Shortage of interventional radiologists in UK putting patients at risk

Dr Nicola Strickland, president of the Royal College of Radiologists (RCR) in the United Kingdom, commented on UK newspaper reports that patients in the UK are dying because of an acute shortage of specialist doctors to perform life-saving surgery on patients such as women after childbirth, victims of car crashes and other emergency cases. She said: “There is no doubt that around the country people are dying or coming to serious harm due to the lack of interventional radiology provision in their area, although we can’t explicitly quantify how many people die or suffer because they do not get seen by an interventional radiologist.”

A shortage of interventional radiologists in the UK national health service (NHS) means that some patients are having to undergo major, life-changing operations simply because they cannot get the minimally invasive help they need, according to several British doctors, who have spoken out to highlight the human cost of the health service’s shortage of specialist radiologists after the UK government admitted that one in four hospitals cannot provide such care to patients every day of the week because they cannot recruit enough interventional radiologists. Interventional radiologists perform minimally invasive surgery in cases such as those which require stopping acute bleeding, removing life-threatening vascular blockages such as blood clots and also treating cancers and the potentially fatal infection of sepsis. Advances in medicine mean that almost one million such procedures are performed each year in the UK, according to NHS sources.

“It’s outrageously unfair that if you have had the misfortune to have a thrombotic stroke in a part of the country where there are no neuro-specialist interventional radiologists, or no out-of-hours stroke thrombectomy services, you could end up in a wheelchair with half your body paralysed and possibly not being able to speak,” added Strickland. “This postcode lottery, where the NHS is unable to offer the 24/7 care by these IR specialists that everyone agrees is crucial to ensure good patient care, means that some patients come to avoidable harm because their urgent health needs are not addressed. This really serious shortage of these specialists across the NHS is having a damagingly negative effect on patient care.”

Hospitals have about 44% fewer interventional radiologists than they need. Five years after a government-commissioned review said the NHS in England needed about 735 of the specialists to provide a 24/7 on-call service everywhere, there are just 414 of them, according to RCR figures. A government spokesperson said: “There are 29% more clinical radiologists than in 2010, and Health Education England is running an additional 35 clinical radiology training programmes each year from 2017 to 2021.

www.rcr.ac.uk/

“Legacy” pacemakers and ICDs in patients undergoing MRI are rarely dangerous

Long-term adverse events are rare in patients undergoing MRI and who have “legacy” pacemakers or implantable cardioverter-defibrillator devices (ICDs), according to a recent study (Nazarian S et al. Safety of Magnetic Resonance Imaging in Patients with Cardiac Devices N Engl J Med 2017; 377:2555)

A team of researchers from Johns Hopkins University in the USA studied patients who underwent MRI and whose ICD or pacemaker wasn’t MRI-conditional. (MRI-conditional devices are those that that FDA has determined don’t pose additional hazards under pre-specified conditions.). Overall, the patients underwent 2103 thoracic and nonthoracic MRI examinations that were deemed to be clinically necessary. Outcome assessments included adverse events and changes in the variables that indicate lead and generator function and interaction with surrounding tissue (device parameters).

No long-term clinically significant adverse events were reported. In nine MRI examinations (0.4%), the patient’s device reset to a backup mode, with the reset being transient in eight of the nine examinations. In one case, a pacemaker with less than 1 month left of battery life reset to ventricular inhibited pacing and could not be reprogrammed; the device was subsequently replaced. The most common notable change in device parameters immediately after MRI was a decrease in P-wave amplitude, which occurred in 1% of the patients. At long-term follow-up (results of which were available for 63% of the patients), the most common notable changes from baseline were decreases in P-wave amplitude (in 4% of the patients), increases in atrial capture threshold (4%), increases in right ventricular capture threshold (4%), and increases in left ventricular capture threshold (3%). The observed changes in lead parameters were not clinically significant.

The authors thus found that there were no long-term clinically significant adverse events and conclude that their results, along with prior research, “provide complementary evidence that MRI scanning can be performed safely in patients with legacy devices, provided that an appropriate protocol is followed.”

https://tinyurl.com/Nazarian-et-al-paper
Are patients being sufficiently shielded against stray radiation during CT scans?

Radiation exposure during diagnostic imaging such as CT contributes to a small, but potentially preventable percentage of cancers. Nevertheless, a recently published study reports that 40% of hospitals surveyed do not routinely utilize CT shielding. (Safiullah S et al. Prevalence of Protective Shielding Utilization for Radiation Dose Reduction in Adult Patients Undergoing Body Scanning Using Computed Tomography. J Endourol. 2017; 31(10): 985-990).

