SE 06 IR-01
Trans-catheter arterial embolization for acute nonvariceal upper gastrointestinal track bleeding: indication, techniques and outcomes
Jae Hyun Kwon, Jung Eun Lee
Dongguk University Ilsan Hospital, Korea.
jhkwon17@naver.com

Upper gastrointestinal tract bleeding (UGIB) is defined as originating in the distal esophagus, stomach and duodenum (proximal to the Ligament of Treitz). The most common cause of nonvariceal UGIB is peptic ulcer disease, but the differential diagnosis is diverse, including benign and malignant tumors, ischemia, gastritis, arteriovenous malformations such as Dieulafoy lesions, Malloy-Weiss tears, trauma and iatrogenic causes. Endoscopic hemostasis remains the initial treatment modality, however, in patients endoscopic treatment fails to control bleeding, trans-catheter arterial embolization is a safe, effective and minimally invasive treatment to surgery. Advances in catheter-based technique and newer embolic agents have expanded the role of interventional radiology in the treatment of UGIB. In this presentation, techniques, embolic agents, and literature evidence on the outcomes of trans-catheter arterial embolization in such a setting.

SE 06 IR-02
Patient radiation doses in AV access interventions: a comparison between transradial and transvenous approaches
Chek Han Tan1, Nicholas Zhi Hao Teo1, Pua Uei2, Lawrence Quek2, Terrence Hui2
1Yong Loo Lin School of Medicine, National University of Singapore, 2Singapore Radiological Society, 3Tan Tock Seng Hospital, Singapore.
tan_chek_han@hotmail.com

PURPOSE: Arteriovenous (AV) access interventions are most usually performed through a transvenous approach, where the fistula site is directly punctured. A recent alternative has been proposed - the transradial approach - as this offers a different set of advantages, such as a direct visualization of the arterial and venous limbs and any juxta-anastomotic stenosis. Our study seeks to compare the correlation between the approach used and the fluoroscopy time of the procedure.

MATERIALS AND METHODS: We conducted a retrospective study in our institution from January 2016 to February 2017, where a total of 471 fistuloplasties were performed. Procedures with incomplete data, central vein interventions, AV grafts, infected or thrombosed accesses were excluded, yielding 244 procedures performed in 198 unique patients for analysis. Patients were further divided into two groups - patients whose AV fistulae had a single lesion (n = 155, 63.5%), and patients whose AV fistulae had multiple lesions (n = 93, 36.5%). The approach for the AV intervention, either transradial (TR) or transvenous (TV), was then compared against multiple variables - fluoroscopy times, contrast dose, air kerma and dose area product - to identify a possible correlation. R v3.3.1 was used for statistical analyses.

RESULTS: In the group with multiple lesions, a TR approach (n = 15, 16.9%) resulted in a statistically significant lower fluoroscopy time (mean, 380s [IQR: 333.5-485.5] vs. 480s [IQR: 281.75-731.75]; p = 0.04) vs. a TV approach (n = 74, 83.1%). Furthermore, a TR approach yielded a lower air kerma (mean, 28 mGy [IQR: 17-34] vs. 59 mGy [IQR: 24-62]; p = 0.007) and a lower dose area product (mean, 1018 µGy2 [IQR: 434-1188] vs. 1923 µGy2 [IQR: 577-1593]; p = 0.049). TR approaches used to treat a single lesion in the AV fistula also resulted in lower fluoroscopy times, albeit statistically insignificant (mean, 262s [IQR: 124-309] vs. 321s [IQR: 170-370]; p = 0.29). Conversely, our study showed that TV approaches used to treat a single lesion in the AV fistula yielded a lower air kerma (mean, 32 mGy [IQR: 14-39] vs. 38 mGy [IQR: 16-41] p = 0.39) and a lower dose area product (mean, 1110 µGy2 [IQR: 400-1444] vs. 1315 µGy2 [IQR: 519-1543]; p = 0.049).

CONCLUSION: A TR approach to fistuloplasty demonstrates lower fluoroscopy times and radiation doses in patients with multiple lesions in the AV fistula. However, both TR and TV approaches are appropriate for patients with single lesions.

SE 06 IR-03
A novel fully covered segmented irradiation stent for the palliation of malignant dysphagia: a pilot study
Chao Wang, Jin-He Guo
Zhongda Hospital, Southeast University, China.
jinheguo@sina.com

PURPOSE: To investigate safety and clinical efficacy of a novel fully covered segmented irradiation stent for the treatment of patients with esophageal cancer.

MATERIALS AND METHODS: Thirty-one patients who had undergone the placement of a novel fully covered segmented irradiation stents for the treatment of esophageal cancer in the department of intervention and vascular surgery of Zhongda Hospital from January 2015 to July 2016 were analyzed retrospectively. The novel irradiation stent was composed of a fully covered...
segmented self-expandable metal stent (Micro-tech, Nanjing, China) and $^{125}$I radioactive seeds. The stent body consisted of several independent segments, connected with thread. Placement of irradiation stents was performed under fluoroscopic and pharyngeal anesthesia was applied. Observation targets included technical success, dysphagia score, overall survival, stent patency, stent restenosis, migration and other complications. Dysphagia score before and after treatment was analyzed by the Wilcoxon rank sum test. Survival was estimated by the Kaplan-Meier method and analyzed by the log-rank test. A p value < 0.05 was considered to indicate a significant difference.

RESULTS: A total of 31 stents were placed in 31 patients at the first time and the technical success rate was 100%. The dysphagia score was $3.23 \pm 0.56$ before stents placement, and $1.16 \pm 0.74$ at 7 days after placement, dysphagia was significantly relieved at 7 days after placement ($p < 0.001$). Median overall survival was 132 days (95% CI 125-208 days) and tumor metastasis was a hazard factor influencing overall survival ($p = 0.002$). Median stent patency period was 132 days (95% CI 125-208 days). Stent restenosis occurred in 6 patients with a median restenosis period of 206 days (range, 50-391 days) and migration occurred in 3 patients. No stent collapse, fracture, or seeds displacement was observed. Other complications included severe chest pain in 7 patients, fistula formation in 1 patient and hemorrhage in 2 patients.

CONCLUSION: This novel fully covered segmented irradiation stent could relieve dysphagia in patients with esophageal cancer effectively with less complications after placement. In addition, this stent could be placed and retrieved easily.

