

P518**Single Centre Experience Using Ekos-Catheter-Directed Thrombolysis in the Management of Acute Sub-Massive Pulmonary Embolus****Charles Hall, Mohamad Hamady, Taranpal Bansal, William Oldfield¹, Robert Thomas***Departments of Radiology and ¹Medicine, Imperial College Healthcare NHS Trust, London, United Kingdom.
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Background: Acute pulmonary embolism (PE) results in approximately 150,000 deaths per year in the United States. Massive PE results in haemodynamic instability. Patients with a sub-massive PE have a large embolus burden with evidence of right ventricular dysfunction (RV/LV ratio >0.9) but are haemodynamically stable. A Lancet review estimates the 3-month mortality rate for sub-massive PE is 21%. The treatment for massive PE is systemic intravenous tissue plasminogen activator (tPA) therapy. A beneficial reduction in all-cause mortality in these patients is attenuated by the 3-5% risk of catastrophic intracerebral haemorrhage. For haemodynamically stable patients with sub-massive PE, the current standard of care is anticoagulation. Our institution presents three patients with acute sub-massive PE managed with EkoSonic (EKOS) acoustic pulse thrombolysis, a form of ultrasound-enhanced catheter-directed thrombolysis (UE-CDTR). This combines conventional catheter directed tPA thrombolysis with high-frequency ultrasound, which increases thrombus permeability via acoustic cavitation for increased tPA efficacy. **Methods:** Three patients with CT pulmonary angiography (CTPA) confirmed sub-massive PE with RV dysfunction and a positive biomarker of cardiac strain (BNP/Troponin) underwent EKOS. Under local anaesthetic and via common femoral vein approach, EKOS endovascular systems were placed in either one or both lower lobe pulmonary arteries. A tPA bolus followed by infusion (0.5 mg/hr tPA) was commenced according to protocol. **Results:** At 4 hours, all patients had a reduction in resting heart rate and a reciprocal improvement in oxygen requirements. Repeat CTPA at 24 hours following initiation of EKOS-directed thrombolysis demonstrated significantly decreased thrombus burden (up to 75%) and radiographic resolution of RV dysfunction with no episodes of major haemorrhage. **Conclusions:** Our institution has successfully employed EKOS-directed thrombolysis in three patients with sub-massive PE. All patients had clinical and radiological improvement with reduced inpatient stay compared to patients treated with anticoagulation alone.

P519**Role of Interventional Radiology in Challenging Vascular Access for Pediatric Patients****Mohamed El Ghobashy, Mostafa Gad, Bibi nazaria, Hafez bazaraa***Faculty of Medicine, Cairo University, Cairo, Giza, Egypt.
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Background: The purpose of this study is to determine the technical and functional aspects concerning image guided

peripherally inserted central catheter (PICC) and central venous catheters for challenging vascular access in pediatric patients. **Methods:** This prospective study done including 20 pediatric patients, 10 patients of them undergo peripheral inserted central catheters while, the other 10 patients undergo traditional CVCs using ultrasound and/or fluoroscopy guidance for different indications. **Results:** Venous access devices were successfully provided for 20 patients. There were 12 males (60%) and 8 females (40%) with a mean age of 4.91 years (range, 0-15 years). The right internal jugular vein was targeted for 6 cases (30%); 3 patients coming for BMT and 3 patients on regular hemodialysis. The left internal jugular vein was used for 3 cases (15%). The right subclavian vein was used in 1 case (5%) with end stage renal disease and the right internal mammary vein was used in 1 case (5%) on regular haemodialysis. The left femoral vein was used for 5 patients (25%) and the right femoral vein was used for 2 (10%) PICC lines with multisystem organ failure. Technical success in all patients. **Conclusions:** Image guided venous access success is considered as a feasible, safe and valuable option for central venous access in pediatric patients.

P520**Carbon Dioxide as Alternative Contrast Agents for Diagnostic Angiography and Vascular Interventions****Mohammed Al-Toki, Jamal Abdulla***Department of Radiology, Diakonie-Kliniken Kassel, Kassel, Germany.
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Background: To evaluate the role of CO₂ contrast agent for diagnostic angiography and vascular interventions as an alternative to the iodinated contrast in the in patients with renal failure or severe allergic reaction. Carbon dioxide (CO₂) was used as a contrast agent particularly in patients who were hypersensitive to iodinated contrast material or whose renal function was compromised since years. Recently with the availability of high-resolution DSA and a reliable gas delivery system CO₂ angiography has become widely used to guide various vascular interventions, including angioplasty and stent placement. **Materials and Methods:** In 2016, 28 patients were examined with CO₂ angiography in our department, about 20% of them underwent above Knee angioplasty. All of the patients had contraindication to use the iodinated contrast, critical renal function, previous severe reaction to iodinated contrast. Most of the angiography was done through transbrachial approach, selective CO₂ angiography of the iliac, femoral and below knee arteries were done. For the angioplasty in the iliac artery selective transbrachial angioplasty was performed, for the angioplasty in the femoral and below knee arteries ipsilateral antegrade approach was performed. The image summation techniques was used to improve the quality and accuracy of the angiography image. **Results:** 5000 unit heparin were given to all patients who underwent angioplasty, no heparin was given to the diagnostic angiography. The most important complication was pain experience during CO₂ injection; to decrease the pain during the procedure we decrease the injection rate, increase the time between each injection. **Conclusions:** The use of CO₂ contrast agent for diagnostic angiography and vascular interventions for the iliac, femoral and popliteal arteries in patients who have a contraindication to iodinated contrast material seems to

be safe, useful and effective alternative to the iodinated contrast. However, the use of CO₂ below Knee is less effective.

