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Medical Student Knowledge and Interest in Interventional Radiology following a Rotation Integrated into the Surgery Clerkship

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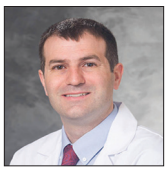

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ABSTRACT

Objective: The objective of the study was to evaluate how early exposure to interventional radiology (IR) affects medical students' knowledge and interest in IR.

Methods: Surveys assessing students' awareness of IR training pathways, IR services, and interest in IR were distributed in 2018. Descriptive statistics were calculated. Likert scale data were evaluated using Mann–Whitney U-test. We hypothesized that students' interest in IR and knowledge of the specialty would increase following their rotations.

Results: 16/20 (80%) pre-rotation and 13/20 post-rotation (65%) students responded to the surveys. About 73% of pre and 85% of post students knew that IR had its own new residency program. About 50% of pre and 100% of post students knew that integrated IR residency was a new training pathway. About 38% of pre and 46% of post students knew that independent IR residency was a new training pathway. About 38% of pre and 62% of post students knew that early specialization was a new training pathway. The number of students who knew IR had admitting privileges doubled (62% post vs. 31% pre). More students knew that IR had a clinic at our hospital (85% vs. 63%). The level of interest in becoming an IR increased from 3.00 to 3.23 ($P = 0.36$), and the level of interest in becoming a diagnostic radiologist increased from 2.56 to 2.69 ($P = 0.91$).

Conclusion: Awareness of IR as a clinical specialty and familiarity with the new training pathways increased after an IR elective integrated into a surgery rotation. Students' interest in pursuing IR also non-significantly increased.

Keywords: Education, Medical students, Surgery clerkship

INTRODUCTION

The integrated interventional radiology (IR) residency was approved by the Accreditation Council for Graduate Medical Education in September 2014 and participated in its first match in the 2016–2017 cycle.[1] Additional routes to pursue IR training include early specialization in IR (ESIR) and the independent IR residency. Diagnostic radiology residents in programs with ESIR designations can complete ESIR training in their Postgraduate Year 5 (PGY5) and independent IR residency in their PGY6. Residents who did not participate in ESIR programs can participate in 2-year independent IR residency programs during their PGY6 and 7.

While exciting, the new integrated IR residency requires trainee to choose to specialize in IR in their 4th year of medical school and has resulted in calls to increase exposure to IR in medical

school curricula.[1-4] Authors have advocated for increasing IR exposure through integrating IR in preclinical gross anatomy courses, forming IR interest groups, creating hands-on IR workshops, hosting IR symposia, and establishing 3rd year IR electives.[1,2]

Concurrent with the changes in the IR training pathways, our institution underwent a transition from a traditional medical school training model (2 years of basic science followed by 2 years of clinical experiences) to a three-phase model that fully integrates basic science, public health, and clinical care throughout our medical students' education. Integrated curricula have recently become common in North American medical schools, driven by dissatisfaction with the teaching of basic sciences without concurrent clinical application, and by cognitive theories of learning, suggesting integrated educational approaches improve learning, retention, and relevance.[5,6] At our institution, Phase 1, the first 18 months after matriculation, focuses on basic science while fully integrating clinical science and public health. Phase 2 is comprised four 12-week clinical blocks integrated with basic science and public health, spans the year-long period beginning at the halfway point of the 2nd year of medical school, and concludes at the halfway point of the 3rd year of medical school. Phase 3 is dedicated to career exploration and internship preparation, contained many individualized opportunities, and spans the final year and a half of medical school.

This curriculum change created an opportunity to incorporate IR into the Surgical and Procedural Care block of Phase 2 along with the other procedurally based specialties of general surgery, neurosurgery, ophthalmology, otolaryngology, urology, cardiothoracic surgery, vascular surgery, orthopedics, plastic and reconstructive surgery, gynecology, anesthesia, and procedural cardiology and gastroenterology. Positioning the IR elective in the Surgical and Procedural Care block results in earlier exposure to the field of IR for students who participated in our rotation than they would have experienced in the traditional curriculum. Students at our institution do not have required diagnostic radiology rotations but have opportunities to participate in multiple 2-week diagnostic radiology courses during Phase 3 of the curriculum. This study was aimed at identifying how early exposure to an IR rotation influenced students' knowledge of, and interest in, our specialty.

