

Ultrasound interest group: a novel method of expanding ultrasound education in medical school

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Abstract

Purpose Ultrasound technology and clinical applications are advancing across many medical specialties and there exists an increasing need for ultrasound education in medical school. Few institutions, however, have incorporated this into the 4-year curriculum and barriers to curricular change remain. The Ultrasound Interest Group (USIG) is an alternative, extracurricular way for future operators to gain ultrasound exposure throughout all four years of medical school and develop the skill sets necessary to emerge as leaders in sonography.

Methods The USIG was designed using a student organization infrastructure. The mission is to promote ultrasound education and student leadership across the medical school, outside the required curriculum. Participation is voluntary and open to all medical students. Leadership consists of defined positions held by junior and senior

medical students. The USIG holds four meetings per year, organizes clinical and scanning opportunities for students, sponsors ultrasound events, and distributes a newsletter.

Results The USIG has been an active student interest group for three academic years and had three sets of student leaders. Participants in USIG activities included first through fourth-year medical students each year. To date, the USIG had 12 meetings including 2 national and 4 local guest speakers. The USIG has organized scanning opportunities for students, sponsored events, and established a vertical model of structured mentorship.

Conclusion The USIG is a feasible method of promoting ultrasound education and student leadership among medical students. This model may be implemented at other medical schools as a centralized, organizing body for extracurricular ultrasound education.

Keywords Ultrasound · Medical students · Interest groups · Education

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Introduction

Ultrasound technology and clinical applications are advancing across many medical specialties. Clinicians are discovering new uses for this imaging modality that are leading to improvements in patient care. At the same time, machines are becoming more compact, more affordable, and of higher quality [1]. Many physicians, however, continue to lack the skill set necessary to fully use this imaging modality in clinical practice [2]. In the last 10 years, ultrasound technology and miniaturization have outpaced the education of future operators. With these advancements, there exists an ever increasing need for ultrasound education in undergraduate medical training [3–6].

Few institutions have integrated ultrasound education into the 4-year medical school curriculum [7–10] despite evidence that medical students are capable of learning how to use and apply ultrasound during both their preclinical and clinical years [6, 7, 9–12]. This lag in incorporating ultrasound into undergraduate medical training may be due to a variety of reasons including lack of experience with ultrasound on the part of faculty educators, reluctance to change on the part of medical school administrators, or the turf mentality that exists across many specialties regarding the domain of ultrasound [6]. The logistics of how to include such training in an already full 4-year curriculum also comes into question by medical school deans and administrators. It is therefore worthwhile to investigate alternative, extracurricular ways for medical students to gain exposure to ultrasound, develop skill sets necessary to use this modality as future clinicians, and emerge as leaders in sonography.

Studies in academic medicine demonstrate that medical education often takes place in settings outside of the core curriculum [13]. One forum for this is student interest groups. These organizations are quite common in medical schools and they allow medical students to learn about and develop interests in different specialty areas [14, 15]. In considering ways to provide medical students with ultrasound educational opportunities, particularly in institutions where curricular change may not be immediately feasible, a student interest group is a reasonable option.

Methods

Under the guidance of an emergency medicine ultrasound director, students at The Ohio State University College of Medicine created the Ultrasound Interest Group (USIG). The mission of this student-run organization is to promote ultrasound educational opportunities and student leadership across the medical school, outside of the required curriculum. It was designed to serve as a central repository for all ultrasound educational activities for students within the College of Medicine. As an extracurricular program, membership is voluntary and it is open to all matriculating students within the College.

The USIG uses The Ohio State University student organization infrastructure for funding and leadership purposes. As a registered student organization both within the University and the College of Medicine, the interest group can obtain financial support from both sources. From the University, the interest group receives \$200 annually for operating costs (printing, food for interest group meetings, recruitment) and can apply for up to \$3,000 in funding for a specific event. The USIG also receives \$300 annually from the College of Medicine Student Council to use for any interest group-related expenses. The USIG bylaws state that

leadership is composed of junior and senior medical students and the specific positions include President, Vice President, Secretary, and Treasurer. The roles of President and Vice President are to be held by fourth-year medical students whereas those of Secretary and Treasurer are to be held by second-year students. In accordance with student organization policies within the College of Medicine and the University, there is a faculty advisor. The USIG is designed to hold four interest group meetings per year, organize scanning sessions for students, facilitate structured mentorship opportunities, improve ultrasound exposure at College of Medicine events, and distribute an interest group newsletter to all medical students.

Results

The USIG has been an active, registered student organization within the College of Medicine and University for three academic years and had three sets of student leaders. The faculty advisor is a registered diagnostic medical sonographer (RDMS) certified emergency physician and ultrasound director for the College of Medicine and Department of Emergency Medicine. The USIG held four interest group meetings per year with guest speakers (Table 1). The meetings consisted of interest group announcements, talks by guest speakers, ultrasound demonstrations, case presentations, and free lunch for those in attendance. Local and national guest speakers have discussed the use of ultrasound and its latest advances in cardiology, gastroenterology, emergency medicine, critical care, and anesthesiology as well as the RDMS certification process. Interest group meetings were attended by first through fourth-year medical students and the interest group began to keep complete meeting attendance records during its third year of existence (Table 2).