SE 06 IR-04
Comparison of access patency between balloon angioplasty related venous rupture and nonvenous rupture in failed hemodialysis patient
Jae myeong Lee¹, Seung Boo Yang², Dong Erk Goo³, Yong Jae Kim³, Woong Hee Lee⁴
¹Soonchunhyang University Hospital Bucheon, ²Soonchunhyang University Hospital Gumi, ³Soonchunhyang University Hospital (Seoul), ⁴Soonchunhyang University Cheonan Hospital, Korea.
ysbysb@sch.ac.kr

PURPOSE: To evaluate the access patency difference between balloon angioplasty related venous rupture and nonrupture after treatment of failed hemodialysis patient.
MATERIALS AND METHODS: From January 1998 to December 2015, 13,506 percutaneous angioplasty, mechanical thrombectomy and thrombolysis procedure in 6732 patients (M:F = 3047:3685; mean age, 58.60 ± 12.84 years; mean hemodialysis access age, 34.32 ± 39.35 mo) were performed. Rupture rate was obtained and access patency was determined according to rupture status, with/or without thrombosis and treatment type (i.e., balloon tamponade and stent).
RESULTS: Venous rupture was developed in 604 of 13,506 procedures (4.5%). Rupture was more frequent in female (5.1% vs. 3.6% in male; $p = 0.001$), AVG (4.9% vs. 3.9% in AVF; $p = 0.006$) and thrombosis (7.7% vs. 3.3% in stenosis; $p = 0.001$). A balloon tamponade was performed for a total of 604 rupture cases, and stents were deployed on 119 cases where contrast extravasation and flow stasis persisted. The primary patency time were significantly better in non rupture group rather than rupture group (11.0 months vs. 8.9 months; $p = 0.001$). However, the access type ($p = 0.372$) and with/or without thrombus ($p = 0.358$) did not significantly differs in patency time. The primary patency time in rupture patients were 8.4 months after prolonged balloon tamponade and 11.2 months after stent placement ($p = 0.014$).

CONCLUSION: Primary patency is better in nonruptured than balloon angioplasty related ruptured stenotic AVF. And balloon tamponade and bare metal stent placement are effective treatment methods for treating PTA induced venous rupture. Particularly, stent placement shows similar patency time when compared to nonrupture group.
SE 06 IR-05
Ruptured extracranial carotid artery: endovascular treatment with covered stent graft
Jungho Won1, Dae Seob Choi1, Sung Eun Park2, Hocheol Choi1, Hwa Seon Shin1, Hye Jin Baek2, Kyeong Hwa Ryu2, Jaeboem Na1, Jae Min Cho3, Soo Buem Cho4
1Gyeongsang National University Hospital, 2Gyeongsang National University Changwon Hospital, 3Gyeongsang National University School of Medicine, Korea.
uneyes@hanmail.net

PURPOSE: The extracranial carotid artery rupture is a rare, but potentially disastrous event. We aimed to review the clinical presentations and radiologic findings of this entity and to evaluate the efficacy of endovascular treatment with covered stent graft.

MATERIALS AND METHODS: Since January 2009, nine patients with extracranial carotid artery rupture received endovascular treatment with covered stent graft. We retrospectively reviewed their medical records and radiologic findings.

RESULTS: The ruptured sites were in the common carotid artery (n = 6), cervical internal carotid artery (ICA) (n = 2) and petrous ICA (n = 1), respectively. The causes of injury included spontaneous (n = 2), carotid blowout syndrome (CBS) (n = 3), iatrogenic (n = 2) and traumatic (n = 2). Technical success and immediate hemostasis were achieved in all cases. Procedure-related complications occurred in 3 patients (33.3%). In a patient, the ipsilateral angular branch of the middle cerebral artery was occluded during the procedure and it was completely reopened via mechanical thrombectomy without any neurologic deficit. Minor cerebral infarction was developed in 2 patients (22%). During a mean follow-up of 297 days (range, 2-2053 days), two patients died: one from recurrent CBS and the other from aspiration pneumonia.

CONCLUSION: The covered stent grafting is an effective method for the treatment of extracranial carotid artery rupture.

SE 06 IR-06
An update on intra-arterial chemosurgery for retinoblastoma
Anil Gopinathan, Yi Ting Lim
National University Hospital Singapore, Singapore.
yi_ting_lim@nuhs.edu.sg

OBJECTIVE: We present an update on the indications, complications, limitations, success and technical aspects of intra-arterial chemosurgery (IAC).

BACKGROUND: Retinoblastoma (Rb) is the most common childhood intraocular malignancy. For early disease (groups A and B), local therapies like laser ablation are often adequate. Meanwhile, for higher grade disease, Rb therapy has evolved from external beam radiation therapy (EBRT) to systemic chemotherapy in the last century, and more recently to IAC and plaque brachytherapy. Nevertheless, enucleation has always been the cornerstone of the treatment; but it comes at the cost of an eye. IAC is a relatively novel technique that aims to deliver high dose of chemotherapeutic agent(s) into the ophthalmic artery or its equivalent to permit high drug concentration in the tumor with minimal systemic toxicity. The aim of IAC is primarily to save the life and cure the malignancy with the stretched goal of globe preservation and a potential for conserving vision.

DISCUSSION: IAC has been used effectively as both primary treatment as well as secondary treatment for tumors refractory to systemic chemotherapy. Melphalan is the most frequently used chemotherapeutic agent for IAC. In certain cases topotecan and/or carboplatin may be added to the treatment regimen. On average, most patients receive 3 to 4 sessions of IAC. The technical success rate for the procedure ranges from 80% to 98%. It has consistently shown better globe salvage rates than the incumbent alternative of systemic chemotherapy for group C, D and E diseases. Preservation of vision is an unpredictable outcome, depending on the location and extent of the tumor. Complications are usually in the form of minor ocular toxicities. Major ocular toxicities due to vascular complications may make an enucleation imperative, which is anyway the standard treatment option for most of the patients with retinoblastoma. Major stroke and intracranial hemorrhages are extremely rare. Given its safety and high efficacy, IAC is evolving as the first-line option for tumors not amenable for local therapies.

SE 06 IR-07
Successful management of long-standing gross hematuria due to radiation cystitis using trans-catheter embolization of inferior vesical arteries: a case report
Jae Hyun Kwon, Jung Bum Bae
Dongguk University Ilsan Hospital, Korea.
jhkwon17@naver.com

Radical radiotherapy is an effective treatment for pelvic malignancy but in most cases the bladder receives a significant radiation dose even if precautions are taken. Severe hemorrhagic cystitis follow radiotherapy is a relatively rare event. However, the fact that it is relentlessly progressive and treatment options are suboptimal makes it clinically important. We report a patient who underwent trans-urethral radical
prostatectomy and radiotherapy for recurrent lesion. The patient presented long-standing gross hematuria due to radiation cystitis even though the conventional irrigation therapy for urinary bladder for 3 months. It was successfully managed by trans-catheter embolization of inferior vesical arteries using gelatin sponges.

