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Diagnostic errors in ambulatory care: dimensions and preventive strategies

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Abstract

Despite an increasing focus on patient safety in ambulatory care, progress in understanding and reducing diagnostic errors in this setting lag behind many other safety concerns such as medication errors. To explore the extent and nature of diagnostic errors in ambulatory care, we identified five dimensions of ambulatory care from which errors may arise: (1) the provider–patient encounter, (2) performance and interpretation of diagnostic tests, (3) follow-up of patients and diagnostic test results, (4) subspecialty consultation, and (5) patients seeking care and adhering to their instruction/appointments, i.e. patient behaviors. We presented these risk domains to conference participants to elicit their views about sources of and solutions to diagnostic errors in ambulatory care. In this paper, we present a summary of discussion in each of these risk domains. Many novel themes and hypotheses for future research and interventions emerged.

Keywords

Diagnostic error; Ambulatory care; Primary care; Diagnostic tests; Electronic communication; Patient behaviors; Patient follow-up

Background

Despite an increasing focus on patient safety in ambulatory care, progress in understanding and reducing diagnostic errors in this setting lag behind many other safety concerns such as medication errors (Singh et al. 2008). Lack of progress may be attributed to several factors. The diagnostic process spans multiple sites of care in a complex and fragmented ambulatory care environment, and presents myriad challenges in coordinating care. Diagnoses are made in time-pressured primary care visits, where providers are often unaware of the ultimate patient outcome. Consequently, outpatient diagnostic errors may be more common than realized and result from many types of process-of-care breakdowns (Rayson et al. 2004; Wahls and Cram 2007; Langenbach et al. 2003; Aiello Bowles et al. 2008; Gandhi et al. 2006; Singh et al. 2007b). In addition, diagnostic errors are hard to identify, it is challenging to ascertain their real causes, and they are difficult to prevent. The purpose of our discussion

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group was to explore this problem and generate ideas about causes and prevention of diagnostic errors in ambulatory care.

Malpractice claims data inform most of our current knowledge about errors of diagnosis in ambulatory care. A study of 49,345 malpractice claims between 1985 and 2000 found over one-third of claims to be related to diagnostic error (Phillips et al. 2004). Data from the Malpractice Insurers' Medical Error Prevention Study (MIMEPS) study found that cancer was the most common source of ambulatory claims (Phillips et al. 2004). A recent sub-analysis of the Utah- Colorado study found that most ambulatory preventable adverse events (APAEs) occurred in physician offices and emergency rooms and most often involved primary care physicians (Woods et al. 2007). This first population-based estimate of the magnitude of diagnostic error has revealed that diagnostic errors were the most common type of APAE (36%), followed by surgical events (24.1%), nonsurgical procedures (14.6%), and medication-related events (13.1%). However, these data only represent errors resulting in hospitalization, and therefore underestimate the total number of diagnostic errors in outpatient settings (Weingart et al. 2000). Despite their prevalence and patient impact, little epidemiologic or intervention data address ambulatory care diagnostic errors (Rosenthal and Sutcliffe 2002).

To explore the extent and nature of diagnostic errors in ambulatory care, we identified five dimensions of ambulatory care from which errors may arise: (1) the provider–patient encounter, (2) performance and interpretation of diagnostic tests, (3) follow-up of patients and diagnostic test results, (4) subspecialty consultation, and (5) patients seeking care and adhering to their instruction/appointments, i.e. patient behaviors.

We presented these risk domains to conference participants to elicit their views about sources of and solutions to diagnostic errors in ambulatory care. The authors moderated two groups of 20–25 participants each; each session lasted about 45 min. We asked participants to focus their attention on diagnostic errors involving diseases seen frequently in ambulatory care rather than on rare diseases or unusual presentations. We encouraged participants to think broadly and creatively in order to generate novel concepts, hypotheses, and research opportunities. We present the main themes from these discussions below.

Summary of discussions

Provider–patient encounter

During a provider encounter, the clinician may not receive accurate or sufficient data to make a correct diagnosis. This situation may develop when inaccurate or second-hand history information is obtained from colleagues or trainees, or from patients themselves. In these circumstances, errors may propagate when problem lists contain inaccurate or outdated information about the patient's active medical issues. Ambulatory diagnostic errors may also be more likely to occur when the provider is rushed or distracted, leading to premature diagnosis, when he or she relies on imaging or laboratory studies rather than a thorough history and physical examination, and when the provider relies on previously “established” diagnoses made by other clinicians (Graber et al. 2005; Singh et al. 2006, 2007c).

