Asian Society of Vascular Surgery in 2012
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**Chronic Lymphedema: Establishment of an animal model and stem cell therapy**

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Purpose: Lymphedema is a poorly understood disease and lack of animal models make studies even harder. The purpose of this study was to evaluate the adequacy of a murine chronic lymphedema model and investigate the potential role of stem cell therapy in lymphedema resolution. Methodology: Lymphedema was created in 18 Balb/c mice by circumferential resection of the skin, subcutaneous tissue and muscle of one hind limb with subsequent electrocauterization of the lymphatics in the perivascular area (sham group). Six of them were exposed to 4500 rads of radiation after 5 d (RT group) and another 6 mice were given both radiotherapy and a single injection of stem cells (cell therapy group), consisting of muscle-derived stem cells co-cultured with 50% supernatant from human lymphatic endothelial cells for lymphoendothelial differentiation. Volumetric analysis, lymphoscintigraphy, lymphoendothelial marker immunohistochemistry, RT-PCR and ELISA were done and compared to a control group. Results: Volumetric analysis showed increased volume in the sham group for only up to 2 wk compared to control. The RT group maintained its edematous state beyond 4 wk but little difference was found at 8 wk because part of the hind limb tissue necrotized and weared off by the effects of radiotherapy. The cell therapy group did not show significant differences in volume, but showed an improved flow in lymphoscintigraphy, increased LYVE-1 expression in IHC staining and increased expression of podoplanin, Prox-1 and Flt4 in RT-PCR. Conclusion: For sustained lymphedema, RT is necessary but with a dose adjustment. Stem cell therapy showed promising results at the molecular level, and repeated injections may lead to measurable changes in volume.
**VS05**

Disease progression in contralateral carotid artery after carotid endarterectomy

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Purpose: Despite the strict control of risk factors, we’ve experienced some patients with progression of stenosis of contralateral carotid artery after carotid endarterectomy (CEA). The purpose of this study was to evaluate the progression of atherosclerotic lesions in contralateral carotid artery after CEA. Patients and Methods: From March 1996 to May 2012, 76 CEA procedures were performed in 71 patients at our hospital. Among them, 67 patients, who were followed-up with duplex scan after surgery, were the targets of this study. We classified the stenosis of internal carotid artery (ICA) into four categories; none (0%-49%), moderate (50%-69%), severe (70%-99%), and occlusion using duplex scan. Progression of the lesion was defined as a deterioration of the stenosis into more severe category of stenosis. Multivariate analysis was used to detect the independent risk factor for the progression of the carotid lesions. Results: Average age of the patients at CEA was 71±7.6 (51 to 81) yrs. During the follow-up, progression of the contralateral carotid arteries was observed in 10 patients (14.9%). Their risk factors consisted of hypertension, smoking history, hyperlipidemia, diabetes, ischemic heart disease, and peripheral arterial disease. However, multivariate analysis could not detect the independent risk factors for progression of contralateral carotid arterial stenosis. Conclusions: After CEA, although all patients were receiving antiplatelet treatment, we identified an annual rate of progression of the carotid artery stenosis. Clinical and demographic factors were not helpful in predicting which patients would have disease progression.

**VS06**

Pursuit of the effective vascularization therapy; Importance of choosing an appropriate intramuscular injection part

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Introduction: The basic concept in most therapeutic strategies for chronic arterial occlusive diseases is local delivery of bioactive factors or cells. Previous animal model studies of chronic ischemia that tested delivery of these materials reported favorable therapeutic effects in some growth factors and cells. However, very little is known about the most appropriate region for delivery of these factors or cells. It might be possible to increase therapeutic efficiency by specific delivery to the target region. We aimed to identify therapeutic targets for effective development of collateral vessels. Material & Method: As a preliminary experiment, we performed angiography on a chronic ischemic rabbit limb. Post angiography, the collateral vessel developed in the coccygeo-femoral muscle (CFM) in all individuals. Thus, we effectively administered 100-μg basic fibroblast growth factor (bFGF), in 3 regions, in the CFM of the ischemic rabbit limb. The control group was injected in the adductor magnus muscle. Evaluation was carried out 28 days after intramuscular injection. Results: Injections to the CFM and associated blood pressure, angiographic score, and leg blood-flow volume showed significant improvement than that in the control group. Moreover, similar improvements were seen in the functional blood-vessel density measured with the tissue specimen. Conclusions: Vascularization was effectively promoted by choosing an appropriate treatment target and administering therapeutic factors that possibly had a curative effect.

**VS12**

A Novel Robotic Monofilament Test for Diabetic Neuropathy

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Purpose: We have reported a novel robotic monofilament inspector (RMI) as a standard machine for screening of diabetic neuropathy. In this study, we aimed to evaluate the efficacy of RMI as compared to the manual Semmes-Weinstein monofilament test (SW), vibration perception test (VP), and Toronto Clinical Scoring (TC) in the screening of diabetic neuropathy. Methodology: 116 consecutive patients with Type II diabetes were included. The examiner conducted the RMI, VP, TC, and SW test without knowledge of patients’ lower-extremity symptoms and blinded from the patients’ perception. The performance of each test was analyzed by generating ROC curves for the detection diabetic neuropathy. The area under the curve (AUC), sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were determined by logistic regression analysis with adjustment for underlying disease. Results: The prevalence of diabetic neuropathy detected (true positive) was highest in RMI, followed by SW, VP, and TC. The false positive rate for RMI, SW, VP, and TC were 26.42%, 24.53%, 33.96%, and 50.94%, respectively. The AUC of ROC curve for RMI was highest. It was slightly but not significantly higher than SW test. The AUCs of ROC curves of VP test and TC were significantly lower than RMI and SW test (Table 3, Figure 1). The sensitivity was highest in RMI, whereas the specificity was highest in SW test. Conclusions: Difference screening tests result in different detection prevalence of diabetic neuropathy even in the same group of patients. The RMI could be used as a reliable tool in the screening of diabetic neuropathy.
Clinical Features and Treatment for Functional Carotid Body Tumors

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ABSTRACT Objective: Functional carotid body tumors are rare but with risks such as malignant hypertension, postoperative persisten hypotension, injury of cranial nerve and stroke. The purpose of this article is to review the treatments available for functional carotid body tumors. Methods: During 7 years period, six functional carotid body tumors patients were found and underwent surgical treatment. All of them presented with preoperative abnormal catecholamine (norepinephrine, 721-452.2 ng/L; epinephrine, normal). One patient presented preoperative hypertension. Preoperative α- and β-adrenergic blockade were performed. Surgical methods included total resection (100%), saphenous vein interposition (33.3%) and carotid shunt (16.7%). Results: With careful monitoring and medical treatment, six functional carotid body tumors patients successfully underwent tumor resection. Intraoperative hypertensions (6/6, 100%) were found when tumors were resected. Postoperative complications included persistence hypotension (3/6, 50%), bucking (3/6, 50%) and deviation of the tongue on protrusion (3/6, 50%). Conclusion: The clinical features of functional carotid body tumor included preoperative abnormal catecholamine, per-operative fluctuations of blood pressure and other routine complications. Surgical resection is the choice for functional carotid body tumor. Careful preoperative evaluation, measurement of serum catecholamine, medical treatment such as α- and β-adrenergic blockade, gentle intraoperative manipulation are important in avoiding life-threatening complications.

Mid-term results of Stanford type B aortic dissections in northeast China - a single centre report

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Objectives: To investigate the mid-term outcome of Stanford type B aortic dissection patients who underwent thoracic endovascular aortic repair (TEVAR) or conservative therapy from a single centre in northeast China. Method: From September 1999 to December 2011, 235 consecutive patients with type B dissection admitted in our hospital (191 men; mean age 53.8 years; range 28-80). Among those, 113 patients were treated conservatively, while 117 by TEVAR. 5 patients received open surgery were excluded from this study. Results: In TEVAR group, technical success was achieved in all patients. Intentionally coverage of the left subclavian artery (LSA) was performed in 39 selective patients (33.3%) without revascularization. Both left common carotid artery and LSA were covered in 2 patients with an additional procedure of carotid-carotid bypass at the time of TEVAR. No paraplegia developed. In conservative group, 45 patients (39.8%) were defined as complicated dissection (rupture, malperfusion syndrome, or aorta dilation), who refused TEVAR because of financial problem. The overall 30-day and in-hospital mortality was 6.5% (4/117 in TEVAR group, and 11/113 in conservative group, P<0.05). 5 patients needed re-intervention due to retrograde type A dissection in one, consistent type endoleak in two, stent migration in one, and abdominal aortic aneurysm in one. Deaths in chronic phase during a mean 3.5 years; follow-up showed no significant difference in groups (3/113 in TEVAR group, and 4/102 in conservative group, P>0.05). Conclusions: TEVAR is safe and feasible for type B aortic dissection, especially in complicated dissection. The cost, as well as the medical insurance, influences the development of TEVAR in northeast China.

Maggot Therapy for Chronic Ulcer: Systematic review, Meta-analysis and Cost-effective

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Purpose: The efficacy of the Maggot wound therapy (MWT) therapy remained controversial. We aimed to conduct a cohort study and a meta-analysis to assess treatment effects. Methodology: A cohort study was performed in diabetic foot ulcer (DFU) patients who were treated with MWT or conventional wound therapy (CWT). The healing probabilities were estimated. A meta-analysis was performed to pool our study with previous studies identified form Medline and Scopus. Results: The estimated incidence of wound healing was 5.7/100 (95% CI: 4.49, 7.32) patients-week, and the median time to healing was 14 weeks. The hazard ratio of wound healing was 7.66 times significantly higher in the MWT than the CWT. The average cost of treatments in patients with DFU were lower in the MWT than the CWT (P<0.001). For meta-analysis, the treatment effects were moderately heterogeneous (Chi-square = 6.18 (d.f.=4) p=0.186; I2=35.2%), with the pooled RR of 1.77 (95% CI: 1.01, 3.11), i.e., the chance of wound healing was 20% significant higher in the MWT than the CWT. The average cost of treatments in patients with DFU were lower in the MWT than the CWT, with the median of US$292.82 and US$490, respectively. Conclusion: Our evidence suggests that the MWT is significantly better in wound healing and cost-effectiveness than the CWT. An updated meta-analysis or large scale randomized control trial is required to confirm this effect.
Usefulness of Viabahn endoprosthesis in vascular field

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The GORE VIABAHN Endoprosthesis is constructed with a durable, reinforced, biocompatible, expanded polytetrafluoroethylene (ePTFE) liner attached to an external nitinol stent structure. The flexibility of the GORE VIABAHN Endoprosthesis enables it to traverse tortuous areas of the SFA and conform closely to the complex anatomy of the artery and hemodialysis access. A database was collected for the period 2011 through 2012 and was prospectively reviewed. We used Viabahn endoprosthesis in 24 cases (including 14 cases in arterial system, 10 cases in venous system). In the aspect of 14 cases in arterial system, we used Viabahn endoprosthesis in 5 cases of atherosclerotic popliteal lesion, 4 cases of traumatic ruptured lesion (external iliac artery: 2, subclavian artery: 1, poplitea artery: 1), 1 cases of in-stent-restenosis, 3 cases of endoconduit during EVAR. In the aspect of 10 cases in venous system, we used Viabahn endoprosthesis in 1 case of central vein stenosis, 9 cases of venous anastomosis stenosis of hemodialysis access. All Viabahn endoprosthesis showed good patency in early follow-up period. Most of all, compared with self-expanding or balloon-expandable stent, Viabahn sent-graft is very flexible and tolerable to torsion or flexion from joint movement, which makes it suitable for blood vessels around joints like superficial femoral artery, popliteal artery, and subclavian artery. Moreover, smooth lumen can prevent neointimal growth between stents.

The application of oral enteral nutrition support (Anso) for abdominal aortic aneurysm patients who underwent endovascular aortic repair (EVAR) under local anesthesia

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Objective: To investigate the value of oral enteral nutrition support (Anso) for abdominal aortic aneurysm (AAA) patients who underwent endovascular aortic repair (EVAR). Methods: The data of 30 AAA patients who underwent endovascular aortic repair (EVAR) was restrictively reviewed. The patients were divided into two groups ( Group A = 15, with postoperative oral enteral nutrition support of Anso, 50 g, tid; Group B = 15, with postoperative common food. The postoperative data were compared between two groups, such as the hospital stay, infection of operative incision rate and nutritional state in the third and seventh day after operation. Results: The postoperative hospital stay of group A were lower than group B (P < 0.05). The plasma albumin in group A in the third day and the seventh day were higher (P < 0.05). Conclusion: Oral enteral nutrition support (Anso) improved the nutritional status of AAA patients who underwent EVAR, and shorten postoperative hospital stays.

Emergency endovascular stenting as first-line treatment for symptomatic or ruptured abdominal aortic aneurysm: Hong Kong East Cluster Experience

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Purpose The use of emergency endovascular stenting for ruptured abdominal aortic aneurysm was started since 2009 in Hong Kong East Cluster. This study is to report our experience with endovascular stenting for symptomatic or ruptured abdominal aortic aneurysm comparing with emergency open aneurysmal repair. Method A Retrospective review is conducted with data retrieved by CDARS for patient who underwent emergency open repair or endovascular stenting from Jan 2002- June2012. 30-day mortality was compared and statistical analysis was performed using SPSS 19. Result A total of 95 patients with symptomatic or ruptured AAA underwent emergency surgery. Fifty two were treated with open aneurysmal repair while 43 were treated with emergency endovascular stenting respectively. One of the patient failed endovascular stenting and required open repair. The endovascular devices involved include Medtronic Endurant and Cook Zenith. The mean age for open repair and endovascular stenting were 78.3 and 77.9 (p=0.81) respectively. Blood loss for patients with open repair was significantly higher than patients in endovascular group (p<0.01, 2855ml vs 448ml). The average OT time for open group and endovascular group were similar 179 vs 155 minutes (p= 0.08). Thirty-day mortality for endovascular group is significantly lower than open group (p= 0.01, 20.9% vs 46%). Endoleak occurred in 12 patients and 6 of them required re-intervention and no procedure-related mortality were reported. Conclusion Emergency endovascular stenting for symptomatic or ruptured abdominal aortic aneurysm is associated with improved survival outcome compared with open repair. Re-intervention for endovascular stenting does not affect overall survival.
Endovascular management of pseudo-aneurysms of the aorta close to the left subclavian artery origin

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Pseudo-aneurysms of the aorta in the vicinity of the left subclavian artery (LSA) origin are uncommon, and often remain clinically silent until presenting with life-threatening haemoptysis. These pseudo-aneurysms can result from a variety of causes, including accidental or iatrogenic trauma; as a complication of surgical or percutaneous treatment of aortic coarctation; contained rupture after dissection, and infections, especially tuberculosis, among others. These patients have poor outcomes after conventional surgery. Their endovascular management produces technical challenges due to variety of anatomic and etiologic reasons, including enlarged aortic knuckle producing acutely angulated arch with issues related to device deployment and alignment, frequent association of co-existent aortic arch hypoplasia, dilatation of the proximal LSA that may approach the diameter of the arch and anomalies of the origin of great vessels in selected patients with issues related to device sizing and proximal landing zones, and sub-clinical infection among others. Endovascular repair of such lesions is infrequently reported. We have evaluated the immediate and follow up outcomes of their endovascular management in a group of patients, using a Talent or Valiant (Medtronic, USA) device. Prolonged pre-treatment with appropriate antibiotics was given, if necessary. All patients were afebrile and had no clinical or laboratory evidence of infection at the time of device placement. Device deployment technique was modified in selected patients to ensure optimal anchorage in hypoplastic aortic arches with co-existent gross dilatation of the LSA. Adjunct endovascular procedures, such as embolization of collateral feeding vessels, were required to optimize the long term outcomes. All patients underwent a stringent imaging follow up. Endovascular stent-grafting of these pseudo-aneurysms is feasible in selected patients with low mortality and morbidity rates. Close imaging surveillance is crucial to detect secondary aortic complications, including peri-graft infection, and assess the long-term results of endovascular repair.

