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ORIGINAL ARTICLE

Radiology perspective on anatomy teaching in Australia and New Zealand

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Abstract

Introduction Anatomy pedagogy and radiologists involvement in teaching undergraduate anatomy varies widely. We surveyed radiologists practising in Australia and New Zealand to establish their opinions on their own experience of undergraduate anatomy and their view on the role of radiology in anatomy teaching. We also sought their views on the role of radiologists in anatomy teaching.

Methods A short survey was designed on the Survey Monkey platform using the website surveymonkey.com. The survey was distributed to members of the Royal Australian and New Zealand College of Radiologists (RANCZR) as a link attached to a monthly e-newsletter with a short paragraph outlining its aim.

Results Sixty-seven responses were eligible for analysis. 33% (22/67) were dissatisfied with their own anatomy training and 55% (38/67) felt that current graduates had an inadequate level of anatomy. 55% (38/67) indicated that radiology had not been a major part of their own undergraduate anatomy training. 58% (39/67) of respondents felt that non-radiology medical and para-medical professionals were not suitably qualified to teach radiologic anatomy. 75% (42/67) were of the opinion that radiology with 3-D support platforms may replace cadaveric dissection in the future, yet most were not familiar with 3-D platforms in current usage.

Keywords Anatomy · Radiology · Education

Introduction

Since 2000 most medical schools around the world have been integrating radiology into undergraduate medical school anatomy teaching [5, 9, 12, 18, 20]. In 2010 a survey of New Zealand and Australian medical schools reported the inclusion of radiology in 100% undergraduate anatomy courses [5].

The benefit of including radiology in undergraduate anatomy teaching is widely accepted as the discipline has a central role in medical diagnosis and care. Physicians, surgeons, general practitioners and other specialists encounter medical imaging at all stages of their medical career. An introduction to imaging at an early stage provides a foundation that can be built upon in later postgraduate training. Imaging can enhance the undergraduate anatomy curriculum at a time when cadaver-based learning is declining. Factors contributing to this include health concerns regarding the chemicals used in preparation and preservation of cadavers, ethical and medicolegal concerns, and the cost involved in offering a cadaveric programme [8, 14, 16, 17, 21].

At the same time, the amount of time spent in medical schools on anatomy teaching has declined over the years, with shorter courses and increasingly busy undergraduate curricula. Some reports in the literature, including a previous survey of Australian medical students, lamented both the lack of time devoted to anatomy at undergraduate level and the quality of anatomic knowledge in medical graduates [2, 4, 6, 7, 10, 15, 19], with one suggesting adverse clinical outcomes as a result [7]. However, those studies were published over a decade ago and may not reflect current experience.

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We wished to survey radiologists currently working in Australia and New Zealand to gauge their perception of anatomic competency in junior doctors today and the desirability of involvement by radiologists in current anatomy teaching. We also surveyed radiologists' perception of teaching of radiologic involvement in their own undergraduate anatomy experience.

Methods

Ethical approval was obtained from the Research and Ethics committee of Greenslopes Private Hospital, Newdegate St, Greenslopes QLD, Australia. A short survey was adapted from a recent similar survey of radiologists practicing in Ireland [19]. It was designed on the Survey Monkey platform using the website surveymonkey.com (SurveyMonkey Inc, San Mateo, California, USA). The survey was distributed to members of the Royal Australian and New Zealand College of Radiologists (RANCZR) as an optional link attached to a monthly e-newsletter, with a short paragraph outlining its aim. Three reminders appeared in subsequent newsletters. Replies were anonymous and respondents could opt out of having their answers used for research analysis. The survey consisted of 20 statements accompanied by 5 choices of response: strongly agree; agree; neither agree nor disagree; disagree and strongly disagree. An option for free comments was given for each statement.

Results

There were 69 responses of which 67 were complete and allowed inclusion for analysis. A breakdown of all questions and responses is provided below. 43% (29/67) were consultants, with 57% (38/67) training in radiology. Five respondents were radiation oncologists, the remainder were radiologists. 68% (46/67) had graduated medical school in Australia, 27% (18/67) in New Zealand and 15% (13/67) internationally. The vast majority of respondents had graduated medical school since 1990, and 40% were graduates since 2010.

The baseline question was whether respondents felt that anatomy knowledge was important in their field of medicine. All 67 responded agreed with this.

Radiologists were posed the following statement: 'When leaving medical school my knowledge of anatomy was sufficient to begin training in my field'. 30% (20/67) of respondents agreed, 31% (21/67) neither agreed nor disagreed, 33% (22/67) disagreed with this statement.

71% (48/67) felt that junior doctors had an inadequate knowledge of anatomy to work in clinical practice. The vast majority of respondents agreed that radiology should be taught in tandem with anatomy undergraduate teaching with only 4% (3/67) disagreeing. Almost 100% agreed that "Radiologic images used to compliment anatomy teaching would prepare students well for clinical practice'.

