ORIGINAL ARTICLE

Reductions in High-End Imaging Utilization With Radiology Review and Consultation

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Abstract

Following the uptake of value-based purchasing in concert with health care reform in the United States, providers, insurers, and patients are looking for ways to reduce excessive, dangerous, and/or inappropriate high-end imaging utilization (HEIU). Inappropriate HEIU is associated with patient safety risks due to unnecessary exposure to radiation, misappropriation of scarce equipment resources and staff, complications to clinical care, and needless, excessive costs for the patient, hospital, and payer. This paper presents a cost-effective radiology-initiated improvement program piloted in the Christiana Hospital Coordinated Care Network. The pilot demonstrated the effectiveness of regulating high-end imaging orders through radiologists' review of requests of the order as part of the consult process. Over the 2014-2015 fiscal year, 2,177 high-end imaging orders were reviewed by 26 radiologists for approval, rejection, or recommendation of an alternate examination. Of the orders, 86.7% (1887) were approved, 4.0% (87) were rejected, and 9.3% (203) received recommendation for an alternate examination. Based on improved patient safety, cost savings, and appropriate resource use, these findings suggest that radiologists' review can effectively reduce excessive HEIU. This method, with an appropriate algorithm to assist with handling a larger volume of orders, would be ideal to implement systemwide to manage HEIU cost efficiency, simultaneously providing radiologists with more control in their area of expertise and positively impacting quality, safety, and value-based purchasing goals.

Key Words: High-end imaging utilization, radiology benefits management, radiologists review, clinical decision support

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Increased use of diagnostic imaging is felt to be a major driver of health care costs [1]. Although estimates of excess high-end imaging utilization (HEIU) vary, ranging from 20% to 50% [2-4], there is general agreement that certain diagnostic imaging tests are overutilized. There is much demand for evidence-based solutions, including a push for collaborative efforts toward increasing the value and quality of health care while moving away from traditional payment for volume [5-7]. Examples include radiology benefit management (RBM) and third-party regulation [8], education to increase awareness among ordering physicians [9], clinical decision support and/or physician self-regulation [10], and radiologists' control over imaging selection and use. Different strategies to reduce HEIU are important, given potential impact on patient safety, clinical care complications, and misappropriation of equipment and staff, in addition to costs for the patient, hospital, and payer. It is crucial that health care providers follow evidence-based guidelines regarding appropriate use of high-end imaging technologies and encourage practicing radiologists to provide value above and beyond image interpretation.

RBM has provided an incentive for providers to be critical of their technology usage [11] and has self-reported reduced HEIU. However, RBM also introduces a potentially harmful time barrier to patient care and an additional burden for referring physicians and radiologists [12]. RBM use is not popular among providers [10], who believe that the time spent on the preauthorization process is a significant strain on their

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time devoted to patient care [12]. Multiple entities claim that that RBMs shift costs to providers, meaning that savings made by reducing excess HEIU are outweighed by the cost to comply with the bureaucratic process and time spent in gaining preauthorization to high-end diagnostic imaging [13]. In addition to these shortcomings, RBMs lack educational opportunities for ordering physicians and do not utilize the training, education, and experience of on-site radiologists [13,14].

The current climate places radiologists in a constrained role as a simple service, device provider, with little opportunity to actively improve patient care and reduce resource overutilization [15-17]. Radiology-driven HEIU control systems provide a way to increase value added for the specialty, remain relevant within the changing health care paradigm, and possibly generate new revenue. Multiple studies have shown that communication and consultation between ordering physicians and radiologists expedites care and is preferred by ordering physicians and staff [10,18]. In an effort to self-regulate and take steps toward alignment with professional society approaches, our radiologists conducted a pilot study to evaluate the efficacy of radiologist review of all high-end imaging orders for outpatient MRI and CT in reducing HEIU.

METHODS

Christiana Care Health System (CCHS), headquartered in Wilmington, Delaware, is one of the country's largest health care providers, ranking 22nd in the nation for hospital admissions at 53,621 annually. A not-for-profit, nonsectarian health system, CCHS includes two major teaching hospitals with more than 1,100 patient beds, a home health care service, preventive medicine, rehabilitation services, a network of primary care physicians, and an extensive range of outpatient services including 16 accredited imaging locations. CCHS currently utilizes an RBM for their preauthorization services, an external process recognized as cumbersome and lacking acceptance and efficiency. To align with value-based goals and reduce inappropriate imaging, CCHS implemented radiology order entry and an evidence-based decision support system to address CT volume growth and growth rate and MRI growth rate [19]. The pilot study population included outpatient CT or MRI examinations requested for patients in our clinically integrated network and that were performed at CCHS imaging locations between July 1, 2014 and August 14, 2015. Using a standardized, semiautomated workflow and several software tools (ACR criteria, Interqual, Choosing Wisely criteria, proprietary radiation dose tool), the radiology team reviewed all outpatient CT and MRI orders (Fig. 1).

The Utilization Management team was responsible for reviewing requested studies. The Utilization Management nurse first applied Interqual criteria to clinical information from available electronic medical records to identify whether the study was appropriate for the patients' circumstances. Radiologists determined appropriateness of utilization using ACR criteria, prior radiation dose data, prior imaging timeline, and clinical information as indicated. Radiologists were encouraged to confer with radiology colleagues to resolve concerns or discrepancies revealed in the above review. For each imaging request, radiologists made one of three decisions: approved, rejected, or recommended an alternate examination. All orders that were not approved as appropriate resulted in communication and discussion between the consulting radiologist and ordering physician. Recommendations and results were tracked and audited.

Counts of approved, rejected, and alternative recommendations were summarized to evaluate the success/progress of this process. Turnaround time for this process was captured with a random audit of 7.9% of study orders, and the summary includes the average time and percentage of requests resolved within 1, 2, 4, 8, and 12 hours. Time to resolve was defined as time of order submission until final decision (approval, rejection, alternate recommendation) was determined, including time spent conferring with the ordering physician.

RESULTS

Over a 12-month period, 2,177 examinations were reviewed and 395 conversations between radiologists and ordering physicians documented (Table 1). More than

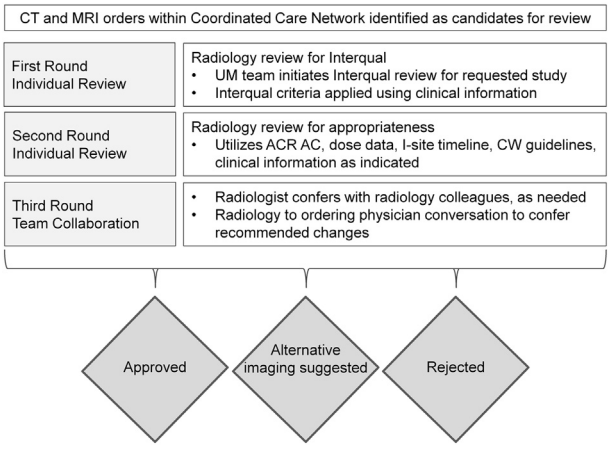

Fig 1. Standardized workflow for high-end imaging utilization radiologist review.