MATERIALS AND METHODS

Study design

We accepted one student per 2-week rotation; given that, the block is 12-week long, we had the capacity for six students per block and a total of 24 students during the year. Before the rotation's start, students received a PowerPoint about IR patient care, procedures, and training pathways (including details about the years spent in each specialty in the different pathways). In addition to participating in procedures, students were required to write inpatient consult notes, round on inpatients, present in morning rounds, see patients in clinic, and attend multidisciplinary conferences. The first five students were assigned to IR randomly, while the subsequent 15 requested IR as a rotation. The study period was from January 2018 to December 2018. Surveys were electronically distributed to the students immediately before ("pre") and immediately after ("post") the 12-week Surgical and Procedural Care block. Since the surveys were distributed after the 12-week blocks, anonymity was maintained. The surveys were designed to assess the students' knowledge of and interest in interventional and diagnostic radiology. The surveys were anonymous and administered through Qualtrics (Provo, Utah). We hypothesized that students' interest in and knowledge of IR and diagnostic radiology would increase following their rotations. The survey was determined to be IRB exempt by our institutional review board.

Statistical analysis

Likert scale data were converted to mean values and evaluated using Mann–Whitney U-test. Statistical analyses were performed with SPSS version 25.0 (SPSS Inc., Chicago, IL).

RESULTS

Twenty of our potential 24 (83%) elective spots were filled. Half of the students were women. Sixteen of 20 (80%) and 13/20 (65%) students responded to the pre and post surveys, respectively [Table 1]. Before their rotations, 73% of students knew that IR had its own residency program, 50% knew that integrated IR residency was a new training pathway, 38% knew that independent IR residency was a new training pathway, and 38% knew that ESIR was a new training pathway. After their rotations, 85% of students knew that IR had its own new residency program, 100% knew that integrated IR residency was a new training pathway, 46% knew that independent IR residency was a new training pathway, and 62% knew that ESIR was a new training pathway. Before the rotation, 31% knew that IR had admitting privileges at our hospital and 38% knew that IR had a clinic at our hospital. Following the rotation, those numbers increased with 62% knowing that IR had admitting privileges and 85% aware that IR had a clinic. On a 5-point Likert scale (1 = no interest and 5 = extremely high interest), the level of interest in becoming an interventional radiologist increased from a mean of 3.00 pre-rotation to mean of 3.23 post-rotation ($P = 0.36$), and the level of interest in becoming a diagnostic radiologist increased from a mean of 2.56 to a mean of 2.69 post-rotation ($P = 0.91$).

Table 1: IR survey questions and results.

1. IR has its own residency program

	True (%)	False (%)	Unknown (%)
Pre-rotation	11 (73)	0 (0)	4 (27)
Post-rotation	11 (85)	1 (8)	1 (8)

2. The new IR training pathways include

	Fellowship (%)	Integrated residency (%)	Residential fellowship (%)	Independent residency (%)	ESIR (%)	Unknown (%)
Pre	8 (50)	8 (50)	5 (31)	6 (38)	6 (38)	7 (44)
Post	10 (77)	13 (100)	4 (31)	6 (46)	8 (62)	0 (0)

3. IR has hospital admitting privileges

	True (%)	False (%)	Unknown (%)
Pre-rotation	5 (31)	3 (19)	8 (50)
Post-rotation	8 (62)	3 (23)	2 (15)

4. IR has a clinic

	True (%)	False (%)	Unknown (%)
Pre-rotation	10 (63)	0 (0)	6 (38)
Post-rotation	11 (85)	1 (8)	1 (8)

