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MRI reporting by radiographers: Findings of an accredited postgraduate programme

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Abstract *Aim:* To analyse the objective structured examination (OSE) results of the first three cohorts of radiographers ($n = 39$) who completed an accredited postgraduate certificate (PgC) programme in reporting of general magnetic resonance imaging (MRI) investigations and to compare the agreement rates with those demonstrated for a small group of consultant radiologists.
Method: Forty MRI investigations were used in the OSE which included the following anatomical areas and abnormal appearances: knee; meniscal/ligament injuries, bone bruises, effusions and osteochondral defects; lumbar spine: intervertebral disc morphology, vertebral collapse, tumours (bone and soft tissue), spinal stenosis and/or nerve root involvement; internal auditory meati (IAM): acoustic neuroma. Incidental findings included maxillary polyp, arachnoid cyst, renal cyst, hydroureter, pleural effusion and metastases (adrenal, lung, perirenal and/or thoracic spine). Sensitivity, specificity and total percentage agreement rates were calculated for all radiographers ($n = 39$) using all reports ($n = 1560$). A small representative subgroup of reports ($n = 27$) was compared to the three consultant radiologists' reports which were produced when constructing the OSE. Kappa values were estimated to measure agreement in four groups: consultant radiologists only; radiographers and each of the consultant radiologists independently.
Results: The sensitivity, specificity and agreement rates for the three cohorts (combined) of radiographers were 99.0%, 99.0% and 89.2%, respectively. For the majority (5/9) of anatomical areas and/or pathological categories no significant differences ($p < 0.05$) were found between the mean Kappa scores ($K = 0.47–0.76$) for different groups of observers, whether radiographers were included in the group analysis or not. Where differences were apparent, this was in cases (4/9) where the variation was either not greater than found between radiologists and/or of no clinical significance. These results suggest therefore that in an academic setting,

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these groups of radiographers have the ability to correctly identify normal investigations and are able to provide a report on the abnormal appearances to a high standard. Further work is required to confirm the clinical application of these findings.

Introduction

The role of the radiographer in the reporting of magnetic resonance imaging (MRI) investigations is still a relatively new concept although in the United Kingdom (UK) this practice is now receiving growing attention. It has been a number of years since the Audit Commission recommended that radiographers' roles could develop into this area of practice[1] and the considerable challenges posed by recent guidance[2] suggest that some clinical imaging departments may find it difficult to meet such targets as the 18 week patient pathway without wider introduction of effective skill mix. The National Diagnostics Imaging Board (NDIB) recognises this as a key challenge and recommends that there should be a 'focus on roles and responsibilities, skills and competences to facilitate better use of skill mix' (2007, p. 5).[3] Most recently, the NDIB has published more challenging guidance which recommends that 'imaging services should aim to provide reporting turn around times as follows: urgent cases — Immediate (within 30 min); Inpatients and A&E — Same working day; All other cases — By next working day'.[4]

Some departments have responded to these recommendations and have already introduced initiatives which include the reporting of certain MRI investigations by radiographers who have received appropriate education and training.[5,6] A postgraduate programme (PgC Clinical Reporting — MRI General Investigations) accredited and approved by the College of Radiographers (UK)/Canterbury Christ Church University,[7] described previously,[8] has recruited nationally, annual cohorts of radiographers wishing to develop their skills in reporting of MRI investigations of the knee, lumbar spine and internal auditory meati (IAM) since 2003. The 12-month workplace based programme consists of short, two day, briefing blocks held at the university approximately every two months. Experienced MRI consultant radiologists are involved in the design, management, teaching and assessment aspects of the programme. The assessment schedule includes a case-study, an assignment which requires students to critically reflect on their developing competence in MRI reporting and 500 practice reports, 125 of which must be checked by a consultant radiologist mentor in the students' workplace. One of the final summative assessments for the PgC is an Objective Structured Examination (OSE) which consists of 40 MRI investigations.

The aim of this study was to analyse the OSE results achieved by the first three cohorts consisting of a total of 39 radiographers who completed the PgC.

Objectives

(1) To present and evaluate the results of the first three cohorts of radiographers who completed the PgC programme, for the different anatomical areas (knee, lumbar spine and internal auditory meatus) included in the OSE.
(2) To compare the agreement rates (by weighted and unweighted Kappa values), for a small representative subgroup of radiographers with the rates of a small group of radiologists.

Method

As part of the summative assessment at the end of the PgC programme the radiographers were required to report 40 general MRI investigations in the form of an OSE, the construction of which is described in detail previously.[8] During construction of the OSE, 72 MRI investigations (25 knee; 29 lumbar spine; 18 [IAM] internal auditory meati) were reported independently by three groups of experienced consultant radiologists employed within the UK, and who routinely report MRI investigations as part of their clinical role. As reported earlier, the extent to which all three reports agreed on the appearances demonstrated varied, as follows: knee; 68—96%; lumbar spine; 78—99%: IAM; 100%, dependent on the anatomical area and/or pathological category.[8] Due to the poor agreement, 16 investigations (knee = 9; lumbar spine = 7) were excluded from possible use in the OSE banks. Five banks of eight MRI investigations were randomly selected from the 56 potential cases ensuring that the prevalence of abnormal to normal cases approximated 50% and that the anatomical areas were represented similarly. The specific cases selected were randomised and rotated for each of the three cohorts but typically the actual number of investigations, for each anatomical area, in each of the OSEs, was as follows: knee; 11—13, lumbar spine; 14—16 and IAM; 12—14.

Expected answers (based on the three previous independent radiological reports),[8] for each of the 40 investigations selected for the OSE, were then agreed by the programme team (KP and KB) and one of the external examiners (a consultant radiologist [NT] experienced in MRI reporting), who also confirmed that an appropriate selection of discriminatory cases were included.[9] A range of cases were included to adequately test the depth and breadth of the candidates' knowledge and to demonstrate competence and excellence at postgraduate level. Typical abnormal appearances included: knee; meniscal/ligament injuries, bone bruises, effusions and osteochondral defects, lumbar spine; intervertebral disc morphology (bulge, protrusion, extrusion, sequestration, annular tear), vertebral changes (Modic, collapse), tumours (bone and soft tissue, including metastases) — with and without cord compression, spinal stenosis and/or nerve root involvement, IAM; acoustic neuroma and polyps. Other incidental findings, particularly in the lumbar spine category, included arachnoid cyst, renal cyst and hydroureter; pleural effusion and metastases (adrenal, lung, perirenal and/or thoracic spine).