

Face-to-Face: Resident-led Radiology Medicine Rounds Facilitate Evidence-based Processes for Clinical Decision Support

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Face-to-Face: Resident-led Radiology Medicine Rounds Facilitate Evidence-based Processes for Clinical Decision Support

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Abstract:

The transition toward value-based payment models increases focus on the radiologist's direct impact on hospital-provided patient care. Radiology trainees understand inpatient hospital workflows and decision-making paradigms and are well positioned to interface directly with hospital physicians regarding clinical decision making related to diagnostic imaging and/or image guided interventions. A radiology resident-led project with internal medicine residents focused on Clinical Decision Support was designed, implemented, and reviewed, with the objectives of educating clinical teams and positively impacting patient care. During the 2017-2018 academic year, senior radiology residents (PGY-5) led weekly rounds with medicine residents rotating through inpatient floor units. During these rounds, they discussed

indications for and types of hospital inpatient imaging studies, exchanged clinical information, directed further imaging workup, and taught the essentials of image interpretation. Participating medical residents' degree of radiology-awareness and opinions were systematically surveyed at the conclusion of the academic year. Thirty-four out of a total of 161 (21%) Internal Medicine residents responded to the survey. Thirty one percent of these residents could identify an instance where radiology-led rounds altered patient management and 94% acknowledged an increase in medical knowledge. Sixty-one percent believed evidence-based choice for imaging orders was enhanced by attending radiology-led rounds and 64% developed a better understanding of resources available to guide image ordering. Forty-nine percent of residents made suggestions to their Internal Medicine attending physician or more senior trainee or otherwise applied something learned during radiology-led rounds and 42% cancelled or ordered a study based on what they learned or discussed in radiology rounds. Thirty-nine percent of medicine residents stated that these rounds changed their perception of the role of the radiologist and 75% expressed the desire to see increased participation by radiologists in their daily workflow. Radiology resident-led educational medicine rounds promote cross-specialty collaboration, further educate trainees, and directly affect patient management. It is therefore valuable for radiology trainees to directly engage in the teaching of other medical providers, to enhance their own consultative skill set, promote face-to-face interactions with other physicians, and to directly impact patient care.

Keywords

Core competencies, resident, education, interdisciplinary, clinical decision support

Introduction

The transition of hospital re-imbursement to value-based payment models increases the need for radiologists to actively engage in and demonstrate direct involvement in patient management [1]. Co-operative models of care have been described, including radiology-led patient clinics, rounding with clinical teams, embedded reading rooms, and direct clinical decision support [2-10]. Academic centers are challenged with implementing patient-centered care and promoting resident education; not all practice models which may best benefit the patients would be educationally beneficial for residents and vice versa. Senior residents are ideally positioned to be more directly involved in patient care; they have a critical knowledge base-after four years of radiology training that can benefit patients and clinicians and they have more time available in their schedule to participate in educational activities compared to their attending faculty members and their junior radiology co-residents [11]. Thus, weekly radiology resident-led medicine rounds were instituted to bridge the inter-specialty gap between clinical teams and the “reclusive radiologist”. Here, we demonstrate the feasibility and assess the utility of these rounds in clinical practice at a large academic medical center.

Methods

Structure of radiology rounds

Weekly radiology rounds with medicine residents have been occurring for many years at our institution using different formats, including led by radiology residents and/or attendings. During the 2017-2018 academic year, 4th year radiology residents (PGY-5) led weekly clinical and educational rounds with medicine residents rotating on inpatient general medicine floors at our institution. The 4th year radiology residents had extensive experience taking call, presenting at multidisciplinary conferences,

and performing clinical consultations in the reading room. Of the nine 4th year radiology residents, the majority of the rounds were led by the 2 chief residents.