Macro study on Traumatic Thoracic Aortic Injury Due to Traffic Accidents in Japan using the Japan Trauma Data Bank

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Purpose: Japan formally started a trauma record system, the Japan Trauma Data Bank (JTDB), from 2004 and currently over50 facilities. In this retrospective study. Method: Data organization was conducted by the Quality Assessment Identification Committee of the Japanese Association for Acute Medicine Clinic and the Trauma Registry Investigation Committee of the Japan Trauma Society, and from the resulting JTDB Annual Report 2004&2011; 2007, the number of cases involving thoracic aortic injury with the injury code of AIS90 regarding traffic accidents involving four-wheeled vehicles. Those injured were divided into four cohorts (those in automobiles, on motorcycles, on bicycles, and pedestrians) and the number of cases involving aortic injury and incidence rate were compared for each. Results: Among 114 institutions nationally, there were 20,257 cases of trauma, 9181 of which involved traffic accidents. In the 4 cohorts, there were 3844 cases involving automobiles, 2044 involving motorcycles, 1342 involving bicycles, and 1525 involving pedestrians, and thoracic aortic injuries were 43 (0.32%), 31 (0.33%), 4 (0.08%), and 25 (0.40%), respectively. Discussion: While the number of injuries per cohort decreased in frequency in the order automobile, motorcycle, pedestrian, and bicycle, the rate of occurrence of thoracic aortic injuries differed, with pedestrian showing the highest rate, followed by motorcycle, automobile, and bicycle. Conclusion: Thoracic aortic injuries caused by traffic accidents occurred most frequently in automobile accidents. We determined that the pedestrian cohort had the highest occurrence rate and the bicycle cohort the lowest.

Microsurgical Procedures for Para- & Infra-Malleolar Distal Bypass Depending on the Conditions of Target Outflow Artery

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Critical limb ischemia (CLI) is manifested by resting pain and a non-healing wound. Diabetic patients are more likely than other patients to develop peripheral arterial occlusive disease (PAD) that
is amenable to arterial revascularization. In these patients, target outflow arteries show intimal dissection, hypertrophy, and medial calcification with various degrees of these combinations. To achieve higher patency and limb salvage rates, we have to select a reliable method for vascular anastomosis depending on the conditions of target outflow arteries. We report our approach for limb salvage in patients with CLI employing microsurgical revascularization. Over the past ten years, 87 patients (average: 70 years; range: 42 to 91) were treated for diabetic and ischemic foot ulcers. Among these patients, microsurgical para- and infra-malleolar distal revascularizations were performed in 16 patients with a reversed saphenous vein graft (RSVG) in 10, a combination of RSVG and a subscapular arterial system (SSAS) in 2, and a combination of RSVG, SSAS and short vein graft in 4. Two simultaneous arterial revascularizations were performed in 4 patients using a subscapular arterial system. Fifteen of the 16 patients with microsurgical revascularization were ambulatory at an average follow-up of 2.3 months, and the primary patency rate was 87.5%. Conclusion: In our experience, a microsurgical approach leads to improvements in graft patency and limb salvage rates. Therefore, plastic surgeons should play an important role in distal arterial reconstruction as well as in free flap soft tissue reconstruction of the foot in patients with diabetes mellitus and ischemic ulcers.

**VS26**

**Results of Endovascular Therapy for Arteriosclerosis Obliterans (ASO) with Infrainguinal Lesions**

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Background: Endovascular therapy (EVT) for ASO with infrainguinal lesions have been performed in more patients in recent years because of improvement of the devices. However, restenosis is still a major limitation after EVT. We evaluate the results of EVT in our hospital. Methods: EVT were consecutive140 (Trans-Atlantic Society Consensus II: TASC A; 9, B; 24, C; 15, D; 28) patients in the superficial femoral arteries (SFA) and popliteal artery (PA), 76 patients (82 arteries) in below the knee arteries (BKA) evaluated from January 2005 to December 2011. The patients who underwent successful EVT (with or without nitinol stent) were retrospectively selected and analyzed. Primary patency was defined as treated vessel without restenosis and repeat revascularization. Secondary patency was defined as target vessels which become totally occluded. Results: The initial success rate of EVT for SFA & PA was 97%, primary patency rate at 5-year were TASC A; 100%, B; 90.5%, C; 86%, D; 34.5%. Secondary patency rate were A; 100%, B; 90%, C, 87%, D; 53.5%, respectively. 84.6% of EVT for BKA were accompanied with EVT for SFA & PA (all successful) and primary patency at 5-year were 54.6%(anterior tibial artery), 73.2%(posterior tibial artery), 74.5%(peroneal artery). Mean lesion length in the SFA were19.4 cm, and mean utilizing number of stents (Nitinol stents) were 2.3. Limb salvage rate were over 70% in CLI patients with EVT only and there were no hospital death. Conclusion: Even secondary patency rate was still low in the TASC D (SFA) lesions, We can not deny the efficacy of EVT in the infrainguinal lesions. Improvement of EVT and expansion of its indication may bring benefits especially for CLI patients in poor general condition.

**VS27**

**Validation of the BASIL survival prediction model in patients with severe limb ischaemia undergoing revascularization in the Asian population**

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Purpose: The Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL) predictor model is a tool to predict likelihood of survival in severe limb ischaemia (SLI) patients with infragastric disease. Identifying patients who are likely to survive beyond 2-years will aid in clinical decision-making regarding a bypass-first or angioplasty-first revascularization strategy. As the model’s prognostic performance has only been validated in the UK, this study aims to assess its validity in the Asian population. Methodology: 140 SLI patients who had undergone either bypass surgery or angioplasty between January 2008 and December 2010 in the National University Hospital of Singapore were studied. The discriminative performance of the predictor model was tested using receiver operating characteristic (ROC) analysis. Calibration of the model was evaluated by comparing predicted 6-months, 1-year and 2-years survival with the observed survivals respectively. Results: The BASIL model predicted 6-months, 1-year and 2-years survival was 91.34%, 86.54%, and 79.30% while actual observed survival was 83%, 79%, and 69.25%, indicating an overestimation of survival of 8.34% (95%CI: 3.26–12.74), 7.54% (95%CI: 2.43–13.57) and 10.05% (95%CI: 3.25–16.74) respectively. The area under ROC curve was 0.606 for 6-months (95%CI: 0.457–0.755), 0.597 for 1-year (95%CI: 0.474–0.720) and 0.625 for 2-years (95%CI: 0.523–0.727). 95% CI for 6 months and 1-year survival included 0.5, indicating no discriminative performance of the model. Conclusion: The BASIL model consistently overestimates survival when applied to the current Asian population. These findings suggest that it requires adaptation prior to be used in the Asian setting.
Long term results of endovascular management of steno-occlusive lesions of the aorta caused by non-specific aortitis (Takayasu’s arteritis)

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Purpose: To evaluate long term outcomes of endovascular management of steno-occlusive lesions of the aorta caused by non-specific aortitis. Background: Non-specific aortitis is a rare form of arteritis, involving the aorta, its branches and the pulmonary arteries. These patients frequently have steno-occlusive lesions in the aorta producing difficult-to-control hypertension, congestive heart failure, flash pulmonary edema and ischemia distal to the stenosis. These lesions are difficult to treat surgically due to diffuse long segment involvement, the presence of pan-aortitis and difficult to control disease activity, and have a high incidence of graft failure after reconstructive surgery. Method: We have retrospectively evaluated the outcomes in 112 consecutive patients who underwent endovascular treatment over a 17-year period. The diagnosis in each patient was based on the criteria established by the Aortitis Syndrome Research Committee of Japan. We treated patients with symptomatic SICAD during a study period of 72 months were retrospectively reviewed. The clinical manifestations, initial radiologic findings, methods of treatment and serial follow-up studies were analyzed. Results: Five patients underwent early intervention after symptom presentation, mainly due to aneurysmal dilatation or distal hypoperfusion. Three of the 7 patients who were initially treated conservatively had progression of disease and delayed intervention was performed. However in one of these patients, thombo had propagated extensively and therefore stenting was not possible. Fortunately, a collateral artery from the SMA was feeding the hepatic artery preventing hepatic ischemia, yet the overall anatomy was very unfavorable. The remaining 4 patients were managed conservatively with success. The mean follow-up duration for the 7 patients who underwent successful intervention was 26.7 mo and all stents were patent during this period. All patients who underwent intervention had SICAD extending to either the hepatic or splenic arteries and the mean length of dissection was 4.1 cm. Conclusion: Intervention for symptomatic SICAD seems to be effective and durable. Early intervention is recommended if there is any risk of progression because a delay can lead to development of unfavorable anatomy for subsequent intervention.

Feasibility of early intervention for symptomatic spontaneous isolated coeliac artery dissection

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Purpose: Spontaneous isolated celiac artery dissection (SICAD) is a very rare disease and recent case reports tend to advocate conservative management of this disease unless it presents with complications. We report the feasibility of early intervention for symptomatic SICAD and suggest a possible management strategy for this disease. Methodology: Twelve patients presenting with symptomatic SICAD during a study period of 72 months were retrospectively reviewed. The clinical manifestations, initial radiologic findings, methods of treatment and serial follow-up studies were analyzed. Results: Five patients underwent early intervention after symptom presentation, mainly due to aneurysmal dilatation or distal hypoperfusion. Three of the 7 patients who were initially treated conservatively had progression of disease and delayed intervention was performed. However in one of these patients, thrombo had propagated extensively and therefore stenting was not possible. Fortunately, a collateral artery from the SMA was feeding the hepatic artery preventing hepatic ischemia, yet the overall anatomy was very unfavorable. The remaining 4 patients were managed conservatively with success. The mean follow-up duration for the 7 patients who underwent successful intervention was 26.7 mo and all stents were patent during this period. All patients who underwent intervention had SICAD extending to either the hepatic or splenic arteries and the mean length of dissection was 4.1 cm. Conclusion: Intervention for symptomatic SICAD seems to be effective and durable. Early intervention is recommended if there is any risk of progression because a delay can lead to development of unfavorable anatomy for subsequent intervention.

Symptomatic Isolated Dissection of the Superior Mesenteric Artery

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Purpose: To summarize the outcomes of spontaneous isolated superior mesenteric artery dissections (SMAD) with conservative management. Methods: From April 2007 to July 2012, 22 consecutive patients with symptomatic spontaneous isolated SMAD were retrospectively reviewed. Short-term anticoagulation was adopted in 21 patients and expectant therapy was adopted in 1 patient with
chronic liver disease. We grouped the patients with patent false lumen with both entry and re-entry (Group I, n=5) and partially or completely thrombosed false lumen (Group II, n=17). Follow-up CT angiography (CTA) was generally taken after 1 week, 1 month, and 6 months after admission. Results: All patients were discharged without symptoms after conservative management and median duration from admission to symptom relief was 2 (0-7) days. Endovascular or surgical approach for persistent symptoms or complications was not needed in all cases. In Group I, serial CTA demonstrated no interval changes and patients were asymptomatic during 18.0±141.7 (6.1-33.5) months. However, in Group II, CTA 1 week after admission revealed aggravation of true lumen stenosis in 12 (66.7%) patients (including 6 cases of SMA occlusion) compared with initial CTA despite of symptomatic relief. Serial follow-up CTA in group II revealed progressive improvement of true lumen stenosis or occlusion, and resolution of false lumen thrombosis during 19.1±6.3 (0.4-51.1) months of follow-up. Conclusions: The therapeutic regimen for SMAD should be established based on clinical symptoms and the degree of SMA stenosis could not be the indication for invasive treatment because the true lumen stenosis has been improved with time in most cases.

Invited Presentation

VS31

Symptomatic Complicated Type B Aortic Dissection in India: Outcomes of endovascular management & its impact on aortic remodelling

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Entry tear coverage in type B dissection is an appealing method to treat acute complications, and by inducing false lumen thrombosis, it can also prevent late aneurysm formation. Patients with type B aortic dissections, acute or chronic and complicated or uncomplicated, have been successfully treated by thoracic endovascular aortic repair (TEVAR) over the last decade. Many reports, including large trials such as the INSTEAD, have reported the true and false lumen changes and patient outcomes following TEVAR for patients with stable type B dissection. However, structural changes within the aorta after TEVAR for acute and chronic complicated type B aortic dissections are not well documented. We have studied the morphology of the stent graft, aortic remodelling and volumetric changes in the true and false lumen by analyzing the serial CT angiographic images during follow up in a group of patients with symptomatic, complicated type B dissection who underwent a successful TEVAR. The primary entry point was covered in all patients using a Talent or Valiant (Medtronic, USA) device. All procedures were technically successful and resulted in amelioration of symptoms during follow up in most patients. No major procedure-related complications were encountered. There was no instance of stroke, paraplegia or death in the 30-day period after treatment. Sealing of the primary entry tear was confirmed at CTA 1 week-1 month after treatment in all patients. The maximum aortic diameter decreased, true lumen diameter increased and false lumen diameter decreased during follow up in most patients. We found that a lack of increase in the true lumen volume was associated with endoleaks or distal reperfusion. Partial or complete thrombosis of the false lumen along the stented segment of aorta was recorded in all patients at 6-month follow up CTA. There was an association between the increase in postoperative true lumen volume and the degree of false lumen thrombosis. The patients in whom the true lumen volume did not increase continued to have a patent false lumen. Further, the larger pre-operative maximum thoracic aortic diameter and smaller true lumen volume also adversely influenced the false lumen thrombosis after TEVAR. Whereas most patients showed varying degrees of false lumen thrombosis in the thoracic aorta after TEVAR, the infra-diaphragmatic false lumen remained largely perfused. Optimal understanding of the natural history of this finding may support a role for secondary endovascular interventions in treating distal re-entry points and persistent infra-renal aortic expansion. Overall, endovascular repair of complicated Type B aortic dissection is feasible, safe and appears to promote early aortic remodelling. Most treated patients maintained at least partial false lumen thrombosis during follow up. Since continued false lumen patency correlates strongly with late aneurysm formation, such favorable remodelling may be considered as a surrogate for prevention of late aneurysm. Long follow-up is required to validate this concept.

Verbal Presentation

VS40

Vascular injuries of the extremities are a major challenge in a third world country.

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Introduction: Vascular trauma of extremities is very common in third world countries. Mostly it is due to poor traffic laws, street crimes, robberies and violent situations including road side bomb blasts and industrial accidents. We would like to share our experience of dealing vascular injuries of extremities over past 10 years in a tertiary care centre. Methods: This was a retrospective study carried out in the department of vascular surgery of Liaquat National Hospital, Karachi, Pakistan. All cases with vascular injuries of upper and lower limb that presented with signs of salvageable limb and presented within 12 hours of injury were included in the study. Patients with more than 12 hours of presentation and whom primary amputation done were excluded from the study. Results: There were 300 patients. Mortality was 5 %. Limb salvage
rate was 75%. The causes of trauma were RTA=55%, Firearms = 20%, Bomb-blast = 5%, Industrial accidents = 10% and miscellaneous = 10%. Major arterial injuries were Popliteal Artery =43%, Femoral Artery = 28%, Brachial = 20%, Axillary = 5%, SubClavian = 2% And Infra-Popliteal = 2%. Conclusion: Because of the violent situation in the third world countries the vascular injuries of the extremities are the major contributor of limb loss. This morbidity can be reduced by educating people, improving law and order situation and better training with provision of vascular services in remote areas so the delay factor can be reduced and hence the morbidity and mortality can be reduced to several folds.

**VS42**

Is Endovascular Repair A Durable Option for Chronic Type B Aortic Dissection?

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**Purposes:** Endovascular repair (TEVAR) has gained popularity in treating chronic type B aortic dissection by depressurizing the false lumen and preventing rupture. However, the outcome of the procedures could be affected by the chronicity of the dissection flap and the presence of multiple fenestration sites. This study is to investigate the short- and mid-term outcomes of TEVAR in chronic type B aortic dissection. **Methodology:** From 2004 to 2011, a total of 67 consecutive patients with chronic type B aortic dissection were treated by TEVAR. Their preoperative characteristics, operative outcomes, and survivals were analyzed. **Results:** The mean time interval between dissection and the first operation was 39.1 ± 7.7 months. The mean aortic diameter was 5.3 ± 0.18cm. Nineteen patients required hybrid procedure to extend the proximal landing zone. Complications included retrograde type A dissection (n=2) and paraplegia (n=1). The 30-day mortality rate was 0.7%. Fifty-five patients had mid-term follow-up of which 11 patients had distal tear after 41.6 ± 3.6 months. The aortic diameter increased in 17 patients, remained static in 25, and decreased in 13. Aortic dilatation after TEVAR is associated with a lower survival rate (81.4% at 3 years). The 1-, 3- and 5-year estimated overall survival rates were 91%, 85.9%, and 78.7%, respectively. Only one patient died of aortic rupture after procedure. The re-intervention rate at 1 year and 3 years were 4.4% and 30.1%, respectively. Conclusion: TEVAR carries low peri-operative mortality and morbidity, however its long-term durability is challenged by distal tear and aortic dilatation.