In addition to meetings, the USIG offered scanning opportunities for medical students and created innovative programs for structured mentorship. All students have access to the ultrasound machines in a clinical skills lab. An online scheduling system allows students to request both an ultrasound model and an experienced student proctor for individual practice sessions. The interest group has also organized clinical scanning shifts in the Emergency

Table 1 Summary of USIG meetings and speakers by year

Academic year	Number of meetings	Local speakers	National speakers
2008–2009	4	0	1
2009–2010	4	2	1
2010–2011	4	2	0

Table 2 USIG meeting attendance for 2010–2011 academic year

Meeting date	Topic	Guest speaker	Number of students in attendance
8/30/2010	Overview of ultrasound and USIG, scanning demonstrations	None	97
12/8/2010	Endoscopic ultrasound	Gastroenterologist	28
2/28/2011	Echocardiography	Cardiologist	24
5/18/2011	State of ultrasound education in medical school, cases	None	21

Department and Department of Gastroenterology with ultrasound-trained attending oversight. Both the skills lab and clinical hands-on experiences allowed participants to visualize normal and pathologic sonographic findings.

The USIG has sponsored and participated in College of Medicine and University events. The Ultrasound Olympics developed as an interest group competition in which students compete against each other in six different focused ultrasound exams: FAST, aorta, cardiac, pelvic, procedures, and median nerve. Instituted during the second year of USIG, this annual event is now being considered by College of Medicine leadership as a medical school wide event. Qualifying scans were scored and assessed for image quality and acquisition time. Medals were awarded to the top three students in each category and a “Sonographer’s Cup” was awarded to the overall highest scorer that participated in all categories. Within the College of Medicine, the USIG has put on ultrasound demonstrations at three student activities fairs, two parents’ weekends, and one second-look day for incoming students. The interest group also sent representatives to a university-wide alumni fundraiser event to bring attention to educational innovations within the medical school.

Finally, the USIG has produced quarterly newsletters each year since it began. These newsletters featured articles on recent USIG events, a case of the month, educational opportunities, and scanning tips. They were distributed to all students via email and served as an additional learning tool.

Discussion

The Ultrasound Interest Group has been well received by participants and student leaders. In addition to serving as an extracurricular forum for expanding ultrasound education, it was designed to facilitate structured mentorship among students. It has been well established that mentoring can offer a multitude of benefits in terms of personal and professional development for mentees [16]. Despite the fact that greater than 90% of all residents agree that mentorship is important, only 40% of medical students have identified a mentor [17]. Results from a survey

conducted by Stenforos-Hayes et al. [18] suggest that similar benefits as well as interest in teaching and professional development can also be attained by mentors in a structured mentorship program. In our interest group, we created a vertical mentorship model. The leadership infrastructure and the creation of the proctor pool were designed with this purpose in mind. The student-to-student structured mentorship allows the less experienced student to learn ultrasound skills from more advanced students and at the same time allows the fourth-year students to gain teaching and leadership experience. Physician-performed ultrasound is less defined in terms of training requirements and scope of practice among medical specialties; it is important that educational programs focus on the development of teaching and leadership skills in addition to simply expanding ultrasound knowledge.

At this institution, interest groups have traditionally consisted of only first and second-year students. The USIG was designed for the specific purpose of encouraging medical students of all 4 years to share experiences and questions about ultrasound technology, clinical applications, and education. With the USIG’s unique leadership structure, the proctor pool, and variety of events, this interest group has maintained participation of first through fourth-year students.

The Ultrasound Interest Group is one component of the entire medical student ultrasound program at our institution. The Ohio State University College of Medicine curriculum is based on repeated exposures to various focused ultrasound exams over 4 years. All medical students participate in core curricular ultrasound exercises in courses including anatomy, introduction to clinical medicine, and the emergency medicine fourth-year clerkship. Motivated students can participate in elective or extracurricular ultrasound programs such as the Ultrasound Interest Group, enriched lecture series for first and second-year students, research projects, and a fourth-year ultrasound honors rotation. Many of the USIG members also participate in one or several of these other elective ultrasound opportunities. The USIG allows students to take leadership positions in organizing ultrasound activities within the College of Medicine, such as the Ultrasound Olympics.

Future directions

In its third year of existence, the USIG is still evolving based on student input and educational needs. One future goal is to create more student clinical scanning opportunities in other specialties. As multiple specialties begin to investigate how portable ultrasound can be used in their patient care, opportunities may arise to help medical students learn this skill in their future practice. Another goal is to develop a structured evaluation process to better respond to student input and assess the efficacy of this educational program. We plan to administer brief written evaluations to students after interest group functions and at the end of the academic year to elicit feedback. We also plan to review students' scans following each scanning session to track their progress, identify areas of weakness, and provide them with feedback. In addition, the USIG aims to cosponsor workshops with other student interest groups in the College of Medicine in an attempt to get more students involved with ultrasound and to facilitate learning.

