Communication Practices on 4 Harvard Surgical Services

A Surgical Safety Collaborative

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Background: Communication breakdowns between surgical residents and attending physicians in the pre- and postoperative setting are common contributors to patient injury. These communication transactions might offer an opportunity for safety improvement, but it remains unknown how often resident-attending communication fails, what the current level of attending involvement is, and how often attending input changes the plan for patient care. We conducted a prospective study at 4 Harvard teaching hospitals to address these issues.

Methods: Three prospective data collection strategies were employed: (1) we randomly selected surgical services and queried residents for the occurrence of predefined critical patient events and the characteristics of attending communications that ensued, (2) on weekends, randomly selected patients were interviewed and their charts reviewed to identify the frequency of attending visitation and how such visits affected processes of care, and (3) on weekends, senior residents on randomly selected surgical services were queried regarding the occurrence of attending-resident discussion of patients in their care.

Results: Of 80 critical patient events identified, 26 (33%) were not communicated to attending surgeons. Residents reported that, when contacted, all attending physicians were receptive to communication, whether they were the primary surgeon or providing cross-coverage. Although residents felt that attending contact was unnecessary for safe patient care in 61 (76%) of these events, discussions with attending physicians changed management in 33% (18/54) of cases in which they occurred. Attending surgeons were found to visit their patients on randomly selected weekend days 42% (n = 37) of the time, while 21% (n = 19) had not visited for 2 or greater days. When attending physicians visited patients, however, resident management was modified 46% (n = 36) of the time. Though residents frequently discussed patient management with attending physicians on randomly selected weekends, they failed to do so 16% (n = 58) of the time, which appeared to be related to service-specific variation ($\chi^2 = 269$, $P < 0.0001$).

Conclusions: In the context of both critical patient events and routine patient care, residents often fail to obtain attending surgeons' input for management decisions. These failures seem to derive more from residents' perception of necessity than from attending physicians' receptiveness or interest in being contacted. Once involved, attending physicians frequently modify resident's management decisions. It seems, therefore, that there is significant potential for communication failure and information loss among our 4 institutions.

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Communication breakdowns in all clinical disciplines are a common cause of serious errors resulting in patient injury.[1] In surgery, efforts to improve the safety of communication practices have been impeded by a failure to understand the etiology of these breakdowns. In a recent study of serious communication errors,[2] we found that, unlike other types of errors in surgery,[3] communication failures were not concentrated in the operating room. Rather, they occurred throughout the continuum of care, typically resulting from failure in verbal communication between a surgical attending and another caregiver, and they frequently involved ambiguity about clinical responsibilities, handoffs, and/or transfers in location of care.[2–7]

In 2005, a collaborative was established that brought together the Chiefs of Surgery at 4 Harvard teaching hospitals in partnership with their malpractice carrier, CRICO/RMF, with a goal of improving the safety of surgical patients. On the basis of previous malpractice claim data at both the local and national level, we found that communication failures often precipitated the occurrence of significant patient morbidity.[2] As such, the collaborative decided to focus on interventions aimed at improving communication in the pre- and postoperative period. A working group of surgeons from the institutions was established to formulate recommendations and suggested 3 evidence-based policy interventions to address the specific failures observed in the malpractice claims analyses:

i. Because communication failures to and from attending surgeons predominated among the cases, a defined set of "trigger" events (Table 1) should be developed whose occurrence would obligate nurses or house staff to communicate promptly with the attending surgeon of record.
ii. As a safeguard against information loss, the primary surgeon or a covering attending should visit patients daily or at a frequency that each surgical department explicitly defines.
iii. To prevent breakdowns between cross-covering attending physicians, structured protocols for hand-offs between attending surgeons should be instituted.