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The Role of the Interventional Radiology in the Management of the Thoracic Outlet Syndrome

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Background: To evaluate the role of interventional radiology for diagnosis and treatment of the Thoracic outlet syndrome (TOS). **Introduction:** Thoracic outlet syndrome (TOS) is a term used to describe a group of disorders that occur when blood vessels and/or nerves in the space between the lower neck and upper chest area (the thoracic outlet) are compressed. Symptoms include neck, shoulder, and arm pain, numbness in the fingers, or weakness, impaired circulation and discoloration of the extremities. Often symptoms are reproduced or worsened when the arm is positioned above the shoulder or extended. Diagnosis of thoracic outlet syndrome is suggested by the symptoms and physical findings and is supported by Electromyography (EMG) and/or radiological examinations. **Materials and Methods:** About 42 patients were examined in our department in 2016, 4 patients underwent venous thrombolysis and angioplasty before the surgery. Every patient had superior thorax aperture x-ray, and cervical spine x ray. Both median cubital veins were punctured and indirect arteriogram for the both subclavian arteries and venogram for both subclavian veins in normal position, in abduction and in hyperabduction position were done. The examinations were done in sitting position. The number of patients with subclavian artery occlusion is more than the patients who had subclavian vein occlusions. We treated 4 patients with venous occlusion and thrombosis with thrombolysis and angioplasty before the operation. **Results:** The number of patients with subclavian artery occlusion is more than the patients who had subclavian vein occlusions. We treated 4 patients with venous occlusion and thrombosis with thrombolysis and angioplasty before the operation. **Conclusions:** Interventional radiology confirms the diagnosis of the TOS, plays an important role in the treatment of their complications and could be an adjuvant therapy to improve the surgical result.

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Emergency Embolization: Patient's Pathway from Phone Call Reporting to Bleeding Cessation: Single Center Experience

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Background: Hemorrhage is a major yet preventable cause of death and long term disability varying from mild self-limiting to massive necessitating angioembolization or surgery. The time from patient injury to hemorrhage cessation critically affects prognosis. We prospectively assessed the emergency protocol and transfer logistics for Emergency Embolization patients in Ain Shams University hospitals in 2016. **Materials and Methods:** 80 bleeding patients were presented from ER or inpatient wards with average haemoglobin concentrations 6 mg/dL. The protocol

followed was reporting cases to IR residents through official IR emergency telephone who instantly reported to on call IR consultant. Patients were transferred by ambulance to the Angiosuite. Polytrauma patients did MDCT whole body and FAST US first. Emergency team did resuscitation via blood products and medical support during transfer. Vascular-sheath was applied by the residents till consultant arrival. **Results:** Average call to angiosuite time was 17 minutes. Average call to Consultant arrival was 73 minutes and call to procedure end was 106 minutes. 1ry cessation of bleeding was achieved in 79 cases, 1 patient with pph needed further hysterectomy. Rebleeding after 48 hours or more occurred in 6 patients 2 of which underwent embolization, 3 died and 1 underwent nephrectomy. Bowel ischaemia occurred in 1 patient with resection of gangrenous sigmoid loop 6 days postembolization. 10 patients died within the first week despite hemodynamic stabilization attributed to marked coagulopathy upon arrival. **Conclusions:** IR plays a major role in management of hemorrhage. Patients transfer time and hemodynamic status are the most important prognostic factors.

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Custom-made Fenestrated Endograft for Patients with Type 1 Endoleak and Previous Endovascular Aneurysm Repairs: A Promising Endovascular Alternative Approach to Open Surgery

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Background: Endovascular management of type 1 endoleak in patients with pre-existing endovascular stent graft (EVAR) is quite challenging due to the anatomical limitations. Custom-made fenestrated stent grafts have been proposed to increase the proximal landing zone and thereby eliminate the endoleak. We present our experience in nine patients who have undergone FEVAR using a custom made AnacondaTM graft. The clinical and technical success rate as well as lessons will be discussed. **Materials and Methods:** Retrospective review of patients with type IA endoleaks who underwent FEVAR from 2010-2016. The technical success, vessel patency, reintervention, clinical and imaging follow-up were recorded. **Results:** Nine patients (eight male; mean 80 years, ASA grade \geq III) with type IA endoleaks/aneurysm enlargement were included. Five patients were treated with cuffs whilst four underwent complete re-alignment; 30 side branches were treated with success in 28 (93%). The overall technical success was 88%. Mean hospital stay was 6.8 days with no 30-day mortality. The reintervention rate was 22% related to endoleaks from renal fenestrations. There were no type I endoleaks following the procedures. Two patients died at 6 and 18 months from septicaemia and myocardial infarction respectively and one patient lost to follow-up who died from ruptured aortic aneurysm at 51 months. The remaining patients continue to be followed-up with stable aneurysm sac sizes. **Conclusions:** Custom-made fenestrated stent grafts to treat type 1 endoleak in patients with previous EVAR provide an alternative to open surgery in selected patients, especially in those with significant comorbidities.