SE 06 IR-01
Management of patients with concomitant atherosclerotic lesions of carotid and coronary arteries
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PURPOSE: Atherosclerosis is a systemic disease, affecting neighboring and distant vascular pools. Comorbidities of coronary and carotid arteries take the leading place among multifocal atherosclerotic diseases in Uzbekistan, where annually is registered more than 40,000 of strokes.

MATERIALS AND METHODS: We analyzed the results of treatment of 198 patients with associated carotid and coronary pathology, who were treated in Tashkent Medical Academy from January 2013 to March 2016. 134 (67.6%) were male. The mean age was 51.4 ± 6.3 years. If patient had non-embolicogenic carotid plaques according to ultrasound duplex scanning, coronary and carotid angiography (129 patients) was performed; in the presence of embolicogenic plaque was performed multislice computed tomography angiography (69 patients). At multivessel coronary lesions, we used the Syntax score. At score ≤ 22 we performed an endovascular intervention, at > 22 points - open surgery.

RESULTS: 1 or 2 vessel disease was found in 106 (53.4%) patients. Of these, 70 patients on the first stage had stenting of coronary arteries. Triple-vessel disease was detected in 86 patients. Analysis by the Syntax score showed that 66 patients had < 22 points, they had stenting of coronary on the first stage, followed by reconstruction of CA on 3–6 day. 20 patients had > 22 points and open surgery of CA. In 13 (65%) of 20 patients was revealed a low risk, they had operation on the carotid arteries on the first stage, after which the patients were directed to cardiac surgery. The remaining 7 patients had high or medium risk and bypass surgery on the first step. In 6 patients there wasn’t found disease, requiring surgery on CA. 3 patients had transient ischemic attack, which disappeared after therapy. In the short-term period 3 patients (1.5%) had ischemic stroke, at 2 patients (1%) with lethal outcome.

CONCLUSION: Today, we adhere to the tactics of staged surgical treatment of the carotid and coronary atherosclerosis. Priority is given to revascularization of CA. In the case, if we had low myocardial reserve, we conducted interventions on the coronary arteries, and preference is given to endovascular interventions. Short- and long-term outcomes of treatment at patients with concomitant carotid and coronary lesions are the same as the results of leading world clinics and confirm the correctness of management at this group of patients.

SE 06 IR-02
Hybrid DynaCT guided hookwire localization of pulmonary lesions prior to surgical resection in the same hybrid operating theater
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PURPOSE: Hybrid DynaCT guided hookwire localization of pulmonary lesions immediately prior to surgical resection by the radiologist in same hybrid operating theater is a new one-stop technique, which may reduce interdepartmental transfer time and complications such as pneumothorax and hookwire dislodgement. Our center is the world’s first in performing such procedure. This is in contrast to previous multi-slice CT (MSCT) guided hookwire placement in radiology department which necessitates patient transfer from radiology suite to operating room. We aim to compare the safety and efficacy of this new technique with conventional MSCT guided hookwire procedure.

MATERIALS AND METHODS: Retrospective case-control study performed in a university-based hospital from February 2014 to January 2016. 18 patients with lung lesions who underwent hybrid DynaCT-guided hookwire localization utilizing Siemens Artis Zeego system were compared against 10 age and sex matched controls who underwent conventional MSCT guided hookwire placement. All cases performed under local anesthesia.

RESULTS: Mean lesion size was significantly smaller in DynaCT group compared with MSCT group (5.96 ± 1.92 mm vs. 8.42 ± 3.30 mm, p = 0.02). All interventions met primary endpoint of satisfactory hookwire positioning by DynaCT/ MSCT guidance. No case of hookwire dislodgement in both groups. DynaCT procedure associated with significantly shorter transfer times (38.28 ± 16.95 min vs. 98.7 ± 35.24 min, p < 0.001) and a trend towards lower pneumothorax rate (22% vs. 50%, p = 0.13). DynaCT group had higher estimated effective dose (24.62 ± 22.48 vs. 8.26 ± 3.88, p = 0.01) and longer procedure time (55.39 ± 16.95 min vs. 23.30 ± 9.99 min, p < 0.001) than MSCT group. Lesion size inversely correlated with procedural time (r = -0.50, p = 0.01). Smaller lesion size (< 5 mm) also associated with higher estimated effective dose (p = 0.03); suggesting smaller target lesion size may contribute towards longer procedure time and higher radiation dose in DynaCT.
Hybrid DynaCT guided hookwire localization of pulmonary lesions immediately prior to surgical resection in same hybrid operative theater is a pioneer one-stop technique; which is associated with shorter interdepartmental transfer time and lower post-procedure pneumothorax rate when compared with conventional MSCT guided procedure. Smaller target lesion size in DynaCT group may result in slightly longer procedure time and higher radiation dose, as more exposures required to confirm hookwire position.

