Q&A column, 6/15

Editor: Frederick L. Kiechle, MD, PhD

Submit your pathology-related question for reply by appropriate medical consultants. CAP TODAY will make every effort to answer all relevant questions. However, those questions that are not of general interest may not receive a reply. For your question to be considered, you must include your name and address; this information will be omitted if your question is published in CAP TODAY.

Submit a Question

Blood components for IgA-deficient patients

Measuring lactate concentrations

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Q. Can IgA-deficient patients who require transfusion receive blood only from donors who are also IgA deficient?

A. Patients who are IgA deficient and do not have a history of a prior anaphylactic transfusion reaction do not require IgA-deficient blood components. Most case reports of IgA-related anaphylactic transfusion reactions in the literature describe generalized reactions in patients with selective IgA deficiency (less than 0.05 mg/dL IgA) who also had anti-IgA in their plasma. Anaphylactic reactions may occur following transfusions of plasma in patients with or without IgA deficiency. A recent review of published cases of transfusion-related anaphylaxis, as well as more recent hemovigilance data, indicate that IgA deficiency with anti-IgA is rarely, if ever, an etiologic factor in transfusion-associated anaphylaxis.[1]

1. Sandler SG, Eder AF, Goldman M, Winters JL. The entity of immunoglobulin A-related anaphylactic transfusion reactions is not evidence based. *Transfusion.* 2015;55(1):199–204.

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Q. There are studies that indicate that lactate is a great marker for sepsis. Typically, lactate results are accurate if the preanalytical variables are controlled. Is the lactate test more accurate on a blood gas analyzer using ion-selective electrode or on a general chemistry analyzer using oxidation-reduction reaction—or are they both reliable methods?

A. Measuring lactate concentrations in blood is important for detecting impaired circulation and tissue oxygenation in critically ill patients. It is highly desirable to use methods that measure lactate quickly since most critical care monitoring requires rapid availability of results. The National Academy of Clinical Biochemistry guidelines on evidence-based practice for point-of-care testing concluded that a more rapid turnaround time of lactate results in critically ill patients leads to improved clinical outcomes.[1] Therefore, the use of whole blood and point-of-care measurement devices seems to be clinically warranted. Few studies exist, however, that compare results from the central laboratory (using plasma-based methods) and whole blood point-of-care and blood gas platforms.[2,3]

Two basic methodologies are used to measure lactate; both methods use an enzymatic reaction where L-lactate oxidase converts L-lactate to pyruvate and H2O2. The analyzers that measure plasma samples use peroxidases and substrates to produce H2O2 that oxidizes dye precursors which are then measured by spectrophotometry. Whole blood analyzers, in contrast, use amperometric methods where H2O2 is oxidized over an electrode that produces a measurable current. There is currently no reference standard for lactate measurement.[2,3]

A study by Karon, et al.,[2] compared five different methods for lactate determination—three whole blood applications and two plasma-based laboratory methods. The study demonstrated an excellent correlation between the plasma-based analyzers such that they could be used interchangeably. However, the correlations of the whole blood analyzers to the laboratory plasma-based assays showed discrepancies. In general, the authors discovered that the whole blood analyzers exhibit a clinically significant negative bias relative to the plasma-based systems at elevated lactate levels. This could be problematic if the first measurement was performed on a point-of-care device and the follow-up measurement was performed in the central laboratory. This may give the false impression that the lactate values had increased over time and would suggest a worse prognosis for the patient. Therefore, institutions that employ both point-of-care and central laboratory methods should inform clinicians that caution must be used when comparing elevated values between point-of-care and laboratory methods.

1. Nichols JH, ed. *The National Academy of Clinical Biochemistry Laboratory Medicine Practice Guidelines: Evidence-Based Practice for Point-of-Care Testing.* Washington, DC: AACC Press; 2006.
2. Karon BS, Scott R, Burritt MF, Santrach PJ. Comparison of lactate values between point-of-care and central laboratory analyzers. *Am J Clin Pathol.* 2007;128(1):168–171.
3. Toffaletti J, Hammes ME, Gray R, Lineberry B, Abrams B. Lactate measured in diluted and undiluted whole blood and plasma: comparison of methods and effect of hematocrit. *Clin Chem.* 1992;38(12):2430–2434.

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