The rounds took place one morning each week and lasted for approximately 30-60 minutes. The medicine residents prepared a list of cases to discuss during the rounds. After the medicine residents gave a brief clinical presentation about the patient, the radiology resident would then review the images, review basic imaging principles, re-enforce the basis for image interpretation, discuss pertinent findings, resources for clinical decision support, and give recommendations based on imaging findings. The radiology resident was free to structure the rounds as they wished within this basic organization, guiding the discussion in ways they thought would be most beneficial in the moment. No distinct educational modules were utilized. No educational materials were assigned to the medicine residents for work outside the rounds, although resources for clinical decisions support, such as the ACR appropriateness criteria, were enforced. If the medicine residents had not prepared cases to fill the allotted time or the radiology resident wished to convey a specific teaching point, the radiology residents could present cases of their choosing with specific learning objectives, such as basic chest x-ray evaluation, although this was at the discretion of the resident leading conference that week. To our knowledge, the medicine residents did not receive any other structured radiology curriculum.

Resident surveys.

After obtaining exemption from full IRB review, surveys assessing the medicine residents' opinion of the rounds and how it affected their clinical practice were provided to all medicine residents after 10 months of regular medicine rounds, regardless of where they were rotating on the inpatient floors at that time (Appendix A). In order to determine how the rounds affected both patient care and resident education, we designed survey questions to assess how the radiology rounds addressed the core

competencies designated by the American Council for Graduate Medical Education (ACGME): Practice-Based Learning and Improvement, Patient Care and Procedural Skills, Systems-Based Practice, Medical Knowledge, Interpersonal and Communication Skills, and Professionalism [12]. Survey questions were also informed by similar studies that assessed the feasibility and utility of radiology consultation with clinician services [5, 7-10]. Surveys were distributed using Google Forms (Google LLC, Mountain View, CA). Data were compiled and analyzed, and charts were created, using Microsoft Excel version 16.16.1.

Results

Thirty-four of 161 participating medicine residents responded to the survey. Thirty-eight percent (13) were interns (PGY-1), 38% (13) were PGY-2 residents, and 24% (8) were PGY-3 residents. When asked about the number of rounds in which they participated during the year, the largest number of residents had participated in over 10 (30% of respondents).

While the vast majority of respondents (88%) preferred to speak to radiologists in person, they called the reading room instead due to time constraints. Only 6% preferred to speak with radiologists on the phone rather than come to the reading room. Specific resident comments about the rounds, including the most and least beneficial aspects and suggestions for improvements, are included in Table 1.

Responses assessing how the rounds addressed ACGME core competencies are summarized in Figure 1. Thirty one percent of residents identified an instance where rounds altered patient management. Examples of such instances included changing the choice of study, cancelling an ordered exam, and changing management based on elaborated differential diagnosis (patient placed on isolation given the possibility of TB pneumonia).

After participating in rounds, 94% reported increased medical knowledge: 87% in abdomen/pelvis, 83% in chest, 63% in neuroradiology, and 23% in musculoskeletal imaging. Twenty-

eight percent believed more teaching would be useful in the area of abdomen/pelvis, 22% in chest, and 13% in neuroradiology. Eighty-five percent of residents felt more comfortable looking at/interpreting radiology exams after attending rounds. The exams residents felt more comfortable interpreting included CT (82%), x-rays (71%), and MRI (29%). They believed more instruction would be useful to help interpret MRI (33%), CT (24%), and ultrasound (24%).

Thirty-nine percent of medicine residents acknowledged that rounds changed their perception of the role of the radiologist, as they were “able to understand what information radiologists want to know when we order tests”, they learned “evidence-based choice of imaging”, they stated, “helps me to understand how much uncertainty exists in the interpretation of radiologic studies”, and described the “ability to broaden the differential diagnosis”. Ninety-one percent felt more comfortable speaking to a radiologist and had a better understanding of radiologists’ thought processes and 94% found that speaking with the radiologist in person was more valuable than speaking over the phone. Seventy-five percent of residents would like to see increased participation of radiologists in their daily workflow. Specific suggestions are summarized in Table 2.

