

Patient Safety Tip of the Week

November 25, 2014

Misdiagnosis Due to Lab Error

We've done lots of columns on serious test results falling through the cracks and leading to delays in diagnosis. Sometimes, however, patients may be given an incorrect diagnosis based on specimen mixups or other issues related to lab specimens.

A recent case in Ontario, Canada illustrates the latter ([Carville 2014a](#)). A 46 y.o. man with a chronic cough had a CT scan that suggested sarcoidosis. However, he underwent lung biopsy that was interpreted as showing Stage 4 lung cancer. Chemotherapy was recommended and he was under the impression he had less than 12 months to live, a prognosis tearfully relayed to his wife and young children. But the patient did not feel like he was dying and sought further opinions. He declined chemotherapy while undergoing those outside evaluations. Several outside consultants felt he did not have cancer and ultimately a second biopsy showed no sign of cancer and he was diagnosed as having sarcoidosis.

The hospital where the original biopsy was done subsequently reanalyzed the specimen and concluded it was cross-contaminated with that of another patient who did have advanced lung cancer ([Carville 2014b](#)). DNA analysis apparently showed three specimen fragments on the slide, 2 from the patient and one from the other patient (whose specimen apparently was processed on the same day).

You'll recall from our prior columns that 2 patients are typically impacted by specimen mixups (eg. one may be erroneously given a cancer diagnosis and the other erroneously told he/she does not have cancer). However, in the current case the other patient had been given a correct diagnosis and was not impacted by the lab issue.

A physician executive was quoted as saying this was a "one in a million kind of occurrence" ([Carville 2014b](#)). But is that really true? In our January 22, 2013 Patient Safety Tip of the Week "[You Don't Know What You Don't Know](#)" we discussed occult specimen provenance complications (SPC's). It's a scary concept because it is **occult**, i.e. the error is not recognized because it is not identified by standard laboratory procedures. There are actually 2 types of such errors:

- Type 1 complete transposition between patients
- Type 2 contamination of a patient's tissue with that of one or more other patients

So I could have a prostate biopsy that either gets mixed up with someone else's biopsy or that gets contaminated by tissue from another patient and my specimen gets reported as showing cancer. I might end up getting a treatment for prostate cancer and all the side effects even though I don't have cancer. Or I actually could have cancer and my specimen gets interpreted as normal and I don't get any treatment. Such errors usually only come to attention when a patient undergoes, for example, a mastectomy or prostatectomy after a biopsy was interpreted as showing cancer and the full surgical specimen removed shows no cancer.

In that column we noted a study providing an estimate of how often such SPC's occur ([Pfeifer 2013](#)). The authors examined about 13,000 prostate biopsy specimens from a wide variety of urology practices and pathology laboratories using a DNA identification technology. They found the frequency of occult type 1 errors (a complete transposition between patients) was 0.26% and type 2 errors (contamination of the patient's tissue with 1 or more unrelated patients) was 0.67%. Overall, the mean frequency of SPCs across practice settings was 0.22% for type 1 errors and 1.69% for type 2 errors.

Basically, it means that just under 1% of patients might be given an incorrect diagnosis that no one even suspects is incorrect!

Perhaps just as striking is the fact that virtually every lab or clinical setting they studied had at least one SPC identified. So it's not simply that one lab is making errors. Rather this is a problem that can and does occur in every lab.

In one of our earliest columns on lab errors (see our October 9, 2007 Patient Safety Tip of the Week "[Errors in the Laboratory](#)") we noted a paper ([Suba 2007](#)) that suggested we consider the "**DNA timeout**" akin to the surgical timeout where we ask the question "Is this the correct diagnosis for the correct patient?" before doing an invasive procedure. Particularly when all the pieces of evidence do not completely mesh that may not be a bad idea.

Unlike the process improvements and technological solutions to prevent specimen mixups noted in our prior columns, we know of no current means of otherwise identifying such cross-contamination. Therefore, the astute clinician must always be thinking "is this the correct diagnosis for this patient?" particularly before embarking on an invasive procedure or recommending treatment with potentially severe side effects.

The current case thus also has lessons learned about **diagnostic error**. The patient apparently was angered that a physician and nurse walked out of a meeting with him when he challenged the diagnosis of cancer ([Carville 2014b](#)). Not only did the patient feel relatively healthy for someone said to have advanced cancer but he also had not lost any weight even 6 months after the original diagnosis of advanced cancer. In our many prior columns on diagnostic error (see the full list below) we've discussed some of the cognitive biases that may have been in play here: **anchoring**, **early closure**, and **confirmation bias** (actually its corollary: ignoring disconfirming evidence).

Fortunately in the current case there was a happy ending and the patient never underwent unnecessary chemotherapy. Nevertheless, he and his family undoubtedly suffered unimaginable stress during the ordeal. Let's hope everyone can learn from this case and recognize the problematic scenario early.

Some of our other columns on errors related to laboratory studies:

- October 9, 2007 [“Errors in the Laboratory”](#)
- November 16, 2010 [“Lost Lab Specimens”](#)
- October 11, 2011 [“LEAN in the Lab”](#)
- March 6, 2012 [““Lab” Error”](#)
- April 2012 [“Specimen Labeling Errors”](#)
- January 22, 2013 [“You Don't Know What You Don't Know”](#)
- April 15, 2014 [“Specimen Identification Mixups”](#)

Some of our prior columns on diagnostic error:

- September 28, 2010 [“Diagnostic Error”](#)
- November 29, 2011 [“More on Diagnostic Error”](#)
- May 15, 2012 [“Diagnostic Error Chapter 3”](#)
- May 29, 2008 [“If You Do RCA's or Design Healthcare Processes...Read Gary Klein's Work”](#)
- August 12, 2008 [“Jerome Groopman's “How Doctors Think”](#)
- August 10, 2010 [“It's Not Always About The Evidence”](#)
- January 24, 2012 [“Patient Safety in Ambulatory Care”](#)
- October 9, 2012 [“Call for Focus on Diagnostic Errors”](#)
- March 2013 [“Diagnostic Error in Primary Care”](#)
- May 2013 [“Scope and Consequences of Diagnostic Errors”](#)
- August 2013 [“Clinical Intuition”](#)
- January 2014 [“Trigger Tools to Prevent Diagnostic Delays”](#)
- January 14, 2014 [“Diagnostic Error: Salient Distracting Features”](#)
- May 2014 [“Frequency of Diagnostic Errors in Outpatients”](#)
- June 24, 2014 [“Lessons from the General Motors Recall Analysis”](#)

- And our review of [Malcolm Gladwell's “Blink”](#) in our Patient Safety Library

References:

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http://www.thestar.com/life/health_wellness/2014/11/14/hamilton_father_misdiagnosed_with_lung_cancer_demands_answers.html#

Carville O. Hospitals 'deeply sorry' for lung cancer misdiagnosis. Thestar.com (Hamilton, Ontario) Published on Fri Nov 14 2014

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