Since the penetrance of focused ultrasound spreads disproportionately by specialty and by geographic area, there has not been a top-down push toward regulating this skill set. The strategy with the USIG has been to engage the students in an effort to get them interested and involved. We hope to use a "grassroots" approach to instilling ultrasound in medicine from the bottom-up. These future physicians will learn the capabilities of focused ultrasound and the alternatives to managing various types of patients with this modality. With the changes in health care and limitations on expensive imaging, ultrasound may arise as an alternative if more individuals are appropriately trained.

Conclusion

The Ohio State University College of Medicine Ultrasound Interest Group is a feasible method of promoting ultrasound education and student leadership among medical students. As ultrasound education begins to grow within medical school, it is important for students to be engaged and shape how it will affect their future practice. By utilizing the interest group infrastructure and modifying the current governance to include structured mentorship throughout all 4 years, the USIG has attempted to become a resource for all students interested in using ultrasound in their careers. This model may be implemented at other medical schools as a centralized, organizing body for extracurricular ultrasound education.

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Conflict of interest None.

References

- Moore CL, Copel JA (2011) Point-of-care ultrasonography. *N Engl J Med* 364(8):749–757
- Moore CL, Molina AA, Lin H (2006) Ultrasonography in community emergency departments in the United States: access to ultrasonography performed by consultants and status of emergency physician-performed ultrasonography. *Ann Emerg Med* 47(2):147–153
- Greenbaum LD, Benson CB, Lewis NH, Bahner DP, Spitz JL, Platt JD (2004) Proceedings of the compact ultrasound conference sponsored by the American Institute Ultrasound in Medicine. *J Ultrasound Med* 23:1249–1254
- Greenbaum LD (2003) It is time for the sonoscope. *J Ultrasound Med* 22:321–322
- Arger PH, Schultz SM, Sehgal CM, Cary TW, Aronchick J (2005) Teaching medical students diagnostic sonography. *J Ultrasound Med* 24:1365–1369
- Cook T, Hunt P, Hoppman R (2007) Emergency medicine leads the way for training medical students in clinician-based ultrasound: a radical paradigm shift in patient imaging. *Acad Emerg Med* 14(6):558–561
- Hoppmann R, Cook T, Hunt P, Fowler S, Paulman L, Wells J, Richeson N, Thomas L, Wilson B, Neuffer F, McCallum J, Smith S (2006) Ultrasound in medical education: a vertical curriculum at the University of South Carolina School of Medicine. *J SC Med Assoc* 102:330–334
- Rao S, van Holsbeeck L, Musial JL, Parker A, Bouffard JA, Bridge P, Jackson M, Dulchavsky SA (2008) A pilot study of comprehensive ultrasound education at the Wayne State University School of Medicine: a pioneer year review. *J Ultrasound Med* 27:745–749
- Hoppmann RA, Rao VV, Poston MB et al (2011) An integrated ultrasound curriculum (iUSC) for medical students: 4-year experience. *Crit Ultrasound J* 3(1):1–12
- Fox JC, Cusick S, Scruggs W et al (2007) Educational assessment of medical student rotation in emergency ultrasound. *West J Emerg Med* VIII(3):84–87
- Gogalniceanu P, Sheena Y, Kashef E, Purkayastha S, Darzi A, Paraskeva P (2010) Is basic emergency ultrasound training feasible as part of standard undergraduate medical education? *J Surg Edu* 67(3):152–156
- Syperda VA, Trivedi PN, Melo LC, Freeman ML, Ledermann EJ, Smith TM, Alben JO (2008) Ultrasonography in preclinical education: a pilot study. *J Am Osteopath Assoc* 108(10):601–605
- Hafferty FW (1998) Beyond curriculum reform: confronting medicine's hidden curriculum. *Acad Med* 73:403–407
- Fricke BB, Gunderman RB (2010) Creating and enhancing radiology student interest groups. *Acad Radiol* 17:1567–1569
- Pitre CJ (2002) The unique educational value of emergency medicine student interest groups. *J Emerg Med* 22:427–428
- Kalen S, Stenforos-Hayes T, Hylin U et al (2010) Mentoring medical students during clinical courses: a way to enhance professional development. *Med Teach* 32(8):e315–e321
- Yeung M, Nuth J, Stiell IG (2011) Mentoring in emergency medicine: the art and the evidence. *CJEM* 12(2):143–149
- Stenforos-Hayes T, Kalen S, Hult H, Dalgren LO, Hindbeck H, Ponzer S (2010) Being a mentor for undergraduate medical students enhances personal and professional development. *Med Teach* 32(2):148–153