

Point-of-Care Reference Materials Increase Practice Compliance With Societal Guidelines for Incidental Findings in Emergency Imaging

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Abstract

Purpose: The aim of this study was to assess the efficacy of an educational framework encouraging the systematic application of national societal recommendations regarding the imaging evaluation and follow-up of incidental findings (IFs) in the emergency department.

Methods: After institutional review board approval was received, consecutive CT and ultrasonographic examinations from the emergency department over a 2-month period were collected. Examination reports were categorized by study type and evaluated individually for the presence of IFs that fit into the following core categories: solid or subsolid pulmonary nodules, liver lesions, splenic lesions, gallbladder polyps, pancreatic cystic lesions, adrenal nodules, adnexal cysts on CT or ultrasonography, thyroid nodules (CT), and abnormal lymph nodes. Subsequently, after an educational intervention consisting of printed and electronic references, e-mail, and verbal communication detailing societal guidelines and the introduction of voice recognition macros, data were recollected in the same fashion for an additional 2-month period.

Results: A total of 3,131 imaging events occurred in the 2-month preintervention period, yielding 514 total incidental findings. Of these 514 findings, 67.5% were correctly managed and 32.5% were incorrectly managed according to societal recommendations. In the postintervention period, 3,793 imaging events yielded 499 total incidental findings. Of these 499 findings, 80.2% were correctly managed and 19.8% were incorrectly managed. The increased rate of reporting incidental findings in concordance with societal guidelines was statistically significant ($P < .0001$).

Conclusions: Point-of-care decision support reference materials increase radiologist compliance with societal guidelines for incidental findings. Compliance with societal guidelines improves patient care and has cost-saving implications.

Key Words: Incidental findings, emergency, radiology, American College of Radiology, clinical decision support system

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INTRODUCTION

Emergency department (ED) imaging utilization continues to grow for all modalities in the United States [1,2]. Data from 2000 to 2008 for Medicare beneficiaries showed 227% and 95% increases in use in the ED of CT and ultrasonography, respectively. In 2008, CT constituted

29% of ED imaging, up from 14% in 2000, on the basis of Medicare data [1]. Studies estimate that 15% to 67% of all ED CT examinations reveal incidental findings (IFs) [3,4]. Increased ED imaging continues to drive the discovery of IFs, and the appropriate management of IFs in this patient population is important and challenging [5]. Most IFs are benign; however, a subset of IFs may represent early malignancies [6]. Overly aggressive management can lead to increased health care costs, unnecessary radiation exposure, and patient anxiety [7].

To promote evidence-based and cost-effective management of IFs, national organizations including the ACR, the Society of Radiologists in Ultrasound and the Fleischner Society have developed standardized consensus guidelines [8-14]. Despite these recommendations, radiologist

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adherence to guidelines is not consistent [15-17]. A recently published retrospective study at our institution demonstrated appropriate adherence to guidelines in only 67.5% of identified IFs [18]. Previous studies have validated the use of clinical decision support systems (CDSS) to increase compliance with practice guidelines [19-21]. Key features of an effective CDSS include embedded support in the routine workflow, rapid real-time support, succinct reference information, and actionable evidence-based recommendations [22].

After our initial investigation, we created easily accessible reference materials and standardized dictation macros to improve the concordance of follow-up recommendations for IFs. Satisfying the key features of effective CDSS was achieved using IT infrastructure currently in place. The purpose of this study was to evaluate whether educational material provided at the point of care improved reporting and recommendations for IFs by increasing compliance with national society guidelines.

METHODS

This study was approved by the institutional review board and was conducted in an academic emergency radiology division consisting of 11 faculty members. Members of this division interpreted all examinations. Examinations originated from the EDs of two university-affiliated hospitals.

Definitions and Preintervention Data Collection

To collect baseline data on the frequency and handling of IFs in the ED, we retrospectively identified consecutive CT and ultrasonographic examinations during a 2-month period from September 1, 2014, to November 1, 2014. These baseline data and our methods have been previously published [18].

ACR white papers and Fleischner Society consensus statements were used to identify a core list of IFs with standardized recommendations for follow-up [8-14]. Core IFs with consensus recommendations included thyroid nodules, solitary pulmonary nodules, liver lesions, splenic lesions, ovarian cysts on CT or ultrasonography, gallbladder polyps, pancreatic cysts or cystic masses, renal cysts, adrenal nodules, and abnormal number or size of lymph nodes. These consensus-based societal guidelines were held as the gold standard for the appropriate management of IFs. Applicable examinations with radiology reports and patient demographics were exported into a database. Each report was reviewed and evaluated for the core set of IFs.

Each IF, along with the interpreting radiologist's recommendation, was cataloged individually. In cases in which the radiologist made no recommendation but used a word such as *unchanged* or *stable* to characterize the IF, we assumed that no follow-up was intended. This final recommendation was compared with the societal guidelines for management and deemed concordant or discordant. Discordant recommendations for additional imaging were categorized as more aggressive or less aggressive compared with the guidelines. More aggressive imaging was defined as recommending earlier, more frequent, or more advanced imaging than guidelines, whereas less aggressive imaging was the opposite. In certain cases, reports did not contain the level of detail needed to establish follow-up imaging recommendations. These unclear cases were categorized in consensus by two attending emergency radiologists.

Educational Intervention and Postintervention Data Collection

We created a 16-page document summarizing societal guidelines. This document had a 1-page summary of each organ system or IF and the accompanying societal recommendations, often in tabular format. The document contained a table of contents, which was hyperlinked in the electronic version, allowing single-click linking from the table of contents to the reference material content. Citations to the full guidelines were placed at the bottom of each page. We created automated macros in PowerScribe 360 (Nuance, Burlington, Massachusetts) to facilitate guideline compliance.

In August 2015, the entire emergency radiology division was educated about guideline use during a monthly meeting. In this short (<1 hour) meeting, we did not try to teach the guidelines to the radiologists but rather educated radiologists about the importance of following guidelines and informed them about the three easy ways they could access these guidelines: (1) precreated PowerScribe 360 macros for all guidelines, (2) the short 16-page book at every workstation, and (3) an electronic version of the guideline book with electronic links in the table of contents. Printed, color-coded, and spiral-bound copies of the 16-page educational document were placed at all workstations, and electronic versions were placed on all interpretation workstation desktops. E-mails were sent to all radiologists encouraging compliance with societal guidelines for IFs. A reminder e-mail was sent 4 weeks later, and verbal reminders were provided by the division chief at both the September and October monthly division meetings.

Consecutive CT and ultrasonographic examinations were collected during a 2-month period from September

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