

## Foundation Doctors' Exposure to Interventional Radiology in Two Large Teaching Hospitals in the United Kingdom

### Abstract

**Background:** Significant efforts have been made to improve medical students' exposure to interventional radiology (IR). Foundation doctors in the UK, however, are a neglected group, with little being done engage these doctors who are at a crucial juncture in their training. **Objectives:** The objective of the study is to assess Foundation Year 1 (FY1) doctors' understanding of and exposure to IR. **Methods:** FY1s from two teaching hospitals in the UK at the end of their first year of Foundation training were invited to take part in an 18-question survey, including 14 single-best-answer (SBA) questions. The questions examined knowledge of IR and other specialties. The SBAs were scored out of 14 and the Student's *t*-test was used to compare IR and non-IR scores. **Results:** Questionnaires were given to 72 FY1 doctors and 52 (72.2%) were completed. The median score was 9/14 (64.3%) [4.5/14–12/14]. Questions relating to coronary intervention and neurosurgery scored best (96.2% and 94.3%, respectively). The mean score for IR-related questions was significantly lower than that for non-IR questions (51.5% vs. 81.1%, respectively,  $P < 0.0001$ ). Participants who referred patients to IR at least once per month scored higher than those who rarely referred (60.5% vs. 47.2%, respectively,  $P < 0.0084$ ). Nearly 83.0% of participants expressed a desire to gain more exposure to IR. **Conclusion:** Although Foundation doctors have some understanding of IR, reflecting some exposure to the specialty, this remains deficient when compared with their knowledge of other specialties. This may be improved by the introduction of IR specific teaching during the Foundation program.

**Keywords:** Foundation program, interventional radiology, medical education, radiology, training

### Introduction

As technology advances, the scope of interventional radiology (IR) continues to rapidly expand, forming a key part of modern patient care in the elective and emergency settings<sup>[1,2]</sup>. The supply of Interventional radiologists has, however, failed to meet the demand, with the Royal College of Radiologists' census in 2017 showing that 39 consultant posts remain unfilled.<sup>[3]</sup> In addition, over two-thirds of hospitals in the UK employ fewer than four Interventional radiologists despite evidence suggesting that a minimum of six consultants is required to run an effective and sustainable service<sup>[2,4]</sup>. Attempts have been made to encourage medical students to pursue a career in IR with varying success,<sup>[5-7]</sup> but little has been done to appeal to Foundation doctors (equivalent to interns in many European countries and the United States) who are about to embark

on their specialist training (residency). With few radiology rotations on offer within the Foundation program in the UK, very few Foundation doctors are exposed sufficiently to radiology and its subspecialties.

Due to the growth in the number and complexity of treatments offered by IR, nonradiologists may not be familiar with its scope.<sup>[8]</sup> While there are published undergraduate medical curricula<sup>[9,10]</sup> there is a distinct lack of postgraduate education relating to IR except for those pursuing radiology training. Foundation doctors in the UK are often the front-line physicians referring patients for consideration of IR treatment. These doctors, like some of their more experienced colleagues, often have little understanding of IR, which can lead to patients not being referred for the appropriate treatment.

The aim of this study is to evaluate Foundation Year 1 (FY1) doctors' understanding of the scope of IR by assessing their grasp of common IR

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procedures in everyday clinical scenarios and compare this to their knowledge of other clinical specialties.

## Methods

An anonymous paper-based survey composed of eighteen questions was handed out to FY1 doctors from two teaching hospitals in the UK (West Suffolk NHS Foundation Trust and The Royal Preston Hospital). The survey was adapted from one used previously to assess medical students' understanding of IR although with more clinically relevant questions.<sup>[11]</sup> The survey was given to FY1 doctors during their last month of training in July 2018 before progression to their FY2. This is a critical period when doctors are preparing to apply for specialty training. The questionnaire included fourteen clinically relevant single-best-answer (SBA) questions [Appendix 1]. One question assessed the FY1 doctors' current exposure to IR, while two questions asked the participants about their interest in gaining more experience in the field and undertaking part of their Foundation training in an IR department. The last question assessed where the participant's undergraduate medical education was undertaken. The SBA questions were designed to assess clinicians' ability to make appropriate IR and other minimally invasive non-IR referrals in commonly encountered clinical scenarios. For each clinical scenario, the participants were given a list of possible referral pathways/interventions and were asked to choose the most appropriate referral.

Correct answers scored one mark with no negative marking. We accepted two possible correct answers for question seven and gave half a mark if the answer (a) was given for question 12 recognizing clinical flexibility in some scenarios. All the questions were equally weighted and the questionnaires were marked out of 14.

GraphPad Prism 6.0 for Mac OS (GraphPad Software Inc., San Diego, CA, USA) was used for the statistical analysis. The results were evaluated using descriptive statistics as well as paired two-tailed Student's *t*-test. All results are expressed as mean or median and interquartile range.  $P < 0.05$  was considered statistically significant.

