Wednesday 22 November 2023

EVAR Endoleak Imaging – Prof Ciaràn McDonnell

Professor McDonnell outlined his current practice for endovascular AAA repair surveillance, which utilises ultrasound as a first line tool. All patients receive ultrasound scans at routine intervals, which are arranged by the vascular scientists. Normal scans then receive a follow up appointment, with the results forwarded to the consultant. Abnormal or urgent scans are immediately discussed with the on-call consultant. This practice frees up consultant appointments, CT booking slots, and saves the trust money, while also helping to foster a positive relationship between patients and staff.

This is more streamlined than the practice at my trust. Currently EVAR patients receive CT scans for 2 – 3 years initially and are then converted to ultrasound surveillance. Surveillance is monitored by our Vascular Nurse Specialist (VNS), who ensures that follow up scans are logged, and future scans requested. Any abnormality is highlighted by the vascular scientist, and/or discussed with the VNS or consultant immediately. While the process described by Professor McDonnell would free up VNS time, it would be difficult to set up at my trust as we currently do not have enough vascular scientists to ensure that all tasks could be completed appropriately.

EVAR Endoleak Imaging – Ms Louise Bowen

Ms Bowen discussed the different types of endoleak, including which vessels are responsible, and outlined appropriate scanning techniques for identifying them. The use of colour flow was endorsed, with multiple endoleak examples given. Unfortunately colour flow is not always successful in diagnosing endoleak, and therefore contrast enhanced ultrasound is used.

There were clear and useful examples of endoleaks depicted, both with colour flow and contrast enhanced ultrasound. Using contrast in this circumstance allows even slow leaks to be identified and can highlight any possible abnormality which may arise from endograft kinking on Xray. CEUS is not currently performed in my trust as we are a spoke site. None of our consultant radiologists are trained in CEUS, and there is no one who has been interested in training into CEUS historically. Any CEUS is performed at our hub site and brought to the attention of the network MDT. CEUS is not performed by the vascular scientists at our hub site, but rather by the radiologists themselves. I think that with adequate training, this could be incorporated into the routine scanning protocols for the vascular scientists. While doing so would require training the vascular scientists in venipuncture and safe administration of contrast, it would improve the patient experience by preventing multiple appointments.

Pedal Vessel Imaging – Mr Ben Freedman
Mr Freedman demonstrated the techniques used for scanning pedal arteries, with tips on obtaining optimum colour fill and spectral Doppler tracings. He outlined the protocol within his current practice, as well as the department policy to never perform lower limb amputations based solely on angiogram. When performed adequately, pedal vessel ultrasound can identify and quantify flow in distal vessels and provide options for plantar artery bypass. Unfortunately, pedal ultrasound is not quick to perform, and may take the same amount of time as aorta to popliteal scanning. In his practice, they have achieved an 83% limb salvage rate at one year.

This was a very informative presentation, with excellent imaging of the pedal vessels. This is an area of practice that would benefit many patients, especially those diabetics who typically only have infrapopliteal artery disease. These patients typically do not receive any IR intervention at my trust or in my network unless it is for limb salvage, so being able to provide the possibility of distal bypass could prevent limb loss and help promote wound healing. As this would increase the scan time, it would not be feasible to offer to every patient but would have to be specifically requested by the consultants on a case-by-case basis.

3D Ultrasound – Prof Daniel Staub
Excellent 3D images were provided by Professor Staub. His research has demonstrated that younger patients with low LDL levels showed regression of their carotid arterial disease, especially smooth hypoechoic plaques, while on lipid lowering therapy or statins.

While we currently use the Philips EPIQ system in our trust, 3D assessment is not likely to become a part of our standard practice. We have too few practitioners currently providing high quality carotid ultrasound, and therefore would need more resilience in the system before adding an additional layer of scanning. The resulting images would be very beneficial to the vascular consultants however, as they are very diagram-orientated, and prefer to see a visual representation of the disease before endarterectomy.