**VS44**

Potential role of omental wrapping to prevent infection after treatment for infectious thoracic aortic aneurysms

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Objective: Postoperative infection control is one of the most important issues for infected aortic aneurysms, and methods of preventing recurrent infection remain controversial. We previously reported that omental flaps could prevent or reduce the occurrence of infection after implantation of an artificial aortic graft. However, the long-term outcomes of this strategy are unknown. We used imaging modalities to evaluate the long-term effectiveness of wrapping prosthetic grafts with omentum to prevent postoperative graft infection. Patients and methods We surgically treated 521 patients with thoracic aortic aneurysm (TAA) at our hospital between July 1995 and May 2012. Of these, 22 (3.9%) (male, n = 17; mean age, 68.2 ± 11.4 years) had infectious TAA. All infectious aneurysms were resected, all patients received in-situ grafts and 16 grafts were wrapped with omentum. We followed-up all survivors annually using computed tomography. We also used angiography to investigate blood circulation in omental flaps over the long term. Results Five patients died in hospital (operative mortality, 26.3%). The operative mortality rates of patients with and without omental wrapping were 12.5% and 50.0%, respectively (p = 0.06, NS), and the 5-year event-free survival rates were 84.6% and 33.3% (p = 0.04), respectively. Omental flaps around prosthetic grafts and their blood circulation were preserved well over the long term. Conclusion Wrapping implanted artificial aortic grafts with omental flaps could prevent or reduce the occurrence of subsequent infection. Furthermore, blood circulation in the flaps must be well-preserved to improve long-term outcomes.

**VS45**

Remodeling of proximal neck angulation after endovascular aneurysm repair

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Objective: To investigate remodeling of proximal neck (PN) angulations after EVAR. Methods: A multi-detector CT scan of AAAs treated with EVAR was reviewed, and PN angulation was measured on a 3D image. 78 patients (54 Zeniths and 24 Excluders) were enrolled in the study. Results: PN angulation was 50 ±/- 20 degrees preoperatively, 36 ±/- 14 degrees one week after EVAR, and 28 ±/- 13 degrees after 3 years. PN angulations <60
degrees were 41 +/- 13 degrees preoperatively, 31 +/- 12 one week after EVAR, and 26 +/- 13 after 3 years. Angulation >60 degrees was 78 +/- 14, 51 +/- 11, and 40 +/- 12 degrees, respectively. The greater preoperative PN angulation was, the greater its reduction immediately after EVAR (P < .001). The diameter shrinkage of AAAs with a PN angulation >60 degrees was 3 +/- 6-mm after one year; a significantly smaller shrinkage than with a PN angulation <60 degrees (7 +/- 7-mm, P < .05). AAAs with a PN angulation >60 degrees had a larger angulation reduction and a smaller diameter shrinkage after the EVAR procedure. PN angulation of AAAs treated by Zenith was 49 +/- 22 degrees preoperatively, 34 +/- 14 one week after EVAR, and 25 +/- 13 after 3 years. The angulation of Excluder was 52 +/- 17, 41 +/- 14, and 38 +/- 9 degrees, respectively. The PN angulation reduction of Zenith and Excluder was similar one week after the EVAR procedure. However, unlike Excluder, the PN angulation in Zenith continued to reduce for a long period at a slow pace. Conclusions: PN angulation was not a major issue in a mid-term follow-up of AAAs with adequate PN length for patients in this series who received a Zenith or Excluder graft.

VS46

Efficacy of continuous low dose PGE1 infusion after paramalleolar bypass -trial of poor run-off cases-

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Objective: To investigate the effect of short-term intra-bypass graft infusion therapy with low dose prostanglandin E1(PGE1), our results were summarized in patients with CLI showing the poor blood flow cases after pallarmalleolar bypass grafting. Design: Retrospective study. Methods: From September 2006 to August 2011, 177 limbs from 159 patients performed pallarmalleolar bypass grafting were studied. 40 limbs were admired the low dose PGE1 infusion after bypass surgery due to the low blood flow (below 20ml/ min) of grafts (PG group). The results of cases required the low dose PGE1 infusions were summarized, and compared to the results of cases without PGE1 infusion (nonPG group). Results: Compared with the nonPG group, the rate of patients with hemodialysis (HD) in PG group and were 30% (37 limbs) (versus 5% (3 limbs; P<0.01). The number of graft failure within 7 days after bypass surgery were 6 cases (13%) in PG group (versus 8 cases (5%) in nonPG group; P>0.09). The PG group patients exhibited lower the 2-year cumulative primary patency rates (75% versus 49%; P<0.01). The 2-year cumulative secondary patency rates and limb salvage rates were 89% and 97% in PG group, respectively (versus 83% and 94% in nonPG group; P>0.05). There were no significant difference between nonPG group and PG group. Conclusions: The short-term intra-bypass graft infusion therapy of prostanglandin E1 might be effect the prevention of the graft failure in early post bypass surgery.

VS47

Revealing maximal diameter of upper limb superficial vein with an elevated environmental temperature

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Purpose: Ultrasonography is recommended by National Kidney Foundation for pre-operative analysis of vein condition for fistula creation in end-stage renal disease patients. Various provocative techniques focus on body positioning, tourniquets and local temperature changes to optimize venous diameters. This study examined the effect of environmental temperature over whole body on the superficial vein size. Methodology: Left upper limb superficial veins of thirteen healthy volunteers were marked at sites of forearm cephalic vein, arm cephalic vein and arm basilic vein. The size of these superficial veins were measured at two cross-sectional diameters for each subject using ultrasound at 26 degrees centigrade and averaged out. Venous diameter at marked sites for each subject was measured again after whole body warmed under a Bair Hugger blanket at 43 degrees centigrade for 20 minutes. The vein size at 26 degrees centigrade and 43 degrees centigrade for each superficial vein was compared. SPSS STATISTICS 19 was employed to analyze differences due to the change of environmental temperatures. Results: All three sites displayed statistically significant increases in diameters concordant with the higher temperature. Forearm cephalic vein showed the highest mean diameter increase as well as the greatest individual increment of 52%. Arm cephalic vein showed the least mean change in diameter, whereas, increments in basilic vein in arm varied from 4% to 38%. Paired sample t-test p values for the three veins were 0.004, 0.022 and 0.020, respectively (95% CI). Conclusion: This study proved environmental temperature exerts significant effect on the vein size measured by ultrasound as pre-operative assessment for fistula.

VS48

The Impact of End-Stage Renal Disease (ESRD) on the Occurrence of Vein Graft Intimal Hyperplasia

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Progressive intimal hyperplasia (IH) has been known to be the primary cause of vein graft stenosis in distal bypass. With the rapid increase in recent years of the number of patients with ESRD, distal bypass for CLI is being performed more frequently and investigation of IH in vein grafts (VG) in patients undergoing this procedure is warranted. Purpose: We herein investigated fac-
tors influencing onset of IH in patients with and without ESRD who underwent distal bypass. Subjects and methods: Infrastructural bypass using a VG was performed for a total of 219 limbs (295 grafts) with CLI at our department during the 10-year period from 2000. During follow-up, the 70 grafts in 65 patients for which IH was identified were investigated. After allocating grafts in patients with ESRD to the E group (n=36) and those in patients without ESRD to the N group (n=34), factors related to onset of IH and long-term results were retrospectively investigated. Results: Incidence of IH was 12.8% and 12.5% in the E and N group respectively, while time to initial onset of IH was 6.8 and 10.2 months in the E and N groups, respectively (P<0.05). Five-year secondary patency rate and limb salvage rate were both favorable at 79.9% and 88.0% in the E group and 84.3% and 93.8% in the N group, respectively. No significant differences were observed for these rates. Conclusion: The present findings suggest that intraoperative graft flow influences the onset of IH in ESRD patients. In addition, because IH occurs at a relatively early stage, appropriate graft surveillance and salvage may contribute to high patency and limb salvage rates.

**VS49**

Histopathological changes of Vascular Calcification in the Arterialized Vein of Renal Failure Patient After repair of Arterio-Venous Fistula

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Background: Native vein remains the superior dialysis conduit, since it was first described 30 years ago. However, arterialized vein (AV) of arterio-venous fistula (AVF) develops progressive stenosis due to thrombosis, occlusion and calcification in 37% of hemodialysis patients who received AVF. Therefore, we designed this study to find out one of factors which cause failure of AVF through pathologic assessment of vascular calcification (VC) in the repaired AVF. Material and Methods: Specimen of AV were obtained during the repair of AVF to study morphological change in the wall of the AV after AVF construction. We retrospectively analyzed 27 patients with AV specimen which prepared and stained with hematoxylin & eosin (H & E), Masson’s trichrome and Verhoeff van Gieson stains. Results: Of the 27 patients, only 7 patients had evidence of VC in the AV (5 patients media only, 2 patients intima and media involved). The repaired AVF was caused by aneurysms (3 cases), stenosis (2 cases), Kidney transplantation (2 cases). Patients who had evidence of VC were 4 males and 3 females (mean age 49.4 years). The mean duration from AVF construction to the repair of AVF was 88 months (14 to 50 months). The incidence of diabetes mellitus, hypertension in patients with VC was 2 cases each other. Conclusion: This study suggests that VC in the end stage renal diease patients showed various morphologic change and may be one of factors which cause failure of AVF.

**VS50**

Intra-aneurysm sac pressure measurements in patients with aneurysm expansion after endovascular aneurysm repair.

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(Purpose) This study was performed to determine the intra-aneurysm sac pressure of abdominal aortic aneurysms (AAAs) after endovascular aneurysm repair (EVAR) in type II endoleak (EL) patients with aneurysm expansion. (Methodology) Between January 2008 and May 2012, 125 patients with AAA were treated with EVAR at our institute. Five patients (4%) underwent percutaneous transulimal embolization of type II EL due to aneurysm expansion of more than 5 mm. In two of the five patients, direct intra-aneurysm sac pressure measurements were made during the embolization procedure using a 0.014-inch guide wire-mounted pressure sensor. The pressure wire was inserted into the aneurysm sac via the hypagastoric artery in one patient and via the superior mesenteric artery in the other patient. The mean pressure index (MPI) was calculated as the ratio of mean sac pressure to mean systemic pressure. (Results) Both of the patients were treated with a Zenith flex endovascular graft for AAA. The interval between EVAR and embolization was 12 months and 15 months, respectively. Inflows of type II EL were the lumber artery in one patient and the inferior mesenteric artery in the other patient. Intra-aneurysm systolic/diastolic/mean pressures were 82/62/70 mmHg (Systemic pressure: 127/72/95 mmHg) and 83/65/74 mmHg (Systemic pressure: 126/74/86), respectively. MPI was 73.6% and 86.0%, respectively. In both cases, the aneurysm diameter stabilized after embolization. (Conclusion) The measurement of intra-aneurysm pressure using a pressure wire provides information on the hemodynamics within the aneurysm sac. In this investigation, the pressure in the aneurysm sac in both type II EL patients with aneurysm expansion after EVAR was relatively high.
Infrainguinal angioplasty for patients with critical limb ischemia

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Purposes. The use of infrainguinal angioplasty as a first-line therapy for critical limb ischemia (CLI) is increasing with continuing advances in imaging techniques, angioplasty equipment, and endovascular expertise. We evaluated the efficacy and the feasibility of infrainguinal angioplasty in patients with CLI. Patients and Methods. Between April 2006 and June 2012, infrainguinal angioplasty was performed on 63 limbs of 57 patients (48 males; mean age 71 years) with CLI (Fontaine grade 3 or 4). One straight-line flow was established from the abdominal aorta down to the crural vessels, and 9 limbs (14%) had multilevel treatment. Initial technical and clinical success rates were 94% and 77%, respectively. No major complication requiring surgical intervention occurred after angioplasty. Limb salvage, survival and amputation-free survival were analyzed. Results. The median follow-up duration was 362 days. The superficial femoral artery was treated in 24 limbs (38%), 30 limbs (47%) were limited to the crural vessels, and 9 limbs (14%) had multilevel treatment. Initial technical and clinical success rates were 94% and 77%, respectively. No major complication requiring surgical intervention occurred after angioplasty. Limb salvage, survival and amputation-free survival were 88%, 82% and 75% at 12 months, respectively, and 78%, 52% and 43% at 24 months, respectively. The involvement of the crural vessels was significantly associated with poor amputation-free survival. Conclusions. Infrainguinal angioplasty is a safe and technically feasible procedure and offers good limb salvage rate in patients with CLI. However, these patients have a very poor survival and this may hamper any attempts of revascularization.

Timing of referral for permanent vascular access: analysis on the status and the barriers to timely referral

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The K/DOQI recommended that a permanent vascular access should be placed 6 months before the anticipated start of hemodialysis (HD) therapy. In practice, however, many patients started HD using a catheter. We analyzed the timing of referral for permanent vascular access and the barriers to timely referral. From January 2009 to December 2009, 198 patients with chronic kidney disease underwent creation of permanent vascular access. Referral before HD was done in 118 (58.1%) patients, and referral after HD in 80 (41.9%). In patients referred before HD therapy, 108 AVFs (91.5%) and 10 AVGs (8.5%) were made. For the initiation of HD in these patients, 71 patients (60.2%) used AVF, 6 patients (5.1%) used AVG, and 37 patients (31.4%) used permanent catheters. Fifteen patients (12.8%) experienced maturation failure or delayed maturation. When divided by the timing of referral, 28 (41.4%) patients were referred > 6 months before starting HD, 33 (46.7%) in 2-6 mo, and 33 (26.8%) within 2 mo. In each group, 27 (96.4%), 29 (87.9%), and 21 (39.6%) patients started HD using functional AVF or AVG. Four AVFs were not used due to slow progression of disease. In patients referred after HD therapy, 66 AVFs (82.5%) and 14 AVGs (17.5%) were made. The causes of late referral were late visit to nephrologists in 35 (43.8%), unexpected acute renal failure in 23 (28.8%), patient’s refusal or noncompliance in 14 (17.5%), and unknown in 8 (10.0%). Only small portion of patients were referred 6 months before anticipated HD therapy. Avoidance of catheter insertion was successful in patients referred 2 months before HD. The modifiable barrier to timely creation of permanent access was mainly late visit to nephrologists.

Hybrid operation room concept for combined endovascular and surgical procedure in vascular field (Cath-room based and C-arm based experiences)

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We hope to share out experiences in cath-room based hybrid room (Cath-HR) during 2008-2010, in C-arm based hybrid room (C-arm-HR) experiences during 2011-2012. For atherosclerotic diseases, 128 lesions of 80 patients in cath-HR, 188 lesions of 123 patient in C-arm-HR were performed. Endovascular procedure only cases were majority in cath-HR. However, Hybrid procedure including endovascular and surgical therapy are majority in C-arm-HR. Hybrid procedure was very unsuitable in Cath-HR because we worried about infection, absence of anesthesiologic assist, supplement, and so on. For aortic aneurysm diseases, 15 cases of TEVAR and EVAR in Cath-HR, 26 cases in C-arm-HR including 1 case of coronary artery bypass graft with hybrid thoracic endovascular aortic repair and 2 case of 2-stage procedure of TEVAR and EVAR. For hemodialysis access problems, only 4 patients of AVF/AVG malfunction were treated with only endovascular procedure in Cath-HR. However, 30 patients of primary AVG/AVG and 60 patients of AVF/AVG malfunction, 15 patients of permanent catheter related procedure could be performed in C-arm-HR. For deep vein thrombosis, 7 patients of deep vein thrombosis were treated by only endovascular procedure in Cath-HR. Recently, 13 patients of hybrid procedure could be done with good results in C-arm-HR. For chemoport, 10 patients with unsuitable vascular anatomy of primary chemoport and 11 patients of chemoport malfunction could be treated in C-arm-HR. The trend to-
wards hybrid techniques is more a revolution than an evolution due to the rapid integration into the surgical techniques.

