The impact of training diagnostic radiologists to perform basic interventional procedures

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Aims and objectives

Since its inception, interventional radiology (IR) has monopolised the use of minimally invasive procedures in patient management. As techniques and technology evolves, the range of procedures encompassed by IR continues to expand [1]. This, coupled with a distinct lack of interventional trainees and skilled allied professionals has created soaring demand for elective and emergency IR services. Irrespective of population growth, IR workload is predicted to further rise in correlation with advancements in technology [2]. Presently, in the UK, there is currently significant under-provision of trained interventionalists. Should this continue to be unaddressed there is a risk that patient safety may be compromised [1],[3].

Although progress has been made to expand the IR workforce by increasing available trainee posts and training allied professionals, the demand has not yet been met. A programme was therefore devised within our trust, whereby all consultant diagnostic radiologists underwent training to refresh their basic interventional skills. The aim of this programme was to alleviate interventional workload thereby reducing inpatient waiting times and allowing interventionalists to focus on technically challenging procedures.

Methods and materials

Depending on their existing skillset all consultant diagnostic radiologists (n=27) within the Heart of England Foundation Trust, Birmingham, UK, underwent three months of direct training from consultant interventionalists. This was followed by a period of indirect supervision until the clinician was able to practice independently. Diagnosticians were trained to conduct CT and ultrasound guided biopsies, drainages and aspirations.

All inpatient radiologically guided biopsies, drainages and aspirations performed between January and June 2015, prior to the commencement of the training programme, were compared with those spanning from January to June 2018, following completion of the interventional training.

The following data was collected:

I.) **Procedural data**: The type of procedure, the responsible clinician, waiting time from submission of request and weekend or weekday procedure

II.) **Outcome measures**: Difference in waiting times, difference in proportion of interventional and diagnostic led weekday procedures and the difference in proportion of interventional and diagnostic led weekend procedures.

Statistical analysis was performed using Microsoft Excel.

Results

I.) Procedural Data:

Over the 6 month period analysed in 2015 a total of 280 weekday procedures were conducted. 129 (46%) of these were ultrasound guided drainages. 51 (18%) were ultrasound guided biopsies and 43 (15%) were ultrasound guided aspirations. 33 (12%) CT biopsies and the remaining 24 (9%) were CT guided drainages. Median inpatient waiting time was 3 days.

A total of 17 weekend procedures were performed in the 6 month period of 2015, all of which were urgent drainages.

In 2018, a total of 269 inpatient image guided procedures were conducted. 116 (43%) of these were ultrasound guided drainages. 60 (22%) were ultrasound guided biopsies and 32 (13%) were ultrasound guided aspirations. 36 (13%) CT drainages and the remaining 25 (9%) were CT guided biopsies (Figure 1). Median inpatient waiting time was 1 day.

Again, a total of 17 weekend image guided procedures were completed in the cited 2018 period.