SE 06 IR-08
Portal hypertension due to massive arterioporal shunts: successful embolization of shunts and control of portal hypertension
Seojin Jang, Jae Hyun Kwon, Jae Hak Kim
Dongguk University Ilsan Hospital, Korea.
jhkwon17@naver.com

We report a case with idiopathic massive arterioporal shunt inducing portal hypertension, ascites, esophageal varix and hepatic encephalopathy. Liver cirrhosis was not evident on transjugular intrahepatic liver biopsy. Liver dynamic CT scan showed intense enhancement of portal vein in arterial phase and multiple fine vessels around the right portal vein. Angiography revealed arterioporal shunts supplied by hepatic, right gastric, and gastroduodenal arteries which were embolized by Gelfoam particles. After the procedure, the drainage amount of ascites decreased from 2000 mL/day to 430 mL/day and the patient recovered alert mentality. Liver function test showed normal range and the patient remained in good condition throughout follow-up and at the time of publication.

SE 06 IR-09
Selective arterial embolization for unresectable gastric cancer bleeding: a single center experience in 58 patients
Soo Buem Cho1, Saebeom Hur2, Hyo-Cheol Kim2, Hwan Jun Jae3, Myungsu Lee2, Minuk Kim1, Jeong-Eun Kim4
1Gyeongsang National University Changwon Hospital, 2Seoul National University Hospital, 3Ewha Womans University Mokdong Hospital, 4Hallym University Sacred Heart Hospital, Korea.
thurz21@gmail.com

PURPOSE: To investigate the imaging findings of angiography, and clinical outcomes of the transcatheter embolization for the acute UGIB in patients with unresectable cancer.

MATERIALS AND METHODS: From January 2005 to December 2014, 58 patients with pathologically-proven gastric cancer who were treated with transcatheter embolization due to the acute upper gastrointestinal bleeding, which were recalcitrant to endoscopic treatment in our institution. The electronic medical record for each patient was reviewed for clinical presentation, endoscopy history, computed tomography (CT) and angiographic findings, blood transfusion requirement, and long-term follow-up results.

RESULTS: On angiography, 11 patients had the active bleeding (contrast extravasation (n = 8/11, 72.7%), pseudoaneurysm (n = 2/11, 18.2%), both (n = 1, 9.1%). They underwent the embolization treatment by using the Gelfoam, glue, coil, and combined. The overall clinical success rate was 72.4% (42/58), and the success rate for the patient with positive finding on angiography was 63.6% (7/11). The median overall survival period was 97.5 days (range, 7-1415), and the overall 1-month survival rate was 89.6% (52/58). The 30-day survival rates were 95.2% (40/42) in clinical success group, which was significant higher than failed group (p=0.04). And in clinical success group, there were significant small amount of late transfusion (2.43, range, 0-24 U, p = 0.02).

CONCLUSION: The transcatheter embolization as a treatment for the patient who have an active bleeding is highly effective. It is necessarily considered as an additional treatment especially when the endoscopic or surgical treatment failed, or are hard to approach to conduct.
CONCLUSION: The appropriate p/s control in TACE procedures can reduce significant radiation dose for patients. Further research is necessary to evaluate image quality according to p/s control and reduction of potential adverse effects of irradiation.

SE 06 IR-11
The key role of interventional radiology in trauma critical care: a pictorial essay
Mu Sook Lee, Seung Hyoung Kim, Sun Young Jeong, Su Yeon Ko, Kyung Ryool Lee, Jeong Sub Lee, Bong Soo Kim, Guk Myung Choi
Jeju National University School of Medicine, Korea.
kimsh.kr@gmail.com

LEARNING OBJECTIVES: Acute trauma is one of the leading causes of disabilities and mortality across all ages. While surgery is often considered the definitive treatment option for controlling bleeding, it is not always the ultimate solution for stabilizing trauma critical care (TCC) patients. Since Margolies et al. first described an endovascular technique to prevent hemorrhage in the trauma setting, there have been a lot of emerging concepts and techniques of interventional radiology (IR) in the management of the trauma patients. Nowadays IR plays a key role in acute trauma management. The purpose of this presentation is to give examples of our experiences with 65 TCC patients whose life threatening bleeding was initially controlled by IR. This presentation also demonstrates non-vascular injuries which were managed by IR, hence unnecessary surgery was avoided.

CONTENT: From November 2007 to March 2017, 65 TCC patients were treated with IR and are included in this study. The patients were 46 men and 19 women with ages ranging from 12 to 87 years (mean, 59.8 years; SD, 20.3 years). The mechanisms of acute traumatic injuries were traffic accident (TA) in 28 patients (43.1%); 15 of in-car TA and 13 of out-car TA), iatrogenic in 26 patients (40%), and fall from height in 8 patients (12.3%). The mechanisms of acute trauma in the remaining three patients were as follows; a saddle injury, being crushed by a falling big tree, and being injured by a deep tackle during a soccer game. The most common organ injury was hepatosplenic system (42.8%), followed by musculoskeletal system (22.8%), genitourinary system (15.7%), and etc.

CONCLUSION: For the optimal management of TCC patients, a multidisciplinary team approach is a necessity. This includes surgeons, interventional radiologists, and modern facilities and equipment.

Although emergency laparotomy is still the standard treatment for hemodynamically unstable patients, IR has a growing and accepted role for the management of acute trauma patients. IR also provides a significant contribution towards achieving the best clinical outcomes of TCC patients.

SE 06 IR-12
Clinical feasibility and effectiveness of bedside peripherally inserted central catheter by using portable digital radiography in patients with intensive care unit: a single center experience
Hwanghui Jo1, Soo Buem Cho2, Hye Jin Baek2, Jin Il Moon2, Bo Hwa Choi2, Kyungsoo Bae2, Kyung Nyeo Jeon2, Sung Eun Park2
1Gyeongsang National University Hospital, 2Gyeongsang National University Changwon Hospital, Korea.
kingnose80@gmail.com

PURPOSE: To evaluate clinical feasibility and effectiveness of bedside peripherally inserted central catheter (PICC) by using portable digital radiography (DR) in intensive care unit (ICU) patients.

MATERIALS AND METHODS: Sixty-five ICU patients who underwent PICC were enrolled in this study between May 2016 and May 2017. Of 65 patients, 45 (69.2%) were performed bedside procedure at ICU by using portable DR, and 20 (30.8%) underwent at the intervention clinic by single interventional radiologist. We retrospectively reviewed clinical presentation, total procedural time, total radiation dose, and clinical outcomes by electrical medical records. Independent t-test was performed for evaluating the clinical effectiveness between two groups.