SE 06 IR-03
Transrectal ultrasound guided prostate fiducial marker placement for image-guided radiotherapy in prostate cancer: safety and efficacy from a single center experience
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PURPOSE: Use of fiducial markers to guide accurate prostate localization during image-guided radiotherapy (IGRT) is now standard practice. Transrectal ultrasound (TRUS) guided placement of prostate fiducial markers is performed by interventional radiologists at many centers. We aim to evaluate the technique, efficacy and safety of TRUS-guided prostate fiducial marker placement at our institution.

MATERIALS AND METHODS: We retrieved the medical records of patients who underwent TRUS guided prostate fiducial marker placement in a tertiary hospital from 2009–2015. Three gold markers (IZI Medical Products, Baltimore, MD) were placed, two on the right side (apex and base) and one on the left (base). Post procedure US was used to document marker position in all patients and in 78 patients, post procedure CT or MRI was available to confirm the markers were in situ. Complications of marker placement were recorded.

RESULTS: 133 men with mean age 70.5 years (range, 55–79) underwent prostate fiducial marker placement and 131 men proceeded to external beam radiotherapy (RT). One patient did not undergo RT due to discovery of bony metastasis and another patient died of pneumonia before RT. Mean PSA was 10.8 (range, 1.1–27.7), mean Gleason score 6.1 (range, 5–7) and clinical stage ranged from T1b-T3b. History of prior TURP was present in 11 men (8%). Mean prostate volume was 44.8 ml (range 10.6–144.0). 120 patients (92%) subsequently underwent intensity modulated radiotherapy using IGRT and 11 patients (8%) underwent stereotactic body radiotherapy. All patients received a sedative-analgesic premedication (pethidine 50 mg IM) as protocol. Procedure was well tolerated and all patients were successfully discharged on the same day. Malposition of 1 marker suspected at US in 2 patients, leading to additional marker placement in 1 patient but subsequent MRI confirmed all markers were in situ in both patients. All markers were confirmed to be in-situ in the remaining 131 patients either by US, CT or MRI. No patient required additional prostate localization at RT. Post-procedure culture-positive urinary tract infection required oral antibiotics in 1 patient (0.8%) and IV antibiotics in 6 (4.5%). Mild hematuria/ per rectal bleeding in 11 patients (8%) and acute urinary retention in 3 patients (2.3%).

CONCLUSION: TRUS-guided prostate fiducial marker placement is safe and effective procedure which can facilitate accurate prostate localization for IGRT in treatment of prostate cancer.

SE 06 IR-04
Review: anatomic variants of celiac axis
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PURPOSE: 1. To demonstrate all possible anatomic variations of celiac axis, providing an actual example of each variation type.
2. To study the distribution of each variation compared to previous research.

CONTENT ORGANIZATION:
1. Anatomic definition and nomenclature regarding celiac axis.
2. Radiologic appearance of theoretically possible all 15 variations (suggested in the textbook of interventional radiology).
   - data selection: celiac DSA(Digital Subtraction Angiography) and enhanced CT scan, performed in last several years, counting about 300 cases.
3. Incidence for each type.

SUMMARY: There are 15 possible variants of celiac axis, which the operator should be aware of during vessel-handling procedures. About 300 cases are planned to be studied, and will be shown in order of reported incidence. Angiography, CT image and vascular illustration will help understanding each variant. Calculated incidence will provide information which type should be priory considered.
SE 06 IR-05
Endovascular interventions in the treatment of occlusive and stenotic lesions of lower limb arteries
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PURPOSE: To identify the factors worsening the results of endovascular interventions for occlusive-stenotic lesions of the lower limb arteries (LLA).

MATERIALS AND METHODS: A retrospective analysis of the results of endovascular interventions in 100 patients with occlusive-stenotic atherosclerotic lesions of LLA, treated in 2013–2016 in Tashkent Medical Academy. Male - 63 (63%), female - 27 (27%). Mean age was 58 ± 7.8 years. In 87 (87%) patients was also identified defeat of other arterial beds, in 10 (10%) - type 2 diabetes. Patients were divided into 2 groups according to the level of lesions of LLA. The first group included 34 (34%) patients with lesions of aorto-iliac segment, the second - with lesions of the femoropopliteal segment and leg arteries - 66 (66%). The complex examination of patients included clinical examination, ultrasound Doppler with the definition of ankle-brachial index (ABI), duplex scanning, MSCT angiography and selective arteriography of the lower limbs. According to the classification TASC II in the first group was observed type A - 1 (1%) of patients, type B at 8 (8%), type C in 5 (5%), the type D in 10 (10%). In the 2nd group of type A was observed in 2 (2%) of patients, type B 7 (7%), C type at 23 (23%), type D 34 (34%).

RESULTS: Analysis of the results showed that after endovascular interventions were the following improvement: early activation of patients, an increase in pain-free walking distance, healing of venous ulcers, pain disappearance. Improved results were noted in both groups. ABI which was 0.38 ± 0.2, after the intervention increased to 0.86 ± 0.5. In the early postoperative period thrombosis was observed in 6 cases, and therefore, repeated surgery was performed. In 4 - permeability of the arteries was restored, in 2 cases was performed amputation of the lower limb due to progressive ischemia. Postpuncture pulsating hematoma was detected in 2 (2%) cases, which required open surgery. Lethal outcome was observed in 1 (1%) case, the cause was acute myocardial infarction.

