Medical Student Performance After a Vertically Integrated Radiology Clerkship

Stefan Tigges, MD, MSCR[a], *Petra J. Lewis, MBBS*[b], *Nancy J. McNulty, MD*[b,c], *Mark E. Mullins, MD, PhD*[a]

Abstract

Purpose: Proper selection of imaging examinations and basic image interpretation skills are essential for all physicians, yet only approximately 25% of US medical schools require clerkships in radiology. Although there is limited time in most medical school curricula to allow the addition of a required radiology clerkship, the authors developed one that is vertically integrated over a two-year period. This clerkship includes one week of contact with radiologists distributed over the M2 and M3 years, podcasts, online modules, required readings, and presentations. A standard national examination is administered at the end of the clerkship period. This clerkship was designed to address the educational needs of students while occupying minimal time in the curriculum. The purpose of this study was to determine if students completing this clerkship perform as well on a national radiology examination as students from other medical schools, regardless of their curricula.

Methods: At the end of the M3 year, these students take a computer-based radiology examination developed by the Alliance of Medical Student Educators in Radiology and used by students at multiple medical schools nationally. The mean and median scores of these students were compared with those of students at these other institutions.

Results: The mean and median scores of the students were 74% and 74% (standard deviation, 7.5%) compared with 74% and 50% (standard deviation, 8.4%) at other institutions.

Conclusions: Students completing this vertically integrated radiology clerkship had test scores comparable with those of students at other medical schools.

Key Words: Curriculum, education, medical student, radiology

J Am Coll Radiol 2016;13:67-71.

INTRODUCTION

Imaging is an expensive and ubiquitous part of medical care; in 2011, more than 10% of all medical visits involved some type of imaging in the Medicare-age population [1], and the cost of imaging to Medicare alone was more than $10 billion in 2012 [2]. Exposure to radiology during medical school is critical, not only for the consideration of radiology as a career choice but also to help prepare all physicians to appropriately advocate for their patients and utilize resources. Subjects such as radiology utilization, appropriateness, quality, and safety seem both universal and critical to medical practice and thus medical student education. Who is better suited to teach radiology than radiologists?

Unfortunately, in contradistinction, only 10% to 25% of medical schools require radiology training for their students [3,4], despite recognition by nonradiology residency directors, interns, and medical school deans of the importance of imaging to patient care [5-7]. Barriers to a formal radiology clerkship include a lack of available radiology faculty members and insufficient space in an already crowded curriculum [7]. An alternative to the traditional freestanding 2- to 4-week radiology clerkship is vertically integrating radiology into the other clerkships,

[a]Department of Radiology and Imaging Sciences, Emory University School of Medicine, Atlanta, Georgia.

[b]Department of Radiology, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire.

[c]Department of Anatomy, Dartmouth Medical School, Hanover, New Hampshire.

Corresponding author: Mark E. Mullins, MD, PhD, Emory University School of Medicine, Department of Radiology and Imaging Sciences, 1364 Clifton Road NE, Room D125A, Atlanta, GA 30322; e-mail: memulli@emory.edu.

Petra J. Lewis, MBBS, Chief Editor of CORE, reports a financial disclosure from MedU outside the submitted work. The other authors have no conflicts of interest related to the material discussed in this article.

1546-1440/15/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2015.07.019

using lectures, small group sessions, and computer modules [8,9]. We developed a longitudinally integrated clerkship, the "virtual radiology clerkship," in which students spend time learning radiology intermittently and through a number of methods, rather than spending a block of time in the radiology department. For two years, the students completing their M3 year have taken a computer-based standardized examination, developed by the Alliance of Medical Student Educators in Radiology (AMSER), which is used by multiple medical schools nationally [10]. This examination was developed through the collaborative work of multiple national student radiology educators who are experienced test writers and editors. To the best of our knowledge, there is no National Board of Medical Examiners shelf examination in radiology, and we feel that the AMSER standardized examination fulfills this role for this clerkship.

The purpose of this study was to compare the AMSER examination results of our students completing this virtual clerkship with the overall national performance of all medical students taking this examination, regardless of curriculum, including both elective and required clerkships, integrated or otherwise. We also report the results of a survey by the Association of American Medical Colleges (AAMC) regarding student attitudes toward radiology education at our institution before and after the adoption of this integrated approach. Finally, we surveyed radiology clerkship directors of other medical schools who use the AMSER examination regarding the structure of their clerkships.

METHODS

The Emory University Institutional Review Board determined that this study did not require review.

History and Structure of Our Virtual Clerkship

In 2010, the Emory University School of Medicine requirement for a 2-week free-standing radiology clerkship in the M3 year was eliminated from the curriculum and replaced with a virtual clerkship integrated into the M2 and M3 ambulatory care, internal medicine, neurology, pediatrics, psychiatry, obstetrics and gynecology, and surgery clerkships. To our knowledge, this was the only such curricular change during this epoch at this medical school. The virtual clerkship has had four principal components: (1) approximately one week of total contact with radiologists, (2) online computer modules and podcasts, (3) required and optional readings, and (4) student participation (attendance), student presentations, and an examination. In addition to a small amount of radiology-related teaching in anatomy (in the M1 year, approximately 15 teaching sessions, including a focus on anatomy) and a radiology elective clerkship (in the M3 or M4 year), the virtual clerkship represents the bulk of organized radiology education of our medical students. We are not aware of any students who took the radiology elective before the virtual clerkship.

Contact With Radiologists

Contact with radiologists is distributed throughout the M2 and M3 years and consists of lectures, interactive small group sessions, and a half day of shadowing a radiology resident. The lectures are coordinated with the concurrent clerkship and delivered by subspecialty radiologists. For example, there are three different complementary lectures on chest radiograph interpretation, one each given during ambulatory care, internal medicine, and surgery. Each version has a different emphasis; the ambulatory care lecture stresses anatomy and radiologic signs, the internal medicine lecture highlights medical diseases, and the surgery version emphasizes trauma and surgical diseases. Other lectures are similarly integrated; for example, neuroimaging lectures are given during the neurology and psychiatry clerkships, pelvic ultrasound is taught during the obstetrics and gynecology rotation, and so on. There are a total of 16 lectures over the two years. Sessions are held in multiple locations, predominantly in the medical school itself and the radiology department. Attendance at required functions is tracked by a combination of the radiology department and the "host" department (eg, neurology for the neuroimaging section).

Small group sessions are also integrated into the appropriate clerkships. For example, a workshop on the ACR Appropriateness Criteria® (AC) for chest pain is scheduled during internal medicine, whereas ACR AC related to abdominal pain are discussed during surgery [11]. We previously sought and obtained permission from the ACR to teach medical students using the ACR AC in our department at Emory. Several small group sessions involve presentations by students on topics such as the ACR AC and important imaging topics such as lung cancer screening. Other small group sessions are interactive case conferences, at which students are asked to evaluate radiographs and recognize important and common imaging findings they can expect to encounter in their careers, such as bowel obstruction, pneumoperitoneum, and pneumothorax.

A small group session introduces students to the basics of head, chest, and abdominal CT interpretation. For