Practical Skills Session
The practical skills session this year provided multiple patients who have undergone successful pedal artery bypass surgery. Vascular scientists from the corresponding clinics were on hand to explain the procedures and helped to demonstrate the best way to scan the vessels. The pedal bypasses were quite easy to identify with ultrasound, as they were quite superficial, and there was plenty of time to spend at each of their stations.

3D carotid ultrasound was also demonstrated at the practical skills session. I was able to see the 3D rendering on the Philips EPIQ, which is the machine I use daily, so I was comfortable with the controls already. While the patient was a volunteer, and had no carotid arterial disease, it was educational to see how the vessel was cast as a 3D image, and the types of manipulation which could be performed after the images were stored.

National Carotid Stenosis Grading Audit – Mr Osian Lloyd

Mr Lloyd performed an audit on current practices in grading of carotid artery stenoses in the UK. 80 trusts were invited to complete an online questionnaire regarding their velocity threshold criteria and practices, with a 58% response rate. The findings showed that there was a significantly improved adherence to the 2009 UK guidelines on grading stenoses, with no significant difference between practices in the UK and Ireland, however there was still some variation within the guidelines being used.

We were not one of the clinics invited to fill in a questionnaire. We currently use the 2009 guidelines in our trust and use the prescribed PSVR and St Mary's ratio criteria for grading stenoses.

Advances in AI to Assess Carotid Disease – Mr Dominic PJ Howard

Mr Howard explained the different levels of artificial intelligence, especially the difference between machine learning and deep learning. Machine learning requires someone to input the information to be processed and learned, while deep learning involves the machine to pull the information in on its own. Unfortunately, with both levels of AI, the machine can only learn from the data which is given. In this study, AI was used to assess carotid artery disease. It has shown that plaque composition is a better predictor of stroke risk than degree of stenosis, however it is difficult to describe and stratify. The AI system was better at predicting which plaques would be symptomatic, which could be beneficial for patients who have complex issues (AF), which make grading degree of stenosis difficult.

This study used plaque morphology and quantity to determine stroke risk. Our current practice is to quantify the degree of stenosis and offer endarterectomy to those patients who have a symptomatic stenosis greater than 50%. While the AI was good at predicting symptomatic plaques, it also has the potential to highlight a plaque as risky which is causing no significant stenosis by velocity criteria. I wonder whether vascular consultants would consider CEA on a symptomatic patient whose carotid duplex demonstrated no significant velocity elevation following an AI plaque assessment.

Advances in 3D Ultrasound Artificial Intelligence to Assess Carotid Disease – Dr Steven K Rogers

Dr Rogers has presented his findings on using 3D carotid duplex scanning with artificial intelligence to detect asymptomatic carotid artery disease. As 2D ultrasound requires skilled staff to operate, this 3D/AI model is suggested to be used as a screening tool, allowing identification of those in the population who are at risk of major adverse cardiovascular events, and enabling physicians to provide early intervention. New research is suggesting that best medical therapy may be the chosen treatment over carotid endarterectomy in the future.

I think this could be a very advantageous development for routine screening of the population. I have participated in screening programs in the past in which patients arrived for cardiac, aortic, carotid, respiratory, and diabetic screening. These clinics are very fast paced, and you have a very limited amount of time to perform each assessment. Therefore, the scientist should be very skilled in assessing carotid artery disease rapidly and accurately. These assessments cannot determine risk of MACE however, they can only detect whether the vessels are diseased. By applying 3D and AI to this screening, you have a tool which may be able to detect those patients who are at an increased risk of MACE at an early stage and begin preventative measures.

