PERIPHERAL ARTERIAL ENDOVASCULAR INTERVENTIONS SYMPOSIUM
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ORAL PRESENTATIONS

(OP-1)

Percutaneous Transluminal Angioplasty for Infrapopliteal Arterial Disease

Sıtkı Akın Turan

Zonguldak Bülent Ecevit University Faculty of Medicine, Department of Cardiovascular Surgery, Zonguldak, Turkey

Objectives: Progress in the field of percutaneous transluminal angioplasty has led to the extension of its use for infrapopliteal arterial disease. Altought its use for threating claudication remains controversial, limb salvage rates for critical limb ischemia are high enough and can be accepted as safe and feasible first line therapy to reduce the need for amputation and improve wound healing. Purpose of this study is to evaluate the safety and efficacy of infrapopliteal percutaneous transluminal angioplasty as a primary treatment.

Materials and Methods: Infrapopliteal percutaneous transluminal angioplasty was performed on 36 limbs of 28 patients (mean age 74; range 41-86) and patients were followed for 2-20 months.

Results: Additional angioplasty has performed for superficial femoral arteries at nine patients. There was no 30-day mortality and major morbidity, two patients required major amputations and two patients required finger amputations for local unhealed ulserations. Reinterventiones has performed on 2 patients.

Conclusion: Patients with critical limb ischemia generally have complex, calcified tandem lesions and chronic total occlusion segments in infrapopliteal arteries. Baloon angioplasty remains the standart therapy for infrapopliteal arterial disease. Despite the high technical succes rates of procedures, restenosis rates are still high and to improve outcomes, drug-coated baloons, bare metal stents, drug-eluting stents and numerous atherectomy devices are developed. With the development and evolution of catheter-based technology and aggressive antiplatelet regimens, percutaneous transluminal angioplasty can be offered to poor surgical candidates to attempt limb salvage before bypass surgery.

Keywords: Peripheral artery disease, peripheral vascular disease, infrapopliteal arterial disease, percutaneous transluminal angioplasty

(OP-2)

Endoleak Prevention Methods in Endovascular Interventions: Achilles' Heel

Elif Coşkun

Bülent Ecevit University Faculty of Medicine, Department of Cardiovascular Surgery, Zonguldak, Turkey

Thoracic or abdominal aortic aneurysm is described as the increase in outside diameter of the aorta (more than 1.5 times the normal diameter). In abdominal aortic aneurysms, follow-up is recommended in the literature for the 4-5.5 cm aortic aneurysms and an intervention is recommended if the aneurysm diameter is larger than 5.5 cm. In thoracic aneurysms, general opinion for the cut-off point of aneurysm size to conduct an intervention is ≥5.5-6 cm for the fusiform aneurysm and ≥2 cm for the saccular aneurysm. However, an intervention should be done regardless of the diameter if the patient is symptomatic, in the presence of a clinical sign (pain, intra-abdominal pressure increase, peripheral arterial embolism, aneurysm rupture, etc.) or a rapid growth of the aneurysm sac is detected.

Endovascular method has become the first treatment option for aortic aneurysms in patients with appropriate anatomy. It has been 30 years since the first application of the endovascular treatment technology for treatment of aortic aneurysms. However, some drawbacks are reported after this treatment method recently so new technologies and alternative treatment options has been researched. The most important negative result after an endovascular treatment of aortic aneurysm is the endoleak.

Endoleaks are called the Achilles' heel of the endovascular aortic aneurysm repair. All permanent endoleaks and aneurysm sac growth because of an endoleak requires intervention. Type 2 endoleak is the most common complications in endovascular abdominal aortic aneurysm repair. Embolization methods are frequently applied in treatment of type 2 endoleak. The most commonly used method within these methods is trans-arterial embolization. There are many ongoing experimental, technological and clinical researches on prevention of endoleak after endovascular aortic repair all over the world.