The rationale behind this US-based study was that while ionizing radiation has been implicated in nearly 2% of malignancies in the Unites States and that is known that radiation shields can prevent unnecessary radiation exposure during medical imaging, nevertheless contemporary radiation shield utilization for adult patients in the United States is poorly defined. The researchers therefore evaluated the prevalence of protective shielding utilization in adult patients undergoing CT scans in United States hospitals. They did this via an online survey which was sent to established radiology departments randomly selected from the 2015 American Hospital Association Guide. Radiology departments conducting adult CT imaging were considered eligible. Among 370 eligible departments, 215 departments accepted the study participation request. Questions focused on shielding practices during CT imaging of the eyes, thyroid, breasts, and gonads.

Prevalence data were stratified per hospital location, size, and type and the main outcomes included overall protective shielding utilization, respondents’ belief and knowledge regarding radiation safety, and organ-specific shielding prevalence.

It was found that, overall, 99% of the hospitals responding to the survey reported that they were aware that shielding can safeguard patients and 84% believed it to be beneficial.

Despite this it was found that among the hospitals surveyed, 40% did not utilize CT shielding even though the majority acknowledged the ALARA principle and agreed that shielding is a beneficial practice. The conclusion of the researchers was that failure to address the low prevalence of protective shielding may lead to poor community health due to increased risk of radiation-related cancers.

https://tinyurl.com/Safiullah-et-al-paper

Lower diagnostic yield associated with high users of CT pulmonary angiogram

Pulmonary embolism (PE) can be life-threatening and, when suspected, is usually investigated by computed tomographic pulmonary angiogram (CPA). Since concerns related to overutilization and harmful ionizing radiation have identified CPA as an area in need of resource stewardship, a team of researchers from Montreal, Canada undertook a study to explore interphysician variability in CPA diagnostic yield and to identify any associated physician characteristics that could inform an intervention to reduce overuse in their institution (Chong J et al Association of Lower Diagnostic Yield With High Users of CT Pulmonary Angiogram. JAMA Intern Med. 2018 Jan 8. doi: 10.1001)

The researchers retrospectively reviewed all CPA at an academic teaching hospital in Montreal, Quebec, Canada, and used a multivariable logistic regression analysis to explore whether physician specialty, years in practice, physician sex, or total numbers of studies ordered per physician were associated with the diagnostic yield CPA. A generalized estimating equations (GEE) based approach was used to account for results was observed. This association may reflect a fundamental relationship between individual physician overutilization and decreasing diagnostic yield, Peer-relative rates of utilization are easily quantified from electronic databases, and can identify physicians most likely to benefit from individual performance feedback and decision support tools. Based on these findings, the group has designed automated yield monitoring and feedback, with the aim of closing the gap between individual physician performance in our institution. The hope is that this will translate into a substantial reduction in unnecessary CPA scans along with any associated complications that may occur owing to unnecessary radiation, overdiagnosis, and overtreatment.

https://tinyurl.com/Chong-et-al-paper

PET identifies which prostate cancer patients could benefit from salvage radiation treatment

For prostate cancer patients who have rising levels of PSA, even after radical prostatectomy, early treatment makes a difference. In a recent study, Australian researchers demonstrated that PET scans can identify which of these prostate cancer patients would benefit from salvage radiation treatment (SRT) (Emmett et al Treatment Outcomes from Ba-PSMA PET/CT-Informed Salvage

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“The research is novel because it looks at the impact of PSMA PET/CT on patient responses to treatment, not just on whether the PET scan results in changed management,” explains Dr Louise Emmett, of St. Vincent’s Hospital, Sydney, Australia. She elaborates, “In the study, these patients underwent imaging with a PSMA PET scan and had treatment based on the results of the scan findings. The study then followed how these men were treated, and whether the treatment was effective.”

Results of the study, which ultimately included 146 men of whom 99 received SRT, show an overall treatment response after SRT of 72 percent. Among patients with a negative PSMA, 44 percent underwent SRT, while 56 percent did not. The negative PSMA group that received SRT had an 85 percent treatment response, while 65 percent of the negative PSMA patients not receiving SRT experienced increased in prostate-specific antigen (PSA). For those with disease confined to the prostate fossa, 83 percent responded to SRT. For men with nodal disease, 61 percent had treatment response following SRT.

The study thus demonstrates that PSMA PET can independently predict treatment response to SRT. Men with negative or fossa-confined PSMA have the highest treatment response to SRT, while men with cancerous nodes or distant disease have a poor response. In particular, a negative PSMA PET predicts a high response to SRT.

