

Delaying in house call for Radiology Residents – is there data to support it?

Compiled by Thomas J. Henry M.D and Spencer B. Gay M.D.

The proposed ACGME change delaying in house call to the second year of Radiology residency is a step that has the potential to greatly affect both residency programs and radiology residents. This issue of first-year radiology resident (PGY-2) preparedness for taking overnight call comes forward against a background of increasing pressure from other departments for around the clock in-house attending supervision¹. These demands may be based more on anecdotes and preferences, rather than on any direct evidence of decreased quality of patient care.

We performed a Medline search of relevant articles since 1990. Several retrospective reports have been published by radiology training programs documenting resident errors in interpretation measured against the subsequent attending overread, primarily in head CT²⁻⁵. To our knowledge, no data exists to suggest that these PGY-2 residents are insufficiently trained to take call. The only manuscript⁶ evaluating residents after 6 months training reported that the scores of were not significantly different on a computer based pre call exam to upper level residents.

Current data supports that existing structure of residency provides for residents that make relatively few (< 2%) important errors in diagnosis. Errors for head CT that did not significantly impact patient care were more commonly made (5-8%) were found. There is generally a small improvement in error rate as training increases, but no significant change has been shown for important errors between levels. The goal of zero errors may not be possible even with board-certified dedicated ED radiologists. Our own and other's experience teaching and testing residents prior to independent night call with backup appears prudent and discrepancies have been minimal.

The cost of making such a change in call structure is that first year residents will have no independent experience and that more senior residents will be doing call when they could be in positions providing more effective education. The benefit is likely very small, because there has been no data published to show that a problem exists.

It is arbitrary to declare a resident with 12 months training more ready for call than a resident with 6 or 9 or 24 months, without implementing some system that objectively tests and demonstrates each resident's preparedness. Whether a PGY-2 or and board eligible PGY-5 resident, this is still a less "experienced" radiologist than the greenest general radiologist attending. We should be cognizant that our clinical colleagues will always prefer to have a staff radiologist in-house 24 hours a day. The training of radiology residents - which in part has always relied upon taking independent overnight call - is our responsibility and we need to consider this change and the full result.

1. Am Surg. 2001 Dec;67(12):1175-7.

Around-the-clock attending radiology coverage is essential to avoid mistakes in the care of trauma patients.

Velmahos GC, Fili C, Vassiliu P, Nicolaou N, Radin R, Wilcox A.
Department of Surgery and Radiology, University of Southern California Keck School of Medicine, Los Angeles, USA.

Summary:

Over 6 month period, all trauma CT scans performed after hours were prospectively evaluated for discrepancies between preliminary read of on-call radiology resident and final read of the attending radiologist.

Radiology residents were in their 2nd- 4th years. Precise pre-call training regimen was not specified.

Significant discrepancies were those that resulted in a change in treatment.

383 patients receiving 699 CT scans.

11% (42) of patients (not CT scans) had a final read that differed from preliminary read.

48% of these discrepancies (20/42) (5% of all patients) were considered "significant."

17% of the 2nd year preliminary reads were deemed inadequate (meaning final read differed from preliminary read), compared to 7.5% each for 3rd and 4th years, and 3.5% for 5th years (not specified as to who these people were- fellows?).

Authors conclude "we have shown that trauma CT readings by resident radiologists are often inaccurate. Such readings cause wrong treatment decisions and are associated with prolongation of hospital stay and increase hospital charges."

2. Investigative Radiology 1991 Apr;26(4):374-6.

Resident interpretation of emergency computed tomographic scans.

Summary:

Over 2 month period, 289 emergency head CT scans read by residents were reviewed by staff radiologist (not specified as to specific background of training); this attending opinion was considered "correct."

Discrepancies were divided into three categories: major (changed clinical management and affected prognosis), moderate (changed clinical management without affecting prognosis), and minor (no change in management or prognosis). A panel of 3 radiologists reviewed all discrepancies to judge their significance.

Three types of errors identified: false negative, false positive, and misinterpreted pathology.

43% of studies were interpreted by 2nd year residents, 44% by 3rd years. (Not specified whether this indicates PGY or radiology year).

Five of the six moderate (4) and major (2) errors were made by 2nd year residents. These misses were SAH, SDH, and CNS anoxia.

Overall, 2% major/moderate error rate by the 2nd year residents (5/124), compared to 0.4% for 3rd years.

Overall accuracy in interpretation of all studies was 2%- the authors state that although the hospital QA committee found this rate acceptable, they had reservations as to whether this rate of error for "very significant pathology is acceptable for patient care.

3. Radiology, Vol 208, 125-128, 1998

Head trauma: CT scan interpretation by radiology residents versus staff radiologists

MG Wysoki, CJ Nassar, RA Koenigsberg, RA Novelline, SH Faro and EN Faerber

Department of Radiology, Allegheny University Hospital, Philadelphia, PA 19129, USA.