In a re-review of the malpractice cases, application of these standards was judged to have the potential to prevent between 45% and 73% of communication errors.[2]

We conducted the current study to calculate current communication practices within the participating Departments of Surgery at 4 Harvard Medical School affiliated academic medical centers considering adoption of these 3 standards. Despite evidence that such communication breakdowns are frequently reported by surgeons[7,8] and common among malpractice claims,[2] it is not known how often prevailing communication practices fail to meet these standards in routine care. Thus, to motivate interest in these initiatives and design appropriate improvement interventions, we sought to determine (1) how frequently surgical residents inform attending physicians of critical patient occurrences (Table 1), (2) how often patients are visited by a responsible attending and, (3) how often senior-level trainees identify and contact a responsible

TABLE 1. Description of Critical Patient Events

Critical Patient Events
Admission to the hospital
Transfer into the ICU
Unplanned intubation or ventilatory support
Cardiac arrest, new arrhythmia, hemodynamic instability (tachycardia + hypotension), or CODE
Development of significant neurological changes (CVA/seizure/new onset paralysis)
Development of major wound complications (dehiscence or evisceration)
Medication or treatment errors requiring clinical intervention (invasive procedure(s), increased monitoring, new medications except Narcan)
New blood transfusion without prior attending knowledge or instruction (before or after operation)
Development of any clinical problem requiring an invasive procedure or operation for treatment

attending surgeon for supervision of routine patient management on weekends.

METHODS

Four Harvard Medical School affiliated academic medical centers participated in this quality improvement initiative. All patients admitted to a surgical service within the purview of the Chairmen of the Departments of Surgery (including patients in General, Cardiac, Thoracic, Vascular, Transplant, Burn, Plastics, Surgical Oncology, Pediatrics, Trauma, Acute Care Surgery, Urology, Orthopedics, and/or Otolaryngology, depending on the institution) were eligible for inclusion. A working group composed of surgeons appointed by each institution developed and ratified the 3 standards, which were then approved by the Chairmen. A single investigator (A.W.E.) identified and collected data at all 4 institutions. The protocol was reviewed by the Human Subjects Committee of the Harvard School of Public Health, which determined that it did not meet the threshold definition of research involving human subjects.

Communication of Critical Patient Events

On unannounced nights, we randomly ordered the surgical services and care units, and identified critical patient events (Table 1) for analysis in 3 ways: (i) survey of evening surgical unit charge nurses at the end of their shifts; (ii) contact of on-call surgical residents on the morning following a night shift; and (iii) attendance at morning rounds, noting any of the predefined critical patient events that occurred the previous night.

After initial identification of an event, the research fellow contacted the first-call resident responsible for the patient at the time of the event and solicited information about the communication characteristics that occurred. These characteristics included whether attending contact occurred, the timing of attending contact with respect to resident evaluation of the patient, and whether the resident felt attending contact was necessary in that specific instance. In the event that an attending was contacted, information was gathered regarding whether the attending felt contact was appropriate, and whether attending contact resulted in a change in patient management. If the resident who initiated patient care transferred responsibility to a more senior resident, the senior resident was contacted and questioned regarding characteristics of attending contact. In some instances, the chain of communication required contact of multiple residents/fellows before the final end point of communication was identified. We limited accrual to 20 events per institution.

Frequency of Patient Visits by an Attending

The investigator randomly chose surgical wards on unannounced weekends. Audits were performed in the late evening (after 8 PM) to maximize the likelihood that an attending visit on the day of audit would be captured. Charts for all surgical patients in the selected wards were reviewed for the last documented visit by an attending surgeon. Through chart review, the date of the most recent attending surgeon's note was recorded as: the day of audit, the previous calendar day, or 2 or greater calendar days. Patients who did not have a note on the day of the audit were interviewed about the date and time of the last attending surgeon visit. If there was a discrepancy between the chart review and patient interview, the most recent visit date was used for coding purposes.

For the most recent visit noted, the investigator also evaluated both chart notes and electronic order entry records to evaluate whether the attending surgeon altered elements of the management plan stated in the corresponding resident's note from the same calendar day. Approximately, 20 randomly selected surgical patients per institution were reviewed for this objective.

Attending-Resident Discussion of Patient Management

All surgical services at each institution were randomly ordered to produce the sequence in which services would be reviewed. On unannounced weekends, the investigator contacted the most senior trainee responsible for patients on the surgical service. For each patient admitted to that service, information was collected regarding whether the senior resident discussed the patient's condition/management with either a primary or covering surgeon. Additional information was also obtained, such as the extent to which the senior resident felt the covering surgeon was familiar with the details of the patient. Information for approximately 100 patients per institution was gathered.

Statistical Analysis

Our analyses were primarily descriptive. We compared frequencies of categorical variables using χ^2 tests. Data were analyzed using SAS version 9.1 and JMP 8.0 (SAS Institute, Cary, NC).

