

Emergency Department Chart Auditing in a Family Practice Residency Program

Ken Grauer, MD
Gainesville, Florida

A prospective audit of process on 1,200 consecutive patients seen in the emergency department by family practice residents was performed at the Family Practice Residency Program in Gainesville, Florida. The overall quality of care delivered conformed to the standards of "good medical care" as judged by the author in 85.6 percent of cases. Resident errors were detected in the remaining 14.4 percent of cases, and occurred most frequently among physicians in the earlier years of training ($P < .005$). Ultimate patient management was changed by the audit in only 1 percent of cases but potentially had an important impact on the care of these patients. Errors of inadequate documentation were common among residents irrespective of their level of training. An ongoing audit of emergency department charts with regular feedback on medical process and recording appears to be useful both as an educational tool and as a method of improving emergency care.

Family practice residents may be exposed to the field of emergency medicine either by an ongoing experience of patient care in the emergency department as part of their hospital responsibilities or by monthly rotations in this specialty. Unfortu-

nately, the acceptability of the former experience is often disappointing from both a patient care and educational perspective because of the unsupervised nature of the resident activity. Unless the patient returns to see the resident in the clinic or is admitted to the hospital, or unless the opinion of an attending or consultant is actively sought, little or no constructive feedback may be generated. Patient care goes unmonitored, and the development of fallacious habits may be perpetuated.

This situation should raise several questions regarding the ongoing emergency department experience of family practice residents:

From the Department of Community Health and Family Medicine, College of Medicine, University of Florida, Gainesville, Florida. Requests for reprints should be addressed to Dr. Ken Grauer, Family Practice Medical Group, Inc, 625 SW 4th Avenue, Gainesville, FL 32601.

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1. How good is the quality of care delivered by family practice residents? Does patient care improve with physician experience?

2. What errors of omission, commission, and documentation are most commonly committed? How often do such errors have a potentially significant effect on ultimate patient outcome?

3. Can both the quality of care rendered by family practice residents and the educational value of the emergency department experience be improved by an ongoing process audit of emergency department charts with regular feedback?

Methods

A prospective audit of process judged by implicit criteria was conducted at the Family Practice Residency Program in Gainesville, Florida, during the nine-month period from October 1981 to July 1982. The charts of 1,200 consecutive patients who were evaluated by family practice residents in the emergency department of Alachua General Hospital in Gainesville were reviewed. Patients seen in the emergency department and subsequently admitted to the hospital were excluded from the study.

The questions forming the protocol used for chart review are listed in Table 1. A resident error was recorded for any chart not containing adequate information to answer one or more of these questions. Judgment of whether patient evaluation and management conformed to the standards of "good medical care" was made according to the implicit notions held by the author. Constructive feedback on audited charts was communicated to the individual resident within one to seven days, either personally, by phone, or in writing, depending on the perceived urgency of the situation and its potential impact on patient outcome. Residents were encouraged to discuss problem cases at any time.

Resident errors were classified as primary or secondary depending on the author's judgment of their effect on patient care. Primary errors were defined as those having a potentially significant effect on patient care and included errors of commission (ie, missing a fracture on x-ray examination) or omission (ie, failure to obtain a urine cul-

ture on a child suspected of having a urinary tract infection).

Secondary errors did not influence patient care and included lack of adequate documentation, incomplete charting, and miscellaneous feedback that did not affect patient outcome. When an error that could be considered both primary and secondary was committed on the same patient, the error was classified as primary.

Statistical evaluation of the data was performed using chi-square analysis and significance was established at $\alpha = 0.05$.

Results

Of the 1,200 emergency department charts reviewed, 335 (27.9 percent) were cared for primarily by first-year residents, 549 (45.8 percent) by second-year residents, and 292 (24.3 percent) by senior residents. No one resident was identified as the principal caretaker in the remaining 24 patients (2 percent).

Charts were judged by the author to be complete with appropriate evaluation and management conforming to the standards of "good medical care" in 1,027 cases (85.6 percent), while resident errors were noted in the remaining 173 charts (14.4 percent). These errors were committed most frequently by first-year residents (18.8 percent of 335 cases), followed by second-year residents (15.3 percent of 549 cases), and least often by senior residents (8.9 percent of 292 cases) ($P < .005$).