Emmett points out, “The results of the study show that PSMA PET is more predictive of a treatment response than PSA level, surgical margins or seminal vesical involvement.”

She notes, “In addition, men with a negative PSMA PET scan were the most likely to respond to salvage radiotherapy with a significant treatment response. However, men with a negative PSMA PET were also the least likely to receive radiotherapy treatment. The majority of men with a negative PSMA PET scan who did not receive treatment had a significant increase in their PSA levels, some to levels at which they were no longer curable. While further study of larger patient groups with longer follow-up times is needed for this cohort of prostate cancer patients, this study is pivotal in providing evidence for change in practice.”

https://tinyurl.com/Emmett-et-al-paper

Volume change in brain region linked to physiological changes characteristic of AD

New research has drawn a link between changes in the brain's anatomy and biomarkers that are known to appear at the earliest stages of Alzheimer's disease (AD). These findings could one day provide a sensitive but non-invasive test for AD before cognitive symptoms appear. Scientists have known for some time that one of the first signs of AD is build-up of amyloid-Beta and tau proteins in the brain. They have known also that the hippocampus atrophies and loses volume in some AD patients years before cognitive decline. To examine the link between the two, a team of researchers from McGill University followed 88 individuals at hereditary risk of AD, but who did not show any cognitive signs of the disease (Tardif CL et al. Regionally specific changes in the hippocampal circuitry accompany progression of cerebrospinal fluid biomarkers in preclinical Alzheimer’s disease. Hum Brain Mapp. 2018 ;39: 971). Subjects were scanned using MRI to determine brain volume and had CSF extracted to test levels of amyloid-Beta and tau. The researchers found that the high levels of both tau and amyloid-Beta are associated with smaller volumes and image intensity profiles of specific regions of the hippocampal circuit, and that this is less likely when there is accumulation of one protein but not the other. The intensity related finding suggests that researchers could use MRI to examine changes occurring at a microstructural level that may even precede more severe volume deficits.

“Our work highlights not only the need but also the possibility of adding sensitive biomarkers of early white matter pathology in the presymptomatic phase of AD,” says Christine Tardif, the paper’s first author.

“This technique demonstrates significant promise in identifying those at greatest risk for developing Alzheimer’s disease without using an invasive procedure like a lumbar puncture, which can be stressful for patients” says Mallar Chakravarty, the study’s senior author.

https://tinyurl.com/Tardif-et-al-paper
Research shows ultrasound imaging needle could transform heart surgery

Heart tissue can be imaged in real-time during keyhole procedures using a new optical ultrasound needle developed by researchers at UCL and Queen Mary University of London (QMUL), in London, UK. The revolutionary technology has been successfully used for minimally invasive heart surgery in pigs, giving an unprecedented, high-resolution view of soft tissues up to 2.5 cm in front of the instrument, inside the body. Clinicians currently rely on external ultrasound probes combined with pre-operative imaging scans to visualise soft tissue and organs during keyhole procedures as the miniature surgical instruments used do not support internal ultrasound imaging.

For the recently published study (Xia W et al. Looking beyond the imaging plane: 3D needle tracking with a linear array ultrasound probe. Sci Rep. 2017; 7: 3674) the team of surgeons, engineers, physicists and material chemists designed and built the optical ultrasound technology to fit into existing single-use medical devices, such as needles.

“The optical ultrasound needle is perfect for procedures where there is a small tissue target that is hard to see during keyhole surgery using current methods and where missing it could have disastrous consequences,” said Dr Malcolm Finlay, study co-lead and consultant cardiologist at QMUL and Barts Heart Centre.

“We now have real-time imaging that allows us to differentiate between tissues at a remarkable depth, helping to guide the highest risk moments of these procedures. This will reduce the chances of complications occurring during routine — but skilled — procedures such as ablation procedures in the heart. The technology has been designed to be completely compatible with MRI and other current methods, so it could also be used during brain or fetal surgery, or for guiding epidural needles.”

The team developed over four years the all-optical ultrasound imaging technology for use in a clinical setting. They made sure it was sensitive enough to image centimetre-scale depths of tissues when moving; it fitted into the existing clinical workflow and worked inside the body.

“This is the first demonstration of all-optical ultrasound imaging in a clinically realistic environment. Using inexpensive optical fibres, we have been able to achieve high resolution imaging using needle tips under 1 mm. We now hope to replicate this success across a number of other clinical applications where minimally invasive surgical techniques are being used,” explained study co-lead, Dr Adrien Desjardins.