**VS56**

**Factors related to vein graft failure in paramalleolar bypasses for critical limb ischemia: Retrospective cohort study**

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Background: Paramalleolar bypass (PMB) is the choice of treatment in limb salvage for critical limb ischemia (CLI); however, vein graft failure (VGF) is associated with additional medical care and cost. The aim of this study is to identify preoperative, postoperative, and operation related risk factors for VGF mainly due to progressive intimal hyperplasia. Methods: Since 2006, 188 consecutive patients with CLI underwent 229 PMBs in our institute. Of 229, because VGF (including failing graft) due to vein graft stenosis mainly occurred from 4 weeks to 2 years after surgery, 9 patients underwent successful revision surgery for early graft thrombosis were included in the analysis, while 9 who had operative death, major amputation or VGF without revision within 4 weeks were excluded. In the remaining 220 PMBs, risk factors for VGF were assessed by univariate screen and a stepwise selection Cox model, and p-values less than 0.05 were considered significant. Results: VGF occurred in 52 PMBs (23.6%) between 1-24 months, and primary patency rate at 2 years was 72.0%. The main cause was vein graft stenosis due to progressive intimal hyperplasia (96.2%). Multivariate analysis identified the following risk factors for VGF in PMB: loss of gait function after PMB (hazard ratio [HR] 1.71, P < .001), spliced vein graft (HR 1.85, P < .001), combined PMB and inflow surgical revascularization (HR 1.66, P =.004), poor quality of vein graft (HR 1.63, P =.001). Conclusion: This study identified 4 risk factors for VGF in PMB between 1 and 24 months after surgery.

**VS59**

**Microsurgical Autogenous Radiocephalic Arteriovenous Fistula Creation in Adults with Cephalic Vein of Internal Diameter Under 2mm – Our early experience**

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Introduction: Autogenous radiocephalic arteriovenous fistula (RCAVF) is the gold standard for vascular access in ESRF patients requiring haemodialysis. Guidelines recommend anastomosing vessels with minimal diameters 2.0mm for successful RCAVF creation. Microsurgical RCAVF creation is used at our centre for fistula creation with small cephalic veins that would otherwise be deemed unsuitable. We describe our early results with microsurgical RCAVF creation in patients with cephalic vein diameters ≥8804; 2.0mm. Methods: Medical records of patients who had microscopic RCAVF creation at Singapore General Hospital between June 1, 2010 and September 30, 2011, were reviewed retrospectively. All patients had pre-operative vein mapping to confirm vessel size and continuity. Only those with cephalic vein diameter ≥8804; 2.0mm were included. Kaplan-Meier survival curves were generated for access patency, functional, and secondary access patency. Results: 11 patients underwent microsurgical RCAVF creation. Mean cephalic vein diameter was 1.7±0.3mm. Mean duration of surgery was 104.5±15.6mins. Access patency in the first 24hours was 100%. Access patency at 1, 4 and 6months was 90.8, 73.3 and 72.3% respectively. One early RCAVF failure occurred on the 3rd post-operative day. 6 needed secondary intervention and secondary access patency at 1, 4,6months was 90.8, 81.8, and 80.3%. Functional access patency at 1, 2, 4,6months was 89.3, 55.3, 433, 42.8%. Mean time to AVF cannulation was 2months. There were no surgical complications. Conclusion: Early data suggests that microsurgically created AVFs with cephalic veins of ≥8804; 2.0mm show good patency rates, despite prevailing co-morbidities.

**VS61**

**SURGICAL TREATMENT FOR INFECTED ABDOMINAL AORTIC ANEURYSM: A CASE SERIES OF 19 PATIENTS.**

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PURPOSE: An infected abdominal aortic aneurysm (AAA) is a rare but life-threatening condition, and still remains a challenging entity in terms of the surgical management. In this study, we report the outcome of infected AAA operated in our institution. METHODS: From October 1995 to July 2012, 19 consecutive patients with infected AAA underwent surgery. Patients consisted of 14 men and 5 women with a mean age of 68 years. Diagnosis was obtained by CT scan, blood cultures, and cultures and pathological findings of aortic wall. RESULTS: In-situ grafting was performed in 18 infrarenal cases and auto-arterial patchplasty in suprarenal one. Resection of aneurysm and thorough debridement of surrounding infectious tissue was done except the first patient. Grafts were covered with omental flap in all but one patient with covering the graft by retroperitoneal fat. Prosthetic grafts were impregnated with antibiotic except the first 4 cases. Pulsavac Plus System (Zimmer) was employed for intraperitoneal irrigation in the last 6 cases. Responsible microorganisms were isolated in 13 patients, in which Staphylococcus and Streptococcus species were dominant. Antibiotics were administered intravenously until CRP...
decreased to normal level, and then were switched to oral administration. There were 2 ureteral injuries, 1 ischemic colitis as complications of surgery. Outcome was favorable in 17 patients, but the remaining patients died from sepsis and ischemic colitis.

CONCLUSION: We conclude that in-situ prosthetic reconstruction accompanied by thorough debridement and omentopexy, prolonged intravenous antibiotics administration, and long-term oral antibiotics, can offer the best chance to relieve from this dreadful disease.

**Outcomes of Abdominal Aortic/Iliac Aneurysms between Elective and Emergency Endovascular Aneurysm Repair**

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Objective: To report the outcomes of abdominal aortic/iliac aneurysms (AAIA) treated with endovascular aneurysm repair (EVAR) between elective and emergency cases. Method: Between January 2010 and December 2011, 90 patients (69 men; mean age 76 years, range 42-93) with elective (60 cases) and emergency (30 cases) AAIA underwent EVAR. Emergency AAIA defined as acute non-ruptured (18 cases) and ruptured (12 cases) aneurysms, which underwent EVAR within 24 hours after admission. Technical success and periprocedural mortality rate between 2 groups are the primary endpoints. Secondary endpoints are significant differences in the rate of operative details, graft complications, re-intervention and survival at 2 years. Results: The mean follow-up period was 14±3 months (range, 1-24 months). Technical success rate in elective and emergency was 98% and 100%, respectively. The 30-day mortality rates were 0% and 6.7% in elective and emergency group. The emergency group needed shorter times of procedure and radiation but required more blood transfusion. The tube and aorto-uni-iliac graft were more used in emergency than elective EVAR (57.0% vs 12.0%, P=0.03). The two groups were similar in rates of perioperative graft complications and re-intervention. During follow-up, there were no differences in the rates of freedom from graft complications, devices related re-intervention and survival. Conclusions: EVAR is a feasible treatment in emergency AAIA. The 30-day mortality in emergency cases appears to be higher than elective cases. However, mid-term outcome is similar in both groups of patients.

**Re-intervention for Distal Stent Graft-induced New Entry after Endovascular Repair with a Stainless-steel Based Device in Aortic Dissection**

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Purpose: Stent graft-induced new entry (SINE) has been increasingly observed after thoracic endovascular aortic repair for aortic dissection. The aim of this study was to investigate the mechanism of late distal SINE, prevention strategies, proper size selection of the stent graft, and implantation sequence. Methodology: From November 2006 to May 2011, 99 patients with aortic dissection underwent TEVAR at our center. Among them, 27 distal SINES were recognized. Eight of these cases with complicated distal SINE required intervention with new distal endografts, and all were enrolled for further analysis. Results: Of the 27 cases with distal SINE, 8 underwent a secondary endograft procedure from February 2011 to July 2011. All of them were successfully treated. A high taper ratio (35% ± 11%) and excessive oversizing of the true-lumen area at the distal stent level (293% ± 76%) were noted among these patients. Conclusions: There seemed to be a high incidence of the occurrence of distal SINE, however also low rates of mortality and complications after TEVAR for aortic dissection utilizing stainless-steel based stent grafts. Complicated distal SINE can successfully be resolved by distal endograft implantation. Excessive oversizing of the distal stent graft as measured by the true-lumen area may be a significant factor causing delayed distal SINE. Precise size selection is crucial for the distal end of the stent, especially for high taper ratio dissection pathology in which the implantation sequence of a distal small sized stent graft first might be considered to prevent future distal SINE.

**Complete Pedal artery revascularization bypass surgery using Great Saphenous vein Y-graft in diabetic critical limb ischemia**

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Purpose: Critical limb ischemia may be treated optimal revascularization. We evaluate the early results of complete pedal artery bypass surgery using the great saphenous vein Y-graft (Y-graft PABS) for the purpose of saving the diseased limb. Methodology: From Jul 2008 to June 2012, during two years, a total of 31 diabetic foot patients (28males and 3 females, mean age 69.5(51-82)years old, 37 limbs) underwent Y-graft PABS. The early clinical results in terms of mortality, major morbidities and limb sal-
18 cases of concomitant proximal bypass were simultaneously selected. Results: During the medical care, there was only one ascending thoracic aorta. All patients showed concomitant major state. Major complications were statistically associated early post-structive pulmonary disease or emphysematous lung (FeV1<50%). Aorta) may be applied with safe.

(DPA) and far distal posterior tibial artery (dPTA). There was one surgery should be applied aggressively to the patients in terms of management of traffic accident. Traditionally, early operative treatment of the traumatic descending thoracic aorta tear?

Is the delayed stent-graft justified for optimal treatment of the traumatic descending thoracic aorta tear?

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Purpose: Blunt aortic injury is one of the most lethal complications of traffic accident. Traditionally, early operative treatment have been accepted as optimal treatment. However, combined major organ hemorrhage and heparin usage during the surgery may increase the operative mortality. Stent graft insertion is technically feasible, however, early insertion may be associated late retrograde type A aortic dissection or aortic rupture. Methodology: We present our 5 cases of delayed stent-graft insertion (6 week to 6 month after trauma) for traumatic aortic tearing that located descending thoracic aorta. All patients showed concomitant major trauma with bleeding for example, liver laceration, diaphragm rupture, pelvic bone fracture, pulmonary contusion, bowel perforation, femur fracture. For this reason, delayed stent grafts were selected. Results: During the medical care, there was only one case of transient obstructive pneumonia in the left lung and left vocal cord palsy. All stent graft was successfully inserted except one case of the post procedural left subclavian artery obliteration. Carotid to subclavian bypass using 6mm Gore-Tex ringed graft was performed for the patient. There was no leakage and no other complication related with the procedure. All patients discharged and have been survived during follow up period without any sequelae. Conclusion: In the setting of traumatic aortic injury, initial medical treatment with delayed stent-graft strategy on selected patients (especially who have bleeding complication other than aorta) may be applied with safe.

Treatment of serious complications following endovascular repair for type B thoracic aortic dissection

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Background: The purpose of this research is to describe our experience with the treatment of serious complications after primary endovascular stent-graft repairs (EVAR) in type B aortic dissection. Methods and results: From June 2008 to March 2012, 37 patients underwent previous EVAR for type B dissection that developed serious complications afterwards. They received endovascular, open and medical treatment in our department. The complications included endoleaks, distal true lumen collapse, retrograde dissection, paraplegia/paraparesis, stroke, stent-graft (SG) migration and malignant deployment, as well as lower limb ischemia. Median follow-up time was 23.5 months. 28 patient recovered from complications. 9 patients unhealed. Overall 30-day mortality was 2.7% (1/37), the survival rate in our group was 94.6% (35/37). The cause of death were stroke, retrograde type A dissection and malignant SG implanted in to false lumen. Conclusions: The EVAR has become a widely used method in clinic. It has the advantages in minimal invasion, less blood loss, simple operation, quicker postoperative recovery, and low mortality. However, some characteristic complications may occur, and some specific continuing treatments need to be taken. A reduction in these complications could be achieved by optimal patient selection and matching. Eventually, further studies are recommended to reveal life-long surveillance and long-term clinical effects. Key Words: aortic dissection, endovascular repair, stent-graft, complication

Prevalence of Vascular Anomalies In Klippel Trenaunay Syndrome

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Objective: Klippel-Trenaunay syndrome (KTS) is a condition defined by the association of the three physical features: capillary malformation, varicosities, and hypertrophy of bony and soft tissues. However, KTS is characterized by congenital vascular malformations (CVMs) that are difficult to classify. Therefore the present study was undertaken to analyze the various CVMs in patients with KTS. Methods: Sixty-one patients with KTS were enrolled, and their CVMs were divided into predominantly venous defects, predominantly lymphatic defects, and mixed vascular defects using the Hamburg Classification. Capillary malformation...
(CMs) were subdivided into port-wine stain, telangiectasia and angiokeratoma. Truncular and extratruncular vascular malformations were detected using ultrasound and magnetic resonance imaging (MRI). Reflux in the superficial and deep venous systems was also evaluated. Results: Forty-five patients (73.8%) had predominantly venous defects, 46 (6.6%) had predominantly lymphatic defects and 12 (19.6%) had mixed vascular defects. CMs were detected in 54 patients (88.5%), among which port-wine stain was the most predominant 65.6%, followed by telangiectasia 50.8% and angiokeratoma 29.5%. Extratruncular venous malformations (VMs) were detected in 47 patients (77.0%). In contrast, truncular VMs were found in 50 (82.0%). Among these, embryonic lateral marginal vein showed the highest occurrence, accounting for 52.5% (32 patients). Extratruncular lymphatic malformations (LMs) were found in 13 patients (21.3%) and truncular LMs in 17 (27.9%). Conclusions: Patients with KTS have a variety of CMs, but both extratruncular and truncular venous malformations continue to be target for intervention.

Poster Presentation

**VS100**

Intra-operative cephalic vein distensibility can predict maturation of radiocephalic arteriovenous fistula

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Purpose There have been many studies about risk factors of maturation failure. However, there is no valuable predictor. The aim of this study is to investigate the predictive value of the intra-operative cephalic vein distensibility (CVD) on maturation of radiocephalic arteriovenous fistula (RCAVF). Methodology. A total of 77 subjects, who underwent RCAVF were reviewed and analyzed. Diameters of the radial artery, cephalic vein (CV), and maximally distended CV were checked intra-operatively, CVD was measured by the ratio of intra-operative maximally distended diameter to the natural diameter of CV. Failure to mature is defined as the inability to use the AVF for HD within 6 months after surgery or require radiologic or surgical correction for the maturation. Results. The maturation rate was 77.98%, and age, sex, hypertension, and diabetes mellitus were not significant factors for maturation. In univariate analysis, there were significant differences in the intra-operative maximal CV diameter (P = 0.002), the intra-operative CVD (P = 0.000), post-operative CV flow (P = 0.003), and post-pearing CV diameter (P = 0.027) on duplex ultrasound at 1 week after the operations, between matured and non-matured RCAVF. The intra-operative CVD (Odds ratio: 0.065, 95% CI: 0.005-0.842, P = 0.036) was the only significant risk factor for the maturation failure in a multivariate analysis.

Conclusions. These results suggest that the intra-operative CVD is a predictor of RCAVF maturation. Intra-operative measurement of venous distensibility may be helpful in choosing the most suitable native AVF type for each individual patient, which possibly improves the native AVF maturation.

**VS101**

Long term results of below-knee bypass for critical limb ischemia

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Purpose: To know the results of below-knee bypass using vein graft. Methodology: A retrospective review of below-knee bypass patients treated for critical limb ischemia between April 2007 and March 2012 was conducted at one institution. Patient characteristics and outcome were reviewed. Kaplan-Meier curves were used to estimate patency rates. Results: A total of 36 patients with critical limb ischemia was undertaken by below-knee bypass surgery during this period. The average age of patients at the time of repair was 72+/-10 years and 26 were male. About Fontaine classification 12 patients were III and 24 patients were IV. The primary patency rate was 81% at four years and the secondary patency rate was 88%. Limb salvage rate at four years was 84%. The survival rate at four years was 62% in this group. Conclusion: Below-knee bypass using vein graft for critical limb ischemia patients showed excellent long term patency rate and limb salvage rate. However, high mortality rate in this group was confirmed.