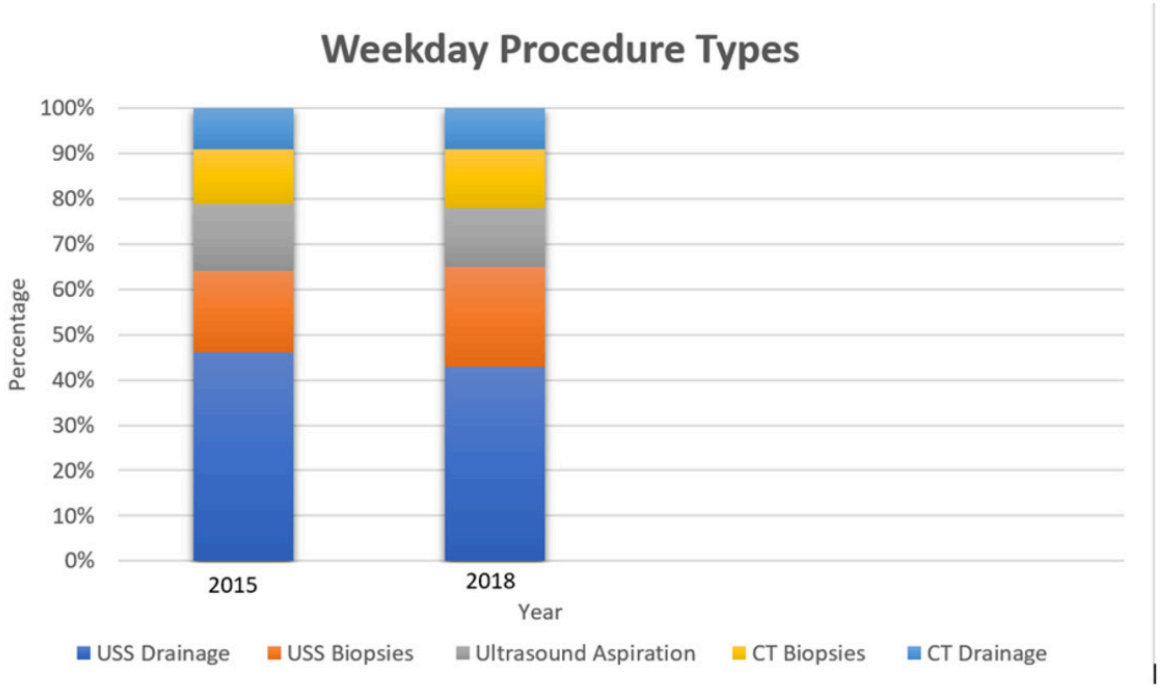

Fig. 1: Breakdown of Relevant Inpatient Weekday Procedures in 2015 and 2018
References: Radiology, Heartlands Hospital - Birmingham/UK

II.) Outcome Measures

In 2015, of the total 280 weekday inpatient procedures, 162 (58%) were carried out by diagnostic radiologists. The remaining 118 (42%) were done by interventional radiologists. In 2018, following the completion of the interventional training, 202 (75%) of weekday procedures were performed by diagnostic radiologists resulting in the remaining 25% being completed by interventionalists (Figure 2). Of this 25%, at least 10% were documented to be technically challenging and hence required a more experienced clinician. A 17% reduction in interventional weekday workload was observed from 2015 to 2018 .