CONCLUSION: Development of endovascular techniques allows to give them preference in the treatment of patients with occlusive-stenotic lesions of the LLA. Factors that worsen the prognosis of endovascular interventions are the shaping of the defeat of type D by TASC II classification, diabetes, coronary and carotid pathology.

SE 06 IR-06
Catheter thrombolysis and thromb aspiration in treatment of acute deep venous thrombosis
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PURPOSE: To study the effectiveness and safety of catheter thrombolysis and thromb aspiration in treatment of acute deep venous thrombosis (DVT).

MATERIALS AND METHODS: We analyzed the results of endovascular interventions at 20 patients with DVT, treated in Tashkent Medical Academy in 2014–2016. 12 patients - female, 8 male, aged from 18 to 75 years. Patients were admitted in 4–7 day from the onset of symptoms with complaints on edema and pain in lower limbs. Endovascular interventions were performed on 1–3 day after admission. The mean difference in the circumference of lower extremity existed: swelling of calves +4 cm, in the middle of hip - +6 cm. Thrombosis was idiopathic. Diagnostic stage was started from ultrasound duplex scanning (UDS), which defined the level and the characteristics of thrombus. Also there were defined hematocrit, INR, aPTT, fibrinogen, SFMC, which were increased. Antiplatelet and anticoagulant therapy was prescribed to the patients. All patients routinely had ascending phlebography. Popliteal vein was punctured under US control. In all cases, we performed mechanic thrombectomy with the following implementation of IVC filter into vena cava inferior on the second stage. The preference was given to popliteal approach due to prophylaxis of such complications as bleeding and hematoma during and after procedure.

RESULTS: In 10 cases of left DVT was revealed May-Thurner syndrome. Balloon angioplasty and stenting of common iliac vein were made to these. In 13 cases was noted significant decrease of edema on the 3rd day after operation. On US deep veins of lower limbs were passable, parietal thrombus were not revealed. In 4 cases the etiology of thrombosis of veins of right lower limb was hypoplasia of femoral vein with presence of floating thrombus, due to this fact was applied IVC filter with following conservative therapy. In one case was observed rethrombosis, was performed re-thrombectomy with positive result. All patients permanently take warfarin or rivaroxaban and also wear compressive stockings with middle compression.
CONCLUSION: Endovascular treatment is less traumatic and effective in treatment of DVT, prophylaxis of pulmonary embolism and post-thrombophlebitic syndrome and is characterized by early activity and improvement of life quality.

SE 06 IR-07
Percutaneous cholangiostomy in treatment of obstructive jaundice of malignant genesis
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PURPOSE: One of the first and the most frequent manifestation of malignant tumors of hepatopancreaticoduodenal zone is resistant biliary hypertension, leading to the development of obstructive jaundice and requiring decompressive treatment. MATERIALS AND METHODS: There were analyzed the results of endobiliary interventions at 262 patients with obstructive jaundice in the age of 22 to 93 years. Jaundice was observed during the period from 18 days to 3 months, the level of serum bilirubin was from 5.85 to 40.95 mg/dl. Clinical features of cholangitis were at 25.6% of patients. Most of patients had severe stage of liver failure. Tumors of caput of pancreas and primary tumors of liver gates were prevalence. Transhepatic biliary interventions were used as the method of biliary decompression. There were analyzed the most effective methods of biliary drainage, corresponding with different types of biliary hypertension. RESULTS: Applying of PTBD with taking into account of the block character provided internal biliary drainage in 188 cases (71.8%), and only at 74 patients was made external drainage, which allows us in short term stabilize the condition of the patients, perform radical surgical operation or palliative treatment in remote period. Complications, connected with the method of transhepatic intervention, were observed in 21 cases (8.1%). At 12 (4.6%) patients was observed the dislocation of drainage, which required re-intervention. In 4 cases (3.5%) was observed hemobilia. From them at 2 patients bleeding was stopped by conservative measures, in 2 cases mortal outcome. In 1 case hemobilia was accompanied by intrahepatic hematoma. Adequate drainage prevented bile leakage and biliary peritonitis. CONCLUSION: The effectiveness of mini-invasive decompressive interventions in treatment of obstructive jaundice of malignant genesis depends on differentiated choice of drainage method.