Identification of the "At Risk" Carotid Plaque – Prof Ciaràn McDonnell

Vascular Consultants want to know two things: How much plaque is there (degree of stenosis)? And how stable is it (is it symptomatic or not)? The 2011 guidelines recommend performing carotid duplex as a primary examination, and then a second modality if the patient is a candidate for endarterectomy; this is not followed in most practices. It has been noted recently that inflammatory markers are elevated in symptomatic arterial disease, and that PET-CT demonstrates active inflammation in those plaques that have a higher stroke risk. This plaque inflammation is identifiable with contrast enhanced US or by using a microvascular Doppler setting. Those plaques which show a high uptake of contrast are more likely to cause future issues.

The images showing a homogeneous plaque on one side, then CEUS on the other were quite startling. To see neovascularisation of a plaque which looks fairly innocuous on 2B imaging is eye-opening. Our current machines do not have microvascular imaging available, and we do not have the resources for CEUS. However, our systems are up for renewal, and I will be quite keen to acquire microvascular imaging on any new systems to better assess these plaques and their stability.

Calf and Pedal Vessel 3D and Contrast Ultrasound Imaging – Mr Joao Carreira
Contrast-enhanced tomographic 3-D ultrasound (CEtUS) is being used to assess calf and foot arteries for surgical planning in patients in need of vascular intervention. This imaging mode has advantages over MRA, CTA, and angiography in that it avoids radiation exposure and contrast agents. CEtUS is therefore safe for renal patients and is cheaper and quicker to perform. CEtUS also demonstrates a good correlation with CTA and angiography and can also be used in vein mapping.

This technique does provide nice imaging of the calf and foot vessels and is reportedly quick and easy to perform. It would, however, still require venous cannulation for administration of contrast. This would also require specific software to render the images into a 3-D map for the consultants. In my opinion, while this technique may be quick to perform, it would require more time in reporting and processing. In a larger hospital, this workload could be spread evenly among the other vascular scientists, however smaller hospitals would struggle to maintain capacity.

Treatment/Management of the Diabetic Foot – The Bigger Picture – Dr Wing May Kong
Complications of the diabetic foot can be devastating and life-changing, and their consequences are severely underestimated. A diabetic patient is 2x more likely to die if they have a foot ulcer. Many complications are often overlooked, and they are not medical. For example, poor hygiene can result from foot/leg ulceration, which could lead to social isolation. Due to the pain of ulceration and decreased mobility, younger patients could lose their job, and ultimately their home. Dr Kong advocates the integration of care to ensure ulcer healing, with no amputation. She also emphasises that patients should be able to reach the appropriate foot care specialists, regardless of where they present for treatment.

This was a very engaging talk on the diabetic foot, and Dr Kong is clearly very passionate about transforming the way in which diabetic patients are managed. I see many diabetic patients from my Trust's Diabetes Centre and have seen how painful and upsetting this condition is. As these ulcers take quite a long time to heal, there is a considerable impact on the patient's quality of life, and many patients are clearly embarrassed and even distressed at their presentation.

Diabetic Foot Multidisciplinary Team – Ms Jodie Buckingham
Ms Buckingham presented her experiences in establishing the Diabetic Foot Multidisciplinary Team at Oxford University Hospitals. She has created an MDT which is diversely populated, ensuring that all necessary procedures can be performed in an outpatient setting. Her efforts have resulted in fewer hospital visits, fewer interventions,

fewer hospital beds required, and fewer amputations. This set up has proven to save the hospital money, as well as lives. She has demonstrated excellent results with foot wounds in the outpatient setting, while avoiding total limb loss.

Again, this was an excellent presentation on the diabetic foot. Ms Buckingham is clearly very enthusiastic about her work and her patients and has created an excellent model for the Diabetic Foot MDT which we should all strive to emulate. Our current Diabetic Foot MDT is held at the Diabetic Centre, and includes endocrinologists, vascular consultants, and multiple nurses. Unfortunately, we are not able to perform many procedures on-site as part of the MDT, but the patients are still receiving input from multiple specialists at one time, which is still reducing the number of hospital visits.