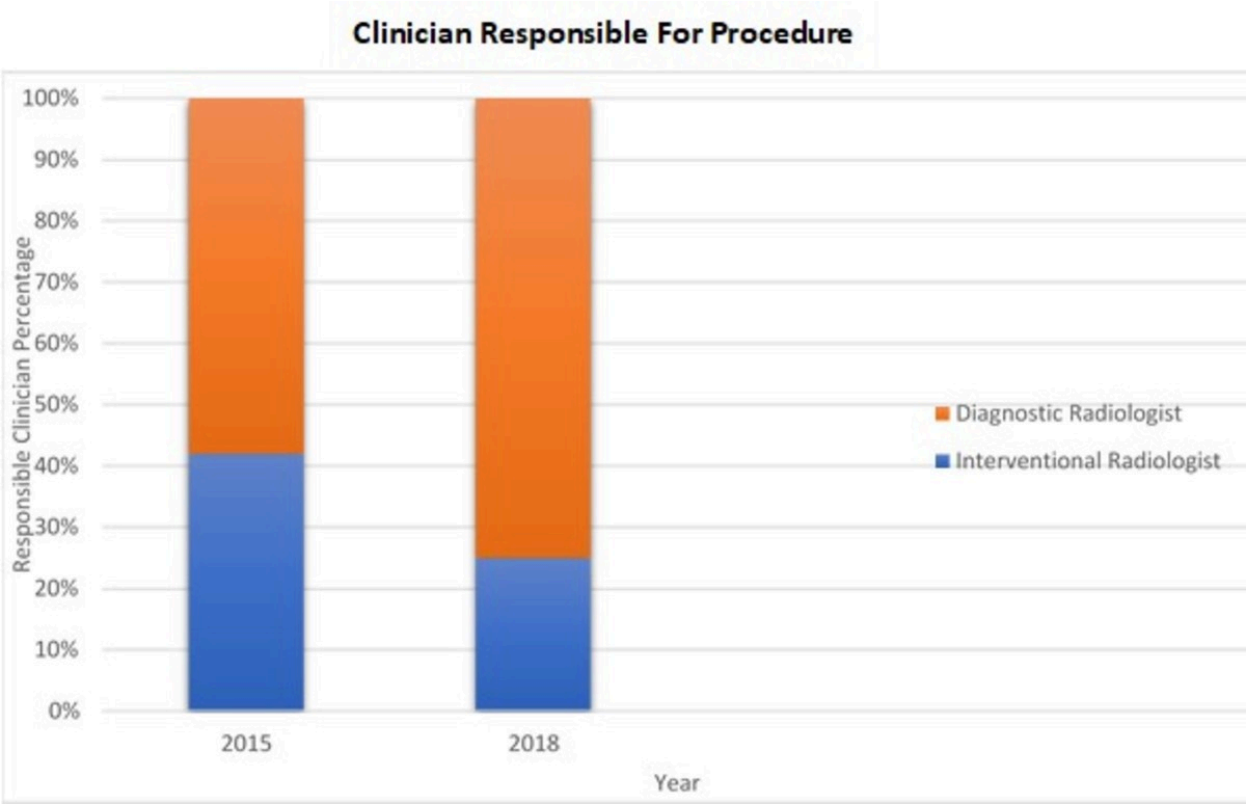

Fig. 2: Type of Clinician responsible for Interventional Procedure in 2015 and 2018
References: Radiology, Heartlands Hospital - Birmingham/UK

In 2015, 14 (82%) of weekend procedures were done by interventionalists, and 18% by diagnostic radiologists. However, in 2018, 3 (18%) of the weekend procedures were completed by interventionalists and 14 (82%) by diagnostic radiologists. Therefore, a 64% drop in weekend interventional workload was seen following the implementation of training (Figure 3).