Summary:

419 consecutive trauma head CT at level one trauma center from 10/95- 2/97.

All residents had completed at least one month of neuroradiology, three months general diagnostic, and 3h/wk neuroradiology conference. Results were stratified by level of training.

Discrepancies divided into two groups: false negative (further divided into major and minor) and false positive.

Major discrepancies defined as those which would affect patient care emergently (eg: ICH, pneumocephalus). Minor discrepancies included skull and facial bone fractures.

First year residents had 2.4% major and 4.9% minor discrepancies, and 1.2% false positive findings; the difference between first and third year residents was not statistically significant

No effort made to compare resident reports with true findings on follow-up—staff neuroradiologist reading considered gold standard.

Radiology Resident Evaluation of Head CT Scan Orders in the Emergency Department

William K. Erly^a, William G. Berger^a, Elizabeth Krupinski^a, Joachim F. Seeger^a and John A. Guisto^b

^a Department of Radiology, University of Arizona Health Sciences Center, Tucson

^b Department of Surgery, University of Arizona Health Sciences Center, Tucson

Summary:

Radiology residents (n = 18), either during normal working hours or while on call, prospectively interpreted 1324 consecutive head CT scans ordered in the emergency department at the University of Arizona Health Sciences Center, Tucson (a level 1 trauma center), from January through July 1999. Studies were overread by one of 5 neuroradiologists. The final interpretation of the neuroradiologist was considered the gold standard.

A disagreement was considered significant if an adverse patient outcome was possible or a gross error in synthesis occurred without the potential for an adverse outcome. An insignificant error was defined as one in which no potential for an adverse patient outcome existed.

The level of residency training significantly affected rates of agreement, although these were high for each year of residency. The neuroradiologists agreed with the first-year residents 90% of the time, with 8% disagree-insignificant and 2% disagree-significant rates. They agreed with second-year residents 92% of the time, with 7% disagree-insignificant and 1% disagree-significant rates. The agreement rate with the third-year residents was 94%, with 6% disagree-insignificant rates. The neuroradiologists agreed with the fourth-year residents 99% of the time, with 1% disagree-insignificant rates. Rates of agreement increased with the year of residency training. All significant disagreements occurred with the first- and second-year residents, although the overall disagree-significant rate was only 2%.

The final interpretation of the attending physician was used as the criterion standard- interobserver variability between neuroradiologists in the interpretation of cranial CT scans undoubtedly exists, and in this series, two cases of significant disagreements (9%) were a result of false-positive interpretations by the attending neuroradiologist.

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6. Academic Radiology, June 2006, vol.13(6) 764-69.

Part I: Preparing First-Year Radiology Residents and Assessing their Readiness for On-Call Responsibilities

Suvranu Ganguli MD^a, Ivan Pedrosa MD^a, Chun-Shan Yam PhD^a, Barbara Appignani MD^a, Bettina Siewert MD^a and Herbert Y. Kressel MD^a

^aBeth Israel Deaconess Medical Center and Harvard Medical School, Department of Radiology, 330 Brookline Avenue, Boston, MA 02215.

A dedicated month-long ER curriculum was designed based on the American Society of Emergency Radiology (ASER) core curriculum in ER. Each lecture of the curriculum lasted 45 minutes and was provided by a department staff radiologist who is subspecialty trained in the area of interest. The department staff used the ASER core curriculum as a guideline for material to be covered within their assigned lecture. The format of the lecture (didactic vs case based) was left to the lecturer's discretion because a standard lecture format was not provided. However, most lecturers combined both didactic slides with slides of example images from actual radiology cases. All lecturers included images from actual cases that were either given to residents as unknown cases or described by the lecturer to illustrate salient radiological findings.

Each first-year resident completed introductory month-long core radiology rotations in thoracic imaging, neuroradiology, body CT and fluoroscopy, musculoskeletal imaging, abdominal and obstetric ultrasound, and nuclear medicine before and during the month of the lecture series.

Of 19 cases, PGY-2 residents scored an average of 73.0% (range, 63.2%–81.6%) of total points possible. PGY-3 residents scored an average of 76.8% (range, 68.4%–86.8%), PGY-4 residents scored an average of 77.4% (range, 65.8%–100%), and PGY-5 residents scored an average of 81.2% (range, 68.4%–94.7%). A *t*-test found no significant statistical difference between these results ($P > .05$).

Moreover, although the average score obtained by PGY-2 residents was not statistically different from the averages of the upper-level classes, there was a trend toward higher scores with superior levels of training. Failure to show differences among residents based on their level of training may be related to the case selection for the test module and the small sample size. Part 2 of this article describes the structure of the training and testing program.