Finger-stick lithium test
In-office alternative to laboratory-based methods

James W. Jefferson, MD
Distinguished senior scientist
Madison Institute of Medicine, Inc.
Clinical professor of psychiatry
University of Wisconsin Medical School

A new, FDA-approved in-office lithium test (Table 1) can eliminate the inconvenience and fallibility of testing venous blood samples that often discourage lithium use. The test, which measures lithium in capillary blood drawn from a finger stick, has shown reliability when compared in clinical trials with established testing methods.

WHY FINGER-STICK TESTING?
Periodically monitoring serum or plasma lithium minimizes side effects and toxicity, maintains therapeutic dosing, and ensures treatment adherence. Laboratories generally use flame photometry, atomic absorption (AA) spectrophotometry, or ion-selective electrode analysis to measure lithium in blood drawn via venipuncture. A colorimetric assay is also available.

For years, researchers have investigated alternatives to venipuncture lithium testing. Aside from being inconvenient, venipuncture draws can increase risk of excessive bleeding, hematoma, infection, vasovagal syncope, and multiple punc- tures to locate a vein. In some cases:

- psychiatrists wait 2 or more days for a laboratory to return results
powerfully reinforce a physician’s advice and promote treatment adherence.3

HOW IT WORKS
A 50-µl blood sample is drawn via finger stick and converted to plasma in a lectin-coated membrane separator. The clinician then adds 0.2 µl of the plasma to a micro-cuvette containing a colorimetric reagent that is photometrically analyzed for lithium. The test takes 5 minutes or less (Figure).

The assay has been shown to be sensitive to 0.1 mEq/L of lithium and linear between 0.1 and 2.5 mEq/L.4

RELIABILITY
In clinical trials during which patients were tested and retested, the colorimetric assay showed reliability when compared with:

• routine lithium spectrophotometry. Researchers compared venipuncture blood samples split for colorimetric and spectrophotometric testing
• atomic absorption spectrophotometry of venipuncture blood from psychiatric patients
• standard spectrophotometry of venipuncture samples to which a known amount of lithium was added.5

Colorimetric finger-stick testing also was compared with AA spectrophotometry testing of 88 matched venipuncture samples from 56 bipolar patients.5 Results were not identical, but most fingerstick results varied no more than ±0.2

continued on page 117
mEq/L from the AA results. Differences were positive and negative, indicating random variation between the two methods rather than systematic bias.

CLINICAL APPLICABILITY

In-office finger-stick blood testing for lithium levels could improve quality of care for patients taking lithium.

The manufacturer, ReliaLAB, says the test costs $399, plus $264 for a refill kit containing 24 patient test packs. A certain volume of patients taking lithium would seem to be necessary to justify purchasing the instrument.

The test may be reimbursable under certain circumstances. ReliaLAB offers information on coding and reimbursement for in-office lithium monitoring (Table).

Also, because instant in-office creatinine and thyroid-stimulating hormone tests are not available, lithium therapy monitoring will still require laboratory visits when these tests are needed. Nonetheless, point-of-care plasma lithium level determination should improve convenience, compliance, and overall comprehensiveness of care.

References


A device that measures plasma lithium in blood drawn by finger-stick has shown reliability in clinical trials. The test’s convenience allows clinicians to ensure properly timed blood samples, retest promptly to confirm a first reading, and immediately discuss low lithium levels with patients.