Performance and interpretation of diagnostic tests

Diagnostic errors may result from problems related to the performance and interpretation of diagnostic tests. This commonly occurs when tests are ordered unnecessarily, when the wrong test is ordered, or when the test is inappropriate. Problems related to diagnostic testing may also result from patient non-adherence to pre-test instructions (e.g., fasting status or bowel preparation) or failure to show up for the scheduled test. Diagnostic tests may be misinterpreted if the ordering physician does not convey background information

needed to interpret the test correctly. Physicians may use a sub-optimal diagnostic test if the preferred test is not covered by the patient's insurance, is too costly, or is unavailable.

Follow-up of patients and diagnostic test results

Inadequate follow-up of diagnostic test results may occur if test result management systems do not communicate abnormal results to ordering clinicians in a timely manner; this is particularly problematic when the ordering clinician is not readily identified. Clinicians may also fail to communicate abnormal test results to their patients. Patients, in turn, may misunderstand the clinician's follow-up instructions. For instance, a patient may not appreciate the importance of completing a "one-week rapid follow-up" visit scheduled by the clinician. Logistical barriers to effective follow up include protracted wait times for follow-up appointments, insurance coverage, and ambiguity regarding the clinician (e.g. primary care provider vs. specialist) who is responsible for follow-up when more than one clinician is involved in the patient's care.

Subspecialty consultation

The subspecialty consultation process is another area vulnerable to diagnostic errors. Primary care physicians may fail to order a consultation despite clear reasons to do so. Consultants, in turn, may fail to communicate their recommendations to the primary care physician. There is sometimes ambiguity regarding the clinician who is responsible for implementing the consultant's recommendation. Indeed, information must flow freely between the referring and consulting physicians to ensure that both are well informed, especially when patients refer themselves to specialists. Clinicians often gain useful information from consultants about difficult-to-diagnose cases, but may be disappointed when the consultant does not meet their expectations. Consultants may fail to address the issue faced by the referring clinician, or may be confused about their role in the case. Conflicting diagnoses from different consulting physicians may be difficult for the primary care provider to adjudicate.

Patient behaviors

The participants discussed patient-related behaviors—such as care-seeking and adherence. Health literacy is a significant and underestimated problem, in which some patients are not able to communicate effectively with their clinicians. They may not be able to relay symptoms accurately, or to understand physicians' recommendations.

Proposed interventions and future work

Researchers and practitioners need more sophisticated and standardized definitions for "diagnostic error" in order to facilitate patient-based solutions, research, and improvement strategies. A better taxonomy would help to clarify the types of errors that are most common in ambulatory care. With a reliable taxonomy, researchers could use error databases to collect and analyze information about the epidemiology of ambulatory care diagnostic errors.

The group proposed many strategies for reducing patient-provider encounter errors. Information technology could enhance continuity of care through an integrated electronic medical record (EMR). Access to medical history information (including medication and problem lists) can function to improve accuracy in data gathering; patient Web portals may also play a valuable role. Additionally, EMRs that are interoperable (i.e. communicate and exchange patient data accurately and effectively) coupled with the use of decision support, have the potential to reduce diagnostic errors. Educating providers (especially trainees) may reduce errors in several ways: by prioritizing patients' medical problems, and by modeling

“slowing-down” behaviors (i.e., thinking about alternate diagnoses in cases that do not “hang together” clinically).

To reduce errors during diagnostic testing, point-of-care testing (POCT) should be encouraged. This allows for testing at or near the site of patient care, ensures convenience and effective communication of results, and increases the likelihood that the patient will obtain the test in a timely manner. Radiologists and pathologists should use reliable mechanisms to ensure transmission of critical information such as abnormal test results (Singh et al. 2007a). Better methods, potentially using information technology, to track patient and test result follow up should be used (Gandhi et al. 2006; Redelmeier 2005; Schiff 1994). Additionally, methods for ensuring timely follow-up of critical results should be standardized in all clinical practices. Data from patient outcomes and experiences should be used more frequently to calibrate diagnostic decisions. Strengthening patient–physician communication and health literacy may decrease errors of follow-up, and empower patients to participate as active partners in their own care.

Participants suggested that the silo-like structure of medical care can get in the way of decision making when subspecialty consultation is used. Therefore, facilitating discussions (both electronic and face-to-face) among colleagues for difficult-to-diagnose cases should be encouraged. Patients should be encouraged to follow up with their clinicians, to adhere to recommendations, and to ask questions about their care and diagnoses. Personal health records and e-mail communication were both felt to be useful mechanisms for reducing diagnostic errors.

In summary, the group discussions identified several key issues and areas to be addressed in all five dimensions of care. We believe this groundwork can be used to enable future progress in reducing ambulatory diagnostic errors.

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