## Ethics

Ethics approval was not required to conduct this anonymized survey. Consent was obtained from the study participants to use their anonymized survey data.

## Results

Questionnaires were handed out to 72 FY1 doctors and 52 (72.2%) were completed. The median score was 9/14 (64.3%) [7.5/14-10/14]. Questions relating to coronary intervention and neurosurgical procedures scored best, with 96.2% and 94.3% of participants answering these correctly, respectively. Three (5.8%) participants knew of the role of

IR in managing hemorrhage in trauma, with the average score for trauma embolization scenarios being 33.3%. The mean score for IR related questions was 51.5% which was significantly lower than that of non-IR questions, 81.1%. ( $P < 0.0001$ , paired two-tailed Student's *t*-test) [Figure 1].

Foundation doctors who referred patients to IR once or more per month scored significantly higher than those who rarely or never referred patients to IR with a mean score of 60.5% [50.0–69.4],  $n = 17$  compared with 47.2% [36.1–55.6],  $n = 36$ , respectively ( $P < 0.0084$ , unpaired two-tailed Student's *t*-test). Nearly 83.7% of participants indicated that they would like more exposure to IR during their Foundation training, whereas 67.3% said that they would apply for a Foundation training post which had an IR rotation.

## Discussion

A number of studies have assessed medical students' understanding of and exposure to IR with a number of recommendations and published undergraduate IR curricula.<sup>[5,7,9,10,12]</sup> Despite this, IR remains significantly under-represented within undergraduate medical education, with few medical schools adopting some form of IR teaching. This could explain why medical students' knowledge of IR remains poor.<sup>[11]</sup> When compared to studies conducted on undergraduates, our results demonstrate that the knowledge of IR among FY1 doctors is better than that of medical students.<sup>[11]</sup> This is to be expected; however, as the majority of FY1 doctors have some contact with the specialty. Foundation trainees who referred patients to IR once or more per month scored significantly higher than those who rarely referred. This is not surprising as with more exposure, junior doctors make more appropriate referrals to IR and develop a better understanding of the role of IR in their patients' pathways.

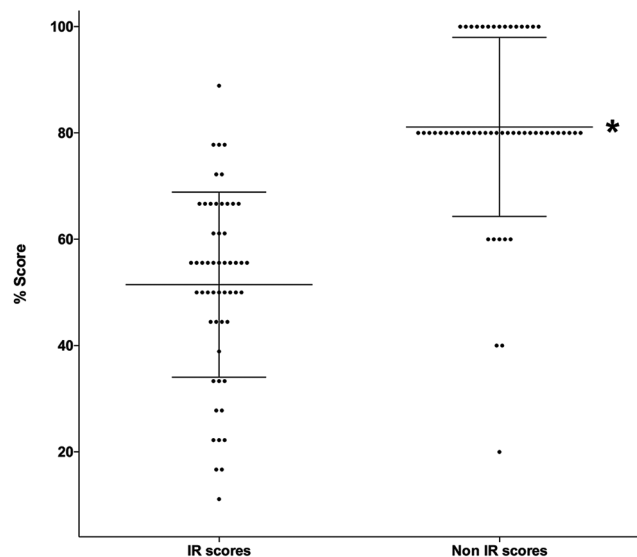


Figure 1: Scatter plot of the individual scores for interventional radiology and noninterventional radiology questions. \*:  $P < 0.0001$ , paired Student's *t*-test

82.7% of FY1 doctors who participated in this study expressed a desire to gain more exposure to IR during their Foundation training, whereas 67.3% said that they would apply for a Foundation training post which had an IR rotation. Despite this interest, there are no rotations on offer during the Foundation program that expose FY1 doctors to IR.

The best-answered question related to coronary intervention, reflecting participants' exposure to cardiology either during cardiology rotations or during general medical or surgical on-calls. The second best-answered question was one relating to the management of hydrocephalus, highlighting awareness of the condition and prior exposure. Our findings are in line with studies focused on medical students where cardiology and neurology/neurosurgery knowledge scored highest, while IR knowledge was significantly lower.<sup>[11]</sup> Unsurprisingly, junior doctors' scores for these topics were higher than senior medical students, which reflects their ongoing practical exposure to these acute specialties.

This is the first study to assess the knowledge of IR among junior doctors in the UK. Despite our sample size of 52 from only two hospitals, our results highlight the lack of FY1 doctors' exposure to IR compared with other specialties. This is particularly concerning as FY1 doctors often did not appreciate the role IR plays in the management of haemorrhage. Those with more frequent exposure to IR scored best, suggesting that IR rotations or IR-related teaching during the Foundation program may be of benefit, with over half of those surveyed expressing a desire to gain more exposure to IR during their rotations.

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Nil.

### Conflicts of interest

The authors have no conflicts of interest.

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