Keywords: EVAR, TEVAR, endoleak, aortic endovascular repair

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(OP-3)

Decision Making by a Complex Case of Iatrogenically Created A-V Fistula with Concomitant AAA and Fem-pop Bypass Occlusion

İlhan Mavioğlu

İrmet Hospital, Clinic of Cardiovascular Surgery, Tekirdağ, Turkey

This is a complex case of a 74-year-old female with an acute onset of rest pain of the right limb. Previous treatments are primary stenting of both renal arteries, endovascular repair of both common iliac arteries in a covered endovascular reconstruction of aortic bifurcation technique and femoropopliteal bypass of right limb. During her current readmission, the computed tomography-scan revealed a high-flow A-V fistula of the right femoral artery, an abdominal aortic aneurysm increasing in diameter (5.17 cm), an occluded stent in the right renal artery as well as an occluded fem-pop bypass.

Endovascular aneurysm repair was applied by placing the main body on the left side to exclude abdominal aortic aneurysm. The iatrogenical A-V fistula was found originating from the right deep femoral artery and discarded by inserting the stent graft into the right deep femoral artery. All of the thrombus material inside the graft was cleared by applying graft thrombectomy and arterial flow was reinstituted to the graft then to popliteal artery.

Keywords: A-V fistula, iatrogenic, EVAR, stent-graft, complication

(OP-4)

Percutaneous Transluminal Angioplasty for Superficial Femoral Artery Disease

Levent Altınay

Zonguldak Bülent Ecevit University Faculty of Medicine, Department of Cardiovascular Surgery, Zonguldak, Turkey

Objectives: We aimed to present our experience in endovascular treatment of superficial femoral artery disease (SFA).

Materials and Methods: This retrospective study included 100 patients with SFA who were treated with endovascular interventions between January 2017-December 2018. Preoperative data such as age, gender, arterial lesion site and degree, risk factors for cardiovascular disease were collected and evaluated. Postoperative data such as type of endovascular intervention (balloon angioplasty or stenting), length, diameter and number of balloons and stents used in the operation, postoperative patency rates and restenosis times, extremity amputation were collected and evaluated.

Results: The mean age of the patients was 66±11 (37-92) years. Nineteen patients were female and 81 patients were male. Ten patients had an endovascular intervention in another center previously. Mean follow-up time was 9.21±6.24 months. Thirteen patients had aorta-iliac and femoropopliteal, 10 had bilateral femoropopliteal, 9 had femoropopliteal and infrapopliteal, 68 had solitary femoropopliteal disease. Percutaneous balloon angioplasty (PTA) was performed in 49, stent was implanted after PTA in 39 patients. Mean stent diameter was 7±1.59 mm, mean stent length was 86.28±30.87 mm, mean balloon diameter was 5.4±1.08 mm and mean balloon length was 109.1±36.07 mm. The intervention was unsuccessful in 12 patients. Extremity amputations were needed in 4 patients and 96 patients were followed free of amputation.

Conclusion: Endovascular treatment is a safe and effective method in treatment of SFA disease.

Keywords: Peripheral artery disease, percutaneous transluminal angioplasty, superficial femoral artery, endovascular intervention

(OP-5)

Achieving Impossible: Establishing a Hybrid Operating Theater

Mustafa Kemal Demirağ, Semih Murat Yücel, Serkan Burç Deşer

Ondokuz Mayıs University Faculty of Medicine, Department of Cardiovascular Surgery, Samsun, Turkey

Objectives: The need for hybrid procedures in including both open procedures and endovascular interventions are recently rising especially for high-risk cardiovascular diseases due to advanced age and accompanying comorbidities. Overall mortality and morbidity rate, in-hospital stay, postoperative intensive care unit stay, blood product use and costs are reduced by hybrid procedures. Patients with ventricular dysfunction, diabetes mellitus, obesity, previous heart surgery, and pulmonary and/or renal failure are potential candidates for hybrid procedures. We aimed to present our experience for establishing a hybrid operating theater.

