Patient Safety Tip of the Week

November 15, 2016 Surgical Specimen Mishaps

Mishaps involving surgical specimens can have devastating impacts on patients. Lost specimens, mislabeled or misidentified specimens, inadequate specimens, and others can lead to misdiagnoses, delays in diagnosis or treatment, incorrect treatments, and repeat surgical procedures for patients. Our multiple prior columns on these issues have highlighted that the majority of such errors occur in the pre-analytic phase of the laboratory spectrum but errors can occur in virtually any phase.

Now, one of the most comprehensive analyses on surgical specimen mishaps has been published from a patient safety organization (Steelman 2016) and there are lessons here for everyone. Steelman and colleagues analyzed 648 adverse events and near misses related to surgical specimens reported (voluntarily) over a 3 year period by members of the PSO consortium of mostly academic hospitals and affiliates.

As expected, the pre-laboratory phase accounted for the vast majority of issues (93%). Problems with specimen labeling (49%), specimen transport or storage (38%), and specimen collection (24%) were most common. Occasionally (6%) issues with orders or order entry were problematic. But nearly a quarter of the issues related to specimen collection. Problems were cited with the incorrect specimen collection solution, lack of any solution or preservative, wrong container, or collection technique.

About a third of the **specimen collection** issues involved specimens not immediately being placed into specimen containers. That resulted in some specimens being temporarily or permanently lost. They might be left in the surgical field or accidentally discarded. Sometimes the sample size was too small and sometimes a specimen might be placed in the wrong type of container. Some of the contributing factors identified include inadequate staff knowledge or training, failed communication or handoffs, and environmental issues (eg. poor lighting). Inattention, distractions and interruptions are common contributing factors to all types of error.

Almost half of all events involved **specimen labeling**. These involved missing labels, missing requisitions, or labels and requisitions that were incomplete, illegible or inaccurate. Often missing were items such as date and time of collection, site or side of the specimen, clinical information, diagnosis, or mismatches related to patient identifiers used, etc.

Specimen transport is another phase prone to error. Sometimes the specimens are not immediately transported to the lab or were stored incorrectly while awaiting transport. Examples would be when specimens are set aside temporarily or put in a refrigerator or

collection box. Batching may lead to delays. And sometimes specimens may be taken to the wrong area of left in an unattended place. Breakage or leakage may also occur during transport.

Only 10% of the issues related to the laboratory phase. These included delays in processing or analyzing specimens, loss or misplacement of specimens within the lab, wrong tests performed, or incorrect labeling during analysis.

Only 3% of the issues in the analysis involved the post-laboratory phase. We suspect these were likely underreported since personnel involved in analysis of "lab" events may never be made aware of issues like clinician failure to follow up on reports on a timely basis, etc.

The contributing factors identified are common to those we see in a host of medical errors. These include distractions and interruptions, inattention, inadequate training or knowledge, miscommunication, handoff failures, mistaken assumptions, workload issues, etc. Certain times ("late" hours or "after" hours) may be particularly vulnerable.

Fortunately, patient harm was apparently relatively rare in this study, perhaps because many of the reports in this analysis were from near-misses. The errors were often picked up before reaching the patient. But in 7% there was need for additional treatment and 1% temporary or permanent patient harm.

The authors provide a nice discussion of potential interventions you should be considering to avoid such errors. For example, having access at the point of care to any information, policies or procedures regarding specimen collection and solutions/fixatives is important. Use of technology-based solutions for patient and specimen identification (barcoding, RFID, etc.) should be considered.

One important intervention is one we've often mentioned: inclusion in your pre-surgical briefing or huddle a discussion of what surgical specimen(s) you anticipate (we advocate you use a checklist for your pre-op briefing that includes such an item). And don't forget to include it in your post-op debriefing. Often in that debriefing it becomes obvious that no specimen was collected and sent to the lab so an immediate search may be able to locate the missing specimen at a time when it may be still suitable for analysis (the trashcan is a common location). However, we would also point out you should never assume that specimens found after being temporarily lost belong to the current patient (you can consider some of the DNA identification techniques discussed in our prior columns). Those DNA identification techniques are also valuable in cases of suspected specimen mislabeling.

The authors recommend you conduct a proactive assessment of you potential vulnerabilities. You could do that as a FMEA (failure mode and effects analysis) or the sort of "tracer" analysis that we described in our March 6, 2012 "'Lab' Error".

The study did not have data available on the cost of errors encountered. From reports most felt the costs incurred were relatively low. But further lab testing or monitoring were needed in 13% and 5% of patients, respectively, and 3% required extended length of stay or admission or a higher level of care. Only 1% apparently required additional surgery. Our only comment is that you likely underestimate the costs incurred unless you formally analyze them. Our September 27, 2016 Patient Safety Tip of the Week "Lab Errors Costly" noted substantial costs associated with other types of lab error. Plus, you'll also usually find that tying a cost to system vulnerabilities is a good way to get your CEO and CFO to provide the resources you need to address those vulnerabilities.

All it takes is one case of a patient receiving an incorrect diagnosis or needing an unnecessary surgical procedure to risk your whole organization's reputation. You owe it to your patients and your staff and your community to ensure that your entire process for managing surgical specimens is as fault-free as possible.

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"
- November 25, 2014 "Misdiagnosis Due to Lab Error"
- March 24, 2015 "Specimen Issues in Prostate Cancer"
- May 26, 2015 "How Safe is the Lab You Use?"
- March 29, 2016 "Inappropriate Lab Testing"
- September 27, 2016 "Lab Errors Costly"

References:

Steelman VM, Williams TL, Szekendi MK, et al. Surgical Specimen Management: A Descriptive Study of 648 Adverse Events and Near Misses. Arch Pathol Lab Med 2016; published online September 9, 2016
http://www.archivesofpathology.org/doi/pdf/10.5858/arpa.2016-0021-OA

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