**VS102**

RISK FACTOR ANALYSIS OF NEW BRAIN LESION (NBL) ASSOCIATED WITH CAROTID ENDARTERECTOMY (CEA)

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Purpose: To identify the potential risk factors of clinical and procedural variables for the incidence of new diffusion-weighted MR imaging (DWI) lesions after CEA this study was conducted. Method: From January 2006 to November 2011, 94 patients who had been studied by DWI on the day after carotid endarterectomy were included. Data were retrospectively investigated by reviewing of vascular registry protocol. 53 patients underwent carotid endarterectomy by Classic technique and 41 cases underwent by eversion technique. For evaluation of embolic event during procedure, the DWI was done in all patients within 1 week after treatment. Seven clinical variables and 3 procedural variables were analysed as potential risk factors. The risk factor analysis was done by logistic regression analysis. Result: Mean age of the pa-
tients was 66 years old and 81% was male. Mean diameter of stenosis was 72.2% in accordance with the NASCET criteria. 24 patients had ulcer on plaque. From the results of Diffusion weighted MR, the incidence of peri-procedural new brain lesions was 27.6% in our series. Among all variables assessed, logistic regression analysis showed that existence of ulcerative plaque and classical operative technique were significantly related post-procedural appearance of NBL. The 30 day incidence of any stroke was 6.4% and the incidence of any stroke after 31 days was 3.2%. There was neither peri-procedural hospital mortality nor any death after 31 days. Conclusion: These results suggest that more concentrated procedure will be needed for high risk patient’s carotid endarterectomy.

**VS103**

**THE RESULTS OF ASPIRATION THROMBECTOMY IN THE ENDOVASCULAR TREATMENT FOR ILIOFEMORAL DEEP VEIN THROMBOSIS**

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Aim: To evaluate the results of aspiration thrombectomy in the endovascular treatment for iliofemoral deep vein thrombosis (DVT) this study was conducted. Methods: One hundred patients (59 women, 41 men; mean age 60.48) who treated with catheter directed thrombolysis (CDT) between November 2001 and April 2011 were reviewed. For complete clot dissolution, we have performed urokinase based catheter directed thrombolysis (CDT) in early period (~ 2004). And then we performed CDT with aspiration thrombectomy in late period (~ 2011). Patients were divided into two groups those treated by CDT with aspiration thrombectomy (AT) (AT group; 71 patients) or those using CDT alone (CDT alone group; 29 patients). Result: Treatment time (40.9 vs. 22.0 hours; p<0.001) and dose of urokinase (248 vs. 161 IU; p<0.001) were decreased by the use of AT. The use of AT did not improved over all lytic success (p=0.136) but more patients had complete thrombus resolution. The recurrent iliac vein occlusion was founded in 18 patients (18%), and the 48 months over all iliac vein patency rate was 78.6%. There was no major morbidity or mortality. The prophylactic IVC filters were inserted in 46 patients and the entrapped thrombus were founded in 6 patients of AT group. The evidence of venous reflux was identified 3 patients in CDT alone group (15.0%) and 2 patients in AT group (1.9%). Conclusion: These results suggested that the use of AT offers more effective thrombus removal in less time and dose of thrombolytic agents infusion.

**VS104**

**Aortic Chimney Stent Graft Repair For Ruptured Mycotic Aneurysms Involving Visceral Vessels Is A Safe and Viable Option: A case series**

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Ruptured complex mycotic aortic aneurysms (CMA) with involvement of visceral vessels pose distinct challenges in management to vascular surgeons. Traditionally, ruptured CMA are treated with antibiotics, surgical resection and debridement of the infected paraortic tissues, followed by reconstruction of aortic flow, either anatomically or extra-anatomically. Despite antibiotic and surgical therapy, morbidity and mortality remain high. Aortic chimney stent graft repair offers a less invasive alternative for patient with CMA who often have significant comorbidities. We present two cases of ruptured CMA involving visceral vessels that were successfully treated with chimney stent grafting.

**VS105**

**Early Experience of Treatment of Endoleak after Endovascular Aortic Aneurysm Repair(EVAR)**

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Purpose To evaluate early outcome of treatment of endoleak after endovascular aortic aneurysm repair (EVAR). Methodology We have analyzed clinical data of 45 patients who were performed EVAR at Chonbuk National University Hospital from January 2007 to December 2011 retrospectively. Results EVARs were performed in 45 patients. During a mean follow-up of 17.8 months, endoleaks were detected in 16 patients (35.5%) including type I (43.7%), type II (18.7%), type III (43.7%), type V (12.5%). The incidences of endoleak according to gender, age, morbidities, type of stent graft and anatomical characteristics were not significant statistically. Intraoperative type I endoleak (n=4) were all performed balloon dilatation (BD) and stent insertion. 1 of postoperative type I endoleak (n=3) was performed stent insertion, and the other was observed without increasing the diameter of sac. Type II endoleaks (n=3) have not been increased of sac without additional procedures. Intraoperative type III endoleak (n=1) was performed BD and stent insertion. 4 of postoperative type III endoleaks (n=6) were observed for median 12.3 months without increasing of the diameter of sac. 2 cases were follow up loss. Type V endoleaks (n=2) were detected. But we couldn’t try to additional procedures because one patients has highly morbidities and the other had been follow up loss. Conclusion: The treatment of endoleak after EVAR should be determined through closed observation because that has a possibility of spontaneous sealing without additional procedures especially type II and III.
Influence of peripheral nerve crushing method on continuous intractable pain of diabetic/ischemic lower limb ulceration

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Purpose: Some patients still own the continuous intractable pain of diabetic/ischemic lower limb ulceration in spite of the use of non-steroidal anti-inflammatory drugs or narcotic analgesic. The purpose of this study was to evaluate the effect of peripheral nerve crushing method to relieve the pain of the lower limb ulceration. Methodology: The sensation of the foot was supplied by five nerves, superficial peroneal, deep peroneal, tibial, sural, and saphenous nerve. To relieve the continuous intense rest pain, each nerve was crushed with an instrument over an extent of 1.5 cm in less than one-third leg. We performed peripheral nerve crushing method between April 2009 through April 2012, and reviewed retrospectively to estimate the effect, sensory regeneration, complication and outcomes. Results: Thirty six patients (25 male; mean age (±SD) at presentation was 71.7 ± 8.0 years) underwent the peripheral nerve crushing method. Primary diseases of ulcerations were diabetes (n= 6, 16.7%), diabetes with atherosclerosis (n=20, 55.6%) and atherosclerosis (n=10, 27.7%). Thirty four patients (94.4%) could get pain relief immediately after the operation. All crushed nerves had regenerated within 6 months (4.21 ± 0.79 months). There are two complications, incision infection in 6 patients (16.7%) and temporary paralysis of toes in 3 patients (8.3%). 20 patients had their ulcers recovered by debridement or toes cleavage. On the other hand, 9 patients had died in the hospital because of vascular co-morbidities. Conclusion: Peripheral nerve crushing method was effective in the treatment for diabetic/ischemic lower limb ulceration with continuous intractable pain.

Phonoangiography with a Fractional Order Chaotic System “A New and Easy Algorithm in Analyzing Residual Arteriovenous Access” Stenosis

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To detect the early developmental stages of stenosis, this study explored an arteriovenous (AV) access stenosis detector based on the fractional order chaos system (FOCS). This device comprised the Burg method and FOCS. The Burg method was used as an autoregressive (AR) model to estimate the frequency spectra of phonoangiographic signals and identify the spectral peaks in the region of 100 to 800 Hz. The frequency spectra differed significantly between standard and turbulent blood flow in AV access. We found that the frequency and amplitude in the power spectra varied according to the degree of AV access stenosis. By contrast, FOCS was used to monitor the differing frequency spectra between the normal condition and AV access stenosis. The dynamic errors formed various patterns and could be used to estimate the degree of AV access stenosis. This study recruited 30 patients treated with percutaneous transluminal angioplasty (PTA). The patients’ phonoangiographicbruit signals were recorded and used to analyse variations in the trajectories of butterfly patterns. The results indicated that the proposed method estimated AV access stenosis well and that venous anastomosis (V-Site) could be used to evaluate the surgical operation outcome of PTA.

Chimney grafts in the treatment of complex aortic aneurysms – the Singaporean experience

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Background: Complex aortic aneurysm (CAA) can be successfully treated by fenestrated/branched endograft (FBE) or the chimney graft technique (CG), which is a cheaper and readily available alternative. We present our experience with the CG in the endovascular management of CAA. Methods: Patients undergoing endovascular repair using CG for CAA from January 2010 - December 2011 were reviewed. Results: 9 patients (8 male and 1 female) were reviewed. Median age was 72 years (range 57-74 years). The mean aneurysm size was 63mm (range 41-78 mm). Indications for CG were leaking mycotic aneurysm in 2 patients, a large-diameter CAA whose treatment could not be delayed for FBE in 5 patients, type 1a endoleak in one patient previously treated with infrarenal EVAR and one patient with dissection of the common iliac artery involving the renal artery. 5 patients had unilateral renal chimneys, 1 had unilateral chimney with unilateral iliac branch device, 1 had bilateral renal chimplneys, and 1 had triple chimneys with superior mesenteric artery and renal combinations. Technical success was 92.85%. One patient had a ruptured renal stent balloon leading to blocked chimney stent. No 30-day mortality was recorded. One small type 2 endoleak due to retrograde flow from the lumbar artery was detected and is under surveillance. Mean follow up was 7.4 months (range 1-12). No aneurysm has enlarged on postoperative imaging and all target vessels were patent. Conclusions: Our results show that CG is feasible and useful in the management of CAA. However, long term endograft durability and proximal fixation remain a significant concern and should be addressed in subsequent studies.
Pathological ascending aorta should not be selected for proximal landing zone

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**Purpose:** To share our experience of hybrid procedures for the aortic arch aneurysms which required zone 0 landing. Method: From 2010 January to 2012 March, 10 hybrid arch procedures were performed (3 emergency and 7 elective). 5 patients underwent total debranching with endovascular stent graft placement. 2 patients underwent open total arch replacement and concomitant extended stent graft coverage for inappropriate proximal landing zone. 3 patients underwent extra-anatomical bypass with a chimney stent graft to the innominate artery and thoracic stent graft placement. Result: Mean patient age was 76±7 years. The average logistic EuroSCORE was 24.6%. The average diameter of the ascending aorta was 40±10 mm. Thirty-day of death and permanent paraplegia/paresis were 10% (n=1) and 0%, respectively. One patient with ruptured thoracic aorta aneurysm was lost. Three of five patients who underwent debranching with stent graft placement required ascending aorta banding for a type I endoleak at the operation. One patient required surgical repair for aortic dissection from partial clamp-injury. The other patients had no endoleak and no late aortic-related events. Conclusion: The results of our hybrid procedures deemed acceptable considering the backgrounds of the cases. However, to safely perform hybrid arch procedures, stent graft placement to pathological ascending aorta should be avoided.

A new method for treating secondary infection after TEVAR

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Thoracic endovascular aneurysm repair (TEVAR) has become a widely accepted alternative to open surgery because of its reduced invasiveness. Some authors have recently reported successful use of TEVAR to treat infected aortic aneurysm, but recurrent aortic infection after endovascular aortic repair or secondary infection of aortic endografts remains one of the most challenging problems in vascular disease. The general consensus regarding the treatment of infected graft material is that complete removal is necessary. However, because surgical results remain unsatisfactory in such cases, we devised and applied a new method, the “window operation”. We have treated 2 patients with secondary infections of thoracic endografts in staged operations. The infected aortic aneurysm was approached by left thoracotomy and the aneurysmal wall was opened with cardiopulmonary bypass on standby. The aneurysmal lumen between the aneurysmal wall and endograft was irrigated with a large volume of saline, then packed with diluted iodine-soaked gauzes for 2 days after surgery. The wound was then reopened and the gauzes removed. Prepared omentum was introduced into left pleural space and partly in the aneurysmal cavity. Postoperatively, antibiotics tailored to culture sensitivity were administered for 8-10 weeks. Both patients have remained well for over 1.5 years postoperatively. Results of open surgery for infected aortic aneurysm or secondary infection of thoracic endograft remain unsatisfactory. Endovascular aneurysmal repair could be helpful to improve operative results if the recurrence of infection can be overcome. We have devised and applied a new approach for treating recurrent infection in TEVAR cases with good results.

Trands of surgical treatment for peripheral arterial disease of middle volume hospital in Korea

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Objective: The purpose of this study is to review the trends of surgical treatment for peripheral artery disease in a mid-sized hospital in Korea. Methods: 112 cases of peripheral artery disease treated at single institute during the period from 2006 to 2011 were studied retrospectively. Based on the fact that endovascular treatment became more frequent than surgical treatment from 2009, these cases were divided into two groups of different time periods, one before 2009 (surgical period group) and the other from 2009 onward (endovascular period group) We analyzed the types and the locations of surgery as well as the clinical characteristics of patients and the results of treatment. Results: Surgical period group included 53 cases and endovascular period group included 59 cases. Demographic characteristics as well as the distribution of major atherosclerosis risk factors were not different between the two groups. Technical and functional success rate was similar in both groups. There were more acute cases in endovascular period than in surgical period. The cases that were needed suprainguinal or below knee exposures were similar in the two groups. In hybrid cases, suprainguinal or below knee exposures were more frequently needed during surgical period than during endovascular period. The cases of simple thromboemboleectomy or endarterectomy rather than bypass were more frequent in endovascular period than in surgical period. Conclusion: Recently, the role of surgical treatment was changing. Surgical treatment is used complementary to endovascular treatment for chronic limb ischemia and it is also used as a main method of treatment for acute limb ischemia.
Cilostazol and long-term outcomes in patients with critical limb ischemia undergoing an infrainguinal bypass

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Purpose: This study was designed to investigate the effectiveness of cilostazol on long-term outcomes in patients with critical limb ischemia (CLI) who underwent an infrainguinal bypass. Methodology: From April 1988 to March 2007, 247 patients underwent an initial infrainguinal bypass for limb salvage. A retrospective chart review of 228 patients, excluding 19 patients with early graft failure or operative death within 30 days after a bypass surgery, was performed in April-June 2012. Patients were stratified by prescription with or without cilostazol before hospital discharge. As a primary end point, amputation free survival (AFS), and as secondary end points, overall survival (OS), freedom of major adverse leg event (MALE), limb salvage (LS), and primary (PP) and secondary patency of a bypass graft (SP) were measured and calculated for up to 5 years by Kaplan-Meier method. To evaluate other perioperative risk factors, a Cox proportional Hazards analysis was performed. Results: Cilostazol was prescribed in 64 patients and not in 164 ones. Cilostazol group was superior to non-cilostazol group in PP (2 years 90% vs. 74%, 5years 74% vs. 60%, p=0.029) but there were no significant differences in AFS, OS, MALE, LS, or SP between two groups. Hypoalbuminemia and ambulation in AFS and OS, ambulation in LS, leukocytosis in MALE, dyslipidemia, cilostazol, eicosapentaenoic acid (EPA) in PP, dyslipidemia, leukocytosis, and EPA in SP were sown to be significant. Conclusion: Cilostazol improved PP that did not lead to AFS or OS. Nutrition and ambulation are more important factors for long-term outcomes of patients with CLI.