In response to the statement 'Radiology was a major component of my undergraduate anatomy training', 21% (14/67) of respondents agreed. The more recent medical graduates were more likely to disagree with this statement. 85% (24/28) of graduates since 2010 disagreed with this statement versus 45% (17/31) of graduates from 1990 to 2010.

35% (23/67) agreed that radiology should be taught as a separate component to preclinical anatomy teaching, while 42% (28/67) disagreed with this statement. This statement attracted several free comments, mostly saying that the disciplines are synergistic. Regarding the best modality for teaching anatomy, CT was favoured by 63% (42/67). However, many qualifying comments stated that a mixture of imaging modalities would be ideal.

Almost all respondents, 96% (64/67) agreed with the statement 'Clinical radiologists are best qualified to deliver anatomy-based radiology teaching'.

Respondents were asked to identify the best teaching methods for undergraduate anatomy training. 43% of respondents (29/67) felt that cadaveric study was still the most beneficial anatomy teaching tool. 19% (13/67) felt that radiologic imaging was the most beneficial methodology. Despite favouring the traditional cadaveric study, most respondents (63%; 42/67) agreed that radiology-supported anatomy teaching with digital 3-D support may eventually replace cadaver-based anatomy teaching.

Discussion

The amount of time given to anatomy teaching has declined over the decades, partly driven by shorter courses being offered but also by an expanding curriculum. In a review of anatomy education in Australian and New Zealand medical schools in 2010, 73% of responding students regarded the number of hours of anatomy teaching they had received as too little, and 40% felt they would not know sufficient anatomy to become a competent doctor [19]. This perception appears to have changed over the last decade. In our survey, only thirty-five percent felt that their knowledge of anatomy was insufficient for clinical practice. Interestingly, 76% felt that junior doctors had an insufficient level of anatomy knowledge. It should be acknowledged that radiologists as a group of specialists are more likely to place a very high value on anatomy as a subject. If other specialties were surveyed the result might be quite different.

The importance of radiology in anatomy teaching is globally recognized and numerous papers since 1985 have highlighted its ever-increasing relevance [1, 5, 9, 12,

19]. However, the extent to which radiology is integrated within the curriculum, the proportion of radiology content that is included, the quality and relevance of the content, and the qualifications of professionals delivering the content is highly variable across medical schools in Australia and New Zealand, as well as throughout the world [3, 5, 9, 12, 13]. Broadly speaking, radiology has been integrated into anatomy and systems-based learning. This blended form of teaching has been proven to be effective [10]. Using radiology images alongside anatomy teaching has also been shown to enhance the quality and efficiency of anatomy learning in many student surveys [11].

While almost all respondents agreed that radiology should form a significant component of undergraduate anatomy teaching, only one in five respondents felt that radiology had been a major part of their own undergraduate training. The temporal delay between their undergraduate training and the survey must be acknowledged as the curricula are continuously evolving, however it is interesting that relatively fewer graduates since 2010 felt that radiology had formed a major part of their anatomy learning (56% versus 45%). One possible explanation is that the radiology content of today's undergraduate courses is less obvious. Many disciplines are blended together with the shift from discipline-based assessment to problem-based learning in modern medical curricula [6] and it may be difficult to discern the traditional discipline boundaries. Imaging mixed in with embryology and pharmacology as part of a problem-based teaching style is less recognizable than imaging delivered as a lecture series.

If there has indeed been a true decline in anatomy teaching by radiologists, it may be related to the ever-increasing workload faced by them in clinical practice. University teaching commitments are onerous. In the Monash programme, for example, the integrated imaging component is taught weekly in small group sessions amounting to 16 h per week. This level of commitment is unlikely to be possible for most clinical radiologists, no matter how motivated they may be to be involved in undergraduate education. University-affiliated radiology posts with protected academic sessions would allow time for integrated engagement and curriculum development working closely with anatomy faculty, and for teaching and assessment of students. Whilst this is the case in some medical schools around the world, it is far from the norm [3, 12, 18, 21].

It must be acknowledged that the number of respondents in our survey was small at 69. Nonetheless we feel that this survey is useful in bringing some focus to the role of radiologists in undergraduate anatomy teaching. It has highlighted a perceived dissatisfaction with level of anatomy knowledge in general, and with the radiology content of undergraduate anatomy instruction in particular, amongst responding radiologists practising in Australia and New Zealand.

Conclusion

Our survey suggests that radiologists put a high value on anatomy knowledge, were not satisfied with their anatomy knowledge at the time of their graduation and furthermore are not satisfied with anatomy proficiency of medical students graduating today. Radiologists feel that radiology is a very important part of anatomy learning and may replace cadaveric dissection in the future. Radiologists feel that they, as a profession, are best qualified to deliver radiology-based anatomy teaching. Increased dialogue between anatomy teachers at in university settings and academically minded radiologists is necessary if we are to see increased involvement by radiologists in anatomy teaching.

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Declarations

Conflict of interest The author declares that they have no conflict of interest.

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Consent to participate and for publication NA.

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