RESULTS: Technical and clinical success rate were 100%, and there were no procedure-related complication. Total radiation dose of bedside PICC at ICU was significantly lower, in comparison with conventional PICC at the intervention clinic (253.6 mGy* ± 38.7 vs. 985.2 mGy* ± 547.6, p < 0.001). Total procedure time of bedside PICC was significantly shorter than that of conventional PICC (26.8 min ± 3.9 vs. 63.15 min ± 14.9, p < 0.001).

CONCLUSION: Bedside PICC by using portable DR in ICU can be one of feasible procedure option with reliable safety and clinical effectiveness.
SE 06 IR-13
Successful imaging guided intervention in a case of infected bleeding aneurysms of inferior pancreaticoduodenal artery and superior gluteal artery with coagulopathy
Jia-Ning Chai
Hospital Canselor Tuanku Muhriz, Malaysia.
chaijaning@gmail.com
Infected aneurysm with involvement of visceral artery is a very rare entity. We present a case of a lady, Madam L, 56 years old with underlying relapsed Ig A nephropathy. She initially presented with short history of high grade fever associated with chills and rigors. Peripheral blood culture showed Group A beta hemolytic Streptococci. She was also found to be anemic with gradual drop in hemoglobin from 8 g/dL to 4 g/dL in five days of admission with no obvious source of bleeding. CT mesentery angiography was subsequently arranged as she presented with concurrent mild abdominal discomfort and acute right gluteal swelling. Image findings revealed an actively bleeding superior gluteal artery and another saccular aneurysm at the inferior pancreaticoduodenal artery. She then underwent conventional visceral angiography with successful glue-embolization of these aneurysms. Postprocedure she went into coagulopathy state with indeterminate cause and was complicated with slow bleeding from femoral sheath puncture sites. Coagulation profile, factor mixing test and fibrinogen levels suggested dysfibrinogenemia. Multiple blood transfusions and courses of antibiotics was given. She made slow recovery and was eventually discharged well at after one month of admission.
We aim to discuss the role of minimally invasive endovascular intervention in the management of this complicated situation of bleeding infected visceral and gluteal aneurysms with challenging coagulopathy.

SE 06 IR-14
Pelvic arterial embolization for obstetric-related hemorrhage in Asian patients - experience from a tertiary referral center
Alexander Chiu Wing Lee, Chong Hei Philip Kwok, Wai Lun Poon, Hon Shing Fung, Wong Kan Wong, Man Kwong Chan, Yue Kie Kevin Wong, Kwok Wing Tang
Queen Elizabeth Hospital, Hong Kong.
alexwings@gmail.com
PURPOSE: To evaluate the efficacy of pelvic arterial embolization (PAE) in Asian patients with obstetric-related hemorrhage. The factors associated with clinical failure were studied to establish recommendations for improving outcomes.
MATERIALS AND METHODS: Patients presented with obstetric-related hemorrhage with PAE performed in Queen Elizabeth Hospital, Hong Kong, from 1 January 2010 to 31 December 2015 were reviewed. The demographic data, indications for PAE, mode of delivery, baseline and post-embolization blood test results, embolization techniques, angiographic findings and clinical outcomes were analyzed. Technical success was defined as successful catheterization of both uterine arteries with embolization to stasis, embolization of pelvic vessel giving rise to active extravasation, or successful coil embolization of vascular lesion. Clinical success was defined as cessation of bleeding without the need for repeat embolization, laparotomy, hysterectomy, or death.
RESULTS: 41 female patients were included. Technical success was achieved in all 41 patients (100%). Clinical success was achieved in 34 patients (82.9%). The overall major complication rate was 0%. Patients who had no detectable contrast extravasation or pseudoaneurysm had a clinical success rate of 88.9%. Those with active contrast extravasation or pseudoaneurysm had a significantly lower clinical success rate of only 40% (p = 0.028). Patient without DIC had a clinical success rate of 86.1%. Those with DIC had significantly lower clinical success rate of 60% (p = 0.016).
CONCLUSION: PAE was safe and efficacious for treating post-obstetric hemorrhage. Factors associated with clinical failure included active extravasation and DIC. We recommend earlier embolization referral and coagulopathy correction for these patients. For patients with DIC, adjunct embolization with NBCA glue would be advisable.

SE 06 IR-15
Contralateral deep vein thrombosis after iliac vein stenting in patients with May-Thurner syndrome
Trong Binh Le1, Taeg Ki Lee2, Yong Sun Jeon2, Keun-Myoun Park2, Kee Chun Hong2, Soon Gu Cho3
1Endovascular Training Center, Inha University Hospital, 2Inha University Hospital, Korea.
radjeon@inha.ac.kr
PURPOSE: To investigate the prevalence and possible causes of contralateral deep vein thrombosis (DVT) after iliac vein stenting in patients with May-Thurner syndrome (MTS).
MATERIALS AND METHODS: We retrospectively analyzed data of 111 patients (mean age, 63.1 ± 15.2 years) who received common iliac vein (CIV) stenting for symptomatic MTS at our institution from
October 2004 to January 2017. The median follow-up was 36 months (range, 1-142 months). Patients’ demographic, comorbidities, stent location, treatment and complications were recorded.

RESULTS: Ten patients (9%, M:F = 4:6) exhibited contralateral DVT at a median timing of 40 months (range, 6-98 months). The median follow-up was 73.5 months (range, 20-134 months). The median age was 69 years (range, 42-85 years). Possible causes were venous intimal hyperplasia (VIH) (n = 7), “jailing” (n = 2) and undefined (n = 1). All patients with VIH had previous CIV stents overextended to the inferior vena cava (IVC). Contralateral DVT group had higher rate of overextended stents than non-contralateral DVT group (80% vs. 16.8%, p < 0.01). Additional stents were deployed in 7 patients. Up to the last visit, 7/10 patients had bilateral CIV patency.

CONCLUSION: Contralateral DVT after CIV stenting is noteworthy. It often occurs at a late timing during follow up. Overextension of the previous CIV stent to the IVC is associated the development of contralateral DVT and VIH should be considered a possible cause. For stenting of MTS, the CIV stent should be confined within the confluence, not contact the IVC wall.