Materials and Methods: Establishing a hybrid operating room can be easier in private hospitals. The chief physician of the hospital should approve these projects in hospitals affiliated to the Ministry of Health while the chief physician of the hospital, the dean of the medical school, the project management office, and the university rector are required to approve these projects in university hospitals. In addition, financing of the hybrid operating room is of paramount importance. The views of the departments of cardiology and interventional radiology that have a common patient profile are important.

Results: When establishing a hybrid operating theater, it is important to decide whether a new operating theater is needed or to make the old operating theater a hybrid. Moreover, with the C-arm scope to be taken, it is important to know what kind of operations will be done and

how much is the power and how much the budget is. It is important to decide whether to have a fixed C-arm scope or a portable C-arm scope.

Conclusion: The thought of the project, application phase, budget, to establish a hybrid operating theater, purchasing a C-arm scope, learn to use, providing in-service training to operating theater staff for radiation protection, to perform proper intervention in proper patients, selection of proper materials and to obtain necessary certificates and documents is a very demanding and exhausting process.

Keywords: Hybrid operating room, endovascular intervention, mobil C-arm

(OP-6)

Atherectomy in Infra-inguinal and Infra-popliteal Peripheral Arterial Disease

Naim Boran Tümer

University of Health Sciences, Ankara Numune Training and Research Hospital, Clinic of Cardiovascular Surgery, Ankara, Turkey

Objectives: The prevalence of peripheral arterial disease is increasing all over the world. The characteristics and the difficulty of the lesions are increasing at the same rate. It is estimated that the prevalence among adult people in the world is between 3-10%,[1] and this rate is estimated to reach 15-20% in adults over 80 years of age. The European Society of Cardiology/the European Society for Vascular Surgery 2017 guideline is the protocol for the treatment of infra-inguinal and infra-popliteal lesions. "Periferik Arter ve Ven Hastalıkları Ulusal Tedavi Kılavuzu 2016" also recommends endovascular interventions primarily for TransAtlantic InterSociety Consensus A, B, C, D lesions.

Materials and Methods: Which endovascular intervention should be preferred? There are many contradictory and various publications. Primary percutaneous balloon angioplasty (PTA) patency is 55%[2] in 1 year. This rate increases to 80% when stenting is performed after PTA. But; due to lower restenosis and target lesion revascularization rates: stent-prevention strategy is becoming increasingly popular. If the drug-eluted balloon (DEB) technology will form the next treatment standard, we need to know the possible problems of the DEBs.[3] The dose, property or coating technology of the product varies between the DEB companies. Atherectomy is a good option to minimize these possible differences. Atherectomy provides better adhesion of paclitaxel to the endothelium,[4] reduces neointimal hyperplasia, and also the risk of restenosis by reducing neointimal hyperplasia.[5] Atherectomy devices are divided into 4 groups:[6] directional, rotational, orbital and laser atherectomy devices.

Results: In our center, we perform surgery for lesions longer than 25 cm. If there is no reason to use it, we use VSM for bypass. For short focal and calcific lesions, we prefer DEB. We also use atherectomy + DEB in the lesions which we pass through the lumen. We use stenting only in case of emergency such as dissection, or no flow or restenosis.

Conclusion: Our conclusion is; the use of DEB + atherectomy in the infar-inguinal and infra-popliteal region is more effective against PTA and/or PTA + stent. Also it is an advantage against foreign body (stent) implantation. Restenosis rates are similar to PTA + stents. Atherectomy reduces brand specific differences. Even if the procedure fails, the patient still has a chance of surgery. Further studies are required to clarify the role of endovascular therapy and atherectomy.