Primary errors having a potentially significant effect on patient outcome were detected in 69 of the 1,200 patients studied (5.8 percent); however, in only 12 of these patients (1.0 percent) was ultimate patient management changed as a result of the audit.

Primary errors made up 39.9 percent of all resident errors, occurring again most commonly among patients cared for by first-year residents (8.7 percent of 335 cases), followed by second-year residents (6 percent of 549 cases) and least often by senior residents (2.4 percent of 292 cases) ($P < .001$). The frequency of occurrence of sec-

Table 1. Protocol Used in Emergency Department Audit

1. Is the patient identification data complete?
2. Is the chart legible?
3. Are all of the vital signs recorded?
4. Are the patient complaints indicated by the physician in the history? Are additional complaints suggested by the nursing notes?
5. Are pertinent positive and negative findings of the physical examination recorded?
6. Are laboratory tests indicated? Are the important results recorded?
7. Are all complaints elicited in the history addressed by either positive or negative physical findings or laboratory results?
8. Is consultation indicated? If so, is this recorded?
9. Does the clinical impression address the patient's complaints?
10. Are treatment plan and follow-up instructions specified?
11. Are any portions of the chart missing or incomplete?
12. Do the history, evaluation, and management of the patient conform to the standards of "good medical care"?

ondary errors was not significantly correlated to the year of resident training.

Examples of the most commonly encountered primary and secondary errors are shown in Table 2.

Discussion

Quality of Care Assessment

Quality of care is generally assessed by evaluation of structure, process and outcome.¹⁻⁴ Structure concerns the emergency facility, the equipment and resources available, and the qualifications of the medical staff. It is difficult to control for and will not be considered further in this discussion.

Process consists of the actual steps involved in patient evaluation and management that will lead to an expected outcome (ie, historical data, physical findings, laboratory tests, and prescribed treatment). Assessment of process judgements is said to be *explicit* if there is reliance on predetermined criteria set by group agreement (ie, determining

how well the actual care delivered compares with ideal preset standards of care), or *implicit* if process judgements rest on the subjective opinion of the individual auditor without reliance on any predetermined criteria (ie, the method used in this study). Quality of care measurements differ markedly in the percentage of cases judged to have rendered acceptable care depending on the method used, with the more objective explicit approach resulting in the fewest number of acceptable cases.³

Outcome measures the end results of patient care such as efficacy of treatment and long-term morbidity and mortality. The present study, as have most others in the literature, examines process. This appears to be more easily monitored and more reliable than audits of outcome, which are influenced not only by physician performance but also by prior health status, socioeconomic class, and patient motivation.³

Process evaluation assumes that good medical recording is associated with good medical care. Whether this is actually the case, however, is still a matter of controversy.^{2,3,5,6} Does the medical record reflect physician performance, or does it merely suggest record-keeping ability? As Fessel and Van Brunt have pointed out, some "outstanding clinicians may keep inadequate records where-

Table 2. Commonly Detected Errors in an Emergency Department Audit

Diagnostic Category	Primary Errors	Secondary Errors
Chest Pain	Misinterpretation of acute ischemic ECG changes*	Inadequate documentation of nature of chest pain (ie, onset, duration, severity, previous chest pain, etc)*
Urinary Tract Infection (UTI) Suspected UTI in males Pediatric UTI	Omission of rectal examination Omission of urine culture and inadequate follow-up plan	
Suspected urolithiasis Elderly patients with UTI	Inadequate follow-up plan Inadequate follow-up plan	
Headaches		Inadequate documentation of nature of headache and whether patient is on oral contraceptives (female)
Trauma Automobile accidents	Failure to order cervical spine x-ray examination despite history of flexion extension injury	
Minor head injuries		Inadequate documentation of mental status examination (ie, loss of consciousness, memory loss, etc)
Lacerations	Failure to order x-ray examination when the possibility of a foreign body exists	Inadequate documentation of size of laceration, exploration of wound, use of local anesthesia, and number of sutures; of tetanus immunization status
Pediatrics Asthma		Inadequate documentation of respiratory rate, expiratory-inspiratory ratio, use of accessory muscles, and of the response to epinephrine
Fever		Inadequate documentation of whether child appears "ill," ability to take fluids, state of hydration, and absence of meningismus
Potential child abuse		Inadequate documentation of circumstances surrounding burns or other suspicious injuries

