

dilation of the stent cell using a balloon catheter. After changing the guidewire to a thin, flexible guidewire, the delivery system passed successfully through the stent cell and exclusion of the aneurysm was achieved.

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Life-Threatening Iatrogenic Pulmonary Arterial Hemorrhage after Percutaneous Lung Biopsy, Successfully Treated with Endovascular Embolization: A Case Report

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Background: A 71-year-old female with a medical history of hypertension, congestive heart failure, pulmonary arterial hypertension, end-stage renal disease on hemodialysis, and colorectal adenocarcinoma status postsigmoid colectomy. The patient underwent a computed tomography (CT) of the chest, which identified multiple bilateral pulmonary nodules measuring up to 1.9 cm, which were FDG avid on PET-CT and concerning for pulmonary metastases. Therefore, she was referred for and underwent CT-guided percutaneous biopsy of the dominant pulmonary nodule in the right upper lobe, without immediate complication. There was expected minimal postbiopsy regional hemorrhage in the lung parenchyma. Postprocedure, follow-up chest radiographs obtained at 1 and 3 h demonstrated rapidly enlarging confluent opacity in the right lung, with poor aeration and leftward mediastinal shift, concerning for hemorrhage secondary to the biopsy. Clinically, the patient was becoming increasingly tachypneic, with respiratory rate in 20 s. She was also having increasing O₂ demand, requiring up to 8 l/min to maintain normal oxygen saturations. A CT angiogram of the chest was urgently performed, which demonstrated a large right hemothorax secondary to active hemorrhage from a suspected segmental pulmonary arterial branch in the region of biopsy in the anterior segment of the right upper lobe. Her respiratory status continued to decline, requiring urgent intubation. A right chest tube was also placed, which drained 1300 mL of sanguineous fluid. The patient was transferred to interventional radiology for emergent embolization of presumed active pulmonary hemorrhage. **Methods:** After appropriate informed consent was obtained and procedural time-out was performed, the patient was placed in supine position and right groin was prepped and draped in usual sterile fashion. The right common femoral vein was accessed under ultrasound guidance and a 7 French vascular sheath was placed. A 6 French pigtail catheter was positioned in the right pulmonary artery, and pulmonary arterial pressures were obtained, measuring 82/32 mmHg (mean arterial pressure 51). A right pulmonary angiogram was then performed, demonstrating contrast extravasation from a right upper lobe segmental pulmonary artery, consistent with active hemorrhage. A 2.4 French microcatheter was then coaxially advanced into the right upper lobe for selective segmental pulmonary angiograms, which confirmed active pulmonary arterial hemorrhage likely from a branch of the anterior segment of the right upper lobe. Gel foam slurry was then administered transcatheter into the anterior segmental pulmonary arterial branch until stasis was achieved. Following

that, three Medtronic Concerto detachable coils were deployed. Completion right pulmonary angiogram demonstrated resolution of previously noted contrast extravasation, consistent with effective cessation of hemorrhage. Catheter and sheath were then removed, and adequate hemostasis was achieved at the right common femoral venotomy without complication.

Results: Right upper lobe anterior segmental pulmonary arterial hemorrhage related to recent percutaneous lung biopsy was effectively controlled with gel foam and coil embolization. Postprocedure, the patient required intensive care for several days, where her right hemothorax was drained via a large bore chest tube and her respiratory status markedly improved. She remained hospitalized for approximately 5 weeks due to her multiple other comorbidities. Of note, her biopsied lung nodule was positive for metastatic colorectal adenocarcinoma. She was discharged in stable condition without any recurrence of pulmonary hemorrhage during the remainder of her hospital stay. **Conclusion:** In this case report, we present a very uncommon massive hemothorax from pulmonary artery hemorrhagic complication of a relatively common procedure, percutaneous lung biopsy. There are several known risks of percutaneous lung biopsy, the most common being pneumothorax and pulmonary hemorrhage. Several institutions have reported their experiences with pulmonary hemorrhage related to percutaneous lung biopsy. Incidence of hemorrhage is reported between 20% and 41%, the vast majority of which do not result in any clinical complication. Incidence of hemothorax has been reported as 0.1%–1.3%, with massive hemothorax requiring surgical intervention only described in two cases across several reports including thousands of patients. The etiology of our patient's rapidly enlarging hemothorax was active hemorrhage from the pulmonary arterial vasculature, which was suspected on CT angiogram and confirmed on digital subtraction pulmonary angiography. The patient's history of pulmonary arterial hypertension is classically thought to be a contributing risk factor. However, a recent study by Digumarthy *et al.* found no significantly increased risk of hemorrhage in patients with pulmonary arterial hypertension. To our knowledge, this is the first case of life-threatening massive hemothorax from postlung biopsy pulmonary artery hemorrhage in our institutional experience.