Automated Devices for PAD Population Screening – Prof Matt Bown

Professor Brown is advocating for the use of automated ABPI devices to be routinely used as a part of the AAA screening program to help identify patients who may be at risk of cardiovascular disease, with an aim to help reduce the risk of stroke and heart attack. Historically, the screening programs have been reluctant to use hand-held Doppler to assess ABPI, as the patients would have to remove socks and shoes, and they are only given 15 minutes to assess each patient. His hope is that using an automated device would make this assessment easier, as it could be set up immediately upon the patient's arrival and could collect data while the abdomen is being scanned.

I have worked at a hospital which offered a one-stop screening program which offered AAA, carotid, cardiac and respiratory assessments, with a consultant on-site to explain results to the patients. I think offering a higher level of screening to patients is important, as many patients only present to hospital when something has gone wrong. By assessing patients before they become symptomatic, patients are more likely to be encouraged to take up best medical therapy to prevent future stroke, cardiac, and PAD complications. I would like to see the AAA screening to take up the cause of cardiovascular screening and offer it to women as well as men.

Diagnostic Tools to Establish the Presence and Severity of Peripheral Arterial Disease in People with Diabetes – Prof Alun H Davies

This was an introduction to the TrEAD study, which outlined that visual arterial spectral waveform assessment is the most promising bedside test for diagnosing peripheral arterial disease. Recruitment has just finished, and the results are due in 2024.

The Ideal Amputation/Amputee – Joint Symposium (VS, SVT, BACPAR, SVN)
This was a joint symposium in which multiple health professionals were invited to speak and discuss their role and experiences in helping guide and counsel patients through their amputation journey. I found the Steel Bones charity presentation to be the most pertinent one for my trust. The foundation was started by an amputee and his wife to ensure that all amputees have the support and counselling the need to maintain a good quality of life following amputation. They offer peer support to anyone who reaches out and have reported that 47% of their members have met with other amputees within 5 years post-surgery, 73% felt more independent, and 80% reported an improved quality of life since joining.

Thursday 23 2023

Recently Completed Studies Abstract Presentations
Emily Alderson presented her findings on whether patients at Cambridge University Hospitals received 2 forms of imaging prior to undergoing carotid endarterectomy. She has noted at 86.3% of patients in her initial audit were treated in concordance with the ESVS guidelines, with no clear explanation for non-compliance. After educating consultants on the guidelines, and implementing a specific CEA pathway, a reaudit demonstrated 100% compliance.

Anna Corby presented the results of her service evaluation of post-operative open AAA repair patients, in which patients completed a questionnaire, and some were invited back for a face-to-face interview. 5 themes were identified: active participation, gratitude, hospital environment, staff communication, and confidence in staff. Responses suggested improvements could be made regarding information provision, especially concerning adverse effects and medication side effects.

Anice Aidi discussed her retrospective study of the clinical significance of pre-operative carotid ultrasound screening prior to cardiac surgery. 962 patients were reviewed, which showed that only 12.3% of patients had CAS, and that 84% of those patients were not treated for their CAS prior to cardiac surgery. Males and those >65 yo were significant predictors for CAS in this study. It is proposed that selectively screening only males >65 yo as high risk could greatly reduce the patient load and has the potential to save the NHS time and money.

Elizabeth Washak performed a retrospective audit of 300 ICAs in her trust which also underwent carotid DUS and CTA and compared the accuracy of grading. Her results demonstrated that there was a strong agreement between DUS and CTA in stenosis classification, with minimal agreement in plaque morphology classification. Overall, she

found that the departmental DUS imaging was being performed adequately at all skill levels.

Bridging the Gap: Implementation of Duplex Ultrasound Techniques in Medical Ultrasound Practice – Mr Ben Warner-Michel

There are many procedures in which vascular ultrasound and general ultrasound overlap, namely interrogating placental insufficiency and hepatic and renal transplants. Currently, these scans tend to be performed within general ultrasound, and vascular scanning techniques may not be properly applied, which could lead to misdiagnosis. Mr Warner-Michel is a vascular scientist who has undertaken training in general and obstetric ultrasound and has reflected on his experiences.