Solutions to Recurrent Tear after Endovascular Repair for Stanford Type B Aortic dissection: Repeat Endovascular Stenting without paraplegia

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Purpose: Endovascular therapy has become an attractive alternative of type B aortic dissection. Postprocedural complications such as endoleak, false lumen aneurysm formation, distal tear disruption, retrograde aortic dissection, spinal cord ischemia, paraplegia, and shock have been observed. Among these complications, recurrent distal tear leading to recurrent dissecting aneurysms after endovascular repair rarely happened. In this report, we describe such a case successfully managed by endovascular stenting three times without paraplegia. Methodology: We placed a stent graft to the descending aorta covering the proximal entry for a Stanford type B aortic dissection patient and planned a selective secondary endovascular repair to resolve persistent false lumen in the abdomen. The patient didn’t come until abdominal pain 5 years later. CTA revealed recurrent tears in thoracic and abdominal aorta with an extensive abdominal aortic dissecting aneurysm. One bare stent and 2 covered stents were used in second therapy. However, the patient suffered recurrent abdominal pain 3 months later due to distal tears and false lumen reperfusion. Finally, the third time endovascular therapy using 2 stents resolved the challenges. Results: The patient recovered smoothly without paraplegia and follow-up CT scan showed no intimal tear or false lumen perfusion. Conclusion: Recurrent intimal tears may occur after endovascular repair of Stanford type B aortic dissection and repeat endovascular stent-grafting is an effective and safe option for the treatment.
ENDOCOVASCULAR MANAGEMENT OF ISOLATED ILIAC ARTERY ANEURYSMS: RETROSPECTIVE ANALYSIS

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Purpose. To evaluate the early and mid term results of endovascular treatment of isolated iliac artery aneurysm (IAA) in patients. Methodology. From February 2004 to April 2011, patients with IAA underwent endovascular treatment. The strategies of treatment depended on the anatomical position and size of aneurysms. The I3 of 19 patients were followed up by abdominal CT angiography, and one patient had been treated abdominal aortic aneurysm previously. The medial records aortic findings of 12 patients (7 men, 5 women) were retrospectively reviewed. Results. Presenting symptoms were asymptomatic (n = 5), recurrent DVT (n=1), hydronephrosis (n=2), abdominal pain (n=1), claudication (n=2), and lower back pain (n=1). The mean aneurysm diameter was 39.6mm (from 20mm to 80mm). Sites of aneurysms were at the common iliac in 5 (41.7%), the internal iliac in 4 (33.3%), combined common and internal iliac in 4 (33.3%), combined common and internal iliac in 2 (16.7%), and combined common, internal and external iliac arteries in 1 patient (8.3%). Stent grafts, bare stents, or bifurcated aortoiliac stent grafts were used singly or combined. Mean diameter of was 17 mm, and mean length 85.0 mm The technical success was 91.7%(n =11). One patient underwent femoro-femoral bypass after stent graft placement in the aorta and the normal iliac artery. Mean follow-up period was 135.8 days. The stent graft patency rate was 100% On follow up CT, 1 patient had with a type I endoleak and 1 patient with type II endoleak. Conclusion. The endovascular treatment of internal iliac artery aneurysms shows a favorable early and mid-term results. The procedure is a safe, minimally invasive technique with low complication rates.

Successful endovascular treatment for acute juxtarenal aortic occlusion

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A 66-year-old man presented to the hospital with both limb weakness. Computed tomography (CT) revealed a juxtarenal aortic occlusion, a suprarenal aortic pseudoaneurysm and partial renal infarction. We performed an emergent thromboembolectomy with an over-the-wire Fogarty catheter for juxtarenal aortic occlusion via bilateral femoral arteries. One day later, follow-up CT angiography (CTA) showed expanded suprarenal aortic pseudoaneurysm and remnant aortic thrombus around the celiac artery. We performed thoracic endovascular aneurysm repair for suprarenal aortic pseudoaneurysm with cerebrospinal fluid drainage. We applied temporary occlusion balloons in celiac artery (CA) and superior mesenteric artery (SMA) to prevent further embolism, and then deployed aortic graft. Follow-up CTA 6 days after TEVAR demonstrated no endoleak and patent visceral arteries. He was discharged 11 days after procedure without any complications. Surgical repair of acute aortic occlusion and suprarenal aortic pseudoaneurysm may be associated with significant morbidity and mortality. Endovascular approach should be considered as a viable alternative in selected patients with complex aortic pathology.

Management of Spontaneous Isolated Dissection of the Superior Mesenteric Artery: Report from a single center

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Purpose: Spontaneous isolated dissection of the superior mesenteric artery (SIDSMA) is an extremely rare disease which can cause intestine ischemia or even bowel infarction. However, the optimal treatment of SISMAD has not been established. Here we report our experience in the management of symptomatic SIDSMA. Methodology: A retrospective review was performed in our single center between January 2007 and December 2011. SIDSMA was confirmed by CT angiography. Treatment options include conservative management, anticoagulation, endovascular stenting, and open surgery. The decision to intervene was based on the morphologic characteristics of SIDSMA on CT scan and the patient symptoms and signs. All patients were available for clinical follow-up after treatment. Results: 38 consecutive symptomatic patients (mean age 56 years; men 84%) with SISMAD were retrospectively reviewed. All patients had acute abdominal pain. Treatment included conservative therapy without anticoagulation in 11 patients, anticoagulation in 14 patients, endovascular stenting in 8 patients, surgical reconstruction in 2 patients and necrotic bowel resection in 3 patients. In patients receiving endovascular stents, 2 of them initially received anticoagulation therapy for months but failed. Median follow-up time was 26 months (range, 7-67 months). Conclusion: SISMAD is a rare entity and may be managed successfully in a variety of ways based on clinical presentation and morphological findings in CT. Conservative management can be applied successfully in symptomatic SIDSMA patients. Endovascular stenting may be preferred treatment in patients with severe intestine ischemia or severe compression of the true lumen.
Family history of aortic aneurysm is an independent risk factor for rapid growth of AAA in Japan.

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Objective: The aim of this study was to investigate risk factors for the rapid growth of AAA smaller than 50 mm (small AAA) in Japan. Method: We retrospectively investigated the clinical data of 374 patients, with a small AAA of less than 50mm in maximum diameter, who were referred to The University of Tokyo Hospital, Tokyo Medical University Hospital, or Saitama Medical Center in Japan between 1995 and 2008. Result: A total of 374 patients (321 men and 53 women) were followed up for a mean of 93 months. The mean diameter on initial examination was 38.9mm, and the mean growth rate of AAAs was 2.57mm per year. The growth rate of AAAs with initial diameter more than 45mm was significantly greater than those with initial diameter less than 45mm (3.33 versus 1.95 mm/year, P=0.0001). The growth rate of AAAs was significantly greater in the patients with hypertension (2.3 versus 1.7 mm/year, P=0.01), and family history of aortic aneurysm (4.2 versus 2.0 mm/year, P=0.04). Logistic regression analysis revealed that a large initial diameter and family history of aortic aneurysm were independent predictors of greater growth rate of small AAAs in Japan. Conclusion: In the present study, a large initial diameter and family history of aortic aneurysm were found to be independent risk factors for the rapid growth rate of small AAAs. Though few studies have mentioned thus far, family history of aortic aneurysm should be taken into account in the follow-up of patients with a small AAA.

Factors affecting Long-Term Survival of Abdominal Aortic Aneurysm after Open repair or Endovascular repair

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Background: Though there have been studies about immediate post-operative mortality of abdominal aortic aneurysm repair, post-operative long-term survival and its risk factors are not well known. In this study, we queried about long-term survival of AAA patients who had received open repair or endovascular AAA repair (EVAR) and factors affecting the mortality of AAA patients. Methods: We retrospectively reviewed consecutive AAA patients (n=503) treated with EVAR (n=164), open repair (n=332), open repair after EVAR (n=7) from September 1999 to February 2011 in Department of Vascular Surgery, Asan Medical Center. Patient demographics, comorbidities, and follow-up results of survival were analyzed. Outcomes were compared using univariate analysis, multivariate analysis, and Kaplan-Meier survival curve. Results: This study has shown that the overall 5-year survival rate is 77.34%, maximum follow-up period is 151 months, and that the overall mortality and 30-day mortality are 27.24% and 5.77% respectively. Old age over 80-years-old increases mortality by 3.52 (P<0.01). Female is higher risk for mortality by 1.81 (P=0.038). Chronic renal insufficiency (serum creatinine over 1.5mg/dL) increases mortality by 3.79 (P<0.01). Higher BMI (BMI>26) is associated with lower risk for mortality by 0.55 (P=0.042). Ruptured AAA is related with higher risk for mortality by 2.18 (P=0.016). Patients who had a cerebrovascular disease showed higher risk for mortality by 2.01 (P=0.035). Conclusions: In this study we have found that old age (over 80-years-old), female, chronic renal insufficiency, lower BMI, ruptured AAA and history of CVA increase long-term mortality of AAA patients.
Skin and soft tissue injuries after Embolo/sclerotherapy in patients with congenital vascular malformation

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Purpose) Embolo/sclerotherapy is considered as a main treatment strategy for congenital vascular malformation (CVM). However, few studies exist for the cutaneous complications after embolo/sclerotherapy, we report the incidence and the prognosis of skin and soft tissue injuries after embolo/sclerotherapy in patients with congenital vascular malformation. Methodology) We retrospectively reviewed 573 patients of whom were treated with embolo/sclerotherapy among the 1823 patients with CVM. Sixty-eight patients (11.9%) with skin and soft tissue injury after embolo/sclerotherapy were investigated. As the embolo/sclerosing agents, absolute or 80% ethanol, ethanolamine oleate, or N-butyl cyanoacrylate were used. Results) Among 68 patients with skin and soft tissue injury, the incidence was most common in extratruncular arteriovenous shunting type (61.8%). There were no skin and soft tissue injuries among the patients with arterial and lymphatic malformations. Among 573 patients treated with embolo/sclerotherapy, skin and soft tissue injuries developed in 15.6% of that used ethanol, 6.3% of that used ethanolamine oleate, and 8.3% of that used glue. Conservative management was performed in all patients and 40 patients (58.9%) were completely healed. However, 4 patients (5.9%) were needed amputation and 6 patients (8.8%) were required split-thickness or full-thickness skin graft as a consequence of embolo/sclerotherapy. Conclusion) Our study indicated that skin and soft tissue injuries relative frequently developed in CVM patients, especially extratruncular arteriovenous shunting type, treated with embolo/sclerotherapy, even though the majority of the injuries were completely healed by conservative management.

Comparative study between superficial femoral artery intervention using mobile C-arm in the operating theater versus fixed C-arm in the angiographic suite

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Purpose: Endovascular intervention (EI) for peripheral arterial disease has increased dramatically and is being performed by different specialists with the available resources. However the interventional outcomes between different resources have not been studied. The aim of this study was to analyze outcomes of EI for superficial femoral artery (SFA) atherosclerosis using a mobile C-arm compared to a fixed C-arm from a historical control group. Methodology: Between March 2009 and December 2010, EI for SFA atherosclerosis was performed in 54 limbs from 47 patients using a mobile C-arm in the operation theater (mobile group). In comparison, a historical group consisted of 76 limbs from 60 patients for whom EI for SFA atherosclerosis was performed using a fixed C-arm in the angiographic suite between July 2003 and May 2008 (fixed group). The outcomes of EI for both groups were retrospectively analyzed. Results: There was no statistically significant difference in demographic factors, TASC classification, and type of intervention between the two groups. Postoperative blood creatinine levels were not significantly different either. However, intervention time was statistically higher in the mobile group, although the amount of radiation exposure could not be quantified. Patency rates at 1 year were 77.1% and 73.7% in the fixed and mobile groups, respectively, and subgroup analysis for TASC A, B versus C, D lesions also failed to show statistical significance. Conclusion: Mobile C-arms have a smaller field of view and less detailed resolution, yet EI using a mobile C-arm in the operating theater is as effective as fixed C-arms in the treatment of SFA atherosclerosis in terms of patency and early postoperative outcomes.
Asian Guidelines for Venous Thromboembolism (VTE) prevention- are we any different?

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Venous thromboembolism (VTE) prophylaxis is under-utilized in Asia because of the misconception that its incidence is lower in Asians as compared to the Caucasians. The available data on VTE in Asia is limited due to the lack of well designed multicenter randomized controlled trials as well as non-standardized research designs, making data comparison difficult. Emerging data indicates that the VTE incidence is not low and in some instances comparable to that reported in the Western literature. There is also a trend towards increasing incidence of VTE, as demonstrated by a number of hospital-based studies in Asia. This could be attributed to lifestyle changes, ageing population, increasing awareness of VTE and wider availability of duplex ultrasound. The risk of VTE in hospitalized patients remains the same in Asians and Caucasians but the utilisation rate of VTE prophylaxis is suboptimal in Asia. The Asian Venous thrombosis Forum formulated a guideline in 2012 based on available evidence in Asia. On admission to the hospital, we recommend assessing the patients for both VTE and bleeding risk. We recommend mechanical prophylaxis for patients at increased risk of bleeding and also utilising it as an adjunctive measure in combination with pharmacological prophylaxis in patients with high risk of VTE. For patients undergoing general or gynaecological surgery and with moderate risk factors for VTE, we recommend prophylaxis with one of the following: Low Dose Unfractionated Heparin (LDUH), Low Molecular Weight Heparin (LMWH), Fondaparinux or Intermittent Pneumatic Compression (IPC). For the same group of patients at high risk of VTE, we recommend pharmacological or combination of pharmacological and mechanical prophylaxis. For patients undergoing major orthopaedic surgeries like total hip replacement, total knee replacement and proximal hip fracture surgery, we recommend using one of the following: LMWH, fondaparinux, rivaroxaban, apixaban, edoxaban, dabigatran, warfarin or aspirin with IPC. For patients admitted to the hospital with acute medical illness and has moderate risk of VTE, we recommend prophylaxis with LDUH, LMWH or Fondaparinux. For the same group with high risk of VTE, we recommend combination of pharmacological and mechanical prophylaxis. The recommended prophylaxis, based on local data, is slightly different from the other international guidelines. It is hoped that with collaboration and endorsement of experts in Asia, there will be increased utilization of thromboprophylaxis.

Iliac vein stenting as a durable option for residual stenosis after catheter based treatment of DVT

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Introduction: This study is to evaluate the primary patency and the clinical outcome after stenting for residual iliac venous stenosis during catheter based treatment (CBT) of acute deep vein thrombosis (DVT). Methods: Retrospective study was done for the patients who underwent iliac vein stenting after CBT of acute DVT from January 2005 to April 2011 in Inha University Hospital. All patients were evaluated with Electronic record, imaging and interview. The patency of iliac vein stent was evaluated with serial Computed Tomography. Results: Fifty-one patients were enrolled. The mean age was 67.0±12.8 (44-86) years. There were 37 females (72.5%). Duration of symptom of acute DVT before CBT was 8.0±6.4 (1-33) days. Self-expanding stent was used for iliac vein stenting. Initial technical success rate was 94.1%. There were two complications: arteriovenous fistula formation in left popliteal area and the right inguinal hematoma. Mean follow up was 15.6±12.8 (6 days & 60 months). Primary patency rate after iliac vein stenting was 94.1%, 94.1% and 94.1% at 6, 12 and 24 months. Four patients had recurrent thrombotic occlusion during the follow-up. Conclusion: Iliac vein stenting showed the good primary patency rate: 94.1%, 94.1% and 94.1% at 6, 12 and 24 months with minor complications. Iliac vein stenting is a durable option for residual stenosis after CBT of acute DVT.

Surgical thrombectomy for acute deep vein thrombosis: Is this procedure obsolete?

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Introduction: Proximal deep vein thrombosis has large risks of pulmonary embolism (PE) and post thrombotic syndrome (PTS) without treatment. Although the anticoagulant therapy is the most evidenced based medicine for prevention of PE and recurrent thrombosis, it is questionable for the best prevention of PTS. The early removal of thrombus by aggressive therapies such as the catheter directed thrombolysis (CDT) and thrombectomy is recommended for active patients to prevent PTS. This presentation shows the improvement for surgical thrombectomy with less invasiveness and better effectiveness with 4 cases. Methods: 4 active patients (Age 44-73 years old) with acute proximal thrombosis
(Onset 2-6 days) underwent venous thrombectomy with temporary IVC filter under local anesthesia and sedation. The extension of thrombus was iliac vein in 2 cases, ilio-femoral vein in 1 case, ilio-popliteal vein in 1 case. 2 cases had asymptomatic PE at pre-operation. Venous thrombectomy was done from common femoral vein using Fogerty catheter and leg milking. After thrombectomy, no case applied temporary artrio-venous fistula, 2 cases had iliac vein stenting for residual stenosis. All cases had anticoagulation with intermittent pneumatic compression and compression therapy. Results: There was no complication except a delayed wound healing after operation. Ilio-femoral segments in all cases were patient for post operative 6 months, although one popliteal segment remained thrombus. Leg swelling and pain were disappeared in all cases. Conclusion: Surgical thrombectomy could one of major option as well as CDT for active patients with acute deep vein thrombosis.

