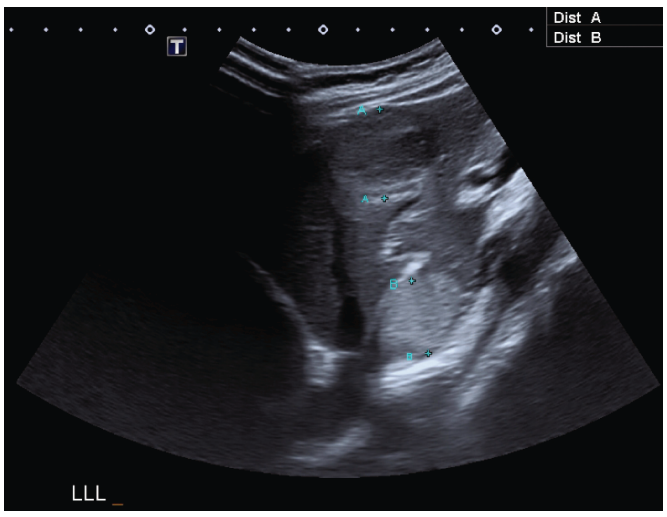

Figure 2
Longitudinal section left lobe of the liver. This shows two lesions: caliper A (segment II/III) measuring an atypical haemangioma; and caliper B (segment I) measuring a typical haemangioma.

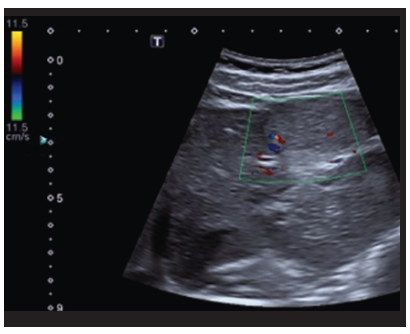

Figure 3
Transverse section left lobe of liver. This shows colour Doppler imaging being used to detect low velocity blood flow, peripherally and centrally, within the atypical haemangioma in segment II/III.

or malignancies in cases where differentiation was poor on 2D ultrasound.[23,24]

Future

As ultrasound equipment becomes more affordable and handheld,[19,20] we believe UK and international healthcare systems will develop two types of ultrasound clinical practice to improve patient management:

1, POCUS with simultaneous clinical assessment by non-radiology healthcare practitioners; and
2, expert opinion from radiologists and sonographers.[25]

The logistics of setting up a POCUS service can be challenging. This needs collaboration between the non-radiology healthcare practitioners and the radiology department to be successful. Local guidelines are required to allow non-radiology healthcare practitioners to refer the patient with suspected incidentalomas such as haemangiomas to the radiology department for a definitive diagnosis.[6,21]

Conclusion

POCUS requires healthcare practitioners with relevant education and training to ensure timely clinical/imaging assessment for rapid decision-making. When POCUS is undertaken by non-radiology practitioners it is a rule-in examination not a definitive diagnostic examination. The ultimate aim of POCUS is to improve and benefit patient care and management.

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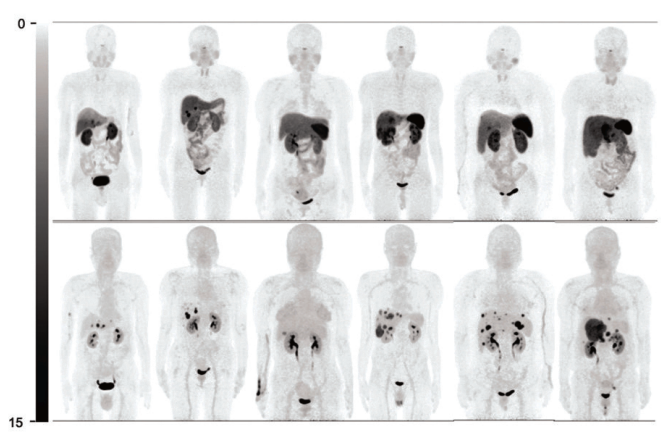

Comparison of whole body maximum intensity projections (MIP) in six representative patients (patients 7, 8, 11, 14, 27, and 29 from left to right). Physiologic uptake is seen at pituitary gland, salivary glands, thyroids, adrenal glands, spleen (splenectomy in patients 7 and 8) and bowel on ^{68}Ga-dotatate MIP (top). However, these normal organs show none or very mild uptake on ^{68}Ga-DOTA-JR11 MIP (bottom). ^{68}Ga-DOTA-JR11 depicts more liver lesions than ^{68}Ga-dotatate, with lower liver background.

Novel radiotracer proves advantageous for imaging neuroendocrine tumour patients with liver-dominant disease

For neuroendocrine cancer patients with liver metastases, new radiopharmaceutical ^{68}Ga-DOTA-JR11 has shown good imaging performance in tumour detection, staging and restaging, providing important information to guide treatment. In a head-to-head comparison of two somatostatin receptor (SSTR) imaging agents, ^{68}Ga-DOTA-JR11 PETCT performed better than ^{68}Ga-dotatate PETCT in detecting liver metastases, with a better tumour-to-background ratio, according to research published in *The Journal of Nuclear Medicine*.