I do agree that there is some overlap between vascular and general ultrasound, and that having the proper understanding of the techniques used to interrogate arterial and venous flow is key to performing these scans. Depending on how the scanning units are set up, training vascular scientists in general ultrasound (and vice versa) can ensure that these scans are performed correctly. In my trust though, I have trained a general sonographer to perform vascular scans, and unfortunately, since there is a larger waiting list for general ultrasound procedures, her vascular scanning has suffered. So while cross-training may allow for a more experienced scientist to perform the scan, that person will need to ensure that they are proficient in both modalities.

Scientific and Case Study Abstract Presentations

Rahul Rai – Acquired Arterio-Venous Fistula following Deep Vein Thrombosis. This was a very interesting and unusual presentation of Acquired AVF following DVT. The discussion of around vascular endothelial growth factor promoting angiogenesis secondary to hypoxia definitely requires further reading. I have never seen this pathology in my practice but will pay special attention to the flow in recanalized thrombus in the future.

Yasmeen Gouda – Crural-to-Crural/Pedal bypasses: a reasonable alternative in challenging cases and times. This discussion looked at short distal bypasses rather than the historical long femoral bypasses. 41 cases were reviewed, with medium term results showing good patency and limb salvage rates.

Rhodri Furlong – Creating and delivering a scientist and nurse-led supervised exercise programme at St George's Hospital, London. Mr Furlong detailed his experience delivering an exercise programme which was led by a vascular scientist and vascular clinical nurse specialist. This was a 3-month pilot study, with very good uptake of the programme, and good results. My trust currently has a supervised exercise programme

which is referred into via the nurse specialist and run by a physiotherapist according to the nurse's recommendations.

Adam Levay – Differences in duplex ultrasound measurement of carotid artery blood flow velocity measurements with the subject supine versus seated up-right when performed by accredited vascular scientists. This study aimed to determine the accuracy of performing sitting carotid scans on patients whose comorbidities limit their ability to lie flat. Results demonstrated that velocities were decreased when seated upright, which could result in a lower degree of stenosis. This could impact management decisions in patients who are borderline for intervention. This should be kept in consideration when scanning patients in wheelchairs or who are unable to lie flat. In many cases, these patients are likely too unwell to undergo surgery anyway.

Joao Carreira – The impact of contrast-enhanced ultrasound on 5-year outcomes in patients under EVAR surveillance. This was a retrospective comparison of patients who received either CTA first vs EDUS first imaging a definitive diagnosis of endoleak. Both groups demonstrated comparable all-cause AAA related mortalities and re-intervention rates. Unfortunately this study collected data on all AAA patients in surveillance, regardless of when their surgery was performed. As a result, historic and current EVAR patients were included, and some devices scanned have been removed from the market. As both groups had similar re-intervention rates, it is suggested that patients could be entered into 6-montly CEUS surveillance; cost-saving by reducing need for CTA.

Akam Shwan – Accuracy of Doppler Ultrasound in Assessing Below Knee Arteries: A Comparative Study. 93 limbs of patients with suspected PAD were assessed with both Doppler US and MRA before intervention. Sensitivity, specificity, PPV and NPV of DUS were assessed. DUS demonstrated a high sensitivity and specificity for ATA and PTA, but was decreased for peroneal artery. Diabetics demonstrated a decreased accuracy. It was noted that there was a statistically significant difference between scans performed by SVT accredited scientists vs nonaccredited. It was pointed out by the audience that most clinicians would use CTA rather than MRA for investigating PAD. Further research proposed by testing CTA/MRA to DUS, rather than the other way around.