SE 06 IR-08
Feasibility of uterine artery embolization for treatment of retained product of conception with marked vascularity
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PURPOSE: To evaluate the efficacy and safety of uterine artery embolization (UAE) for retained product of conception (RPOC) with marked vascularity. MATERIALS AND METHODS: Among 416 patients who were diagnosed with RPOC from January 2006 to December 2015, 14 patients (mean age; 32.2 years, range; 26–45) who underwent UAE were included in this study. All patients presented vaginal bleeding and Doppler study showed markedly increased vascularity. Embolization was performed as a primary treatment to control bleeding in 12 patients and two patients that were preoperative. Previous events were dilatation and curettage (D&C) for artificial (n = 11) or incomplete abortion (n = 2) and normal spontaneous vaginal delivery (n = 1). Mean clinical and imaging follow-up period was 184.1 days (range, 34–699 days) and 42.2 days (range, 2–176 days), respectively. Technical and clinical success rate, angiographic and sonographic findings, and complication were evaluated. RESULTS: Technical success was achieved in 12 of 14 patients (85.7%) with 2 cases of incomplete embolization due to failed selection of ovarian artery (n = 1) and high flow arteriovenous fistula (n = 1). Clinical success rate for primary treatment of RPOC was 91.7% (11/12). Successful 11 cases didn’t require additional treatment, but 1 patient who persisted mild vaginal bleeding after incomplete embolization underwent D&C. Two patients, who underwent pre-operative embolization, ceased vaginal bleeding after embolization, followed by D&C without bleeding complication. Bilateral UAE was performed in all patients, and extra-uterine feeder was found in 2 cases; ovarian artery and round ligament artery. All patients showed hypervascularity on angiography, and 13 of 14 patients showed dilated early draining vein. Pre-procedure color Doppler study showed echogenic mass with marked vascularity in all patients. Follow-up US (n = 9) revealed decreased mass size (mean size; 4.6 cm to 2.3 cm, p < 0.01) and vascularity, There was no procedure related major complication. CONCLUSION: UAE is safe and effective modality as a primary treatment of RPOC with marked vascularity.
SE 06 IR-09
Bronchial artery involvement by polyarteritis nodosa presenting as massive hemoptysis
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Polyarteritis nodosa (PAN) is a systemic necrotizing vasculitis that involves medium-sized arteries. The presenting symptom of PAN varies depending on the organs affected. However, massive hemoptysis has not been reported as the sole presenting symptom. Here we report the case of a 39-year-old woman with massive hemoptysis who was diagnosed with PAN involving the bronchial artery by angiography. Details of this case and a literature review are presented.

SE 06 IR-10
Interventional management of postoperative gastrointestinal fistula and leakage
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Postoperative gastrointestinal (GI) fistula and leakage represents a major complication of gastrointestinal surgery, leading to increased postoperative morbidity; it the foremost cause of mortality after intestinal resection. Identification of risk factors is essential for the prevention. GI fistula/leak can present with various clinical pictures, ranging from the absence of symptoms to life-threatening septic shock. GI fistula/leak can cause a wide array of pathophysiological effects by allowing abnormal diversion of the GI contents, including digestive fluid, water, electrolytes, and nutrients, from either one intestine to another or from the intestine to the skin. As an alternative to surgery, recent technical advances in interventional radiology and percutaneous techniques have been shown as advantageous to lower the morbidity and mortality rate, and allow for superior accessibility to the fistulous tracts via the use of fistulography. In addition, new interventional management techniques continue to emerge. We describe the clinical and imaging features and outline the interventional management of GI fistula/leak.

SE 06 IR-11
“Sandwich technique” endoluminal repair of traumatic innominate artery bifurcation pseudoaneurysm
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INTRODUCTION: Blunt trauma to the innominate artery is quite rare, but commonly Fatal. It is reported that 35% Innominate artery injury are attributed to blunt trauma. It may be treated either through open surgical replacement with or without prosthetic graft insertion or placement of an endoluminal stent-graft. In this report. We present an alternative endovascular option that used to treat innominate artery bifurcation pseudoaneurysm secondary to blunt trauma.

CASE REPORT: A 56-year-old man was admitted to the vascular department with the symptom of chest tightness, shortness of breath, voice hoarse and cough. He had a car accident 19 days ago. Contrast computed tomography of the chest suggested extensive mediastinal hematoma, tracheal compression and innominate artery bifurcation pseudoaneurysm (Figs. 1–3). The patient underwent innominate artery pseudoaneurysm endoluminal repair with “Sandwich technique” because of bifurcated lesion. Postoperatively, the patient developed hematoma drainage and was discharged 11 days later with no subsequent complications. Follow-up CT scans showed no contrast entering the aneurysm sac and occlusion of the false aneurysm (Figs. 4–6). In this case of post-traumatic pseudoaneurysm which located at bifurcation of right carotid artery and right subclavian artery, we believe that “sandwich technique” endovascular treatment was the best option. We decided to perform endovascular treatment because of the presence of multiple associated injuries, progression of the lesion, and its anatomical location. Further prospective analysis of the role for endovascular treatment of carotid injuries is warranted.
Evaluation of delayed endoleaks after endovascular aortic aneurysm repair
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PURPOSE: To determine the incidence and outcomes of delayed endoleak after endovascular aortic aneurysm repair (EVAR).