RESULTS

Communication of Critical Patient Events (Triggers)

Characteristics of communications following critical patient events are shown in Table 2. In one-third of these incidents, residents made no immediate attempt to contact an attending. In all situations when attending physicians were contacted, however, res-

TABLE 2. Results of Resident-Reported Characteristics of Attending Contact for Critical Patient Events

Criteria	Totals
No attempt made to contact attending, n (%)	26/80 (33%)
Did not feel urgent attending contact was necessary, n (%)	49/80 (61%)
Did not feel attending was required for management, n (%)	61/80 (76%)
Time to attending contact, median min (IQR)	30 (14, 60)
Took longer than 60 min to reach attending, n (%)	10/54 (19%)
Management changed after attending reached, n (%)	18/54 (33%)
Attending receptive to contact, n (%)	54/54 (100%)
Patients with cross-covering attending	29/54 (54%)
Attending seemed aware of coverage	29/29 (100%)
Attending willing to provide coverage	29/29 (100%)
Attending aware of relevant patient history	28/29 (97%)

idents uniformly reported attending physicians as being receptive to contact, with no difficulty identifying or contacting the appropriate attending. Furthermore, attending contact was typically prompt, with 4 of 5 residents contacting the responsible attending within 60 minutes. In the majority (76%) of critical events identified, residents did not feel attending contact was necessary for patient management. Yet, once attending physicians were contacted, they altered patient management in 33% of cases. There was no effort to detect the impact of changes made by the attending physicians, however, in most cases these changes deviated significantly from the resident plan (ie, pulmonary embolism computed tomography for a patient requiring immediate intubation, urgent consult for a patient with hemodynamic instability, etc).

The types of critical patient events identified in this study and the likelihood of attending contact are shown in Figure 1. There was significant variation in the frequency of attending contact by type of critical patient event ($\chi^2 = 29.04$, $P = 0.0003$). Residents managing patients who experienced new arrhythmias/hemodynamic instability/CODE infrequently contacted an attending ($\chi^2 = 16.63$; RR, 10.4; CI, 2.44, 44.02; $P < 0.0001$). Comparatively, residents managing patients who were newly admitted to a service ($\chi^2 = 11.4$; RR, 0.23; CI, 0.08, 0.72; $P = 0.0007$), or those requiring an emergent operation/invasive procedure ($\chi^2 = 3.69$, $P = 0.054$), frequently communicated these events to an attending. There were no other significant relationships between the frequency of contact and type of critical event.

Frequency of Patient Visits by an Attending

One in 5 patients had not been seen by an attending for 2 or more calendar days with less than half of all patients being visited by an attending on the day of audit (Figure 2). On the basis of the most recent attending and corresponding resident note, approximately one-half of all patients underwent a change in management as a result of the attending visit. While no effort was made to quantify the clinical implication of these management changes, they included major interventions (ie, urgent operation, intravenous antibiotics), urgent diagnostics (ie, barium swallow, lower extremity doppler ultrasound), as well as efficiency measures, (ie, begin oral intake, change tube feed settings) and minor alterations.

Attending-Resident Discussion of Patient Management

On the day of audit, trainees discussed 84% (337 of 395) of patients with an attending. Surgical services had a median of 13 patients (interquartile range: 9, 19), 4 (interquartile range: 3, 5) primary attending physicians, and 1 (interquartile range: 1, 1) covering attending. Nearly all surgical services (92%) had at least one covering attending. There was significant variation in the frequency of attending discussion of patient management by surgical service; 72% (n = 26) of services had all (n = 224) patients discussed with an attending, while the remaining 27% (n = 8) of services had only 34% (n = 58) of patients discussed with an attending ($\chi^2 = 269$, $P < 0.0001$). Residents discussed patient management with cross-covering attending physicians in 85% (n = 301) of patients compared to primary attending discussion which occurred in 70% (n = 28) of patients ($\chi^2 = 5.47$, $P = 0.02$).