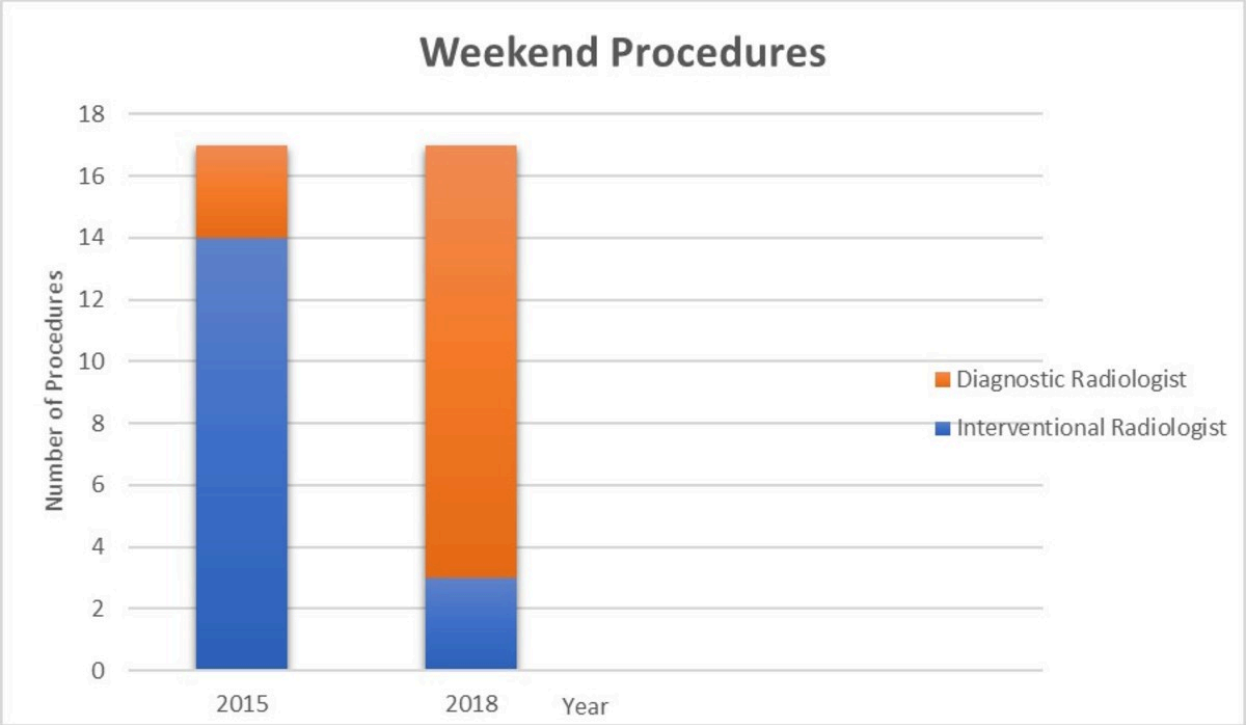

Fig. 3: Number of Weekend Interventional Procedures in 2015 and 2018
References: Radiology, Heartlands Hospital - Birmingham/UK

Median wait time in 2015 was 3 days, in 2018 this dropped to 1 day due to the increased number of competent staff available to perform IR procedures.

Results Summary:

	2015	2018
Number of Weekday IR Led Procedures	162	202
Number of Weekday Diagnostic Radiology Led Procedures	118	67
No of Weekend IR Led Procedures	14	3
Number of Weekend Diagnostic Radiology Led Procedures	3	14
Median Inpatient Waiting Time (days)	3	1

Fig. 4: Summary of Results in 2015 and 2018
References: Radiology, Heartlands Hospital - Birmingham/UK

Images for this section:

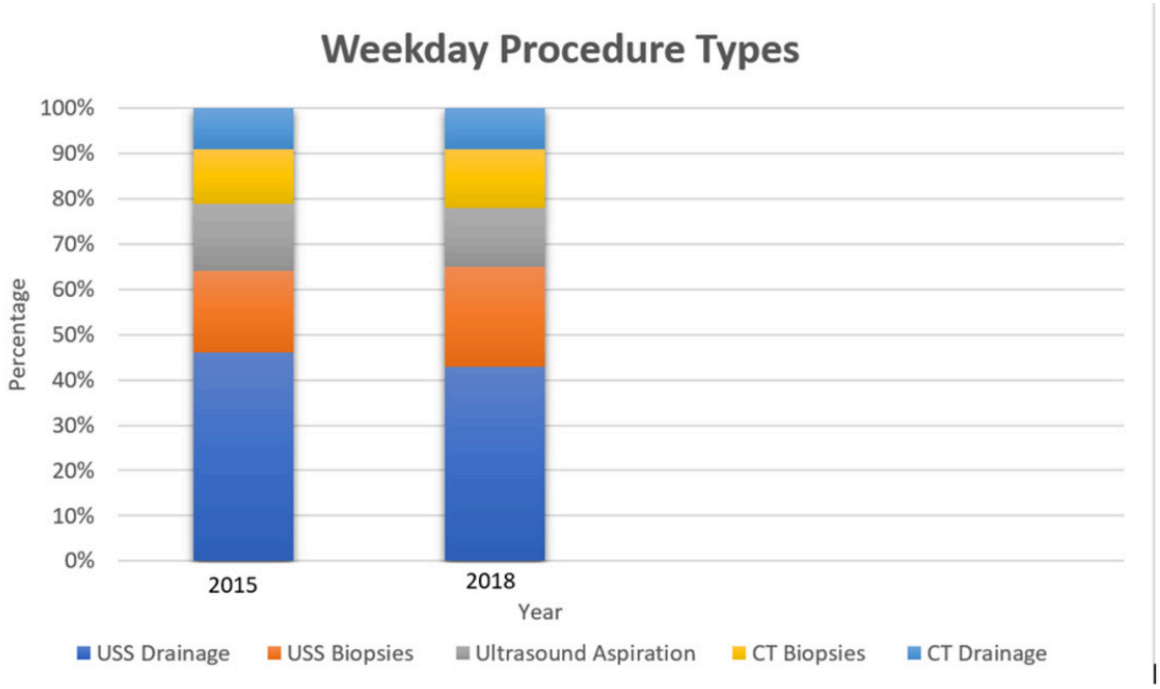

Fig. 1: Breakdown of Relevant Inpatient Weekday Procedures in 2015 and 2018

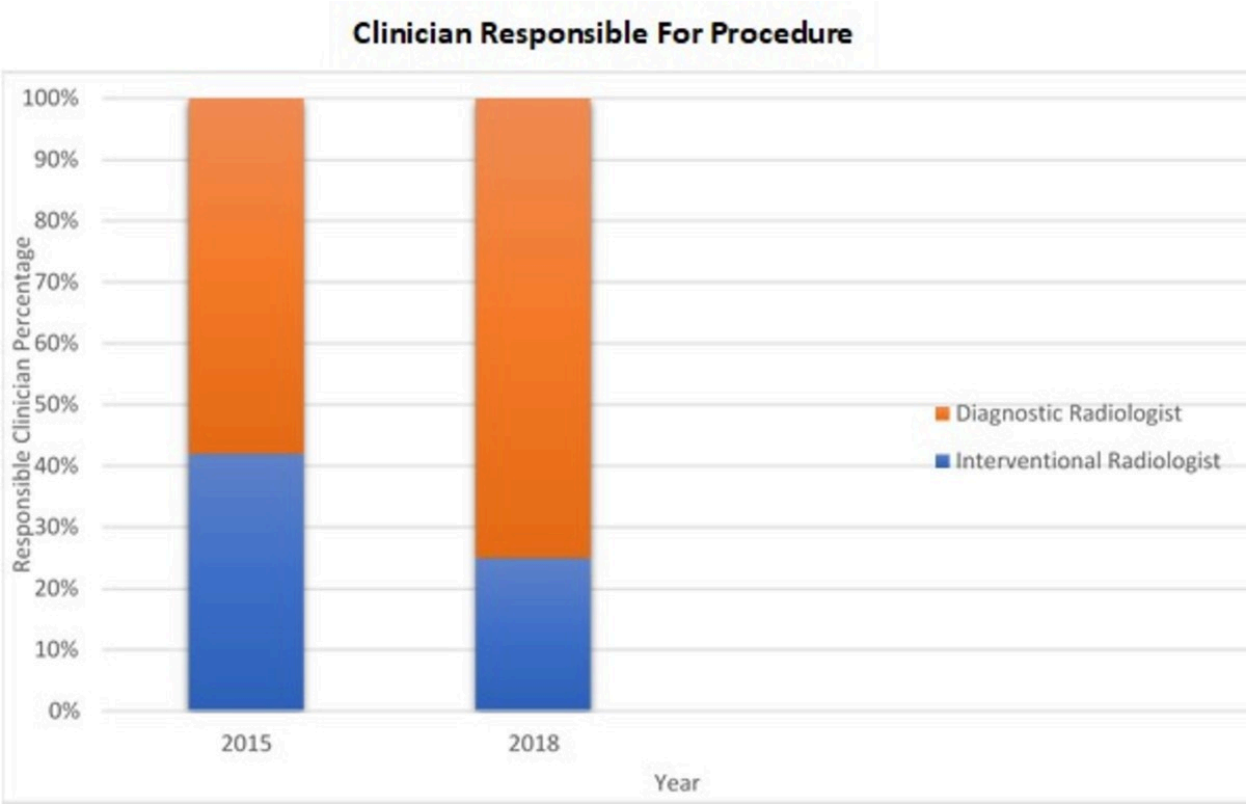

Fig. 2: Type of Clinician responsible for Interventional Procedure in 2015 and 2018