MATERIALS AND METHODS: A delayed endoleak was defined as any types of endoleaks detected ≥ 1 year after EVAR. We retrospectively analyzed the data of 136 patients who underwent EVAR at our institution from December 2005 to April 2016. Exclusion criteria are: (1) EVARs for isolated iliac artery aneurysms, (2) patients who had < 1 year follow-up and (3) patients who had not yet undergone 1-year contrast imaging follow-up. Endoleaks were classified into a more aggressive category if a patient had multiple endoleaks. Age, sex, sac diameter, aneurysmal neck morphology, graft migration, types of devices and follow-up duration were recorded. Types of endoleak, date of detection and re-interventions were also documented.

RESULTS: A total of 60 patients (85% men) were enrolled in this study. The mean age was 71.9 years (range, 34–89 years). The mean follow-up duration was 39.6 months (range, 12–101 months). Twenty-five patients (41.7%) had endoleaks, including 18 early endoleaks (30%) and 7 delayed endoleaks (11.7%). Two patients (3.3%) had endotensions. The delayed endoleak group consisted of 6 types II and 1 type Ia endoleaks. The mean time of detection was 37.6 months (range, 15–60 months). The mean follow-up duration was 56.9 months (range, 26–84 months). The rate of hostile neck in the delayed endoleak group (85.7%) was higher than that of the early endoleak group (33.3%), p < 0.05; whereas no difference in the mean aneurysm size was observed (69.2 mm vs. 61.9 mm, respectively), p > 0.05. The rates of graft migration, aneurysm rupture and re-intervention of the delayed endoleak vs. early endoleak group were 2/7 (28.6%) vs. 3/18 (16.7%), 0/7 vs. 2/18 (11.1%) and 2/7 (28.6%) vs. 6/18 (33.3%), respectively. No statistical differences were found (p > 0.05). Re-interventions were also performed on the two cases of endotension.

CONCLUSION: The incidence of delayed endoleak in this study was 11.7%. Delayed endoleak was associated with hostile aneurysmal neck. Long-term imaging follow-ups are needed to clarify further complications.
SE 06 IR-13
Abdominal pseudoaneurysms treatment and variations
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Endovascular treatment is often the first-line therapy. Endovascular intervention or open surgical repair is necessary for all visceral pseudoaneurysms and is likely indicated for visceral aneurysms 2 cm or more in diameter. Abnormally enlarged visceral arteries in the abdomen and pelvis must be recognized radiologically because early treatment can improve the quality of life and prevent life-threatening complications. These lesions, typically classified as aneurysms and pseudoaneurysms, are being detected more frequently with increased utilization of imaging and have various causes and complications that may be identified radiologically. Ultrasonography, computed tomography, and magnetic resonance imaging often enable detection of visceral vascular lesions, but angiography is important for further diagnosis and treatment. Endovascular exclusion of flow can be achieved with coils, stents, and injectable liquids. Techniques include embolization (“sandwich” or “sac-packing” technique), exclusion of flow with luminal stents, and stent-assisted coil embolization. Management often depends on the location and technical feasibility of endovascular repair. Embolization is usually preferred for aneurysms or pseudoaneurysms within solid organs, and the sandwich technique is often used when collateral flow is present. Covered stent placement may be preferred to preserve the parent artery when main visceral vessels are being treated. It is usually tailored to lesion location, and a cure can often be effected while preserving end-organ arterial flow. Posttreatment follow-up is usually based on treatment location, modality accuracy, and potential consequences of treatment failure. Retreatment is usually warranted if the clinical risks for which embolization was performed are still present. Follow-up imaging may help identify vessel recanalization, unintended thrombosis of an artery or end organ, or sequelae of nontarget embolization.

SE 06 IR-14
Hemobilia: causes and interventional managements
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Hemorrhage into the biliary tract occurs when trauma or disease produces an abnormal communication between blood vessels and bile ducts, either within the liver or in the extrahepatic biliary tract. It is an uncommon cause of gastrointestinal bleeding. Hemobilia can be caused by trauma, inflammation, gallstones, vascular disorders, or malignancy. An iatrogenic traumatic injury to the liver is by far the most common etiology. Iatrogenic procedures that have been associated with a risk of developing hemobilia include percutaneous transhepatic biliary drainage (PTBD), biliary drainage during endoscopic retrograde cholangiopancreatography (ERCP), cholecystectomy, liver biopsy, and radiofrequency ablation (RFA). In this presentation, we present our experience with transcatheter arterial embolization or conservative management for the treatment of hemobilia and review the literature.

