

DCB) have been approved by the FDA following RCTs. Two DCBs (SurVeil DCB and Ranger DCB) are still to be approved following completion of the trials. No drug hypersensitivity reactions have been reported. To our knowledge, there are no other reported cases of anaphylaxis to paclitaxel DCB when used as endovascular treatment for peripheral arterial disease. There is one case in the literature of acute hypersensitivity reaction following femoral-popliteal angioplasty with paclitaxel DCB. The patient developed a painful, erythematous rash of the thigh shortly after removal of the DCB with associated agitation, tachycardia and hypertension. However, the patient did not meet criteria for anaphylaxis. Another paper reported delayed hypersensitivity reaction manifesting as a vasculitic rash of the lower limb following femoral angioplasty of the symptomatic limb with a paclitaxel-coated balloon. **Conclusion:** There is evidence to support the use of DCBs in the treatment of peripheral arterial occlusive disease via improvements in vessel patency. We present a rare case of anaphylaxis following deployment with a paclitaxel DCB. Clinicians using these devices should be aware of such risk.

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Establishing Interventional Radiology in the Developing World: Intra-Arterial Procedures in Tanzania

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Objectives: In the developing country of Tanzania, there are currently no fellowship-trained interventional radiologists to serve the rapidly growing population of almost 60 million people. The inaugural interventional radiology (IR) fellowship in the region was established in 2018 under the auspices of Muhimbili National Hospital (MNH) and Muhimbili University of Health and Allied Sciences. Due to lack of in-country expertise, teaching has been conducted by visiting teams from the United States, training the first generation of Tanzanian IR fellows, nurses, and technologists. While the majority of cases have consisted of nonvascular procedures, this report outlines the first intra-arterial procedures at MNH performed over the past year. **Methods:** All consultations received by the IR service at MNH were logged via Research Electronic Data Capture, a Health Insurance Portability and Accountability Act compliant workflow application. Patient information including sociodemographics, referral source, medical diagnosis, comorbidities, and indications for IR interventions has been collected since October 2018. In addition, procedure type, technical success, complications, and pathology results for relevant interventions were recorded. **Results:** A total of 308 consultations and 231 procedures were performed by the newly established IR service from October 2018 to November 2019. Of these, 28 (12.12%) were intravascular procedures. Of these, seven (25%) were intra-arterial procedures, including one pancreatic pseudoaneurysm embolization, one splenic embolization for thrombocytopenia, and five uterine fibroid embolizations (UFEs).

No intra- or peri-procedural complications occurred. The pancreatic pseudoaneurysm demonstrated no flow of contrast in the aneurysm on follow-up imaging. The splenic embolization demonstrated an improvement of thrombocytopenia from 30,000 to 42,000 platelets per microliter at 1 month. Follow-up visits demonstrated improvement in bulk symptoms, pain, and bleeding in UFE patients at 1 month, and at 3 months, a patient who previously needed a monthly transfusion had hemoglobin of 11 g/dl with no further transfusions required. **Conclusion:** Overall, our early experience demonstrates the safety, feasibility, and excellent outcomes of the first intra-arterial procedures performed in Tanzania. **Recommendations:** The establishment and expansion of IR training improve access to critical IR services in developing countries such as Tanzania.

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Pulmonary Arteriovenous Malformation Embolization: Nottingham University Hospitals, UK-Based Tertiary Center Experience

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Objectives: Pulmonary arteriovenous malformations (PAVMs) are structurally abnormal vessels that provide direct capillary-free communication between the pulmonary and the systemic circulations and hence an anatomic right to left shunt. They are commonly caused by hereditary hemorrhagic telangiectasia (HHT). Treating these lesions is of high clinical priority as they can increase the incidence of developing stroke and cerebral abscesses. The main indication to treat these lesions is when the feeding artery measures more than 4 cm. Here, we present our experience in treating 18 patients with endovascular embolization in Nottingham University Hospitals. **Methods:** A retrospective review of all the PAVMs underwent endovascular embolization between October 2014 and November 2019 (5 years) was conducted. We reviewed the number of treatments, clinical success, complications, and the recanalization rates. **Results:** A total of 18 patients with PAVMs treated with endovascular embolization over 5 years. There were 12 males and 6 females with mean age of 56 years. The documented and genetically proven underlying cause was found to be HHT in most cases (15 patients). A total of 25 treatments were performed (4 patients had multiple AVMs treated in separate occasions and two patients had recanalization of previously treated AVMs which were then re-treated). One patient with AVM underwent angiogram which showed multiple small AVMs which were not treated. One patient had difficult embolization with migration of coil into the pulmonary vein and the right ventricle which was then retrieved using a vascular snare with resolution of ectopics and no late complications developed. No major or minor postembolization complications developed; one patient was admitted postembolization with pleuritic pain which was treated conservatively. No patients suffered a stroke or cerebral abscess since treatment. Sixteen treatments had documented successful improvement in their oxygen saturations on respiratory review. Three patients developed recanalization (defined as persistent perfusion through a previously placed coil). Two patients had further treatments and one patient did not have further treatment. **Conclusion:** Endovascular embolization is a minimally invasive treatment for PAVMs with high technical and

clinical success and low complication rate. The most common persistent pattern in our series was found to be recanalization.