VN05

Endovascular recanalization for nearly total occlusion in the iliocaval venous system

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Background: Obstruction of iliocaval venous system (ICVS) usually lead to severe venous insufficiency. Endovascular recanalization has been considered as the first choice of treatment. To canalize the nearly total occlusion in the ICVS is particularly challenging to interventionist. The purpose of this study is to report our experience and short-term results of endovascular recanalization with stenting. Materials and methods: Between January 2010 and July 2012, endovascular recanalization was successfully performed in 13 patients with near total occlusion of ICVS. Female to male ratio is 11 to 2 and the age ranged from 24 to 83 with median age of 63. Three patients received adjunctive ipsilateral femoral arteriovenous fistula (AVF). Anticoagulant was administrated perioperatively. Oral anticoagulants were continued in the follow-up period. Results: The average follow-up duration was 8 months ranging from 3 weeks to 17.5 months. The clinical symptoms were improved dramatically after operation. However, symptoms reoccurred in 3 patients, in whom no femoral AVF constructed besides recanalization and stent placement. The in-stent thrombosis needed further intervention. One patient with long segment IVC stricture was complicated with blood extravasation in the retroperitoneal space, which required CT-guided pigtail drainage and antibiotic treatment due to superimposed infection. There was 1 perioperative mortality due to pneumonia. Conclusion: Endovascular recanalization with stenting for obstructed ICVS is feasible and effective to improve quality of lives of patients. AVF may improve the patency rate of stent. However, the long-term follow-up is mandatory to assure the positive progression of clinical symptoms.

VN06

A beautiful venous stream

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The use of Japanese tatami mats seem to be good for the venous system because of the all-day stimulating to the venous pumps of the leg (video). However, young people are turning away from the tatami mat lifestyle, which has led to an increase in the venous disease rate in Japan. Some of the refugees of the great earthquake disaster in March 11, 2011 in the east Japan were diagnosed with deep vein thrombosis. Our research showed 30-40% development of deep vein thrombosis in each tsunami-damaged city shelter. Fortunately there were no lethal pulmonary embolisms. We provided 30,000 elastic stockings and information pamphlets to the refugees to explain how the shelter conditions (small, cold, no exercise etc) could lead to poor venous flow. Japanese surveys show most popular sites for deep vein thrombosis are the superficial femoral vein (SFA) in 51.1%, the popliteal vein in 51.0% and the iliac vein in 37.5% (2004). Functionally or anatomically, the severe compression is present in the popliteal vein with the medial head of the gastrocnemius muscle in 15%(young female), Hunter canal by SFA in 20% (young female) in our study, and the iliac vein by the iliac artery at a high percentage. These compressions are relieved by a slight bending position of the joints in the supine position. At least we need to avoid the venous thrombosis by using the venous pump as much as possible and eliminating venous compression by good posture in bed. A beautiful venous stream results when there is no congestion of the venous blood from the above-mentioned two points.

VN07

A Systematic Review and Meta-analysis of Randomised Controlled Trials Comparing Endovenous Ablation and Surgical Intervention in Patients with Varicose Vein

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Purpose. A systematic review and meta-analysis was conducted to compare clinical outcomes between endovenous laser ablation (EVLA), radiofrequency ablation (RFA), ultrasound-guided foam sclerotherapy (UGFS) and surgery. Methodology. We searched
Laser treatment for branch varicosities using a 980nm and 810nm laser

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Object: The objective of this study was to evaluate the technical feasibility and early results of the laser ablation for branch varicosities using a 980nm and 810nm diode laser. Material and methods: From January 2011 to February 2012, 47 patients (51 limbs; male: female =18: 29; mean age, 63 years) with varicose veins were enrolled in this study. 43 patients (91%) had difficulties in performing ambulatory phlebectomy because of low platelets (3 limbs), anticoagulation therapy (4 limbs) and severe lipodermatosclerosis (40 limbs). Branch varicosities were percutaneously punctured with ultrasound guidance following saphenous vein access. Thereafter, endovenous laser ablation was performed in incompetent saphenous veins and branch varicosities using a 980nm laser under tumescent local anesthesia. Residual branch varicosities were skived with 18G needle and intra-extravenous laser treatment was performed using a 980nm or 810nm laser. Patients were evaluated by ultrasound examination. Results: Mean operating time was 41 minutes. Mean number of puncture site were eight for laser ablation of branch varicosities. There were 9 limbs (18%) of thrombophlebitis and one limb (2%) of minor skin burn that was not required treatment and one limb (2%) of nerve injury. Successful ablation in varicose tributaries was seen in 33 of 45 limbs (73%). Conclusion: We suggest that the laser ablation of branch varicosities can be performed safely and appropriate to patients with severe stasis dermatitis, despite partly failure of occlusion and thrombophlebitis after ablation.
were the following: age, sex, medication of anticoagulation or antiplatelet medicine, location of the vein, maximum diameter of the vein, linear endovenous energy density: LEED (J/cm), and fluence (J/cm²): LEED divided by the maximum diameter of the vein. Each risk factor was compared with recanalized group and occluded group by univariate and multivariate analysis.

Results Over a mean follow-up of 366+/−82 days, recanalization occurred in 5 veins (1.1%). Univariate analysis showed age, medication, LEED, and fluence were tend to be significant risk factors: mean age was 51.6+/−13.7 years for recanalized group and 60.6+/−10.9 years for occluded group (p=0.07); one patient (one vein) and twenty-two patients (22 veins) had medication, respectively (p=0.14); mean LEED was 60.0+/−20.7 J/cm and 70.3+/−13.0 J/cm, respectively (p=0.08); mean fluence was 45.0+/−17.2 J/cm² and 64.8+/−24.4 J/cm², respectively (p=0.08). Multivariate analysis showed fluence was the only significant risk factor (p=0.013, r²=0.207). Conclusion In order to reduce recanalization after the EVLT, ablation energy should be 70J or more and be controlled by diameter of the vein.

Ligation and stripping vs. endovenous laser therapy for great saphenous vein reflux under local tumescent anaesthesia as day surgery procedures

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Purpose: Endovenous laser therapy (EVLT) has emerged as a popular treatment for great saphenous vein (GSV) reflux. We performed both sapheno-femoral ligation with stripping (L&S) and EVLT procedures using local tumescent anaesthesia in the treatment of GSV reflux and compared the outcomes. Methodology: One hundred and forty-two legs with GSV reflux received L&S (n=79) or EVLT (940nm) (n=63) under local tumescent anaesthesia as day surgery procedures between November 2008 and June 2011. The safety and efficacy as well as the early results including postoperative pain and the time before resuming normal activities were compared. Venous clinical severity score (VCSS) assessment and Duplex scans were performed at one month and one year after operation. Results: The duration of operation was significantly shorter for EVLT (Median: 70 minutes vs. 90 minutes). The success rate as defined by the absence of GSV reflux at one month Duplex scan were 100% in both groups. No major complications were recorded. Pain score was significantly higher in the EVLT group (Median: 2.86 vs. 1.71) although the numbers of analgesic required were comparable (Median: 3 tablets in EVLT vs. 2 tablets in L&S). The time before resuming normal activities was also similar (Median: 7 days in EVLT vs. 5 days in L&S). VCSS showed significant improvement at one year in both groups (Median: from 4 to 2 in EVLT; 5 to 1 in L&S). Recurrence of GSV reflux noted at one year was comparable (10% in EVLT vs. 4% in L&S). Conclusion: Both procedures were safe and effective in ablating GSV reflux with similar recurrence rate at one year. EVLT was associated with increased pain although the time before resuming normal activities was comparable to L&S.

Subfascial Endoscopic Perforator Surgery Using Screw-type Ports is a Very Useful Component of a Comprehensive Treatment Program for Chronic Venous Insufficiency

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Background: Subfascial endoscopic perforator surgery (SEPS) with a two-port system utilizing screw-type ports, CO2 insufflation and an ultrasonic coagulation system, is a new and useful procedure that does not require burdensome apparatus and techniques. SEPS was accepted as a national advanced medical system by the Japanese Ministry of Health, Labor and Welfare in May 2009. Patients and Methods: Fifty-two limbs of 45 patients with 11 active ulcers (C6) and 4 healed ulcers (C5) were treated by SEPS between February 2010 and June 2012. It was equivalent to 14% of all surgeries for chronic venous insufficiency (384 limbs). Forty-two limbs had concomitant superficial vein surgery. SEPS alone was performed on 10 limbs, in 8 of which the superficial veins had already been ablated. In 2 limbs, incompetent perforating veins (IPVs) existed under the affected skin, around the scars of past surgery. Results: SEPS using the screw-type ports actualized better working space by eliminating leak of insufflated CO2 in the subfascial space and 360 degrees of mobilization of the port tip. Skin lesions of all legs were recuperated. All stasis ulcers of the 11 C6 limbs healed between 1 week and 14 months after SEPS (mean 2.9 months), with no ulcer recurrence during the follow-up period (1 to 28 months). IPVs under the scars were easily and safely interrupted by SEPS. No significant complications were observed. Conclusion: SEPS is a very useful component of a comprehensive treatment program for chronic venous insufficiency, especially in patients with venous stasis ulcers and with IPVs under the scars of past surgery.

Prevalence of various congenital vascular malformations in patients with Klippel-Trenaunay syndrome

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Objective: Klippel-Trenaunay syndrome (KTS) is a condition defined by the association of three physical features: capillary
malformation, varicosities, and hypertrophy of bony and soft tissues. However, KTS is characterized by congenital vascular malformations (CVMs) that are difficult to classify. Therefore the present study was undertaken to analyze the various CVMs in patients with KTS. Methods: Sixty-one patients with KTS were enrolled, and their CVMs were divided into predominantly venous defects, predominantly lymphatic defects, and mixed vascular defects using the Hamburg Classification. Truncular and extratruncular venous malformations were detected using duplex ultrasound and magnetic resonance imaging (MRI). Reflux in the superficial and deep venous systems was also evaluated. Results: Forty-five patients (74%) had predominantly venous defects, 4 (7%) had predominantly lymphatic defects and 12 (20%) had mixed vascular defects. Extratruncular venous malformations (VMs) were detected in 47 patients (77%). In contrast, truncular VMs were found in 50 patients (82%). Among these, embryonic lateral marginal vein showed the highest occurrence, accounting for 53% (32 patients). However, reflux in this vein was detected in only 9 patients (15%). Twelve patients (20%) had reflux in the great saphenous vein and 4 (7%) had reflux in the small saphenous vein. Deep vein hypoplasia was found in 7 patients (12%), and only 5 patients (8%) had deep vein aplasia. Extratruncular lymphatic malformations (LMs) were found in 13 patients (21%) and truncular LMs in 17 (28%). Conclusions: Patients with KTS have a variety of CVMs, but both extratruncular and truncular venous malformations continue to be targets for intervention.

VN23

Endovascular stenting in patients with Klippel-Trenaunay syndrome associated with secondary symptoms of concomitant iliac vein compression

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Introduction: Klippel-Trenaunay syndrome (KTS) was first described in 1900. It is a complex congenital malformation characterized by port-wine stain, varicose veins, and hypertrophy of soft tissues or bones. Two of these three symptoms are sufficient for diagnosis of KTS. Surgical treatment for KTS is controversial, and may be detrimental. Besides the main triad, the secondary symptoms of KTS including phlebitis, lymphedema, recurrent cellulitis and leg ulcers are most likely related to the concomitant iliac vein compression (CIVC). Materials and methods: Between Jan 2006 and Jan 2012, 39 cases of KTS were studied. Majority of patients, excepting 4 cases without port-wine stain, manifested typical triad. Various noninvasive and invasive techniques were used to assess KTS. We adopted iliac venogram with MDCT (multi-detector computed tomography) for evaluation of the pelvic vascular structure. Imaging studies were performed with catheter-directed iliac venogram with multi-detector computed tomography (MDCT). Twenty-two out of 39 patients were verified to have CIVC demonstrating deep compression groove at left ilocaval junction. Results: Angioplasty with stent placement was performed in 22 patients with 26 limbs, deploying 27 stents. The technical success rate was 100%. Clinical symptoms all improved in terms of venous claudication, swelling, wound healing and curtailing frequency of cellulitis. There was no surgical mortality and the morbidity was minimal. Conclusion: Endovascular stenting plays an important role in alleviating the secondary symptoms of KTS, which are the clinical manifestations of iliac vein compression. The long-term follow up is necessary to assure patency of stents.

VN24

Sonographic findings of Klippel-Trenaunay syndrome: Initial presentation and follow up

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Precise pathophysiology of Klippel-Trenaunay syndrome (KTS) is not well studied yet. We performed precise sonographic mapping. Patients and Methods: We studied ten cases of KTS for last eight year. Five were male, and age range was 13 to 62 (mean 36.1) y/o at presentation. Right legs were involved in four cases. Methods: Precise duplex mapping of superficial and deep venous system was performed at presentation, preoperative visit, and annual postoperative visit. Examination was focused on origin of reflux, distribution of abnormally dilated vessel including presence of lateral marginal vein (LMV), dilation and reflux of perforators, patency of deep venous system, and presence arteriovenous fistula. Results: Varicose vein was present in ten cases, nevus in seven cases, and hypertrophy of the leg in six cases. LMV was present in nine cases (full LMV reflux: 2 cases, only distal partial LMV reflux: 5 cases, no LMV reflux: 3 cases). incompetent greater saphenous vein (GSV) was present in 3 cases (full GSV reflux: 1 case, distal partial GSV reflux: 2 cases). Incompetent shorter saphenous vein (SSV) was present in 4 cases (full SSV reflux: 2 case, distal partial SSV reflux: 2 cases). Incompetent lateral calf perforators were present in all cases. Popliteal vein was not visualized in one case. No arteriovenous fistula was present. Radial superficial vein removal with ligation of incompetent perforators was performed in eight cases. Three cases has recurrence of varicose veins originating from lateral calf perforators. Conclusion: Pathophysiological and etiological role of lateral calf perforators is important in KTS.
A study on ovarian cancer treatment with pulmonary embolism merger

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The frequency of venous thromboembolism (VTE) in perioperative obstetrics and gynecology is relatively high, thromboprophylaxis measures has been adopted in the domestic. Inferior vena cava filter (IVCF) may be mentioned as one of the means of prevention of PTE, there is no sufficient evidence in Western countries, the indications for their has not obtained the views of the constant. Also in VTE prevention guidelines in the domestic, the indications for secondary prevention measures and of IVCF has not been specified. 18 months up to January 2011 to June 2010, in cases of ovarian cancer, have experienced five cases had been diagnosed with PTE merger before the operation. Make a case for fibrinolytic therapy just before the onset of hospitalization has been estimated, loss of PTE, surgery has become possible. Patients who developed PTE after hospitalization, surgery became possible because the loss of anticoagulant therapy. Three cases the time of onset is unknown, did not result to the loss of PTE in anticoagulant therapy. PTE loss at anticoagulation therapy and chemotherapy, surgery has become possible either. PTE disappeared in all cases, surgery was possible without the IVCF. PTE merger ovarian cancer, it is presumed to persist throughout the treatment period hypercoagulable state, is selected for permanent IVCF is expected. But if the effect of chemotherapy is expected to be, was considered the treatment of cancer may also improve the hypercoagulable state. Report on the management for patients with ovarian cancer merger VTE in our hospital.