Discussion

After attending radiology resident-led educational rounds, medicine residents were more comfortable interpreting radiology examinations, discussing imaging with their patients, had increased medical knowledge, and had better understanding of the available resources to guide image ordering. Additionally, resident-led rounds directly affected clinical care by guiding modifications to patient management strategies, direct suggestions to attendings or senior residents, and cancellation or alteration of imaging/procedural orders. Although opportunities for structural improvement exist, medicine

residents desire more direct interaction with radiologists. Our data show that in-person, resident-led rounds with medicine residents improves patient care, ordering practices, and inter-specialty relationships.

In an effort to increase the radiologist's direct involvement in clinical decision support, multiple patient and clinical consultation models have been described [2-6, 8-10]. Many of these initiatives are resident-led, both as educational experiences for radiology residents and to facilitate integration into the radiology department schedule [4, 5, 7, 10]. Salama et al instituted similar resident-driven clinical imaging rounds with internal medicine residents and found that the rounds provided a valuable opportunity to improve communication, education, and patient care [7]. Aripoli et al created a system where senior radiology residents rounded with medical teams during their morning rounds to discuss imaging and were available by phone other times during the day [5]. They found that referring clinicians found having dedicated time to review imaging during rounds beneficial for clinical knowledge and that patients benefited from incorporating a radiologist into rounds. Referring clinician trusted in radiology resident interpretation, provision of relevant information regarding the most appropriate imaging examination, and interest in improving clinical practice also increased. Mangano et al describe a primary care clinic where patients with common problems discovered by routine imaging were referred and imaging findings were discussed with the patients [4]. They found that participants rated the consultation as very helpful and all participants would take the opportunity to review studies with the radiologist again. Significantly more patients preferred the involvement of the radiologist in communicating the results of an imaging examination after the consultation compared to before the consultation.

Our study is limited by a low percentage of survey responses, which may be biased by self-selection. A similar number of PGY-1 and PGY-2 medicine residents responded to the survey, with fewer PGY-3 residents responding, which may be related to the fewer inpatient rotations scheduled for the senior medicine residents. We did not collect data regarding PGY-1 resident categorical medicine or preliminary (subsequently completing a different residency specialty) status, although only anesthesia and

psychiatry preliminary interns were admitted to our internal medicine residency program. Additionally, true pre-intervention surveys were not feasible because similar, radiology *attending*-led rounds with internal medicine took place for a few years before the resident-led rounds. While, anecdotally, resident-led rounds were well-received by both medical residents and faculty, it is difficult to measure how much of the effect seen was due to the radiology rounds being resident-led. Multiple radiology residents led the rounds, and although they were given broad organizational guidelines, session to session variation in medical resident participation could also affect their perception of the rounds and content provided. Finally, since medicine residents participated in rounds at various times throughout the academic year and the surveys were administered at the end of year, the surveys are subject to recall bias.

There are many future opportunities to expand direct radiologist involvement with patient care. A natural progression from the current medicine-radiology rounds model would be for a radiology resident to embed with the medical team on their daily clinical rounds. Being present at the time of clinical decision making would maximize the consultant radiologist's impact on clinical case management and answer questions regarding the ordering of imaging and other tests. This would also allow the opportunity to discuss imaging findings directly with patients. Other models, such as a radiology outpatient consultation clinic, where patients can make appointments to discuss imaging findings, or embedded reading rooms, where the radiologist would be in direct proximity to both referring clinicians and patients, represent feasible alternatives. Additionally, with recent need for telemedicine and teleconsultations, radiology residents are uniquely situated to be provide these remote consultations.

In conclusion, radiology resident-led educational medicine rounds promote cross-specialty collaboration, further educate trainees, and affect patient management. It is therefore important and valuable for radiologists, including those in training, to participate in endeavors to that increase face-to-face interactions with referring clinicians and patients and more directly impact patient care.