5. My level of interest in becoming an interventional radiologist is

	Zero–1 (%)	Low–2 (%)	Moderate–3 (%)	High–4 (%)	Extremely high–5 (%)
Pre-rotation	0 (0)	5 (31)	7 (44)	3 (19)	1 (6)
Post-rotation	0 (0)	2 (15)	6 (46)	5 (38)	0 (0)

6. My level of interest in becoming a diagnostic radiologist is

	Zero–1 (%)	Low–2 (%)	Moderate–3 (%)	High–4 (%)	Extremely high–5 (%)
Pre-rotation	0 (0)	10 (63)	4 (25)	1 (6)	1 (6)
Post-rotation	2 (15)	5 (38)	3 (23)	1 (8)	2 (15)

IR: Interventional radiology

DISCUSSION

This survey showed trends toward medical students improving their knowledge of IR and non-significantly increasing their interest in IR following completion of an elective IR rotation in a surgical and procedural care clerkship. A prior study reported that 69% of medical students surveyed were interested in having IR as a 2-week elective in a surgery clerkship.[3] Indeed, our elective is popular with over 80% of the elective spots being filled during the study period.

Foundational competencies including history taking, physical examination, note writing, and presentation skills were emphasized to our students. Students were required to round on inpatients and see patients in the IR clinic. As a consequence, our survey results showed that a higher percentage of students were able to correctly indicate that IR has admitting privileges and a clinic at our hospital following their rotations. Importantly, our clinical emphasis with our medical students pair with the goals of the new IR training pathways and the transition of IR into a clinical specialty.[7] The medical students were also required to attend a liver tumor board multidisciplinary conference, which has been shown to give medical students a greater appreciation for the multidisciplinary aspects of oncology.[8]

Information on the new IR training pathways was included in required pre-rotation reading. The results of this survey reflect that the students' knowledge of the new IR training pathways improved during their rotations with 100% of students identifying integrated residency as a new training option. However, only 46% and 62% of students identified independent residency and ESIR as new training options, respectively, and 77% of students still included fellowship as a "new" IR training option. It is possible that "new" was an ambiguous term in the survey question. Furthermore, our program currently has only fellows, which likely contributed to our students' confusion. Regardless, these survey results support a conclusion that the multiple training pathways into IR remain confusing to medical students and ongoing educational efforts on this topic are worthwhile.

The previous studies have shown that medical students have more favorable opinions of more familiar specialties and are subsequently more likely to consider them as careers, while specialties that lack early exposure receive fewer applicants.[3,9-13] Our rotation proved to be a formative experience for students

in choosing their careers, both positively and negatively. Overall, the percentage of students ranking their interest in both IR and diagnostic radiology as high or very high increased following their rotations. A prior study showed that the top reason for students not choosing diagnostic radiology was a perceived lack of patient contact.[14] Students' exposure to the radiology department during IR rotations introduces them to the breadth of patient contact and impact on patient care radiologists can have and may serve to dispel misconceptions. Only two students became disinterested in diagnostic radiology after their rotations. Given the current competitiveness of the integrated IR residency, early exposure to IR introduces students to potential mentors and research opportunities, both of which could help strengthen students' residency applications.

This study is limited by the small sample size as only 20 students have completed the rotation at the time of manuscript preparation. The small sample size likely accounts for some irregularities in the data. For example, all students went to the IR clinic, yet only 85% reported that there was a clinic. In addition, because the IR rotation was an elective, the students were inherently biased toward having an interest in interventional and diagnostic radiology. However, this study importantly showed that students' interest still increased following their exposure to the IR rotation. Finally, we do not yet know what careers these students elect to pursue and, therefore, do not yet know the long-term impact of this rotation.

CONCLUSION

Our institution has found IR to be well suited for integration into a surgical and procedural care clerkship. This study supports the hypothesis that its integration has increased our visibility as a clinical specialty and increased medical students' awareness and knowledge of IR.

Acknowledgment

This work was presented as a poster at the 2019 Association of Academic Radiologists' meeting. This paper has not been published online or in print and is not under consideration elsewhere.

Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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