The technology uses a miniature optical fibre encased within a customised clinical needle to deliver a brief pulse of light which generates ultrasonic pulses. Reflections of these ultrasonic pulses from tissue are detected by a sensor on a second optical fibre, giving real-time ultrasound imaging to guide surgery.

One of the key innovations was the development of a black flexible material that included a mesh of carbon nanotubes enclosed within clinical grade silicone precisely applied to an optical fibre. The carbon nanotubes absorb pulsed laser light, and this absorption leads to an ultrasound wave via the photoacoustic effect.

“The whole process happens extremely quickly, giving an unprecedented real-time view of soft tissue. It provides doctors with a live image with a resolution of 64 microns, which is the equivalent of only nine red blood cells, and its fantastic sensitivity allows us to readily differentiate soft tissues,” said study co-author, Dr Richard Colchester. The team is now working towards translating the technology for clinical use in patients.

https://tinyurl.com/Xia-et-al-paper

Two-dimensional all-optical ultrasound imaging (B-Mode) acquired during the manual translation of the needle tip across a distance of 4 cm. As the needle tip progressed from the high right atrium to the inferior vena cava, the thin foramen ovale manifested as a hypoechoic region between the thick limbus fossae ovalis and the tendon of Todaro (with a diagonal artifact from the ICE catheter and sheath). X-ray fluoroscopic imaging was acquired concurrently (inset). Credit: Finlay et al.

UK medical personnel, including radiologists, concerned about working time regulations change after Brexit

The British Medical Association (BMA) the professional association and registered trade union for doctors in the United Kingdom, is deeply concerned by reports that there is support within the current UK government for the removal of the Working Time Regulations (WTR) from UK law following the UK’s departure from the European Union.

A group of 15 eminent physicians and leaders of the UK learned societies — including Dr Nicola Strickland, President of the Royal College of Radiologists in the UK — have recently written a letter to the UK Prime Minister, Mrs Theresa May.
Revised criteria expected to speed the diagnosis of multiple sclerosis

The McDonald Criteria for the Diagnosis of Multiple Sclerosis have just been revised by a 30-member international panel of MS experts. The panel recently published their recommended revisions, which are expected to speed the diagnostic process and reduce the chance of misdiagnosis (Thompson AJ et al. Diagnosis of multiple sclerosis: 2017 revisions of the McDonald criteria. Lancet Neurol. 2017. doi: 10.1016/S1474-4422(17)30470-2).

Multiple sclerosis can be difficult to diagnose because there is no single test that can determine that a person has MS. The process of diagnosis involves obtaining evidence from a clinical examination, medical history, lab tests and MRI imaging of the brain and sometimes the spinal cord. These tests are intended to rule out other possible causes of a person’s neurological symptoms and to gather data consistent with MS.

A key principle in diagnosing MS is to uncover evidence that demonstrates lesions in the central nervous system (brain and spinal cord) showing “dissemination in space” (DIS - suggestions of damage in more than one place in the nervous system) and “dissemination in time” (DIT - suggestions that damage has occurred more than once).

New research evidence and evolving knowledge since the previous 2010 McDonald Criteria for diagnosing MS compelled the panel to consider whether revisions would improve the speed and accuracy of the diagnosis of MS while reducing the possibility of misdiagnosis.

The key changes identified by the panel include:

- CSF oligoclonal bands -- Positive findings of oligoclonal bands in the spinal fluid can substitute for demonstration of dissemination of lesions in time in some settings.
- Types of lesions - Both asymptomatic and now symptomatic MRI lesions can be considered in determining dissemination in space or time. (This does not include MRI lesions in the optic nerve in a person presenting with optic neuritis.)
- Site of lesions - Cortical lesions have been added to juxtacortical lesions for use in determining MRI criteria for dissemination of lesions in space.

THE PANEL ALSO RECOMMENDED THAT:

- Brain MRI should be obtained during the MS diagnostic process, unless not possible. Spinal MRI should be obtained when additional data are needed to confirm the diagnosis.
- When spinal fluid is used as part of the diagnostic process, paired serum and CSF samples be analyzed to confirm that oligoclonal bands are unique to the CSF.
- The need to ensure there is no better explanation for the individual’s symptoms remains an essential consideration.
- The McDonald Diagnostic Criteria apply to individuals experiencing a typical clinically isolated syndrome -- CIS. (CIS is a first episode of neurologic symptoms typical of an MS relapse in a person not known to have MS.)

WHAT ARE THE KEY CHANGES?

In individuals with typical CIS:
- CSF oligoclonal bands -- Positive findings of oligoclonal bands in the spinal fluid can substitute for demonstration of dissemination in space.