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Bronchial Artery Embolization; Retrospective Survey from a Tertiary Care Hospital in a Developing South-Asian Country

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Objectives: To evaluate the clinical presentation, etiological cause, and source of hemoptysis in patients undergoing bronchial artery embolization. A 5-year experience of success rate, complications, and follow-up at a tertiary care hospital in developing country. **Methods:** A retrospective cross-sectional study was conducted between January 2014 and December 2018. The study population included patients undergoing angiography for bronchial artery embolization (BAE). Demographic details including risk factors were included. Clinical sign and symptoms were recorded. Bronchoscopy and arteriography were used to locate the source of bleed. Embolization technique and postprocedural results were analyzed. Success and failure rates were noted. Finally, complication, follow-up results and mortality were also discussed. **Results:** The study included 40 cases. Of these, 80% were males. 50% had tuberculosis. 37.5% underwent bronchoscopy. On imaging, 32.5% had bronchiectasis, 30% had pleural thickening, and infiltrate/consolidation was seen in 32.5% of cases. Disease distribution was unilateral in 72.5% of cases. Bronchial artery involvement was seen in 67.5%, and both bronchial and systemic involvement was seen in 25% of cases. Technical success of embolization was 87.5%. Microcatheter was used in 91.4%. Poly vinyl alcohol (PVA) alone was used in 68.6%. **Conclusion:** BAE and nonbronchial systemic artery embolization are safe and effective nonsurgical treatments for patients with massive hemoptysis.

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The Necessity of Surgical Resident Training in Damage Control Vascular Surgery: A Third World Experience

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Objectives: Vascular injuries pose a major challenge for all surgeons even those who are experienced, especially in low/limited resources austere environments. To evaluate the 10 years' experience with damage control vascular surgery (DCVS) in managing vascular injuries in different rural emergency centers, with special emphasis on the rule of surgical residence. **Methods:** This was a 3-year retrospective study from December 2016 to January 2019, to report all cases of isolated vascular trauma that were referred to our center with an emergency vascular trauma from different rural emergency centers. Patients' files were thoroughly reviewed to report the type of vascular injury, the initial DCVS, and the rank of the surgeon

who performed the initial management before referral. **Results:** A total of 240 patients were reported. They were 160 males and 80 females with a male-to-female ratio of 3:1. Their age ranged from 15 to 67 years with the median age 38.5 ± 1.5 years. In 195 patients, the cause of vascular injury was road traffic accident in whom 71 suffered from major trauma to the femoral artery, while the remaining 24 patients experienced trauma to the femoral vein. The remaining 175 patients were victims of assaults by gunshot in 45 patients or direct penetrating stab or contused wound in 130 patients. The mean time between the initial injury and the primary DCVS that was done at the original center ranged from 7 to 20 h, with the mean of 12.5 ± 2.6 . Limb salvage was successful in 112 patients. Out of them, 107 initially underwent the DCVS by experienced surgeons, while the remaining five patients were treated by residents with different scopes of experience. Limbs were sacrificed in 128 patients because of failure of the DCVS. In those patients, amputation was performed as a life-saving procedure. **Conclusion:** Damage control vascular surgery is an effective tool in limb salvage in trauma patient. It should be a major part of Junior and senior residents in the developing countries to save the hospital resources and to decrease the cost-effectiveness of health care.

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Endovascular Treatment of Traumatic Carotid Cavernous Fistula

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Objectives: To evaluate the technical success, complications, and outcome of endovascular management of posttraumatic carotid cavernous fistula (CCF) in patients presenting at Lahore General Hospital (LGH) Lahore, Pakistan. **Methods:** All patients with CCF treated by transballoon arterial embolization were reviewed from January 2016 to December 2018. A total of 48 patients with CCF were treated in angiography suite of LGH, Lahore. 20 (41.6%) patients had deployment of single balloon Gold ball valve balloon (Balt). 18 (37.5%) were treated successfully with the double-balloon technique. 10 (20.8%) had occlusion of cervical part of internal carotid artery with detachable balloon after confirming contralateral flow due to their very large size of fistula. There were 45 (93.71%) males and 3 females. The median age was 36 years, ranging from 20 to 55 years. All patients had CCF caused by trauma and presented with ocular and orbital symptoms, including orbital bruits, deterioration of visual acuity, chemosis, and pulsatile proptosis. **Results:** A total of 42 (87.5%) patients showed full recovery with detachable balloons. Three (6.25%) patients presented with recurred symptoms due to displacement of balloon, and in 5 (10.4%) patients fistula showed partial closure but symptoms improved significantly. **Conclusion:** The detachable balloon technique for transarterial treatment of CCFs is a feasible method that increases the chance of completely occluding the orifice of the CCF. Balloon embolization appears more economical and simple as compared to coil or onyx embolization.