DISCUSSION

Communication breakdowns are important contributors to error in surgery. Seeking to understand our vulnerabilities, we studied 3 different practices which were found to be highly predictive of patient injury.[2] We found communication practices at 4 hospitals to have significant vulnerabilities that could impact patient care. Our most concerning and unexpected finding was that one-third of critical patient events were not promptly reported to an attending. As demonstrated in previous studies, there can be many explanations for the lack of attending contact, including philosophical differences in the view of patient ownership,[8,9] a lack of clarity regarding expectations,[10] or the concern of "being a bother."[11] Our findings suggest that residents at our institutions may not understand attending physicians' expectations. For example, despite capturing

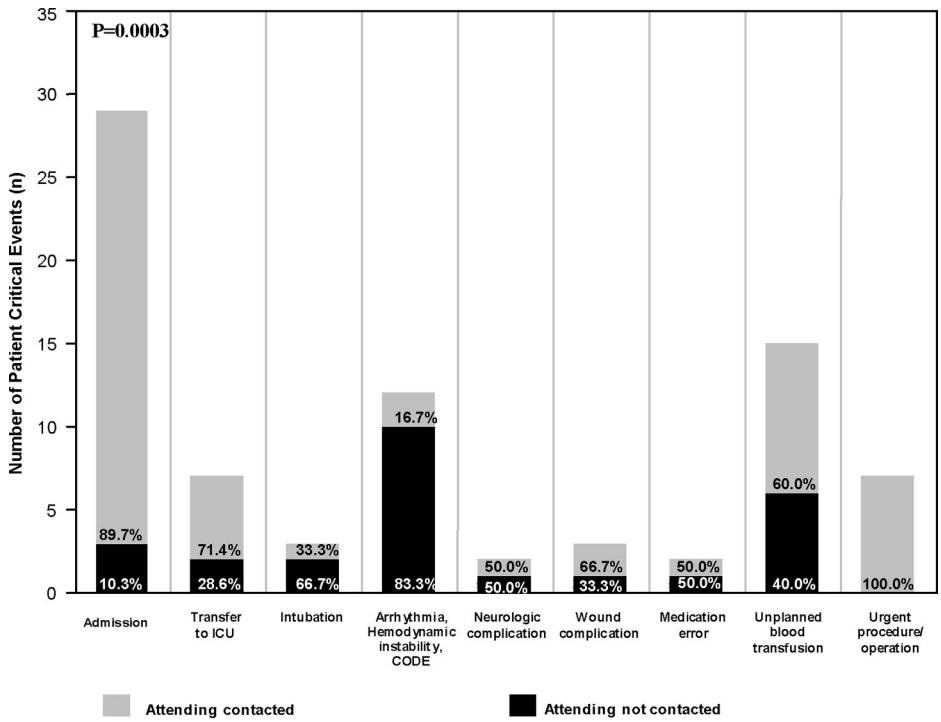

FIGURE 1. Attending-resident contact by type of critical patient event.

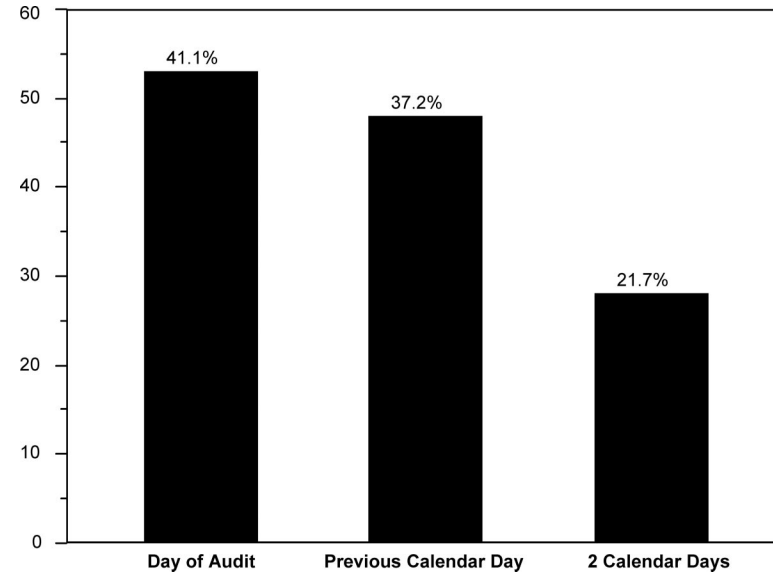

FIGURE 2. Distribution of patient visits by an attending.

events that occurred in the late evening or early morning, we did not find a single instance in which an attending surgeon was not receptive to contact. Instead, it appears residents felt attending contact was neither necessary to effectively manage a patient's critical condition nor required as a means to inform the responsible attending. However, in the majority of events in which attending physicians were contacted, modifications were made to resident management, suggesting that attending physicians not only desire to play an active role in the management of critical patient events, but also make important contributions to care. A natural follow-up question to this finding is whether attending alterations to resident management have an appreciable impact in clinical outcome. Although our study was not designed to capture this, we are now collecting this data with the goal of understanding this phenomenon.