**SE 06 IR-16**

Practical review of the left brachiocephalic vein from congenital variations to pathologic conditions
Bo Ra Yoon¹, Se Hwan Kwon¹, Joo Hyeong Oh²
¹Kyung Hee University Medical Center, ²Kyung Hee University Medical Hospital, Korea.
yoonbora86@hanmail.net

The left brachiocephalic vein (LBCV) is the major venous receiver from ipsilateral neck and upper arm in thorax. Although the anatomic configuration of the LBCV seems simple, many congenital variations and pathologic conditions, such as tumors, trauma, aneurysm formation, and stenosis related to dialysis or other conditions, and various complications related to central venous catheters can occur. In the past, the congenital variations and pathologic conditions of the LBCV were usually made by central vein catheterization or it was done intra-operatively or by postmortem examination. However, the recent advances of noninvasive imaging modalities, including ultrasound, computed tomography, and magnetic resonance imaging can make possible the non-invasive diagnosis of above variable conditions. In this educational exhibition, we will review the embryology, anatomy and also the variable imaging features of congenital variations to pathologic conditions affecting the LBCV.

**SE 06 IR-17**

Retrieval of foreign body in the cerebral venous sinus: a case report and literature review
Beom Sang Cho, Jong Hyouk Yun, Gyoo-sik Jung
Kosin University Gospel Hospital, Korea.
gsjiang240@gmail.com

With the increasing number of interventional procedures, removal of foreign bodies has also become a frequent procedure for the interventional radiologists. There are various techniques to remove these intravascular foreign bodies such as snare technique, double-loop technique, stiff guide wire technique, and balloon displacement technique. In spite of these various techniques, however, it may be challenging to remove in cases of tortuous vessel or coexisting thrombus in the vessel. Here in, we report a case of 23-year-old man with thrombosis in the superior sagittal sinus. He was suffered from broken guide wire fragment in the superior sagittal sinus to sigmoid sinus during thrombolysis procedure. We successfully removed the guide wire fragment by means of snare technique. To our knowledge, percutaneous foreign body removal in the cerebral venous sinus has not been reported. Techniques for removing intravascular foreign body will also be reviewed.

**SE 06 IR-18**

Embolization of inferior pancreaticoduodenal artery aneurysm with celiac stenosis or occlusion: three cases report and review of the literature
Min Ha Kwag, Hyun Seok Jung, Young Jun Cho
Inje University Busan Paik Hospital, Korea.
bighbiva@hanmail.net

Inferior pancreaticoduodenal artery aneurysm (IPDA) with celiac stenosis or occlusion is quite rare. It is suggested that celiac artery stenosis or occlusion results in IPDA; when stenosis or occlusion of celiac artery is present, pancreaticoduodenal blood flow increases through superior mesenteric artery and it can cause IPDA. It is clinically important because it can be life-threatening when it is ruptured. In the past, the only treatment of IPDA was surgical removal. Recently, because of development of interventional procedure, endovascular embolization of arterial aneurysm is in widely used and it tends to increase as time goes on. In this article, three cases of embolization of IPDA with celiac stenosis or occlusion are described. In our case, two of our cases are ruptured IPDA and the other is incidental IPDA. All of our patients underwent embolization of aneurysm successfully. In addition to cases report, a literature review of IPDA associated with celiac artery stenosis or occlusion is presented in this
SE 06 IR-19
Outcomes of various endovascular treatments for splenic artery aneurysms: correlation with aneurysmal characteristics, location, and coil packing density
Jong Eun Lee¹, Jae Kyu Kim², Nam Yeol Yim², Hyoung Ook Kim², Yang Joon Kang¹, Byung Chan Lee²
¹Chonnam National University Hwasun Hospital, ²Chonnam National University Hospital, Korea.
jkkrad@jnu.ac.kr

PURPOSE: To evaluate outcomes after variable methods of endovascular treatment of splenic artery aneurysms.

MATERIALS AND METHODS: Between June 2009 and February 2017, various endovascular treatment methods (coil packing of aneurysmal sac, coil packing of aneurysmal sac and juxta proximal splenic artery, stent-assisted coil packing, stent-graft, proximal splenic artery embolization) were performed for 28 true splenic artery aneurysms in 27 patients (M:F = 5:22; mean age, 58.1 ± 12). Aneurysmal characteristics (size, wide neck, location, wall calcification, internal thrombus), packing density, recurrence, and complication were retrospectively evaluated.

RESULTS: The mean size of aneurysm was 23 mm ± 14 mm (range, 10-72 mm). Immediate recanalization occurred in 7 patients, but those previous recanalization disappeared in 2 patients on follow up CT. Partial splenic infarction occurred in 4 patients. Endovascular treatment methods, aneurysmal size, location, presence of wide neck or wall calcifications had no statistical significance for recurrence of splenic artery aneurysm. However, presence of internal thrombus showed statistically significance for recurrence rate of splenic artery aneurysm (p = 0.019). Packing density also had statistical significance for recurrence (p = 0.042) in patients who underwent coil packing for splenic artery aneurysm.

CONCLUSION: Thrombosed aneurysm and packing density would be risk factors for recurrence in endovascular treatment of splenic artery aneurysms.

SE 06 IR-20
Intravascular or extravascular malpositioning of central venous catheter or guidewire: causes, diagnosis, and interventional correction
Chang Mu Lee, Chang Won Kim, Chang Ho Jeon, Hoon Kwon
Pusan National University Hospital, Korea.
radkim@nate.com

Despite the level of skill of the operator and the use of ultrasound and/or fluoroscopy guidance, central venous catheter (CVC) placement can result in CVC malpositioning, an unintended placement of the catheter tip in an inadequate vessel, extravascular space and loss of guidewire. Undiagnosed CVC malpositioning or migration of the fragment of a fractured central venous catheter can be associated with significant morbidity and mortality. We demonstrate several cases; migration of fractured catheters to main pulmonary artery, missed guidewire, puncture of pleura through subclavian vein and puncture of carotid artery during central venous catheterization. The objectives of this educational report were to demonstrate multiple cases about various complications associated with CVCs insertion and to offer ways of preventing, identifying, and correcting such complications.

SE 06 IR-21
Endovascular embolization for the treatment of acute bleeding episodes in hemophilia patients: case presentations and literature review
Woo Jin Yang¹, Jiyoung Oh¹, Se Hwan Kwon², Joo Hyeong Oh²
¹Kyung Hee University Hospital at Gangdong, ²Kyung Hee University Medical Center, Korea.
gettojam@hanmail.net

PURPOSE:
1. To present cases in which endovascular embolization plays an important role for the treatment of acute bleeding episodes in patients with hemophilia
2. To review the role of endovascular embolization in treatment of acute bleeding episodes in hemophilia patients

CONTENTS ORGANIZATION:
1. Case series (according to the underlying etiology)
   1) Spontaneous bleeding
   2) Post-operative bleeding, iatrogenic bleeding
   3) Traumatic bleeding
   4) Bleeding related to the underlying causative disease
2. Optimal treatment strategies of acute bleeding episodes in hemophilia patients
1) Non-pharmacological treatment
2) Pharmacological treatment
3) Endovascular embolization

CONCLUSION: While caution and careful consideration on a case-by-case basis is needed, endovascular embolization is a safe, effective and cost-saving therapy for treating bleeding episodes in patients with hemophilia.