SE 06 IR-15
Early experience of endovascular treatment for visceral artery aneurysms with wide-neck: double micro-catheter technique for preservation of parent arterial flow
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The purpose of this presentation is to introduce our novel double micro-catheter technique for the treatment of challenging visceral aneurysms with embolization coils, from our early experiences. Surgical and variable endovascular therapeutic options are available to treat visceral artery aneurysms. However, wide-neck aneurysms are difficult to exclude from the circulation by surgical or conventional endovascular techniques without sacrificing parent arterial flow as well as considerable target organ ischemia. Coil embolization is a well-known endovascular technique for the treatment of saccular aneurysms, especially with narrow aneurysmal neck. However, coil embolization could be challenging in wide-neck aneurysms. Various kinds of endovascular techniques had been tried to exclude such a wide-neck visceral aneurysms while preserving parent artery as well as preventing target organ ischemia, such as balloon-assisted or stent-assisted coil embolization, and
Intervention stent-graft placement. However, these attempts could be difficult when aneurysm originated from a distal, small-caliber tortuous vessel. 4 cases will be given to present our novel technique using two micro-catheters simultaneously, to exclude technically challenging wide-neck visceral artery aneurysm (splenic artery [n = 2], left renal artery [n = 2]). With this technique we can treat aneurysms in all patients, and we can preserve parent artery and minimize target organ ischemic injury as well, while excluding visceral artery aneurysm.

SE 06 IR-16
Cone-beam CT: modern imaging modality on interventional radiology
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Cone-beam computed tomography (CBCT) is an advanced imaging technique to produce CT images by using a fixed C-arm angiographic system equipped with flat-panel detector. Since CBCT offers three-dimensional (3D) images of vascular structures, the use of CBCT is increasing on vascular interventional radiology including neurovascular diseases, peripheral vascular diseases and oncology. Especially CBCT is superior to standard two-dimensional angiography in the detection of hepatocellular carcinoma (HCC) and its feeding vessels. Furthermore, CBCT is able to provide various information in detecting and guiding “true” target lesion, visualizing normal anatomical structures and assessing success in diagnosis and treatment. For this advantages, we applied this technique to variable cases that include radiofrequency ablation (RFA) for hepatic tumors, embolization of superior and inferior vesical arteries, visualization of adrenal glands for adrenal vein sampling, and so on. In our cases, CBCT reduced operating times and led successful treatment.

SE 06 IR-17
Popliteal artery agenesis: a case report with literature review
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Variations in branching pattern of the popliteal artery are not uncommon. With continued increase in the cases of interventional procedure in the popliteal artery and its tibial branches, the anatomical variations in this region may have an influence on the diagnosis and therapeutic decisions concerning transluminal angioplasty, thromboembolectomy, or reconstruction for occlusive disease or arterial injury. Herein, the authors report a novel anatomic variant of popliteal artery agenesis in a 48-year-old male patient with claudication. To our knowledge, there has been only one reported case in the world literature. One additional case is presented in this report, describing the imaging findings of the popliteal artery agenesis with emphasis on the differential point from occlusive disease. Embryologic development of the lower extremity vasculature will also be reviewed.

SE 06 IR-18
Interventional treatment in high-grade liver injuries
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TEACHING POINTS:
1. To introduce management of high grade liver injuries.
2. To evaluate the role of intervention in management of high grade liver injuries.
3. To explain multidisciplinary approach of treatment of liver related complications.

TABLE OF CONTENTS/OUTLINE:
1. Introduction of management of high grade liver injuries.
2. The role of intervention in the management of high grade liver injuries.
   1) angiointervention: active bleeding, thrombus
   2) percutaneous transhepatic biliary drainage: biliary leaks, necrosis and strictures
   3) percutaneous drainage: hepatic, and subcapsular hematoma, biloma
3. Benefits of multidisciplinary approach of treatment of liver related complications in angiointervention, percutaneous transhepatic biliary drainage (PTBD), and percutaneous drainage (PCD).

SUMMARY: Interventional treatment is associated with reduced mortality in patients with complications after high grade liver injuries. We explain the importance/role of intervention in management of high grade liver injuries.
SE 06 IR-19

Pearls and pitfalls in transarterial embolization for blunt renal trauma
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PURPOSE: To recognize predictors of need for angiography and embolization after traumatic renal injury. To learn pearls and pitfalls for the interventionist in the management of blunt renal trauma.

BACKGROUND: Although the incidence of renal trauma is lower compared with other solid organ injuries regardless of the mechanism, these injuries can be associated with life-threatening complications of which renal hemorrhage is the most acute and dramatic. Therefore, although there is no unified consensus for the management of renal injury, higher-grade renal injuries typically receive endovascular management.

CONTENTS: Contrast extravasation, the extent of hematoma, long perirenal hematoma rim distance, and discontinuity of Gerota’s fascia are sensitive indicators for the need for transarterial embolization (TAE) for patients with renal trauma. When a discrepancy between CT and angiography manifests, it is important to determine whether it is due to the cessation of arterial bleeding or if vasospasm, the physiologic response to hemodynamic instability, is masking the vascular injury: is prophylactic embolization needed? A sound understanding of potential variations of normal renal vasculature is essential to master and may prevent treatment failure: presence of the accessory renal artery, renal capsular artery, etc. Angiographic interpretation is also a potential source of problems. TAE can be used even in kidneys with congenital malformations such as horseshoe kidney.

CONCLUSION: Interventional radiology has a pivotal role in the diagnosis, management, and treatment of renal trauma. Renal injury may be a life-threatening event, but if handled correctly, it can be managed safely without the need for nephrectomy in most cases. TAE is an alternative treatment option to control renal bleeding.

