



Current status of UK radiology trainee experience in post-mortem imaging: A questionnaire-based survey



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1. Introduction

Post mortem imaging (PMI) has a long-standing role in autopsy, with conventional radiography (CR) well-established in providing useful pathological information, for example with regard to detection of structural bone abnormalities, fractures and dysplasias [1]. There has been increasing use of PMI in recent years, particularly in forensic and paediatric pathological investigation, due to technological advances in cross-sectional imaging of computed tomography (CT) and magnetic resonance imaging (MRI), with CT allowing for excellent bone detail and MRI superior in providing information of soft tissues [2]. Furthermore, post-processing techniques and 3D scanning technology and animation which have been in use since the early emergence of post mortem imaging [3] continue to develop, allowing for continued evolution of post mortem analysis and accurate documentation, leading to qualitative improvements in pathological investigation [4]. The increased ability to accurately detect and localise pathology through imaging, either alone or in conjunction with minimally invasive autopsy, reduces the need for invasive traditional open autopsy [5,6].

The growing use of imaging in post mortem assessment has led to the establishment of the International Society of Forensic Radiology and Imaging (ISFRI), a collaboration of worldwide specialists from pathological, radiological, legal and forensic backgrounds. One of the emerging goals from the first congress of ISFRI in 2012 was to 'build a foundation for establishing standards, educational guidelines and best practices in forensic radiology and imaging' [7,8]. Despite the efforts of the ISFRI subcommittees to achieve this aim, we have anecdotal

experience that radiology trainees in our region have limited knowledge and understanding of forensic and post-mortem imaging. As a result, there is a large trainee cohort who would potentially welcome the opportunity to gain experience and become more involved in PMI, perhaps with a view to sub-specialising in the future, but are naïve to the significance of forensic and post-mortem imaging in current and future practice.

The aims of this study were to assess our radiology trainees' understanding of PMI and of the current status of further opportunities to learn and train in this important emerging sub specialty of radiology.

2. Methods

2.1. Data collection

An online questionnaire was produced using online tool SurveyMonkey® (<http://www.surveymonkey.com/>; SurveyMonkey.com, Palo Alto, CA). An invitation e-mail was sent in March 2015 to all 261 radiology trainees in our region (London, UK), which makes up 20% (261/1268) of the national cohort radiology trainees, to complete an online survey on post-mortem imaging. A reminder e-mail was sent out 3 weeks later, and the total time available to respond was 6 weeks (March–April 2015). The results were compiled into a spreadsheet for further analysis and descriptive graphical representation of the data is presented. The survey comprised four parts: demographics of respondent; personal experience and current knowledge of PMI; certification and reporting; engagement in learning opportunities.

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2.2. Demographics

Two questions were asked to establish level of training of the respondent and their current decision on subspecialty training.

1. Which year of training are you? (one answer permitted)

(1) ST1, (2) ST2, (3) ST3, (4) ST4, (5) ST5 and above.

2. Have you already decided on your sub speciality? (one answer permitted)

(1) Yes, (2) No, (3) Not sure.

2.3. Personal experience and current knowledge of PMI

Nineteen questions were asked using a Likert scale to assess trainee confidence in their experience in and understanding of PMI.

3. Regarding personal experience in PMI. The following questions required an answer (1) Strongly disagree, (2) Disagree, (3) Not sure, (4) Agree, (5) Strongly agree (one answer permitted per question)

- I have a good understanding of the discipline
- I have the opportunity to undertake experience in forensic and/or post mortem imaging in my current place of work or training programme
- I would like the opportunity to undertake experience in forensic and/or post mortem imaging during my training
- Post mortem imaging should be included within the Radiology trainee curriculum
- I would consider sub-specialising in forensic and post mortem imaging
- My current place of work has facilities in place/already performs forensic and post mortem imaging

4. Regarding the use of PMI. The following questions required an answer (1) Strongly disagree, (2) Disagree, (3) Not sure, (4) Agree, (5) Strongly agree (one answer permitted per question)

- More should be done to promote forensic and post mortem imaging to the public
- It will supercede and/or replace traditional autopsy in the future
- It is an important adjunct to traditional forensic and post mortem autopsy
- It has an important role to play in certain religious and/or cultural groups

5. How important are the following modalities in PMI? The following questions required an answer (1) Not at all important, (2) Not important, (3) Not sure, (4) Important, (5) Very important (one answer permitted per question)

- Plain Film
- Ultrasound
- Computed Tomography (CT)
- CT Angiography
- Magnetic Resonance Imaging (MRI)

6. Regarding professional roles in PMI. The following questions required an answer (1) Strongly disagree, (2) Disagree, (3) Not Sure, (4) Agree, (5) Strongly agree (one answer permitted per question)

- It is a clinical sub speciality
- It is a radiological sub speciality

c. It is performed by pathologists

d. It is performed by radiologists

2.4. Certification and reporting

Two multiple choice questions were asked regarding certification and reporting of PMI. Multiple answers were permitted.

7. Accreditation/certification of professionals in PMI should be (1) Radiologists, (2) Pathologists, (3) Radiographers, (4) Other (please specify)

8. Professionals who *report* on PMI should be (1) Radiologists, (2) Pathologists, (3) Radiographers, (4) Other (please specify)

2.5. Engagement in learning opportunities

The final four questions related to trainee interest in PMI associated societies, journals and courses.

9. Would you like to learn more about forensic and post mortem imaging? The following questions required an answer (1) Yes, (2) No, (3) Not sure (one answer permitted per question).

- I am aware of the International Society of Forensic Radiology and Imaging (ISFRI)
- I am already a member/would be interested in becoming a member of ISFRI
- I would be interested in subscribing to JOFRI
- I would be interested in attending courses/lectures on PMI.

3. Results

A total of 43 individual responses to the survey were received out of a total of 261, representing a 16.5% response rate. Two responses were discarded as they were incomplete and unable to confirm the location of their training scheme, leaving a 16% (41/261) response rate.

3.1. Demographics

The majority of respondents were advanced in their training, with 59% (24/41) at ST4 or ST5 level or above. Most respondents have already decided on their training subspecialty (27/41; 66%), which is to be expected given the higher percentage of more senior respondents.

3.2. Personal experience and current knowledge of PMI

85% (35/41) of trainees either disagreed or strongly disagreed that they had a good understanding of PMI in current practice. Many trainees (23/41; 56%) also strongly disagreed that they have the opportunity to undertake PMI experience within their current place of work or training scheme. However, the majority of trainees responded positively to questions regarding learning opportunities, with 71% (29/41) either agreeing or strongly agreeing that they would like the opportunity to gain more PMI experience during training, and only 29% (12/41) not sure. No respondents disagreed (Fig. 1) 59% (24/41) agreed that PMI should be included in the training curriculum (Fig. 1).

Consideration of PMI as a subspecialty was divided amongst respondents, with most (17/41; 41%) remaining unsure. An even minority were confident they would (strongly agree 4/41; 10%) or wouldn't (strongly disagree 4/41; 10%) subspecialise in PMI (Fig. 1).

Regarding the use of PMI, the majority of trainees recognised that imaging is an important adjunct to traditional autopsy, with 85% (35/41) in agreement of its importance in post mortem assessment. 73% (30/41) agreed that PMI is of particular importance to certain religious or cultural groups (Fig. 2).

The role of PMI in replacing or superceding traditional autopsy split opinion, with approximately one third disagreeing (13/41; 32%), one

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