The key target for imaging and peptide receptor radionuclide therapy in patients with neuroendocrine tumours, SSTRs are typically imaged using ^{68}Ga-labelled peptides, which are agonists that bind to SSTRs to elicit a response. However, newly-developed peptide antagonists, which recognise and then block SSTRs, have shown more favourable pharmacokinetics, better image contrast, higher tumour uptake and better residence time in recent studies.

"With antagonists, we now have an alternative to agonists," explained nuclear medicine physician at Peking Union Medical College Hospital, Bejing, Dr Wenjia Zhu. "However, there is still not much evidence about the performance of PETCT imaging with SSTR antagonists. Hence, we designed this prospective study to compare ^{68}Ga-dotatate and ^{68}Ga-DOTA-JR11 PETCT in patients with metastatic, well differentiated neuroendocrine tumours."

The study included 31 patients and took place on two consecutive days. Each patient received an intravenous injection of ^{68}Ga-dotatate on the first day and ^{68}Ga-DOTA-JR11 on the second day. Whole-body time-of-flight PETCT scans were performed 40-60 minutes after each injection on the same scanner. Upon completion, physiologic normal organ uptake, lesion numbers and lesion uptake were compared between ^{68}Ga-dotatate and ^{68}Ga-DOTA-JR11 PETCT images.

The physiologic normal organ uptake of the spleen, renal cortex, adrenal glands, pituitary glands, stomach wall, normal liver parenchyma, small intestine, pancreas and bone marrow was significantly lower on ^{68}Ga-DOTA-JR11 PETCT than on ^{68}Ga-dotatate PETCT. ^{68}Ga-DOTA-JR11 was found to detect significantly more liver lesions than ^{68}Ga-dotatate; however ^{68}Ga-dotatate detected more bone lesions than ^{68}Ga-DOTA-JR11. While the radiopharmaceuticals showed similar lesion uptake for primary tumours and lymph node metastases on both patient-based and lesion-based comparisons, the target-to-background ratio of liver lesions was significantly higher on ^{68}Ga-DOTA-JR11.

Dr Zhu added: "For patients with different metastatic patterns, different peptides (DOTA-JR11 versus dotatate) should be used. In liver-dominant disease, ^{68}Ga-DOTA-JR11 may be a better choice in tumour staging and restaging compared to ^{68}Ga-dotatate. It may also change the treatment strategy, especially when partial resection or local therapy for liver metastasis is considered. In bone-dominant disease, we should probably stick to agonists, as ^{68}Ga-DOTA-JR11 may underestimate tumour burden."

POCUS eases pressure of COVID-19 diagnosis on secondary care at Royal Berkshire

The challenge of providing urgent care to those most in need has been heightened during the COVID-19 pandemic due to increased patient numbers and the need to keep hospital admissions down. In Reading, an innovative point-of-care ultrasound (POCUS) device has been key to establishing a collaboration between the Royal Berkshire Hospital and a local primary care hub to better diagnose patients with COVID-19.

Intensive care medicine consultant Dr Andrew Walden and ultrasound fellow in the acute medical unit Dr Joseph Nunan implemented a new triage system for patients presenting with COVID-19 symptoms to ease the demand on hospital staff, front-line clinicians and on beds. The TICC-19 pathway (triage into the community for COVID-19 patients) was inspired by a similar system used in Brescia, Italy, one of the worst affected areas in Europe at the time.

Dr Walden and Dr Nunan already had experience at the Royal Berkshire Hospital with Butterfly iQ, a hand-held ultrasound system from Butterfly Network that uses a single probe to scan the whole body and connects to a smartphone to show images in real-time. They identified an opportunity to include POCUS as part of the TICC-19 system, which remotely assessed

Dr Andrew Walden

patients with suspected COVID-19 using oximeters. Rapid assessment of patients in the emergency department using lung ultrasound helped to identify those who had COVID-19 pneumonia without the need for chest x-ray.

"The triage system we implemented is a prime example of how collaboration and innovation was able to support patients and the NHS at a critical moment," said Dr Walden. "By including POCUS in our system, we were able to ensure the correct care was provided to those who needed it most, in partnership with our primary care colleagues."

A further opportunity to diagnose COVID-19 patients more efficiently was realised outside of the emergency department. GP lead at Reading Primary Care Response Hub Dr Shwan Maroof had established a primary care respiratory 'hot hub' to diagnose COVID-19 patients in the community, easing pressure on secondary care. Dr Walden and Dr Nunan approached Dr Maroof with the aim of standardising patient assessments in which POCUS played a key role.

To achieve this, Dr Maroof and his GP colleagues at the primary care hub were trained by the Royal Berkshire team on how to perform a lung ultrasound and to specifically rule in or rule out COVID-19 pneumonia. Using Butterfly iQ's secure cloud storage system, they could quickly send the hospital team scans they were concerned about or raise queries.

Royal Berkshire is exploring the role of POCUS with Butterfly iQ with other specialists in cardiovascular care and nursing, and a new training programme on POCUS is now in place.

Hyland makes acquisitions

Content services provider Hyland has acquired Another Monday, a robotic process automation (RPA) software developer based in Germany. The addition of an end-to-end RPA software solution extends Hyland's process automation capabilities and strengthens its content services product portfolio.

In addition, Hyland has signed an agreement to acquire Alfresco, a content services platform and solutions provider. Headquartered in Boston, USA, Alfresco's cloud-native digital business platform delivers content services to connect, manage and protect critical information.

Hyland offers enterprise imaging solutions as part of its content management technology.