Role of Cryotherapy in Varicose Disease

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Objectives  Cryotherapy (CA) is recently introduced as a new treatment modality in varicose disease. Cryoablation (CS) is effective in removing saphenous truncal varicosity by small incision and cryoablation (CA) is also effective to remove tributary varicosity by puncture wound so by using both methods multiple varicosity patients can be treated through same puncture wounds with good esthetic outcomes. Methods  During 2 years (from Jan. 2010 to Dec. 2011) varicosity patients whose clinical class were 2-4 in CEAP class had been treated by CS of GSV or SSV with 1-2 small incision and CA were performed with same wound or 1-2 more puncture wounds. Complication and satisfaction scores such as VCSS (Venous Clinical Severity Score) and AVVSS (Aberdeen Varicose Vein Severity Score) were evaluated. Results  1) In 58 patients, male to female ratio was 33: 25, mean age was 47.0±14.6 and in CEAP class, C2: 31 C3: 23 C4 4 patients in each and all patients were As2, 3 and 4. 2) Numbers of puncture wound were 2.13±2.085 (except groin incision). 3) Complications such as hematoma are 53 cases (91.4%) which were subsided within 2months and mild neuralgia occurred in 20 cases (34.5%) which were easily controlled by analgesics. 4) Their sick leave from work was 4.3±3.17 days. 5) In 55 patients with F/U 2 months, VCSS change were 4.25±1.12 / 0.75±0.69 and AVVSS change were 8.52±4.099 /1.11±4.089 (preop / postop2 mos)

Mid-term Outcomes of 1,320-nm Endovenous Laser Treatment for Saphenous Vein Incompetence

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Background: Endovenous laser treatment (EVLT) can be performed using different wavelengths with different absorption rates and characteristics. However, limited data are available regarding wavelength-related side effects and efficacy. Objective: To evaluate the safety and efficacy of 1,320-nm EVLT for treating saphenous vein incompetence. Method & Materials: A 1-year retrospective study was performed using clinical and Doppler-sonographic follow-up data from patients treated by 810-nm laser or a 1,320-nm laser. Results: Clinical improvement after EVLT between the 2 groups was statistically different. Improvement of venous clinical severity score (VCSS) was greater in the 1,320-nm group than in the 810-nm group, but improvement of Aberdeen Varicose Vein Severity Score (AVSS) was not statistically different between the 2 groups. The ultrasonography (USG)-proved recanalization rates 1 year after surgery were 11.1% for the 810-nm group and 6.5% for the 1,320 nm group (p < 0.05) Conclusion: EVLT with a 1,320-nm laser had better clinical outcomes and lower recurrence and recanalization rates than did EVLT with an 810-nm laser.

Effect of gaiters on muscle pump activity in healthy volunteers

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Objectives: Exercise of the leg with external limb compression has been reported to be useful for preventing and reducing leg edema. The aim of this study was to investigate the effects of leg gaiters on calf muscle pump activity. Methods: Continuous mea-
measurements of the interface pressure at the leg during exercise and determination of the femoral venous velocity at the groin during exercise were carried out in healthy volunteers with elastic stockings alone, leg gaiters alone, and gaiters over the elastic stockings. Results: The greatest pressure difference between muscle contraction and relaxation during exercise was observed when gaiters were applied over the elastic stockings at the calf. Gaiters alone without elastic stockings led to a significantly greater pressure difference between muscle contraction and relaxation during exercise than elastic stockings alone (p<0.01). A significantly higher value of the peak flow velocity of the femoral vein was observed with the combined use of gaiters and elastic stockings than the single use of elastic stockings. Conclusions: Leg gaiters have a beneficial effect of augmenting venous femoral blood flow during calf muscle pump activity in volunteers with normal valve function of their leg veins.

VN29

Surgical thrombectomy and simultaneous stenting for deep venous thrombosis caused by May-Thurner syndrome

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Purpose: May-Thurner syndrome is characterized by left common iliac obstruction secondary to compression of the left iliac vein by the right common iliac artery against the fifth-lumbar vertebra. This anatomic variant results in an increased incidence of deep venous thrombosis (DVT). We present our experience of thrombectomy and simultaneous stenting for DVT due to May-Thurner syndrome, and evaluate the outcome. Materials and Methods: From January 2009 to December 2011, a total of 8 patients (6 women, 2 men; median age, 75 years) underwent surgical venous thrombectomy with stenting. All patients were admitted for acute (<10 days) DVT involving the iliofemoral segment, and diagnosed May-Thurner syndrome. One patient had hypercoagulable disorders and three had malignant disorders. Patients were followed-up, and stent patency was assessed by means of duplex sonography performed at 1, 3, 6, and 12 months, and then yearly thereafter. Results: In all patients, the procedure was successful in achieving re-canalisation of the iliofemoral veins at the end of the operation. Perioperatively, there was no mortality and there was no case of clinically detected pulmonary embolism. Rethrombosis occurred within seven days of operation in 2 patients. Mean follow-up time was 12 months (range, 2-35 months). Primary and secondary patency rates were, respectively, 75% and 75%, at 12 months. Conclusion: Venous thrombectomy with simultaneous stenting is a safe, efficient, and durable technique to treat iliofemoral DVT due to May-Thurner syndrome. This technique also restores venous patency and provides relief of the acute symptoms.

VN30

Measurement of Length between Bronchial Carina and Superior Vena - Right Atrial Junction in Korean Adult Population for Optimal Location of Vascular Access

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Background: Bronchial carina (BC) is one of the landmark, which is frequently used during central venous catheter (CVC) insertion. The aim of this study is to measure the superior vena cava (SVC) length and the length between BC and SVC- Right atrial (RA) junction (LBCSAJ) through chest CT scan in adult Korean population and to review optimal location for catheter tip during CVC access using BC. Methods: Study subjects were enrolled 238 consecutive patients who underwent chest CT scan with contrast in Inha University Hospital between January 2010 and December 2011. Patients who had any lung disease were excluded before enrollment. The Patients’ clinical characteristics and imaging data were reviewed. The SVC length and the LBCSAJ was measured through 3D workstation (Osirix) Results: The mean age was 56.69 ± 14.83 (standard deviation, SD) years, and the mean body weight, height, body mass index was 61.09 ± 11.12 kg, 161.72 ± 9.15 cm, 23.07 ± 4.45 kg/m2 respectively. The mean length of the SVC was 47.67 ± 10.92 mm and the mean LBCSAJ was 30.80 ± 9.03 mm. Men have a longer SVC and LBCSAJ than women (p value: 0.000). Age and height were significant covariates of the SVC length and the LBCSAJ, BMI was significant covariates of the LBCSAJ in multivariate analysis. Conclusions: The BC is a helpful radiographic landmark for proper CVC placement and the optimal location of catheter tip should be adjusted according to the patients’ clinical characteristics.

VN31

SHORT-TERM CATHETER-DIRECTED THROMBOLYSIS WITH UROKINASE FOLLOWED BY ASPIRATION THROMBECTOMY FOR LOWER EXTREMITY DEEP VENOUS THROMBOSIS

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Objective. To evaluate the immediate and late venous patency in patients treated by catheter-directed thrombolysis with low-dose Urokinase (UK) for symptomatic lower extremity deep vein thrombosis (DVT) Methodology. Eighty-nine consecutive patients (46 women, 43 men; age range, 16-86 years; mean 58.1 years) with DVT who treated by catheter–directed thrombolysis with low-
dose UK were included in this retrospective study. Immediate venous patency was evaluated in terms of technical success and clinical success. Late venous patency was evaluated in terms of anatomic success and clinical success. Anatomic success was evaluated in 68 patients who underwent follow-up CT angiography. Results. Thirty-seven (42%) patients were given a single bolus injection of UK (range, 4.14 x 10^4 IU, mean dose, 4.89 ± 2.51 x 10^4 IU) and 52 (58%) patients had a continuous infusion of UK (range, 12-80, mean dose, 33.73 ± 16.42 x 10^4 IU) for a mean of 168 minutes. Before or after catheter-directed thrombolysis aspiration thrombectomy with or without mechanical thrombectomy was performed in 75%. Subsequent angioplasty and/or stent placement was performed in 96% for underlying stenosis or residual thrombosis. Immediate technical success was achieved in all patients and immediate clinical success in 90% patients. There was no major systemic bleeding complication. Primary patency rate was 84% at 6 months. 63% patients were asymptomatic after a median clinical follow-up of 18 months. 12% patients were moderately improved, seven (8%) patients were unchanged, and 17% patients had no clinical follow-up Conclusion. Short-term catheter-directed thrombolysis with low-dose UK can be an effective, safe method to manage the lower extremity DVT.

**VN33**

**The risk factors and treatment outcomes of upper extremity deep vein thrombosis**

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Objective: To explore risk factors and treatment outcomes in patients with UEDVT at a single center for one year. Method: Clinical data of 126 consecutive patients who underwent upper extremity venous duplex ultrasound (VDU) and were confirmed of acute UEDVT was retrospectively reviewed. Result: 74% patients showed arm swelling or arm pain; 93% suffered from cancer; 96% underwent inserted PICC. UEDVT were easier to occur in patients with cancer following PICC. At the same time, 13% patients also had comorbidities with lower extremity deep vein thrombosis. The incidence of pulmonary embolism demonstrated by the computed tomography angiography (CTA) was 7% (9/126) in 9 patients and mortality rate was 5.5% during one month. Low molecular weight heparin and Warfarin for anticoagulation therapy was used for majority of patients (90%) with UEDVT and no anticoagulation was used in 10%(12/126) patients because of anti-coagulation contraindication. The most common risk factors for UEDVT arised from PICC and cancer. Conclusion: guideline of risk evaluation and management for patients with UEDVT and a comparative analysis for the type, size, and duration of PICC placement should be expected in patients at high risk and with UEDVT.

**VN32**

**Use of Pre-operative ultrasound by operating surgeon in varicose vein leg surgery, their role and advantages**

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Abstract: Purpose: Varicose vein is common and can lead to severe limb complications. It affects up to 20% of Hong Kong’s population. Varicose vein is notorious for its tortuosity, variable tributaries and course. These add difficulty to varicose vein operations leading to larger wound size, increased blood loss, prolonged operation duration, nerve injury, deep vein injury (DVI) and thrombosis (DVT). With the use of Pre-operative ultrasound (POUSG) and, therefore, better delineation of varicose vein anatomical configurations, the above problems may be solved. Methodology: 72 patients with leg varicose vein surgery performed in Caritas Medical Centre from Jan 2011 to July 2012 were included. Data of patients with and without POUSG used were compared. The groin/popliteal wound sizes, blood loss, operation duration, and major complications were recorded. The data were analyzed by SPSS 16. Results: The groin wound sizes were significantly smaller in POUSG group (p<0.01), while popliteal wound sizes (p=0.249), operation duration (p=0.485) and blood loss (p=0.217) were not significantly differed. There was no major complication (DVI and DVT) reported in both groups. Conclusion: Despite no difference in blood loss, operation duration and major complication rate, there is an improvement in cosmesis due to smaller wounds. Moreover, according to operating surgeons, there is an improvement in smoothness and better anatomy recognition, especially useful in identifying varicose vein courses and superficial-deep venous junctions and training amateur surgeons.

**VN34**

**Efficacy of Ultrasound-Guided Foam Sclerotherapy for Great Saphenous Vein**

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Objective: To compare the efficacy of Ultrasound-Guided Foam Sclerotherapy (UGFS) for great saphenous vein (GSV) with sapheno-femoral ligation and without sapheno-femoral ligation, after 1 year follow-up. Materials and methods: Patients with varicose veins due to insufficiency of the great saphenous vein (GSV) were assigned to HL+ or HL- group. HL+ group were treated by sapheno-femoral ligation under the tumescent local anesthesia and intravenous anesthesia, and UGFS. HL- group were punctured into GSV branch and treated by UGFS, without sapheno-femoral
ligation. Foam sclerosant was made by Tessari method, consist of 3% Polidocanol and CO2 in the proportion of 1:3. The maximum volume of sclerosant was 8 ml in each group. 48 patients enrolled in HL+ group and 43 patients enrolled in HL- group. Duplex ultrasonography was performed 1, 3, and 6 months after treatment to assess the occlusion length and reflux of patent area. Results: The occlusion rate of HL+ group was 85.4% after 3 months, 80.4% after 6 months and 75.5% after 12 months. HL- group was 77.5%, 63.4% and 52.8%, respectively. There were no adverse events such as deep vein thrombosis and visual disturbances in either group. Conclusions: UGFS for GSV were performed safely in each methods. HL- method was significantly lower occlusion rate compared to HL+ methods, but less invasive, repeatable and effective for short term.

VN35
Early outcomes of balloon angioplasty in primary hemodialysis access at semi-Hybrid operation room

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Venous drainage route (central, cephalic and basilica vein) stenoses are major impediment to long-term arteriovenous access in the upper extremities. The optimal management of these stenoses is still undecided. The purpose of this study was to determine the early outcomes of angioplasty (PTA) in primary dialysis access population at semi-Hybrid operation room. A database was collected for the period 2011 through 2012 and was prospectively reviewed. 15 cases of primary AVF and 25 cases of primary AVG were done. Primary AVF patients were 8 males and 7 female and mean average was 60.9 year old (range: 18-81) Primary AVG patients were 16 males and 9 female and mean average was 64.5 year old (range: 53-80). We use 5x80mm Powerflex balloon at basilic and cephalic vein mainly with angiography by C-arm. PTA was used in 13 patients of 15 primary arteriovenous fistula, and in 23 patients of 25 primary arteriovenous graft. There were 1 case of AVF malfunction and 5 cases of AVG malfunction. However, 3 cases of AVG malfunction were caused by high pressure hand compression at Hemodialysis access unit. Hybrid procedure in primary hemodialysis access is safe, and with low rates of technical failure.

VN36
Early outcomes of Hybrid (surgical and endovascular) repair of hemodialysis access malfunction at semi-Hybrid operation room

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Endovascular and surgical strategies have been used to manage patients with thrombosed vascular access for hemodialysis. A database was collected for the period 2011 through 2012 and was prospectively reviewed. 32 arteriovenous fistula (AVF) malfunction in 28 patients and 21 arteriovenous graft (AVG) malfunction in 16 patients were treated with Hybrid procedure (endovascular and surgical) at semi-hybrid room. Main cause of AVF malfunction was central venous stenosis and main cause of AVG malfunction was venous anastomosis stenosis. Mechanical thrombectomy with 018-guide wire based Fogarty catheter were done in all cases of thrombosed AVF or AVG malfunction. AVF malfunction were treated with 34 cases of balloon angioplasty, 2 cases of branch ligations, 4 cases of graft interposition, 1 case of Vagbahn implantation, excision of pseudoaneurysm. AVG malfunction were treated with 17 cases of balloon angioplasty, 4 cases of graft interposition, 5 cases of stent insertion, 8 cases of Vaibahn implantation. 4 cases of secondary intervention in AVF malfunction and 4 cases of secondary were necessary in this period. The outcome of hybrid (endovascular and surgical intervention) procedure for thrombosed vascular access is comparable.

VN37
Hybrid treatment of deep vein thrombosis through posterior tibial vein at only supine position

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An 78-year-old male presented with a chief complaint of swelling on Lt. leg for 1 week. Treatment was done after 3-day heparinization. Operation was performed in only supine position with IVC filter insertion via Rt. common femoral vein, hybrid thrombectomy via Lt. common femoral vein and post. tibial vein and PTA and stent insertion in Lt. iliac vein. In this method, there are some points; common femoral vein and post. tibial vein are to be exposed for 018 wire-guided Fogarty catheter embolectomy in order that patient is in only supine position. On angiography, there was stenotic portion in Lt. common iliac vein as May-Thurner syndrome and PTA and stent insertion was performed and the final angiography revealed good flow through Lt. common iliac.
vein. In conclusion, with post. tibial vein exposure, we could remove thrombi in whole length of leg vein successfully.

**VN38**

**Risk Factor associated with Recurrence in Venous Stent for Deep Vein Thrombosis in the Lower Extremity**

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Background: The aim of this study is to evaluate the risk factor of recurrent ileofemoral deep vein thrombosis performed endovascular venous stenting. Methods: We retrospectively reviewed the medical records of 82 patients performed ileofemoral venous stenting for deep vein thrombosis at Chonbuk National University Hospital from January 2001 to December 2011. All patients were performed preoperative 3-D computed tomography. Univariate and multivariate analyses were conducted to identify the risk factor of recurred deep vein thrombosis. Results: There were 23 men and 59 women, and their mean age was 52.9 years (range: 23-85). The median follow up periods were 46 months (range: 12-139). 16 patients had risk factors of deep vein thrombosis, such as immobilization, major surgery or recent trauma. 16 cases were recurred deep vein thrombosis after endovascular venous stenting, and primary patency rate of ileofemoral venous stenting was 80.5% at 10 years. Co-existence of inferior vena cava thrombosis and stenting without catheter-guided thrombolysis had statistically significant associated with recurred deep vein thrombosis (p=0.023). Conclusion: In our series, the risk factors associate with recurred deep vein thrombosis in ileofemoral venous stenting were co-existence of inferior vena cava thrombosis and stenting without catheter-guided thrombolysis.