A second area of concern identified in previous communication studies[6] is lack of attending-patient contact. There is no clear standard for how often an attending should visit his/her patients. Nonetheless, in most instances, it is reasonable to believe patients expect to be visited at least once every 2 days, if not daily. In this study, we found that approximately 20% of patients were not seen for 2 or more days. When patients were seen by an attending, changes to patient management were made in almost one-half of all cases. These changes included major interventions such as taking a patient emergently to the operating room and obtaining urgent diagnostic tests to rule out surgical complications. Unfortunately, this study was not designed to assess the impact of these management changes on patient outcome, but there was a clear range of alterations from minor to major, reinforcing the importance of attending surgeon involvement in patient care.

A third vulnerable area identified in earlier studies of communication breakdown occurs when residents fail to discuss patient management with attending physicians. There appeared to be adequate supervision with regard to attending-resident discussion of patient management; we found that 84% of patients were discussed daily suggesting adequate (but far from consistent) communication. This relatively high frequency of compliance masks a worrisome pattern of patient management that was highly service dependent, with many services having all patients discussed with an attending and some services having very few patients discussed. These findings speak to the service-specific cultural variations which ultimately dictate communication practices. On the basis of our previous study[2] that demonstrated inadequate attending-attending sign-outs may lead to patient morbidity, we hypothesized that services with attending cross-coverage may contribute to a lower incidence of resident-attending discussion but instead found the opposite: residents more frequently discussed patients who were cross-covered with an attending compared to patients covered by their primary attending. Future investigation into the effectiveness of attending sign-out is necessary to understand this dynamic and its role in patient care. Although the importance of daily patient discussion between residents and attending physicians is unknown, given a 3% to 16% risk of complication with inpatient surgery,[12] the potential for information loss is significant.

The motivation to improve quality in 3 situations (providing notification to attending physicians when critical changes in patient condition occur, preventing communication breakdowns between cross-covering attending physicians, and assuring daily patient visits by an attending) resulted from a review of malpractice closed claims that indicated these systemic breakdowns may have contributed to adverse clinical outcomes.[2] The findings of case review and direct observation of patient care at 4 Harvard affiliated teaching hospitals confirm that communication breakdowns identified in malpractice claims occur commonly in routine practice. Furthermore, these baseline data suggest that there is a significant need for improving communication and supervisory practices at many academic medical institutions. The Chairmen of the 4 major Harvard-affiliated Surgical Departments have approved uniform expectations for communication practices, including the following: (i) attending or responsible surgeons should be informed of a patient's condition and any significant changes (Table 1) through ongoing communication with the hospital team. The team should notify the attending surgeon or his/her designee of significant changes when they occur, regardless of the time of day or day of the week, (ii) attending surgeons will communicate daily with residents/fellows regarding patient management, and (iii) patients admitted to a surgical service will in general be seen by an attending surgeon or his/her designee daily, or at an interval determined by each respective Department

of Surgery. Because our findings suggest that a lack of expectation may be the cause of poor communication in the perioperative period, we have pursued an intervention strategy aimed at informing both house staff and faculty of the minimum expectations regarding communication of patient management and critical events.

It is unknown whether the findings at our 4 institutions are generalizable to other academic or community hospitals. We would caution, however, that it would be dangerous to assume these problems are unique to our institutions in light of previous studies that have highlighted similar communication deficiencies in surgery. For example, in a closed claims malpractice study by the American College of Surgeons, communication failures related to critical changes in clinical condition were found to be significantly related to patient adverse outcomes.[6] A second study by Phitayakorn et al found a disparity in resident and attending perception regarding the appropriateness and necessity of contact in the context of a critical patient event[10]; residents felt attending contact was necessary less frequently than their attending counterparts. Furthermore, it should be noted that we had no clear indication that our institutions had any major deficiencies. In this respect, our study was revealing with regard to the type and severity of communication breakdowns that exist. Thus, while the conclusions for other institutions remain unclear, we believe that communication and supervisory practices on surgical services are highly vulnerable to communication failures that may significantly impact safe and effective patient care.

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