SE 06 IR-22
Interventional management for iatrogenic arterial injuries after percutaneous interventional procedures
Hye Young Choi, Se Hwan Kwon, Joo Hyeong Oh
Kyung Hee University Medical Center, Korea.
radkwon@naver.com

Recently, percutaneous interventional procedures have become a widely applied technique and represent the first-choice approach for diagnosis and treatment of much pathology of solid organs, such as hepatobiliary system and kidney. These techniques are less invasive than open surgery and are associated with high success rates, but vascular complications related to the percutaneous access can occur, such as early and delayed bleedings. Usually, venous bleedings can be controlled by simple maneuvers, such as deployment of larger dilators or of drainage catheters. Nevertheless, these maneuvers are insufficient in several cases of arterial damage and cannot be performed in arteriovenous fistulas or post-traumatic aneurysms. Therefore, selective angiography and embolization become a highly appealing treatment option. In this educational exhibition, we will review the variable imaging features, interventional management for iatrogenic arterial injuries after percutaneous procedures, including diagnostic and therapeutic hepato-biliary or renal procedures and many drainage procedures.

SE 06 IR-23
Implantation of the irradiation stent system into portal vein: studies on normal beagles
Tiankuan Li
Zhongda Hospital Southeast University, China.
ltkaa@126.com

PURPOSE: To assess the feasibility and safety of the irradiation stent system in portal vein on normal beagles.
MATERIALS AND METHODS: A portal vein irradiation stent system is composed of an Iodine-125 seed-carrier and a conventional stent. 20 beagle dogs were randomly assigned to receive treatment with a conventional stent (5 beagle dogs) or an irradiation stent system (15 beagle dogs in three groups received 11.1 MBq, 22.2 MBq, 33.3 MBq radioactivity, n = 5 in each dose group). Follow-up methods included blood biochemical test, color Doppler sonography and CT scan at 0, 15, 30, 60, and 120 days after implantation of irradiation stent system. Pathological tissues were obtained from sacrificed beagle dogs on the 120th day.
RESULTS: The portal vein irradiation stent systems and the conventional stents were successfully deployed into the targeted portal vein segment in all beagles, none was dislodged during the deployment or the follow-up period. Differences of blood biochemical indexes and portal vein flow volume measured by color Doppler sonography were not significant (p > 0.05). Pathological tissues revealed that the systems were surrounded by fibrous tissues and a few inflammatory cells, but with no significant differences in all groups.
CONCLUSION: It indicates that portal vein irradiation stent system is safe in all dose groups, and it is feasible to design a special irradiation stent system for each patient according to the size of the portal vein tumor thrombus.

SE 06 IR-24
Iliac vein dissection secondary to femoral artery puncture: an extremely rare complication
Trong Binh Le, Keun-Myoung Park, Yong Sun Jeon, Kee Chun Hong, Soon Gu Cho
Inha University Hospital, Korea.
radjeon@inha.ac.kr

Vein wall dissection has been sporadically reported during puncture of an arteriovenous fistula (AVF) for hemodialysis. However, dissection of a healthy iliac vein after femoral artery puncture is an extremely rare complication which has not been literally documented yet. We herein describe a case of iliac vein dissection with flow obstruction and thrombosis treated by endovascular intervention. A 55-year-old woman presented to our institution with right leg swelling 2 weeks after a transfemoral cerebral angiography. She was previously healthy and was not taking any medication. She denied past history of surgery, allergy, smoking, alcohol consumption, hypertension and diabetes mellitus. Laboratory tests were within normal limits except for a raised D-dimer level of 0.64 µg/ml. Computed tomographic venogram demonstrated a focal acute thrombosis of the right iliofemoral vein. The venous wall from the proximal common femoral vein to the entire external iliac vein was extensively thickened and enhanced. A double venous lumen and intimal flap were evident suggesting a vein dissection. The false lumen was filled with thrombus whereas the true
lumen was significantly collapsed. The diagnosis was confirmed by phlebography, followed by angioplasty using 8 x 100 mm balloon. However, recoil persisted despite repeated inflation up to burst pressure. A 10 x 100 mm self-expandable stent was eventually implanted to ensure the patency of the venous flow. Completion venogram demonstrated direct flow to the inferior vena cava. The patient discharged uneventfully 3 days later and remained asymptomatic at the 2-month follow-up.

SE 06 IR-25
Percutaneous catheter drainage in patients with pyogenic liver abscess: the prognostic factors
Sheng Xu, Hai-Dong Zhu, Li Chen, Gao-Jun Teng
Zhongda Hospital, Medical School, Southeast University, China.
xushengseu@163.com

PURPOSE: To identify the prognostic factors of percutaneous catheter drainage (PCD) for pyogenic liver abscess (PLA).

MATERIALS AND METHODS: The data of PLA patients performed by PCD are retrospectively reviewed from March 2010 to February 2017 in Department of Interventional Radiology & Vascular Surgery, Zhongda Hospital, Southeast University. After formulating the criteria of clinical efficacy and clinical efficacy time (CET) for PCD, univariate analysis and multivariate analysis of prognostic factors are performed subsequently.

RESULTS: 74 PLA patients are included in this study. The technical and clinical successful rate are 74/74 (100%) and 64/74 (86.5%), separately, and the CET of PCD was (24.59 ± 18.73) days. Univariate analysis reveals that biliary origins (p = 0.034), diabetes mellitus (DM) (p = 0.027), Hb < 110g/L (p = 0.032), BUN ≥ 7.2 mmol/L (p = 0.002), APTT ≥ 36 s (p = 0.023) and septic shock (p < 0.001) are related to the prognosis of PLA after PCD. Multivariate analysis reveals that DM (p = 0.041, HR = 0.566), septic shock (p = 0.003, HR = 0.322) and biliary origins (p = 0.003, HR = 0.417) are prognostic factors.

CONCLUSION: Biliary origins, DM and septic shock are prognostic factors for PLA patients with PCD treatment.