Keywords: Peripheral arterial disease, drug-eluted balloon, atherectomy, infra-inguinal pad, infra-popliteal pad

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(OP-7)

Live in a Box: Below-the-Knee Endovascular Interventions

Ömer Tanyeli

Necmettin Erbakan University Meram Faculty of Medicine, Department of Cardiovascular Surgery, Konya, Turkey

Objectives: Lower extremity peripheral arterial disease may cause claudication or in the late phase critical limb ischemia (CLI). Infrapopliteal arterial occlusive disease, with or without concomitant inflow disease, is a leading source of CLI. Due to the constant aging of the population and an increased prevalence of diabetes, CLI has

become a major clinical concern for every vascular specialist. In this meeting, current treatment strategy options for below-the-knee (BTK) vascular involvement with, endovascular treatment options, complications and their management will be discussed.

Materials and Methods: As a vascular interventionalist and surgeon, after the assembly of hybrid operating room in our faculty, about 250 endovascular aortic aneurysm repair, and 500 peripheral vascular interventions have been performed since 2014. Among these interventions, BTK lesions deserve a special concern. In this session, after mentioning patient selection criteria according to the European Society of Cardiology guidelines, special concerns about the techniques used in BTK revascularization were discussed. A special group of patients were presented including a 64-year-old male patient with claudication and a 55-year-old male patient with CLI. Mechanic atherectomy/thrombectomy with segmental BTK balloon angioplasty, techniques and stent implantation for popliteal lesions were presented (Figure 1). Although percutaneous balloon angioplasty (PTA) is known to have no role in Buerger's disease, a successful treatment of a 36 year-old-male patient by the help of PTA was also presented.

Results: In case of CLI, rapid revascularization is mandatory, and failure may imply lower limb amputation. However, many of these patients are ineligible for open surgery. The primary goals thus become pain relief and limb salvage over patency. The angiosome concept helps determine the target artery to treat in priority. By performing proper techniques and materials, three of our patients, presented here, were successfully treated by endovascular procedures. The endovascular approach seemed to decrease morbidity and mortality rates compared to distal bypass surgery.

Conclusion: The primary goal of endovascular therapy is the re-establishment of pulsatile, straight-line flow to the foot. Balloon angioplasty is the currently established therapy for BTK lesions. Novel devices such as laser, excisional and rotational atherectomy systems, drug eluting stents or drug coated balloons provide high technical success rates and promising results. Infrapopliteal endovascular techniques represent first-line treatment methods in patients with BTK arterial occlusive disease. Correct preprocedural investigation and planning, appropriate revascularization techniques, and adequate postprocedural follow-up and medical management are crucial for the desired clinical outcome.

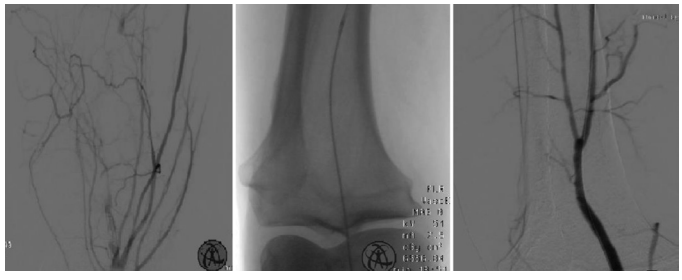

Figure 1. Successful endovascular treatment of below-the-knee occlusion by rotational thrombectomy and drug-eluting balloon angioplasty

(OP-8)

Principles of Endovascular Approach to Obstructive Iliofemoral Peripheral Artery Disease

Dilşad Amanvermez Şenarslan, Funda Yıldırım, Abdülkerim Damar, Ömer Tetik

Manisa Celal Bayar University Faculty of Medicine, Department of Cardiovascular Surgery, Manisa, Turkey

Objectives: Patients with lower extremity artery disease (LEAD) are generally asymptomatic. These patients refer to the cardiovascular clinics with claudication, ischaemic rest pain or wounds. Initial treatment of LEAD is modification of risk factors, antiplatelet therapy, statins and exercise therapy.

Materials and Methods: Revascularization of the patients improves quality of life, walking distance, pain and wound healing. Revascularization of the extremity can be managed by either endovascular or surgical therapies.

