall small numbers of patients and limited experience at individual medical centers. PMF seems to occur in infants and younger children, while PV and ET seem to occur more often in children and adolescents.

Symptoms

Children with MPN may present with similar symptoms to adults that can include:

- A headache
- Fatigue
- Itching
- Nausea or Abdominal pain
- Pain and/or redness in the hands and feet
- Bleeding issues
- Blood clots

Diagnosis

One of the most important things to do when evaluating a child for polycythemia or thrombocytosis is to make sure that it is not secondary to another underlying issue. There are numerous causes of secondary polycythemia or thrombocytosis and these are more common than MPNs. If secondary causes are ruled out, children undergo similar evaluations to adults.

Beyond blood tests such as the complete blood count (for all MPN) and erythropoietin levels (for PV), children undergoing evaluation for MPN should have bone marrow evaluations and genetic testing for JAK2, CALR, and possibly MPL mutations (MPL for PMF or ET work up)

Various studies have shown that children with MPN have lower rates of JAK2, MPL, and CALR mutations than adults. Because of this, it has been suggested that children may require different diagnostic criteria from adults. A negative genetic screen should not rule out the diagnosis of MPN but a positive test can be helpful in the workup.

Available Treatments

Managing symptoms and preventing secondary events should be key goals of therapy. Risk stratifications for children are not clear and large, consensus treatment guidelines are lacking.

PV in children

- Phlebotomy to keep hematocrit below 45% is recommended by some experts
- Low-dose aspirin is also suggested, especially in the setting of microcirculatory symptoms
- For those with more severe symptoms such as severe thrombotic events, cytoreductive therapy (hydroxyurea or interferon) has been recommended

ET in children

- In asymptomatic children, many have suggested no therapy is required
- Low-dose aspirin for children with mild symptoms or cardiovascular risk has been recommended by many
- Caution should be taken given the risk of acquired von Willebrand disease and bleeding with extreme thrombocytosis
- For those children with severe symptoms or resistance to aspirin treatment, cytoreductive therapy has been used (including hydroxyurea, interferon, and Anagrelide.)

PMF in children

- Supportive care has been suggested for lower-risk children with PMF
- Hematopoietic stem cell transplant has been used successfully in young children with PMF
- Newer therapeutics, such as JAK inhibitors, have not been studied in detail in children with MPN.