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Table 1) Specific comments about radiology rounds.

Most beneficial parts of rounds	Least beneficial part of these rounds	Suggestions for improvement
Discussion of imaging modalities	Disorganized, unpredictable, and unstructured	Guidance for educational objectives
More exposure to reading different types of imaging	Focusing on rare pathologies	Pre-select cases
Explanations of findings of more common pathologies	When the radiologist thinks silently to him or herself	Dedicating 5-10 minutes to look at common findings
Specific case discussion	Can spend too much time on one case	Sometimes runs over the time scheduled - would stick to time constraints, even though short
Able to see more images with explanations from radiologists	Sometimes gets too technical with regards to radiographic technology/science	More in depth teaching and instruction, more preparation from radiologist, better cases
Thought process during interpretation and differential provided	Questions by other residents are too specific and not generalizable	Doing it at another time
Looking over images that pertain to my patients and discussing the results	Timing is disruptive to work day	Maybe some basics about MRI like T1 vs T2 vs DWI vs etc.
Learning the differential diagnosis for the radiographic finding, which may expand the differential from the history and labs alone	Hemming and hawing about what is seen without specific objectives	Incorporating more of the radiographic diagnostic reasoning
Insight into how radiologists read studies		

Table 2) Specific suggestions to increase radiology presence in daily medicine workflow

Specific suggestions to increase radiology presence in daily medicine workflow

Calling for interesting findings

Input on what type of study to order

More face-to-face discussion of the results of imaging studies

When a radiologist makes a change to an imaging order, they should page the team to let them know so we can learn too

In interesting cases, it is not always possible to fully discuss in the reading room. If the radiologist could come to the floor that would be great.

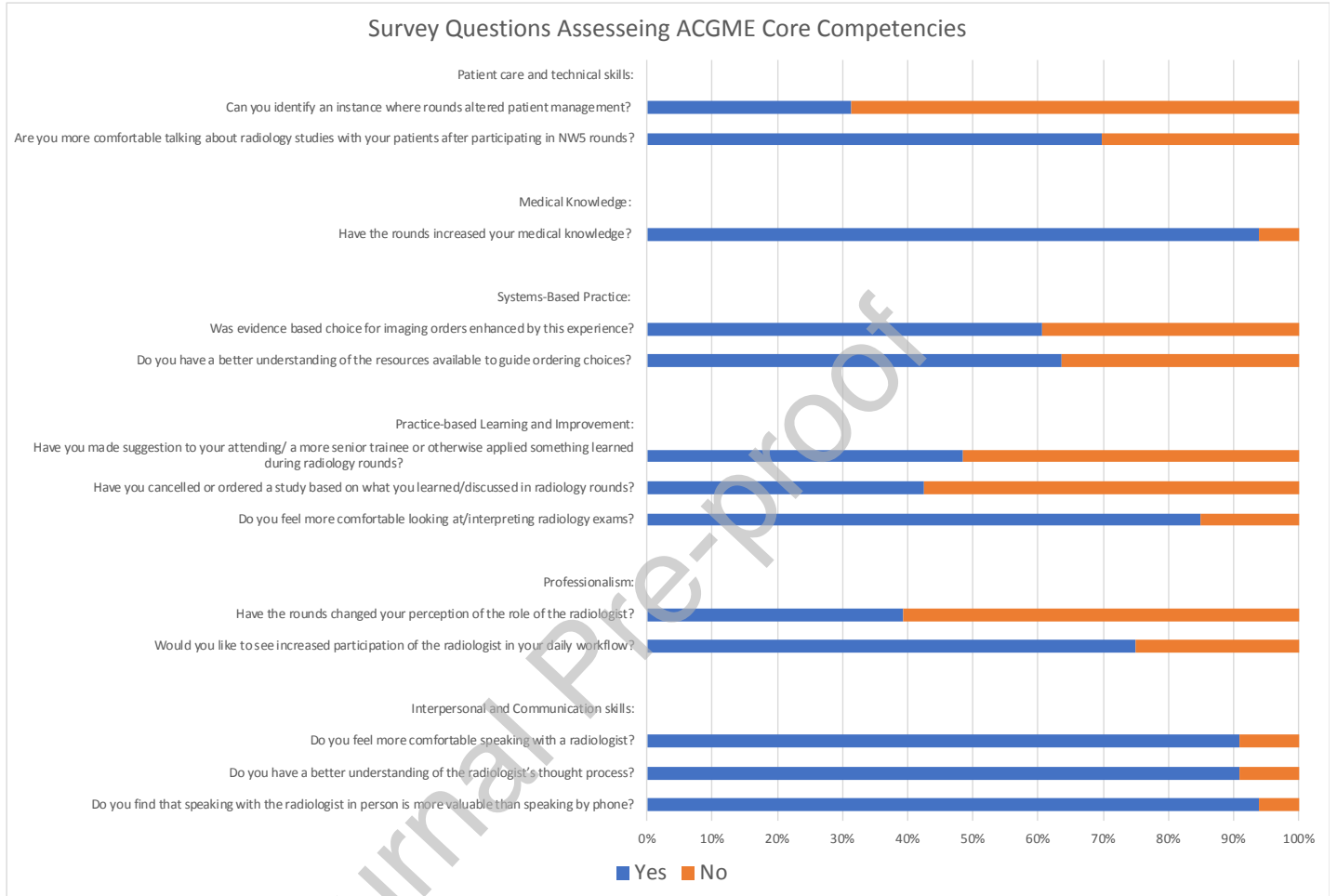
Could attend rounds on a once a week basis, review even standard imaging for teaching points

