Patient Safety Tip of the Week

December 20, 2016

End-of-Rotation Transitions and Mortality

Transitions of care are periods of vulnerability of patients to a variety of errors and adverse events. We usually think of such transitions as when a patient moves from one venue to another. But in academic medical centers we also see a different sort of transition of care: the end-of-rotation change in the whole caregiving team (interns, residents, attendings). Note that similar changes also commonly take place in non-academic settings, for instance, when hospitalists rotate.

A recent study done at 10 academic-affiliated VA hospitals looked at mortality rates associated with housestaff end-of-rotation shifts on internal medicine services between 2008 and 2014 (Denson 2016). The data were stratified by type of transition (intern only, resident only, or intern + resident). Apparently change of attending physician was not considered.

Adjusted hospital mortality was significantly greater in transition vs control patients for the intern-only group (3.5% vs 2.0%) and the intern + resident group (4.0% vs 2.1%) but not for the resident-only group (3.3% vs 2.0%). Adjusted 30-day and 90-day mortality rates were greater in all transition vs control comparisons. Because ACGME duty hour regulations changed in 2011 they also looked at whether there were changes in mortality rates related to those. They found that duty hour changes were associated with greater adjusted hospital mortality for transition patients in the intern-only group and intern + resident group than for controls. They note that the magnitude of the findings was generally greater in relation to intern rotations than resident rotations. They note that interns are the least experienced physicians, thus likely more prone to errors in managing patients, and the work hour restrictions may have resulted in their having less time to prepare for such transitions.

The accompanying editorial (Arora 2016) notes that some of the excess mortality is likely unrelated to the transition of care. They note that sicker, more complex patients are more likely to be present during an end-of-rotation transition of care. Such patients are more likely to die so the statistics may be skewed in such cases. They also note that there may be socioeconomic factors that result in delayed discharges in many patients whose stay overlaps an end-of-rotation transition and those socioeconomic factors may influence downstream mortality. But they concur that we need to take steps to reduce any adverse impacts such end-of-rotation changes may cause.

Back in the mid-1990's at the Erie County Medical Center we recognized that month-to-month transitions of care on our academic units were problematic even when we staggered the times that attending physicians changed or staggered times when senior residents would change relative to interns and junior residents. Thinking back to your housestaff days, you'll recall that it was always much more difficult to manage "inherited" patients than brand new admissions. And that first day on a new service was always a nightmare. You might have to rapidly become familiar with 10 or more existing patients, even on a day when you were admitting new patients. Such transitions were problematic in terms of both patient outcomes and hospital lengths of stay.

Our solution: we developed a **nurse case manager program** (see our February 5, 2008 Patient Safety Tip of the Week "Reducing Errors in Obstetrical Care"). Our Director of Nursing, Karen Maricle, and I took 4 of our best RN's and worked with them to develop the nurse case manager program. One nurse case manager was assigned to each of 4 general medicine teams. They provided the day-to-day and month-to-month continuity that was desperately needed. They became much more familiar not only with patients but also with the patients' families and other support providers. They were especially helpful on days when residents had their continuity clinic and would be off the ward for several hours. And with advent of resident workhour restrictions in New York State the nurse case managers were the ones most knowledgeable about many patients on many days. Soon after we implemented the program as a pilot, other services began clamoring for their own nurse case managers and we expanded the program to other services. We found that the nurse case manager improved continuity of care tremendously, not only on a day-to-day basis, but also when teaching services would rotate on a monthly basis. This program was largely responsible for a substantial improvement in mortality rates, reduction in length of stay, and improvement in patient and family satisfaction. The resultant reduction in average length of stay more than offset the costs of the program. Adding such valuable resources can result in an overall net savings of both human and financial resources.

Another concept that helps is use of the "firm" system, variations of which most academic medical centers are probably already using. At Johns Hopkins we had several medical "firms" where the interns, residents, and attendings were assigned. Patients were also assigned to a firm. So a patient would always be seen by someone in that firm on the outpatient side and if they required hospitalization they would be admitted to that firm's ward. The result was that for many patients you already knew much about them when you rotated onto the inpatient service.

Certain types of diagnostic error are probably more common in "inherited" patients. There is a tendency to accept the diagnoses that were being used by the team that just rotated off service so "anchoring" bias and the related concept of "premature closure" (see our November 29, 2011 Patient Safety Tip of the Week "More on Diagnostic Error") may come into play. So you have to be very careful to make sure that you evaluate all new information on "inherited" patients, paying particular attention not to ignore "disconfirming" information that doesn't quite fit with their working diagnoses. (We should also note, however, that such transitions may sometimes combat "anchoring" bias

in that the incoming team is a "new set of eyes" that may question prior working diagnoses.)

Similarly, some of the subtleties of medication reconciliation may be lost in such transitions of care. Just as medication reconciliation should be done every time a patient moves from one level of care to another, you can make a case that it should be done each time there is transfer of care from one team to another.

The outgoing team also needs to clearly spell out what test results are "pending". In our many columns on significant findings falling through the cracks (see the list below) we've noted that official reports (eg. imaging studies, pathology reports, etc.) may differ from preliminary reports. For example, the team may review a patient's CT scan and consider it normal and describe it as normal in the patient chart. The teams change and no one notices that the official report from Radiology noted a suspicious incidental finding. The incoming team eventually discharges the patient without attention to that finding. That's the reason that discharge summaries and off-service notes should always have a specific section for "studies done, result pending". It's also a reason why your Radiology department needs a system in place for flagging significant or unexpected findings with mechanisms to contact the right people for follow up.

It's also important for the incoming team to become acquainted with family or others who will help care for patients after discharge. Often the rapport the outgoing team had developed with such caregivers is lost during the end-of-rotation transition. That was one area where our nurse case manager program was extremely valuable.

We don't think that the findings of the Denson study are an anomaly. We suspect similar analyses at most hospitals (academic and nonacademic) may find similar adverse impacts of changes in continuity of the care team(s).

See also our other columns on communicating significant results:

- Patient Safety Tip of the Week May 1, 2007 "The Missed Cancer"
- Patient Safety Tip of the Week February 12, 2008 "More on Tracking Test Results"
- Patient Safety Tip of the Week October 13, 2009 "Slipping Through the Cracks"
- What's New in the Patient Safety World July 2009 "Failure to Inform Patients of Clinically Significant Outpatient Test Results"
- Patient Safety Tip of the Week March 9, 2010 "Communication of Urgent or Unexpected Radiology Findings"
- Patient Safety Tip of the Week March 1, 2011 "Tests Pending at Discharge"
- Patient Safety Tip of the Week August 21, 2012 "More on Missed Followup of Tests in Hospital"
- What's New in the Patient Safety World October 2013 "New AHRQ Toolkit: Improving Your Office Testing Process"

- What's New in the Patient Safety World January 2014 "Email Alerts for Pending Test Results"
- What's New in the Patient Safety World July 2015 "Technology to Avoid Delays in Follow-up of Significant Results"
- Patient Safety Tip of the Week November 17, 2015 "Patient Perspectives on Communication of Test Results"

References:

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http://jamanetwork.com/journals/jama/article-abstract/2589342

Arora VM, Farnan JM. Inpatient Service Change: Safety or Selection? JAMA 2016; 316(21): 2193-2194
http://jamanetwork.com/journals/jama/article-abstract/2589329