

Imaging & the Graduating Medical Student

Perceptions and Knowledge of
ACR Appropriateness Criteria



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Introduction

- The cost of medical care in the United States has risen significantly in recent years.
- This has been linked in part to the significant increase in imaging.
 - Up to one third is not appropriate
- In order to curtail rising costs, appropriate use of imaging is necessary.

Radiology Education in Medical School

- Formal radiology rotations significantly improve medical students' ability to choose the appropriate imaging tests, but less than a quarter of medical schools require clerkships in radiology.
- Given the ever-increasing knowledge that is required of students, it is unlikely that radiology clerkships will become more prevalent.
- Basic knowledge of the indications and limitations of the tests ordered is essential for these students to become competent physicians.

ACR Appropriateness Criteria

- The ACR recognized the importance of this when they created the Appropriateness Criteria (AC), with “the goal of assisting referring providers in determining the most efficacious and appropriate imaging practices”.
 - These criteria are the most comprehensive and official set of guidelines currently available.
- Research has shown that AC were effective in modifying ordering behavior, resulting in more appropriate tests being ordered by clinicians.

Goal

- We sought to give medical students the basic tools required to order appropriately in a concise, easy to replicate format that left no one graduating without a minimal understanding of the AC or where to find them.
- We also sought to understand if and how senior medical students were using this resource, and we wanted to determine the effectiveness of our intervention.

Methods

- A 45-minute lecture reviewing the breadth of imaging modalities used in the radiology department was developed and administered by a senior radiology resident with support from board certified faculty.
- It was followed by specific clinical scenarios and was presented to all 115 graduating medical students from an accredited American medical doctorate program during their last month of medical school.

Pre and Post Test Questionnaire

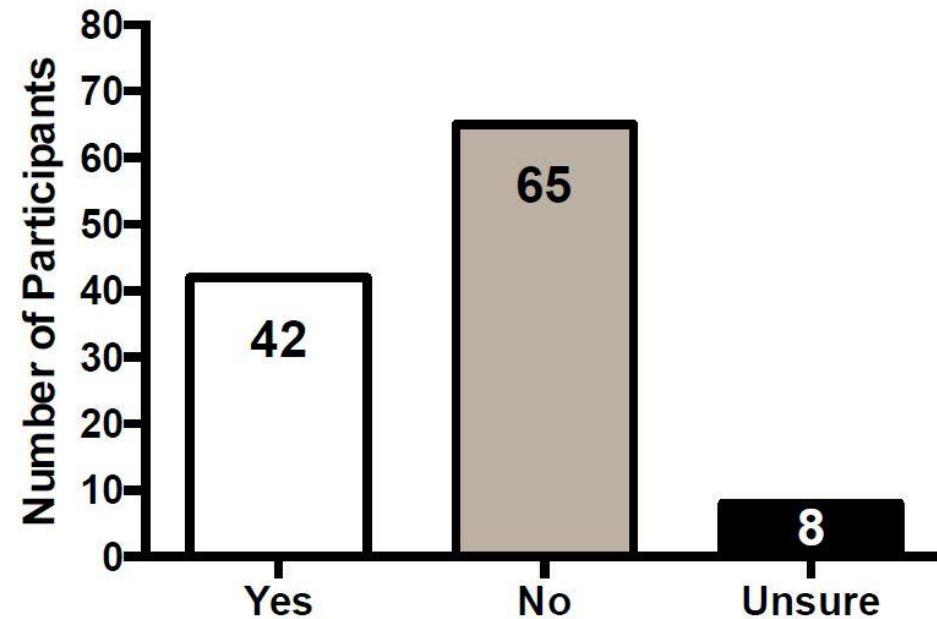
- Prior to the lecture, a 12 question pre-test was administered.
 - Students were asked which specialty they had recently matched into, then were asked about their experience using the ACR Appropriateness Criteria.
 - The second part of the pre-test quizzed students on their knowledge of basic radiology while the third asked about their educational experiences in radiology.
- After the lecture, a 7 question post-test was administered.
 - The first part assessed participants' likelihood of using the Criteria in their future practice, now that they were aware of their existence.
 - The second part of the post-test exam was identical to the pre-test and was designed to assess the students' understanding of the presented material.
 - The third section gauged the participants' perceived comfort in ordering imaging studies after the presentation.