More ability to discuss cases in person

Often discussing scans has helped me recognize the limitations of the study and how to discuss it with family or with making a decision etc.

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Figure 1) Survey responses assessing the effect of rounds on ACGME core competencies



Appendix A: Medicine radiology rounds resident survey

Training Level

Medical Student

PGY

Have you participated in radiology rounds before? Y/N

How many have you participated in?

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, >10

Most beneficial part of rounds?

Free text

Least beneficial part of rounds?

Free text

What can be improved?

Free text

Can you identify an instance where rounds altered patient management?

Y/N

Describe:

Are you comfortable talking about radiology studies with your patients after participating in NW5 rounds?

Y/N

Have the rounds increased your medical knowledge?

Y/N

In what areas (choose all that apply): Neuro, Chest, Abdomen/pelvis, MSK, Nuclear medicine, Peds, Ultrasound, Interventional Radiology.

In what single area would more teaching be of utility? (choose one): Neuro, Chest, Abdomen/pelvis, MSK, Nuclear medicine, Peds, Ultrasound, Interventional Radiology.

Was evidence-based choice for imaging orders enhanced by this experience?

Y/N

Do you have a better understanding of the resources available to guide ordering choices?

Y/N

Practice-based Learning and Improvement:

Have you made suggestion to your attending/ a more senior trainee or otherwise applied something learned during radiology rounds?

Y/N

Have you cancelled or ordered a study based on what you learned/discussed in radiology rounds?

Y/N

Do you feel more comfortable looking at/interpreting radiology exams?

Y/N

If yes, which exams in particular (choose all that apply): X-ray, CT, MRI, Ultrasound, Nuclear medicine

In which modality would more instruction be useful (choose one): X-ray, CT, MRI, Ultrasound, Nuclear medicine

Have the rounds changed your perception of the role of the radiologist?

Y/N

Optional free text: Describe

Would you like to see increased participation of the radiologist in your daily workflow?

Y/N

Do you feel more comfortable speaking with a radiologist?

Y/N

Do you have a better understanding of the radiologist's thought process?

Y/N

Do you find that speaking with the radiologist in person is more valuable than speaking by phone?

Y/N

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