sysmex

sysmex news

Ban the Bands

Originally Published Spring 2013

Ban the Bands

Dr. Holly McDaniel, MD
Medical Director at Banner Estrella Medical Center

Dr. Holly McDaniel, MD, a pathologist with Clin-Path Associates, is the Laboratory Medical Director at Banner Estrella Medical Center (BEMC) in Phoenix Arizona, submitted this article for the lab week contest. BEMC is part of the Banner System which manages 23 acute-care hospitals, as well as other health services in seven states. In Arizona, the Lab Techs and Pathologists work together as Laboratory Sciences of Arizona (LSA) and Pathology Specialists of Arizona (PSA) to provide excellent laboratory services to the Banner patients, physicians and hospitals.

I am such a fan of Sysmex. As soon as I heard about the new parameters, Immature Granulocytes, Reticulocyte Hemoglobin, and Immature Platelet Fraction, I met with my CMO to discuss the impact that these new tests could have on patient care. The Banner Arizona Hospitals would be first to implement during 2011-2012. In the future, we expect all of the Banner Hospitals to implement the Sysmex hematology platform and report the Advanced Clinical Parameters (ACPs).

Banner Estrella Medical Center

Implementation of the Sysmex XE-5000 in nine large hospitals was fairly easy. You would think getting so many analyzers up and running in multiple hospitals, would be impossible to do in seven months. Especially, when we had CAP inspections in the middle of the implementation process! But we have outstanding laboratory technologists and the Sysmex team supported us every step of the way. It was "bam, bam, bam," starting in December 2011 and finished up in May 2012. We've been extremely happy with the whole process.

The first step was implementing the analyzers in the Banner Arizona Hospital Laboratories. The next step is utilizing them to improve patient care. Education is key. Prior to implementation at my hospital, I gave presentations to each department to give them an overview of the ACPs. Handouts, memos and table toppers were also used to get the word out. Now that we are up and running, there are interpretive messages to help our end-user, clinicians, nursing, pharmacists etc., better understand these parameters. For example, the IG message states that" the IG count includes metas, myelos, pros. Bands are not included in the IG count. They are included with the neutrophil count."

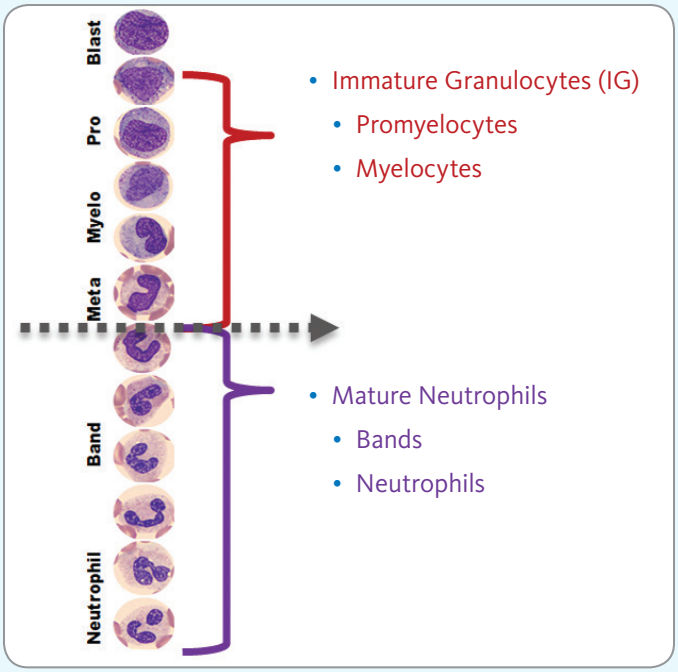
I'm a huge fan of the Immature Granulocyte (IG) count. I can see a clear cut left shift of truly significant cells – metamyelocytes, myelocytes and promyelocytes – with the IG. We now define a left shift as an absolute IG count of > 0.1 x10^3/uL. This is a small number of rare, but significant cells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



I am on a crusade to "BAN the BANDS"! Unfortunately this is more difficult than first anticipated. The band count is enmeshed in the medical literature as part of the criteria to help identify when a patient has a significant bacterial infection (SBI) or is septic. The neonatologists are hanging on tightly to the band count, as it is part of their equation for the Immature to Total Neutrophil Ratio (ITR).

Immature Neutrophils
(BAND+Meta+Myelo+Pro)

Total Neutrophils
(Seg+BAND+Meta+Myelo+Pro)

= ITR

From a MANUAL count of 100 cells

Two seminal articles written about the ITR (Manroe, 1979[1] and Schelonka 1994[2]) 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:

1. Manroe, Barbara L. et al. The neonatal blood count in health and disease. I. Reference values for neutrophlic cells. *Journal of Pediatrics*, vol 95, No. 1, 1979 pp 89-98.
2. Schelonka, Capt. Robert L. et al. Peripheral leukocytes count and leukocyte indexes in healthy newborn term infants. *Journal of Pediatrics*, vol 125, Number 4, 1994, pp 603-606.

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

Sysmex Corporation
1-5-1-Wakinohama-Kaigandori
Chuo-ku, Kobe 651-0073, Japan
Tel. +81 (78) 265-0521
www.sysmex.co.jp

Sysmex America, Inc.
577 Aptakisic Road
Lincolnshire, IL 60069, U.S.A.
Tel. +1 (800) 379-7639
www.sysmex.com/us

Sysmex Canada, Inc.
5045 Orbitor Drive
Building 9, Suite 401
Mississauga, ON, L4W 4Y4, Canada
Tel. +1 (905) 366-7900
www.sysmex.ca

Sysmex Latin America and the Caribbean
Rua Joaquim Nabuco 615 - Bairro Cidade Jardim
São José dos Pinhais
Paraná – Brasil – CEP 83040-210
Tel. +55 (41) 2104-1314
www.sysmex.com.br