Ban the Bands
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I'm a huge fan of the Immature Granulocyte (IG) count. I can see a clear cut left shift of truly significant cells – metamyelocytes, myelocytes and promyelocytes – with the IG. We now define a left shift as an absolute IG count of > 0.1 x10^3/µL. This is a small number of rare, but significant cells in the blood.

Let's compare the automated IG with the manual differential. A patient with an absolute IG count of 0.2 x10^3/µL, meets our definition for a left shift. If the WBC count was 20 x10^3/µL, this means the analyzer found 320 cells out of 32,000 cells that have cellular features (cell membrane characteristics, cytoplasmic granularity, nuclear material, etc.) meeting criteria for an immature granulocyte (metamyelocyte, myelocyte or promyelocyte). Since the manual differential only counts 100 cells, to have the same result of 0.2 x10^3/µL immature granulocytes, one immature granulocyte needs to be identified. However, the manual differential is limited by uneven distribution of cells on the slide and subjectivity of the person making the decision. If zero metamyelocytes, myelocytes or promyelocytes are identified by manual review, then the IG = 0.0 x10^3/µL, if two are seen the IG = 0.4 x10^3/µL. For a physician reviewing the CBC results, one cell on the manual differential can make the difference between no suspicion of infection versus suspicion of infection.

Looking back, I would like to make it clear to our staff that Neutrophils should be broken down into two groups, the Mature Neutrophils and the Immature Granulocytes.

1. **Mature Neutrophils** consist of segmented neutrophils and bands. The mature Neutrophil Count is the same as the Absolute Neutrophil Count (ANC).

2. **Immature Granulocytes** consist of metamyelocytes, myelocytes and promyelocytes. Previous hematology analyzers could not identify or quantify immature granulocytes, so the manual differential was the only way to identify cells less mature than segmented neutrophils.
Two seminal articles written about the ITR (Manroe, 1979 and Schelonka 1994) give different reference values with ≤ 0.16 in one study (Zero-24 hours after birth) and 0.05-0.27 in the other (4 hours after birth). Both studies had one person performing the manual differentials, so neither study reflects the real world experience where more than one lab tech would be performing manual differentials.

An ITR of 0.2 has often been cited in the literature as the cut off for determining negative or positive probability a neonate has an infection. But, because the band count comes from the subjective, imprecise manual differential, the ITR is not reproducible. So now that we have an analyzer that can identify and quantify the immature granulocytes, wouldn’t the IG count be better than the ITR?

To me, the answer is Yes! Hands down, the automated IG is better than the ITR.

Other important parameters with our new hematology analyzer include the Immature Platelet Fraction (IPF) and the Reticulocyte Hemoglobin Content (RET-He). It’s not just a CBC.

My hospital has been live on Sysmex for almost a year now. For any lab that is in the process of implementing the ACPs, I would recommend learning about the tests as much as possible and educating administration, clinicians, informatics, pharmacy, etc., as early as possible. Find out if any committees or workgroups at your hospital or in your system are working on care pathways, quality improvements or other projects that where the ACPs could be useful. The parameters directly relate to infection/sepsis and anemia management, all of which are on hospital administration’s radar.

References:

For more information, click on any of the following:

**Advanced Clinical Parameters (ACPs): Just What the Doctor Ordered**
(4/17/2013) Holly L. McDaniel, MD Clin-Path Associates, PLC Pathology Specialists of Arizona Laboratory Medical Director Banner Estrella Medical Center Phoenix, AZ

**Introduction to ACPs with Dr. McDaniel**

**IPF - Frequently Asked Questions**

**IG - Bibliography**