Philadelphia-negative myeloproliferative neoplasm

Philadelphia-negative myeloproliferative neoplasms (MPNs) are a group of rare blood disorders characterized by the abnormal growth and function of blood cells in the bone marrow. These disorders are called “Philadelphia-negative” because they do not involve a specific genetic mutation known as the Philadelphia chromosome, which is associated with another type of blood cancer called chronic myeloid leukemia (CML).

The three main types of Philadelphia-negative MPNs are:

Polycythemia vera (PV) - a disorder in which the bone marrow produces too many red blood cells, leading to an increased risk of blood clots and other complications.

Essential thrombocythemia (ET) - a disorder in which the bone marrow produces too many platelets, which can lead to excessive bleeding or blood clots.

Primary myelofibrosis (PMF) - a disorder in which the bone marrow produces too many fibrous tissues, leading to anemia, fatigue, and other symptoms.

Symptoms of Philadelphia-negative MPNs can vary depending on the type of disorder and the severity of the condition. Common symptoms include fatigue, weakness, shortness of breath, and an increased risk of bleeding or blood clots.

Treatment for Philadelphia-negative MPNs may include medications to reduce the production of abnormal blood cells, blood thinners to prevent blood clots or bone marrow transplantation in severe cases. Regular monitoring and follow-up care with a hematologist or oncologist are also important to manage symptoms and prevent complications.

Bone Marrow Features

The blood and bone marrow morphology are essential in diagnosis, for WHO classification, establishing a baseline, monitoring response to treatment and identifying changes that may indicate disease progression. The blood film changes may be in any of the cellular elements. The key bone marrow features are architecture and cellularity, relative complement of individual cell types, reticulin content and bony structure. Megakaryocytes are the most abnormal cell and key to classification, as their number, location, size and cytology are all disease-defining. Reticulin content and grade are integral to assignment of the diagnosis of myelofibrosis. Even with careful assessment of all these features, not all cases fit neatly into the diagnostic entities; there is frequent overlap reflecting the biological disease continuum rather than distinct entities. Notwithstanding this, an accurate morphologic diagnosis in MPN is crucial due to the significant differences in prognosis between

different subtypes and the availability of different therapies in the era of novel agents. The distinction between “reactive” and MPN is also not always straightforward and caution needs to be exercised given the prevalence of “triple negative” MPN. Here we describe the morphology of MPN including comments on changes with disease evolution and with treatment [1)]

1)

Ng ZY, Fuller KA, Mazza-Parton A, Erber WN. Morphology of myeloproliferative neoplasms. Int J Lab Hematol. 2023 May 21. doi: 10.1111/ijlh.14086. Epub ahead of print. PMID: 37211431.