SE 06 IR-20

Overlapping self-expandable metallic stent placement for the palliation of malignant gastroduodenal obstruction in patients with a long (> 10 cm) stricture
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Background: Self-expandable metallic stent (SEMS) placement is a well-established palliative treatment approach for malignant gastroduodenal obstruction. However, multiple stents placed in an overlapping fashion are often required in patients with a long (> 10 cm) stricture.

PURPOSE: To investigate the outcomes of overlapping SEMS placement for the palliative treatment of malignant gastroduodenal obstruction in patients with a long (> 10 cm) stricture.

MATERIALS AND METHODS: The medical records of 40 patients with malignant gastroduodenal obstruction who underwent fluoroscopic overlapping SEMS placement because of a long (> 10 cm) stricture were reviewed.

RESULTS: The technical and clinical success rates were 100% and 65.0%, respectively. The mean length of the stricture was 17.0 ± 4.7 cm, and the mean number of stents placed in each patient was 2.2 ± 0.5. Metastatic cancer (Odds ratio [OR], 0.315; P = 0.018); Eastern Cooperative Oncology Group (ECOG) score ≥ 3 (OR, 0.018; P = 0.006), and carcinomatosis with ascites (OR, 0.025; P = 0.017) were independent predictors of poor clinical success. The rates of minor and major complications were 27.5 and 2.5%, respectively. The median stent patency and survival were 33 (interquartile range [IQR], 19–60) and 35 days (IQR, 19–73), respectively. An ECOG score ≥ 3 was an independent predictor of a poor survival outcome (Hazard ratio, 4.681; P < 0.001).

CONCLUSION: Overlapping SEMS placement may be safe and effective for the palliative treatment of malignant gastroduodenal obstruction in patients with a long (> 10 cm) stricture.
SE 06 IR-21
Prognostic analysis of sorafenib treatment in patients with lung metastasis from advanced hepatocellular carcinoma
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PURPOSE: To evaluate the efficacy of sorafenib treatment in patients with lung metastasis from advanced HCC and to explore the prognostic factors which may influencing advance HCC patients' survival in the procession of sorafenib treatment.

MATERIALS AND METHODS: Retrospective analysis of 39 patients with lung metastasis from HCC were included. The mRECIST system was used in evaluation of short-term efficacy of sorafenib treatment, and median time to progression (mTTP) and median overall survival (mOS) were evaluated using Kaplan-Meier methods. Adverse events were record too. Related influencing factors including gender, age, PS score, child-Pugh score, extrahepatic metastasis, burden of local liver lesions, sorafenib related adverse events more than grade 3 were analyzed using Cox regression model. In addition, factors may influence patients' OS in advanced HCC patients with lung metastasis were also analyzed.

RESULTS: 39 advance HCC patients with lung metastasis were included in this study. After 7-years follow-up, 28 patients dead due to tumor progression, 3 patients dead due to liver function failure, 1 patients dead due to cerebral hemorrhage and 7 patients alive at the end of follow-up. Disease control rate of lung metastatic lesions in current study were 59%, including 1 case of CR, 3 cases of PR, 19 cases of SD and 16 cases of PD. The mTTP was 6.693 months (95% CI: 9.521) and the mOS was 12.359 months (95% CI: 9.86–15.08). Uni-variate analysis indicated that Child-Pugh score (p = 0.017), burden of lung metastasis (p = 0.011), control of local liver lesions (p = 0.001) and control of lung metastasis (p = 0.001) were associated with patients' survival while other factors showed no associated with patients' survival. Furthermore, multi-variate analysis indicated that only control of local liver lesions and control of lung metastasis associated with patients' survival (p < 0.05) while other factors had no associated with patients' survival (p > 0.05).

CONCLUSION: This study indicated that sorafenib treatment for patients with lung metastasis from advanced HCC is safe and effective. In addition, energetic control of local liver lesion and lung metastasis could prolong survival in patients with lung metastasis from advanced HCC undergo sorafenib treatment. Prospective and controlled studies with larger sample size and longer follow-up periods are required to verify these results.

SE 06 IR-22
Angiographic patterns of bronchial, pulmonary and non-bronchial systemic circulation in massive hemoptysis
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PURPOSE: Bronchial artery angiography with embolization is established procedure for massive and recurrent hemoptysis. The angiographic patterns are well known but relative incidence of these is not well described. The knowledge of these affects intra procedural decision making and clinical outcome.

OBJECTIVES: To evaluate the incidence of angiographic patterns of bronchial, pulmonary and non-bronchial systemic circulation in massive hemoptysis in patients undergoing BAE.

MATERIALS AND METHODS: Hospital based prospective study from January 2014 to September 2015 of 81 patients presenting with massive hemoptysis. Patients were subjected to bronchial angiography with or without pre-procedural CT bronchial and pulmonary angiography. Pulmonary angiography was done in selected patients with negative bronchial angiogram.