*Indicates errors most frequently committed

Table 2. Commonly Detected Errors in an Emergency Department Audit (Continued)

Diagnostic Category	Primary Errors	Secondary Errors
Roentgenogram Interpretation		
Pediatric chest	Overdiagnosis and underdiagnosis of pneumonia*	
Extremity and facial	Failure to diagnosis fractures*	Inadequate documentation of resident interpretation
Miscellaneous		Inadequate documentation of communication with senior resident, family practice attending faculty, or consultants
		Omission of portions of the emergency room chart (ie, history, physical examination, diagnostic impression, treatment, or follow-up instructions)

as others less competent may write profusely."⁶ In the extreme case one may even postulate a negative correlation between physician performance and medical recording so that "classic casebook recording may (become) a defense for inferior practice."⁵

The subjective nature of implicit process judgments rendered by the author may lead to some valid criticisms of this study. What constitutes pertinent positive or negative physical findings? Which laboratory tests are indicated? Would a history, evaluation, and management plan deemed "good medical care" by the author be criticized by another investigator?

Answers to these questions are not forthcoming from the literature, so that the validity of assessing quality of care from the medical record becomes problematic. Without establishing explicit criteria for the multitude of possible emergency patient presentations and in the absence of direct resident supervision, an implicit audit of process may be the best tool available for monitoring resident performance in the emergency department.

In the present study resident charts were judged to be complete and appropriate in evaluation and

treatment for the vast majority of cases (85.6 percent). Notwithstanding the limitations of equating patient care with medical recording enumerated above, these results suggest that the overall quality of care delivered by family practice residents was quite good.

Resident Errors

Examples of commonly detected primary and secondary errors in the clinical context that they occurred are listed in Table 2. As might be expected, resident errors were most often noted among first- and second-year residents and were least prevalent among senior residents ($P < .005$). More important, primary errors having a potentially significant effect on patient outcome also occurred more frequently among residents in the earlier years of training ($P < .001$), suggesting that patient care improves when it is rendered by resi-

dents having more experience. That primary errors were detected in only 2.4 percent of senior resident charts may be viewed favorably as an indication of adequate preparation for practice.

In contrast, errors of inadequate documentation were common among residents irrespective of the degree of their training. These errors included the failure to include important historical data and pertinent positive and negative physical findings referable to the chief complaint; failure to record interpretations of roentgenograms and electrocardiograms, laboratory tests, procedures performed, or consultations obtained; and failure to indicate the clinical impression, treatment, or the plan for follow-up. Whether the absence of these items from the medical record was merely a reflection of poor record keeping, a high patient load leaving inadequate time for charting, or a frank omission of process indicative of physician error is a matter open to conjecture. Regardless, from an educational standpoint it would appear that more emphasis in the curriculum is needed on emergency chart recording. Medicolegally, the best physician defense has always been a well-documented medical record.

Merits of an Emergency Department Chart Audit

Feedback in this study was provided within one to seven days of the patient encounter. The regularity with which this feedback took place was well accepted by the residents, many of whom revealed that knowing their chart would be reviewed prompted them to become more attentive in their medical recording. Interpretations of electrocardiograms and roentgenograms were corrected, and specific suggestions were offered on various aspects of patient care or chart documentation. Emergency department chart auditing thus introduced faculty input into an area of resident performance that was formerly devoid of any feedback.

Regular audit of emergency department charts with a system of prompt feedback has been shown to improve compliance with process criteria documentation.^{7,8} As alluded to earlier, one might

expect this improved medical recording to be associated with a similar improvement in actual care, although this relationship has not been proven.

A final benefit of emergency department chart auditing by faculty is its potential to favorably influence ultimate patient outcome. Although outcome may be unaffected by the auditor in the overwhelming majority of cases (99 percent in this study), the impact on the lives of those whose care is affected may be substantial. In this study pneumonia was misdiagnosed in five patients, two had fractures that were initially missed, and two patients were discharged with abnormal electrocardiograms that on review were felt to suggest acute infarction necessitating admission. A significant untoward effect on patient outcome may easily have resulted from any of these oversights.

In summary, the implementation of an ongoing audit of emergency department charts into the curriculum of a family practice residency program may be useful both as an educational tool and a means of improving emergency care.

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