SE 06 IR-26
Preliminary results of fluoroscopic peroral placement of self-expandable metallic stent for malignant jejunal obstruction in non-surgically altered anatomy
Zhe Wang, Kun Yung Kim, Ho-Young Song, Jung-Hoon Park, Jiaywei Tsauo, Min Tae Kim, Young Je Lim
Asan Medical Center, Korea
hysong@amc.seoul.kr

PURPOSE: To evaluate the technical feasibility and clinical effectiveness of fluoroscopic peroral placement of self-expandable metallic stent (SEMS) in the palliative treatment of malignant jejunal obstruction in non-surgically altered anatomy.

MATERIALS AND METHODS: With fluoroscopically guided, using peroral method, SEMSs were placed in five consecutive patients with inoperable malignant
jejunal obstruction. Data were collected regarding the technical and clinical success, stent-related complications and management. RESULTS: Stent placement was technically successful in 3 of 5 patients (60%). Stent delivery system could not pass through the obstructions due to angulation of the bowl loop in one patient. In the other patient with technical failure, proximal jejunal perforation occurred during the negotiation of the guide wire. These two patients underwent a palliative bypass surgery. During the mean follow-up period of 229 days (range, 102-377 days), symptoms improved after stent placement in three patients. In one patient, stent migration occurred 32 days after stent placement. This patient was managed with additional stent placement. CONCLUSION: Preliminary results indicate fluoroscopically guided peroral placement of SEMSs can be successfully performed in 60% of the patients, while can provide faster symptom relief. The requirements of a better designed stent delivery system and an advanced guiding sheath have to be developed in order to improve technical success rate of peroral placement of SEMSs into the jejunum.

SE 06 IR-27
Percutaneous radiologic gastrojejunostomy: feasibility and safety of a modified Chiba-needle puncture technique
Yasir Nouri1, Ji Hoon Shin1, Jong Woo Kim1,
Jin Hyoung Kim1, Heung Kyu Ko2
1Asan Medical Center, 2National Cancer Center, Korea. yasirnouri@hotmail.com

PURPOSE: To evaluate the feasibility, safety, and effectiveness of percutaneous radiologic gastrojejunostomy (PRJG) with a modified Chiba-needle puncture technique using a single gastropexy in the same puncture tract. MATERIALS AND METHODS: A total of 57 PRGJ procedures with one anchor technique were attempted in 55 consecutive patients between January 2008 and January 2017. The stomach was punctured with a 21-gauge Chiba-needle. A single anchor was used and gastrojejunostomy tube placement was performed through the same tract of the anchor. Technical success, time length of the procedure, complications occurring within 30 days, and procedure-related mortality were evaluated by means of review of imaging studies and patient medical records. RESULTS: All 57 PRGJ procedures were successfully performed. The average procedure time was 16 min 28 s. There were no procedure-related major complications. Only eight cases have pneumoperitoneum (14%) which were minor complication and it had resolved spontaneously without further problems. There was no evidence of gastroesophageal reflux or aspiration aggravation in any study patient during the follow-up period. The procedure-related mortality was zero. CONCLUSION: PRJG with the modified Chiba-needle puncture technique with use of single gastropexy in the same puncture tract was feasible, safe, and effective.

SE 06 IR-29
Bronchoplasty with balloon dilatation for bronchial stenosis after lung transplantation
Joon Ho Kwon, Man-Deuk Kim, Kichang Han,
Gyoung Min Kim, Jong Yun Won, Do -Yun Lee
Severance Hospital, Korea. mdkim@yuhs.ac

PURPOSE: A retrospective review was conducted to evaluation of safety and efficacy of balloon dilatation to manage bronchial stenosis after lung transplantation. MATERIALS AND METHODS: Fifteen patients (mean age, 55.1 years; range, 36-72) treated between June 2012 and February 2017 qualified for analysis. Each subjected to balloon dilatation under bronchoscopic and fluoroscopic guidance due to bronchial stenosis after lung transplantation. Technical success, primary and secondary clinical success, the median patency periods and complications were investigated to evaluate treatment outcome. RESULTS: Median follow-up period was 6 months (range; 1-55 months). Total thirty-six balloon dilatation sessions were performed in 15 patients, with range of one to six sessions per patients. Three patients were treated for the main bronchus level and 12 patients were at the segmental bronchus level. The mean diameter of balloon use was 10.4 mm (range, 8-14 mm). Dilatation was successful in all patients (technical success, 100%). Primary clinical success was achieved in 6 of the 15 patients (40%) and secondary clinical success rate was 60%, respectively. The median patency periods were 97 days (range; 2-1560 days). There was no procedure related complications. CONCLUSION: Bronchoplasty with balloon appears reasonably safe treatment method to treatment of bronchial stenosis after lung transplantation. Although recurrent stenosis is frequent, efficacy increases when repeated sessions performed, so balloon dilatation can be an effective palliative treatment.
SE 06 IR-30
Soft tissue necrosis following transarterial chemoembolization for bleeding neurofibroma in a neurofibromatosis type 1 patient
Anis Shafina Mahfudz1, Dhayal Balakrishnan2, Izazul Hussin2, Mohd Rizal Roslan3
1Universiti Teknologi MARA Sungai Buloh Campus, 2Selayang Hospital, Malaysia.
anismahfudz@gmail.com

Neurofibromatosis type 1 (NF1) is the most common type of neurofibromatosis, which is characterized by the formation of neurofibromas and abnormalities related to mesodermal dysplasia. Neurofibromas are a type of benign peripheral nerve sheath tumor, which is a hallmark finding in NF1. A 32-year-old gentleman presented to Emergency Department with generalized tonic clonic seizures following an intramuscular analgesic injection and right gluteal swelling. On examination, patient had generalized neurofibromas with multiple café au lait spots. There was a large, tender right gluteal swelling associated with wasting of the right calf muscles. During admission, there was rapid increase in size of the right gluteal swelling with a significant drop in hemoglobin (Hb) to 3.7g/dL. Computed tomography angiography (CTA) scan showed a large heterogeneous mass in the right buttock with active contrast extravasation. Right internal iliac arteriogram revealed bleeding from the right superior gluteal artery branches and proceeded with transarterial embolization (TAE) using Gelfoam and N-Butyl Cyano Acrylate (NBCA). Post-embolization angiographic runs showed no residual contrast extravasation. Four hours post-embolization, patient became hypotensive and tachycardia requiring inotropes and blood transfusions. Repeat CTA showed persistently enlarging right gluteal mass with active contrast extravasation. Patient had another arteriogram which demonstrated bleeding from the right inferior gluteal and right internal pudendal arteries, and further embolization was performed using Gelfoam and polyvinyl alcohol (PVA) particles. Day 1 after the 2nd embolization, patient developed scrotal swelling extending to the perineum which was soft and had bluish discoloration. There was associated edema of the penile shaft. Ultrasound scrotum demonstrated extensive subcutaneous edema and right hydrocele, however normal appearances of the testes and epididymis. Patient was eventually operated which revealed infected hematoma of the right buttock and had multiple sessions of wound debridement of necrotic tissue from the gluteal and perineal regions. Soft tissue necrosis is a recognized complication of TAE, although rare, it causes significant morbidity and is potentially fatal when it happens. Early identification of this problem and prompt debridement is crucial for patient survival.

