Q & A Column, 5/14

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Submit a Question

Reporting percent cell count reference ranges

Managing WBC diff 24-hour urine samples

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Q. Checklist requirement HEM.23050 regarding reference intervals includes a note that if absolute cell counts are reported with their reference ranges, then percent cell count reference ranges should not be reported because they can lead to misinterpretation of CBC data. I understand that many laboratories, like ours, have been reporting reference ranges for both absolute and percent cell counts, and I would like to clarify whether this is permissible.

A. Regarding HEM.23050, currently it is strongly recommended (though not an absolute requirement) that WBC differential percent cell count reference ranges not be reported when accompanied by reporting of absolute cell counts with their reference ranges. It remains at the discretion of the laboratory as to how reference ranges are to be reported, but impact on patient care decisions at the institution should be considered.

The CAP Hematology/Clinical Microscopy Resource Committee provides the following explanation: "If absolute cell counts are reported with their reference ranges, then percent cell count reference ranges should not be reported. In this situation, reporting percentage reference intervals is discouraged because individual values regarded as normal, high, or low may be discordant with the corresponding absolute values, leading to misinterpretation of CBC data. Absolute cell count values are the clinically meaningful parameters and must be accompanied by their reference intervals."

To illustrate the difference between results as compared with their respective reference ranges, a case example is provided below (excerpted from the March 2010 CAP TODAY article "For WBC differentials, report in absolute numbers").

Mr. Jones is a 54-year-old man with a fever and fatigue. The CBC shows a WBC of 2.0 × 109/L with the following differential:

- Neutrophils 40% (40–70%)
- Lymphocytes 50% (15–45%)
- Monocytes 10% (0–12%)
- Eosinophils 0% (0–7%)
- Basophils 0% (0–2%)

Based on review of this proportional differential and its associated reference ranges, one could conclude the

patient has lymphocytosis (albeit relative) and pursue diagnostic considerations based on this result. Many of us have been witness to clinical conversations similar to this. If these differential results are converted to absolute values, the following data would be more appropriately evaluated:

- Neutrophils 0.80 × 109/L (1.8–6.8 × 109/L)
- Lymphocytes 1.00 × 109/L (1.0–3.4 × 109/L)
- Monocytes 0.20 × 109/L (0.2–0.8 × 109/L)
- Eosinophils 0.00 × 109/L (0.0–0.4 × 109/L)
- Basophils 0.00 × 109/L (0.0–0.1 × 109/L)

Now we can easily recognize that the patient has a moderate neutropenia and may be at risk of infection. In addition, we now focus our diagnostic considerations on the causes of neutropenia. We also recognize that the patient does not have a true lymphocytosis, as the absolute lymphocyte count is at the lower end of the reference range.

1. Etzell JE. For WBC differentials, report in absolute numbers. *CAP TODAY 2010.* March;24(3):12.
2. Richardson-Jones A, Twedt D, Hellman R. Absolute versus proportional differential leukocyte counts. *Clin Lab Haematol* 1995;17(2):115–123.

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Q. I work in an 800-bed university hospital core lab. My question is about the processing of 24-hour urines. We get so many per day that the jugs have become difficult to manage. When a test needs acidification, our lab assistants aliquot all tests that do not need any additive. To the remaining urine, they add 25 mL of 1 N HCl (remaining volume must be > 500 mL), mix it up, and aliquot into a sample tube. This tube is set aside for one hour for equilibration before testing is performed. The jug is then discarded. Is this an acceptable practice? In the past, we left the jug for one hour after acidification before aliquoting into a sample tube. But the process is messy and hard to manage.

A. Urine samples may be aliquoted and frozen for analysis at a later time, but to prevent specimen degradation as a consequence of repeated freeze-thawing, the urine sample should be frozen in aliquots.[1] For urine samples that do not require acidification, the urine may be aliquoted and frozen, and the excess discarded. It is important to check for adequate acidification of the entire urine specimen before the aliquoting process, especially for amino acid evaluation (pH ≤ 3.0) and for catecholamines, vanillylmandelic acid (VMA), and 5-hydroxyindoleacetic acid (5-HIAA) (pH 1.0–2.0).[1] After verification of adequate acidification, the aliquots can be saved and the excess urine discarded.

Recently, the Mayo Clinic Department of Laboratory Medicine and Pathology initiated a urine collection study to determine the stability of analytes under different preservatives and temperature conditions. Mayo Clinic suggests

that 30 mL of 6 N HCl be added per 24-hour collection.[2] See the Mayo urine preservatives chart for details.[2]

1. Henry JD, ed. *Clinical Diagnosis and Management by Laboratory Methods.* 20th ed. Philadelphia: W.B. Saunders; 2001.

2. mayomedicallaboratories.com/it-mmlfiles/Urine_Preservatives10.pdf

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