Results

Knowledge & Use of the AC

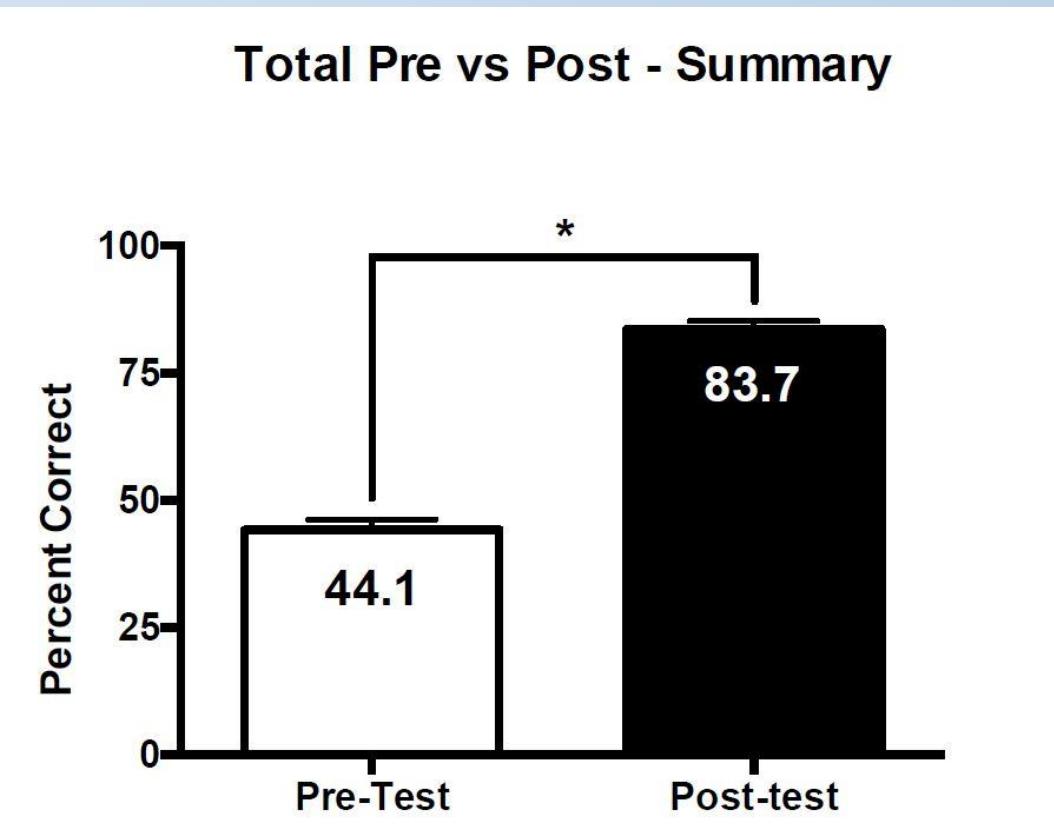
- Most medical students at our institution had not used the AC; in fact only 37% knew of their existence.
- Of those, only 33% had consulted them.
- Of the medical students that had used the criteria, all found that they were helpful.

Have you heard of the ACR Appropriateness Criteria?



Ordering Knowledge

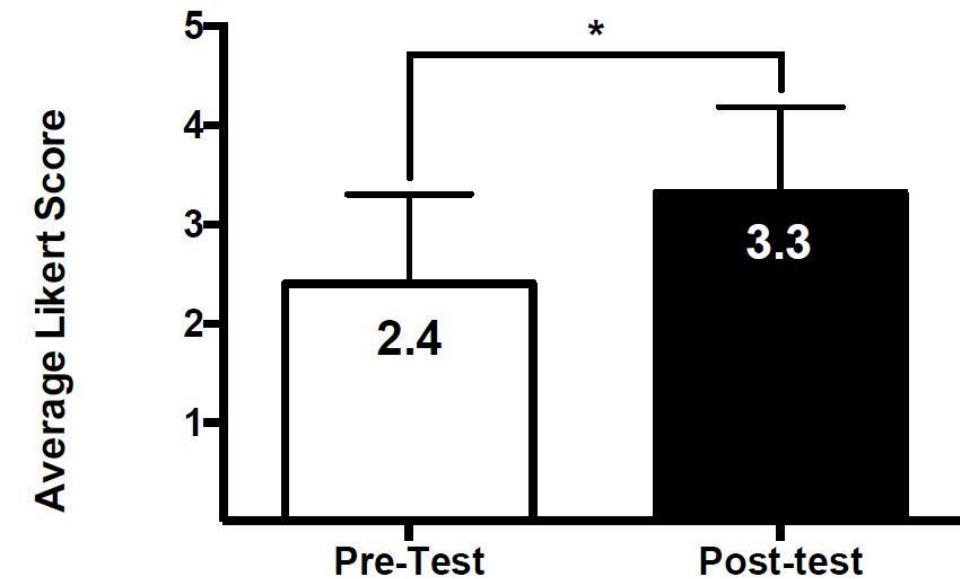
- Students' knowledge of appropriate utilization of imaging improved significantly after the 1 hour lecture describing the ACR Appropriateness Criteria:
 - Before the presentation, the overall average score on the knowledge section of the quiz was 44.1%, which climbed to 83.7% after the lecture.



Imaging Education Perceptions

- On the pre-test, most students (107/115) felt that imaging was important in their ability to practice medicine, but over half did not feel comfortable ordering studies (62/115).
- A little over half (60/115) felt that they needed more education on the topic and most medical students (98/115) wanted more radiology education during their training.

**Comfort Ordering Imaging Studies
Pre vs Post Presentation**



Reactions to Ordering and the AC

- After the presentation, 84% of medical students said they were more likely to consult the AC.
- Most students felt more comfortable with radiology ordering after the presentation:
 - On the pre-test, 54% of students reported feeling not at all or only minimally comfortable when it came to radiology ordering.
 - After the lecture, that number dropped to only 18.2%, while 42.6% felt that they were moderately or much more comfortable.

Specific Concerns

At the end of the post-test, an open-ended question asked students for feedback or concerns.

1. Contrast

- Several questions were raised about the ordering of imaging tests with or without IV contrast.
- Numerous participants noted that this was still a confusing point at the end of the lecture, and many reported that ordering both with and without contrast for all exams was their way to compensate for their lack of knowledge, without realizing that this would expose the patient to significantly more radiation.

2. Costs

- Many students felt like they did not understand the costs of the exams they ordered and wished that more information were available so that they could be cost-conscious.
- This is critical for all of us, but of particular importance to the large number of physicians at our institution and across the country whose patients do not have adequate health insurance.

3. Interpretation

- Many comments stated that medical students wanted to learn how to interpret several types of imaging studies in the one hour lecture, although it was made explicitly clear at the beginning of the lecture that interpretation would not be covered.
- This remains a controversial topic and our study re-demonstrates the poor understanding of the expertise needed to interpret radiographic images.

Conclusion

- We demonstrated that a 1 hour lecture given by a senior radiology resident significantly increased graduating medical students' understanding of basic imaging ordering concepts.
- Retention of that knowledge is, however, a different question altogether, and whether these students will practice according to the AC remains to be determined.

Thank you!

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