SE 06 IR-31
Complications and embolization following PCNL for the treatment of renal stone
Sol Ki Kim, Young Min Han, Gong Yong Jin
Chonbuk National University Hospital, Korea.
ymhan@jbnu.ac.kr

PURPOSE: To evaluate the complications after PCNL (percutaneous nephrolithotomy) in patients with renal stone and the effect of TAE(transarterial embolization) on those complications.

MATERIALS AND METHODS: From January 2013 to March 2017, we retrospectively reviewed 168 patients with renal stone who underwent PCNL at operative room after PCN (percutaneous nephrostomy) at intervention room. The size and location of stone and the way of insertion of PCN catheter were analyzed to explicate the association with complication.

RESULTS: After successful PCN, renal stones were removed by PCNL in all 168 patients. PCN catheters were inserted with angiocatheter in 20 patients, in both sides in 4 patients, at upper pole in 4 patients, at two sites in 6 patients. Complications occurred from 11 out of 168 patients (6.5%) and in 7 patients (4%) who showed evidence of hematuria within 2 weeks after PCNL, they were treated with TAE. In post-angiography, there was no evidence of active bleeding in one patient and were hematoma in 3 patients. One of them was managed by inserting PCD.

CONCLUSION: After the follow-up examination, there were 6.5% of patients who received the PCNL treatment after PCN due to renal stone showed the evidence of complications. If hematuria continues to appear to the patients, TAE is an effective treatment of choice.

SE 06 IR-32
Fluoroscopic stent placement for treating postoperative nonanastomotic strictures in the proximal small-bowel: a 15-year single institution experience
Nader Bakheet1, Jiaywei Tsauo2, Ho-Young Song3
1Asan Medical Center, Egypt, 2Asan Medical Center, China, 3Asan Medical Center, Korea.
yhsong@amc.seoul.kr

PURPOSE: To evaluate the efficacy and safety of fluoroscopic self-expandable metallic stent (SEMS) placement for treating postoperative nonanastomotic strictures in the proximal small-bowel.

MATERIALS AND METHODS: Data of 8 patients (mean age, 63.7 ± 6.9 years; M:F = 7:1) treated with fluoroscopic SEMS placement for postoperative nonanastomotic strictures in the proximal small-bowel...
between January 2000 and February 2016 were retrospectively reviewed. The site of the stricture was located in the proximal jejunum in all patients.

**RESULTS:** A total of 17 (range, 1-6) fluoroscopic SEMS placement procedures were performed for the 8 patients. Technical success was achieved in 100% (17/17) of procedures. Fully-covered, partially-covered, and uncovered SEMSs were used in 58.8% (10/17), 35.3% (6/17), and 5.9% (1/17) of procedures, respectively. Complete resolution of obstructive symptoms and resumption of oral intake of soft or solid food within 3 days occurred after all procedures, rendering a clinical success rate of 100% (17/17). Ulcer bleeding, a complication, occurred after 5.9% (1/17) of procedures. Stent malfunction, including stent migration (n = 6), tissue overgrowth (n = 4), and stent fracture (n = 1), occurred after 64.7% (11/17) of procedures. The median stent dwell, recurrence-free, and follow-up duration after each procedure were 32 (interquartile range [IQR], 19-231), 71 (IQR, 33.5-548.5), and 133 (IQR, 54-626) days, respectively.

**CONCLUSION:** Fluoroscopic SEMS placement may be effective and safe for treating postoperative nonanastomotic strictures, however, the high rate of stent malfunction which often leads to early recurrence seems to be a major drawback.

**SE 06 IR-34**
US-guided thoracocentesis using pigtail catheter with or without pleurodesis in the palliation of recurrent/refractory malignant pleural effusions
Anoop Madayambath Karivellur, Sanjay Thulkar, Ashu Seith Bhatia, Sushma Bhatnagar, Seema Mishra, Manisha Jana
All India Institute of Medical Sciences New Delhi, India
anoopmkcmc@gmail.com

**INTRODUCTION:** Malignant pleural effusion (MPE) is an important complication for patients with intra-thoracic or extra-thoracic malignancies. Dyspnea associated with malignant pleural effusion further compromises the reduced life expectancy in these terminally ill patients. Various treatment options include observation alone, repeated thoracocentesis, tube thoracostomy, pleurodesis or pleuroperoitoneal shunting.

**AIMS AND OBJECTIVES:** We evaluated the efficacy of ultrasound (US)-guided pigtail thoracocentesis followed by pleurodesis in patients with symptomatic and refractory malignant pleural effusions.

**MATERIALS AND METHODS:** We recruited 57 patients with malignant pleural effusion due to intrathoracic (n = 17) and extrathoracic malignancies (n = 40). US-guided thoracocentesis was performed using 10F pigtail catheter. Those in whom the pigtail drain output dropped to < 150 ml/ day and adequate re-expansion of the underlying lung occurred, pleurodesis was performed (n = 33) by intrapleural instillation of Bleomycin (60 IU). Various factors precluded pleurodesis in the remaining patients (n = 24). The post-pleurodesis follow up ranged from 01 to 12 weeks. Pre- and post-procedural clinical scoring was done using NYHA dyspnea grading and ECOG performance status scoring systems. Chest radiographs were performed at regular intervals to detect fluid re-accumulation. 17 patients followed till 12 weeks post-pleurodesis, showed improvement in their clinical and radiological status.

**RESULTS:** Technical success rate of thoracocentesis was 100%, procedural success of pleurodesis was 91% and clinical success rate after Bleomycin in our study was 68%.
SUMMARY AND CONCLUSION: We concluded that pigtail thoracocentesis followed by pleurodesis is an effective and safe procedure for palliation of dyspnea in malignant pleural effusions. Hence, we strongly recommend early consideration of pleurodesis with Bleomycin in cancer patients with recurrent and refractory malignant pleural effusions.

Intervention-Informal Scientific Presentation

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