RESULTS: Among 81 patients, abnormal bronchial arteries were noted in 77 cases (95%), abnormal non-bronchial systemic circulation in 44 (54.3%) and abnormal pulmonary circulation in 5 (6.1%). A single rare case of abnormal ectopic bronchial artery from subclavian artery was noted. The most frequent angiographic pattern was neo and hypervascularity with blush in 77 cases (95%) followed by bronchial artery dilatation (> 1.5 mm) and tortuosity in 68 (83.9%). Bronchopulmonary arteriovenous shunting was third most common pattern seen in 14 cases (17.2%). Broncho-pulmonary interarterial shunting was seen in 13 (16%), shunting from non-bronchial systemic artery to pulmonary artery was seen in 8 (9.8%) and non-bronchial systemic arterial to pulmonary venous shunt was seen in 2 (2.4%). Pseudoaneurysms were uncommon with 4 cases (4.9%) of pulmonary artery pseudoaneurysms and 2 cases (2.4%) of bronchial artery pseudoaneurysms. Extravasation of contrast into alveoli / bronchial tree and pulmonary thromboembolism were rare, seen in 1 case each (2%).

CONCLUSION: Knowledge of the angiographic patterns
during BAE is essential as it affects intra-procedural decision making as regards to access devices and embolic agents.

SE 06 IR-23
Comparative study of left and right liver abscess which managed with percutaneous catheter drainage
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OBJECTIVE: To compare percutaneous catheter drainage (PCD) effectiveness in right and left lobe liver abscesses.

METHOD: Sixty-nine patients diagnosed with liver abscess (right lobe 49, left lobe 20) underwent PCD within 24 hours of admission. Both groups had no complicated hepatobiliary disease and admitted our institution between October 2013 and December 2015. PCD was removed after checking for remnant abscesses by ultrasonic methods. Duration of hospital stay, duration of drainage, patient characteristics, blood investigations and abscess characteristics were recorded.

RESULTS: PCD was successful in all 69 (100%) patients. Size of abscess was similar in both groups. Most common cause of pyogenic abscess is K. pneumoniae (41/69) and 16 patients had amebic. Duration of hospital stay was significantly longer in Left liver abscess patients who were treated by PCD (19.6 days vs. 16.1 days; p=0.01), but the duration of drainage showed no significant difference between both patient groups (10.85 days vs. 9.63 days; p=0.34).

CONCLUSION: In terms of hospital stay, right lobe liver abscesses, with no hepatobiliary disease, showed better PCD treatment effectiveness compared to the left.

SE 06 IR-24
Outcomes of image guided radiofrequency ablation of renal tumors
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A single institution’s experience with CT-guided percutaneous radiofrequency ablation (RFA) of renal tumors was studied to determine the disease-free survival and complication rate. Electronic medical records of 22 patients who underwent percutaneous RFA of 24 renal tumors were retrospectively reviewed. RFA was performed under conscious sedation and use of local anesthesia. Imaging surveillance of patients includes contrast enhanced CT and/or ultrasound; nonenhanced CT or ultrasound was alternatively performed in those who developed renal impairment. Tumor control was defined as absence of contrast enhancement in RFA site. Tumor size ranged from 1.0 cm to 4.9 cm (mean, 2.6 cm; SD 1.0). Efficacy of RFA was defined per International Working Group of Image-Guided Tumor ablation criteria. Of the 24 treated tumors, 22 (primary technical effectiveness rate 92%) were completely ablated (18 in a single ablation session, 4 after a second ablation session) with a mean follow-up interval of 42 months. Two patients with tumor recurrence underwent re-ablation, one of which was successful. Large tumor size (> 4 cm) and its central location in close proximity to renal pelvis and vessels, were contributory factors for failure of complete tumor ablation. There were 6 (30%) minor complications with nil procedure-related mortality. Two patients died from metachronous renal cell carcinoma with metastatic progression, whilst another 3 mortality were not related to renal tumor.

SE 06 IR-25
Complications related to central venous catheter: pictorial review
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TEACHING POINTS:
1. To review types of central venous catheterization.
2. To demonstrate the complications related to central vein.
3. Catheterization which provide interesting radiologic manifestations in clinical settings.
4. To illustrate the various complications central vein catheterization and imaging pitfalls.
TABLE OF CONTENTS:
1. Types of central vein catheter
2. Type and its characteristics
3. Indication and complication of each types
4. Complications related to central vein catheters
5. Mechanical complications associated with insertion
   1) Malpositioning of central vein catheter tip
   2) Pneumothorax, hemothorax, chylothorax
   3) Arterial puncture
   4) Bleeding, Hematoma
   5) Injury of adjacent vessel ex > SVC
6. Indwelling complications
   1) Catheter-related bloodstream infection
   2) Mural thrombosis
   3) Fibrin sheath formation
   4) Catheter fracture (pinch-off syndrome) and embolization of the tip
   5) Catheter tip migration into a suboptimal position
   6) Inversion / flip and rotation of implanted ports
   7) Vascular erosion and perforation

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**Intervention - Informal Scientific Presentation**

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