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Thoracic Endovascular Repair as a Lifesaving Bridge to Definitive Repair in a Recurrent Aorto-Esophageal Fistula: A Case Report

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We present a case of a 57-year-old male who presented with an acute onset of massive hematemesis and hypovolemic shock evidenced by a blood pressure of 90/60, heart rate of 128, hemoglobin of 63 g/dl, and metabolic acidosis with a pH of 6. He was otherwise well prior, except that he had a transhiatal esophagectomy and gastric pull-up for an adenocarcinoma for lower esophagus 15 years prior. He was fluid resuscitated and brought to the endoscopy suite to have an esophago-gastro-

duodenoscopy (OGD) which revealed blood in the stomach (the neo-esophagus). The patient had a cardiac arrest before finding the source of the bleeding; hence, the OGD was aborted and cardiopulmonary resuscitation (CPR) commenced. He responded to one cycle of CPR and was intubated and fluid resuscitated. When hemodynamically stable, a computed tomography aortography (CTA) was performed, which demonstrated an aorto-esophageal fistula (AEF) and no other aortic abnormality. A rapid decision was made to proceed with a thoracic endovascular repair of the aorta (TEVAR) limited to that segment of aorta. The procedure was successful. He had a follow-up OGD weeks later which was normal. Four months later, he represented to hospital with hypovolemic shock secondary to massive hematemesis. Again, a diagnosis of AEF was confirmed on CTA, which was just proximal to the previous aortic stent graft. He again had emergency TEVAR covering the descending aorta from the level just below the left subclavian artery to just proximal to the celiac artery, which was again lifesaving and uncomplicated. Three months later, a repeat OGD revealed a large gastric ulcer with a visible segment of aortic stent graft in the base. At this time, he reported no symptoms and had a normal full blood count. He was then referred urgently to have definitive upper gastrointestinal and descending aorta repair. He underwent a thoracotomy, left heart bypass, repair of aorto-gastric fistula with primary stomach repair, and thoracic and abdominal aorta replacement with a Dacron graft. He made good recovery. His stent graft culture grew *Candida albicans* and vancomycin-resistant enterococcus.

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The Importance of Computed Tomography Angiography before Bronchial Artery Embolization in Hemoptysis

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Educational Poster Background: Massive hemoptysis is an emergency and a life-threatening situation. Computed tomography angiography helps in identifying the underlying pathology and anatomical variation of the bronchial artery. Imaging prior bronchial artery embolization has crucial role in directing an interventional radiologist. The bronchial artery is responsible for majority of hemoptysis cases. Lack of pre-embolization imaging assessment may result in recurrence or incomplete embolization. This poster demonstrates the following: imaging techniques using computed tomography angiography to identify the bronchial artery anatomic variations, procedure planning by identifying the site of bleeding and possible complication.

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Hemoptysis on Tuberculosis Sequelae: From the Physiopathology to the Endovascular Treatment

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Educational Poster Background: Pulmonary tuberculosis is still a deadly endemic infection in most developing countries. In 2015, the incidence of tuberculosis in Morocco was 89/100,000/year. Parenchymal sequelae are frequent presenting as cavitation, cicatricial fibrosis, and parenchymal destruction. Airways lesions often associated are paracatricial bronchiectasis, tracheobronchial stenosis, and broncholithiasis. Hemoptysis is systemic in these cases and due to bronchial artery hypervascularization. Since described in 1974, bronchial artery embolization (BAE) in controlling bleeding has improved in terms of technique and efficacy. It is indicated generally in mild to massive, life-threatening hemoptysis. Embolization's aim is to devascularize the hypervascular territory or at least decrease the hyperemia. The principal vascular occlusion's agents used nowadays are microparticles. Others additional agents are coils for proximal occlusion and liquids agents that require specific training. Hemoptysis on tuberculosis sequelae is due to systemic hypervascularization and bronchopulmonary shunt. Angio-computed tomography with acquisition at an aortic phase allows the detection of the hemorrhage site by searching for "ground glass" zones, and the visualization of bronchopulmonary sequelae. Arguments sustaining the hemoptysis's systemic origin are the dilatation of the bronchial artery, visualization of an early enhancement of pulmonary artery which is a sign of the bronchopulmonary shunt. Selective embolization of the systemic arteries bronchial or collateral such as intercostal, internal mammary artery, and diaphragmatic artery is indicated in case of life-threatening bleeding. Nowadays, the agents of choice are particles. Their size should be above 325 µm so that they do not cross bronchopulmonary anastomoses. The immediate clinical efficacy varies between 70% and 99% with a great percentage of recurrence between 12% and 57%. Despite high recurrence rates, BAE is still the first-line, minimally invasive treatment of hemoptysis in emergency and within surgically unfit patients. Complications are rare (1%). The most severe are spinal ischemia and pulmonary embolism.

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Percutaneous Augmentation Procedures in Chronic Compression Fractures of Dorsolumbar Spine

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Objectives: To evaluate the efficacy of percutaneous balloon vesselplasty in nontraumatic vertebral fractures of the thoracolumbar spine and compare it with percutaneous vertebroplasty. **Methods:** Fifty patients with chronic vertebral compression fracture of more than 12 weeks, severe pain (visual analog scale: more than/equal to 7) and disability attributable to the vertebral fracture were included and underwent vertebral augmentation procedures. Clinical and imaging follow-up was done for the two groups and evaluated for pain, disability scores, increase in anterior vertebral body height, and volume of cement injected. Complication rate was also compared in two groups. **Results:** Mean decrease in pain score was 4.29 in vertebroplasty group and 4.47 in the vesselplasty group. The mean increase in the