Dr Nazia Saeed – Reflections of setting up a new service in the NHS; The impact of Walk-in Ultrasound Imaging for GCA patients. This was a presentation on the creation of a walk-in imaging service for the giant cell arteritis pathway at London Northwest University Hospital Trust. 65 patients were scanned (124 duplex scans). Unfortunately, I found the statistics presented very confusing. Some slides seemed to contradict themselves, and at the end, I was unsure as to what the outcome was. There was some helpful information provided regarding wall thickness: Temporal artery >0.3mm positive,

>0.7mm refer for biopsy and Axillary <1mm normal, 1-1.5 mm equivocal, >1.5 mm positive.

Angie White – An Unusual case of ultrasound-proven occipital GCA: disproving the misnomer of Temporal Arteritis. This was a very interesting case of occipital arteritis, and reinforced that GCA scanning requires excellent anatomical knowledge to ensure that all small vessels are adequately visualised.

Alexandra Croucher – Service evaluation of an ultrasound service for renal artery stenosis. All renal artery duplex scans performed in 2022 were reviewed and analysed by outcome and referrer. Of 930 scans, only 42 were positive for RAS, and only 2 were treated with angioplasty. These results were presented to the Renal Medicine department, as they were the department with the most referrals. As a result, the number of RAS scans have decreased.

Jake Lantry & Prof Mary-Paula Colgan – Is Blue-Dop an accurate screening tool for determining the presence of Peripheral Artery Disease? This was study to determine whether it is feasible to use Blue-Dop as community screening tool, as it is a cuff free method of measuring ABPI. Results were compared to manually calculated ABPI. Findings support the role of Blue-Dop as a screening tool.

Akam Shwan – The value of clinical assessment by vascular specialist prior to referral to vascular technology department: a quality improvement project. This was a prospective study which assessed all referrals for arterial duplex scans for suspected pathology, referral pathway, and whether the patients had been reviewed by a vascular specialist. Results showed that requests which had been vetted by a vascular specialist first resulted in fewer negative scans (6.3% vs 23.6%). By having referrals come via vascular specialists, you gain an increased efficiency and better utilisation of resources.

Christine Sanadi – Two unusual groin pseudoanerysms.

Physiological Sciences/Vascular Education in Ireland – Dr Siobhan Daly
Dr Daly outlined the current state of Physiological Sciences Education in Ireland, including a timeline from the 1960s.

Direction of Healthcare Science Education in the UK – Dr Lisa Ayers
Dr Ayers discussed the physiological sciences courses offered by the National School of Healthcare Science, including STP and HSST.

The Great Debate: Should Vascular Scientists Adopt Advanced/Extended Practice?

Prof Francesco Torella
Mr Steve Wallace
Mr Maciej Juszczak
Ms Katy Bloom
I do believe that vascular scientists should be allowed time to adopt an advanced or extended practice. Unfortunately, there are many time constraints, as well as wait lists demands which must also be met. I also believe that those who wish to extend their practice should already be proficient in the role they are currently performing.

Exciting New Research and Development in Engineering Magnetically Targeted Systems for Precision Drug Delivery/Magnetic Targeted System Application in Vascular Therapy – Prof Eleanor Stride
This was a talk regarding using microbubbles to target the delivery of drugs into tumour cells. Our current drug delivery system is systemic, and inefficient, delivering <0.1% of the drug into the target cells. Dr Ayers is using microbubbles that have a small magnetic charge to the target area, and then dispersing the bubbles with ultrasound to release the drug only into the area of concern. To ensure that this treatment is accessible to as many people as possible, it will be paired with non-name brand drugs, making this a new drug delivery system, and not a new drug. As a vascular therapy, it's proposed use is as a delivery system for tPA in stroke patients, and thrombin in false aneurysms.

I really enjoyed this presentation. I think that this is a revolutionary way to deliver drugs, and could be a life altering system for cancer patients.

AGM
Name change was approved.
The accreditation process has been changed to include a research aspect. All new candidates must perform a research project and present the results. This can be the research project performed as part of MSc or STP programmes.