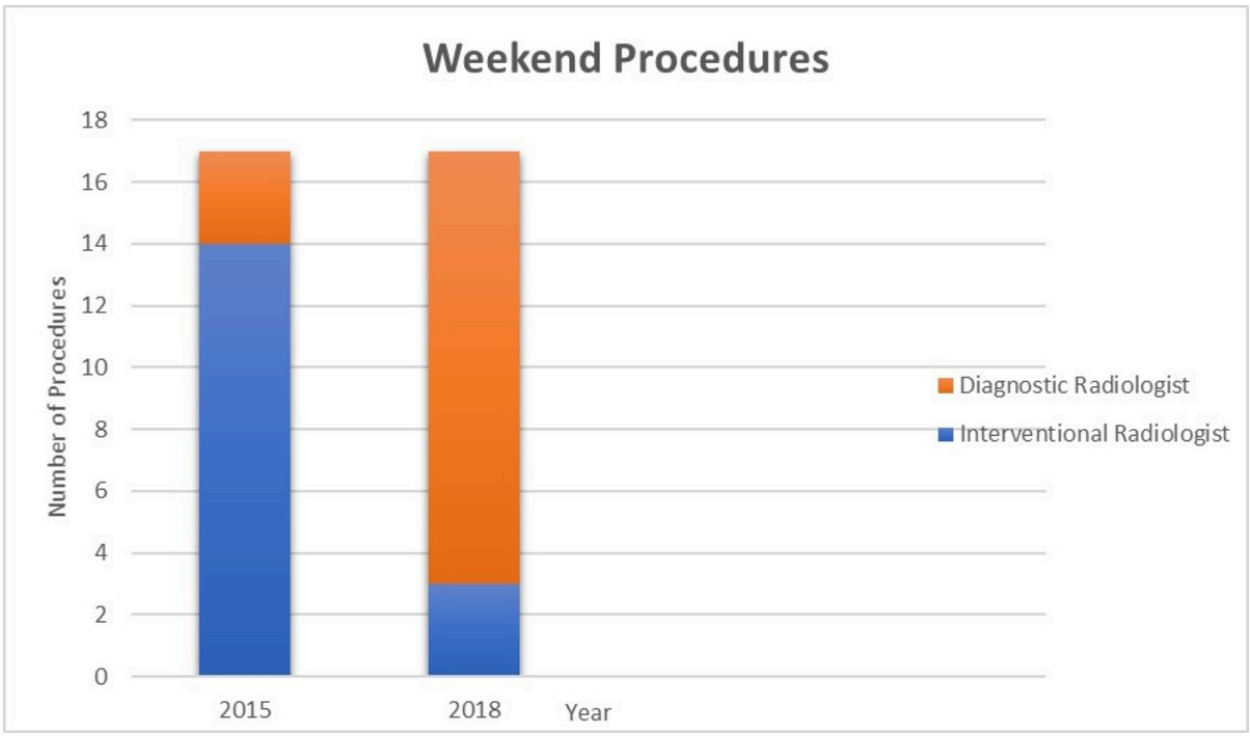

Fig. 3: Number of Weekend Interventional Procedures in 2015 and 2018

Conclusion

The demand for IR services cannot be solely addressed by increasing current training positions. However, harnessing the existing capabilities of the radiology workforce ranging from consultants through to nursing and radiology staff can help to ease interventional workload and improve patient access to innovative procedures.

Training diagnostic radiologists in basic interventional procedures reduced inpatient waiting times by 2 days, thereby improving the standard for inpatient care. Furthermore, weekend services saw an inverse shift in the proportion of diagnostic led and interventional led procedures, in turn allowing greater resources for specialist and acute interventional services. Interventional weekday procedures reduced by 17% due to the increased number of competent diagnostic clinicians.

Ultimately this training structure may be transferrable to other trusts struggling to meet interventional demands, alongside the adoption of established national initiatives to train allied professionals and increase training posts [1].

Our study was limited due to the limited comparable data, its retrospective design and single centre sample size.

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