Endovascular therapy have shorter hospital stay and recovery time and they have lower complication rates compared to surgical therapy. Endovascular therapy provides good long-term results approaching surgical therapy in TransAtlantic InterSociety Consensus (TASC) A and B lesions both in aortoiliac and femoropopliteal disease. Surgical therapy is mostly indicated for more severe diseases presenting as TASC C and D lesions.

Results: Developments in endovascular techniques ensures revascularization of more complex lesions. Preoperative planning is very important to prevent poor interventional performance. After a detailed physical examination, an arterial doppler ultrasonography, computer tomography angiography or magnetic resonance angiography is needed for preoperative evaluation of the patient. In some cases preoperative angiography is also needed prior to intervention. According to place, length, severity, calcification degree of the arterial lesion an optimal puncture site should be determined. If the lesion is in the unilateral iliac and femoral arteries, the contralateral access is preferred. If an isolated iliac lesion is treated, retrograde femoral access is performed. For approaching isolated superficial femoral lesions, antegrade femoral access is preferred. In multilevel peripheral artery diseases with high surgical risks, access from pedal arteries can be selected or hybrid procedures can be planned.

Conclusion: Endovascular treatment of complex peripheral artery diseases can be managed by meticilous preinterventional planning in a fully-equipped hybrid operation centers.

Keywords: Endovascular techniques, femoral artery, iliac artery, peripheral artery disease

(OP-9)

The Role of Atherectomy in Treatment of Superficial Femoral Artery Lesions

Özcan Gür

Tekirdağ Namık Kemal University Faculty of Medicine, Department of Cardiovascular Surgery, Tekirdağ, Turkey

Objectives: Drug-coated balloons (DCB) are the gold standard methods for the treatment of femoro-popliteal disease. Studies have proved high patency rates in the long-term. However, in challenging cases such as calcific, long-segment and chronic total occluded lesions, desired results could not be achieved by drug-eluting balloons. Bail-out stenting with low patency and high late lumen loss rates are observed in such complicated cases.

Materials and Methods: Bail out stenting rate in IN.PACT Global Long Lesion Study (157 patients with mean lesion length of 26.40±8.61 mm) was 40.4% and in IN.PACT Global Chronic Total Occlusion Study was (126 patients) was 46.8%. In such difficult cases, vascular preparation increases the efficacy of drug-eluting balloons and increases the success of endovascular procedures.[1] Atherectomy is one of the common methods used to eliminate plaque burden during vascular preparation.

Atherectomy devices with varying indications, have been designed in different ways to cut, shave, freeze or evaporate such challenging atherosclerotic plaques. Current methods include directional atherectomy, laser atherectomy, orbital atherectomy and rotational atherectomy. Another advantage of vessel preparation with atherectomy is decreasing the incidence of bail-out stenting, which increases the possibility of surgical bypass procedures if required. In a study of McKinsey et al. which included 275 patients with 579 lesions, the Silverhawk atherectomy device was used in infra and supra-popliteal lesions.[2] The primary patency rate at 18 months was determined as 52% and secondary patency rate as 75%.[2]

Results: Combination of atherectomy with DCB revealed better results. In DEFINITIVE AR study, there were 19% dissection and 3.7% bailout stenting rates in patients treated with patients DCB alone group which was higher than those who underwent combined directional atherectomy and anti-restenotic treatment with DCB. When compared in term of 1-year patency rates, the patency rate in DCB alone group was 89.6% and the patency rate in directly-administered antiretroviral therapy group was 93.4%.[3]

Conclusion: In conclusion, in patients with long and calcific lesions or in those with chronic total occlusions, atherectomy procedure increases the success rates of the procedure.

Keywords: Peripheric arterial disease, endovascular treatment, atherectomy

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(OP-10)

Which Wire? Which Catheter? How and When to Use in Lesions?

Selami Gürkan

Tekirdağ Namık Kemal University Faculty of Medicine, Department of Cardiovascular Surgery, Tekirdağ, Turkey

Objectives: Guidewires and catheters are essential devices for peripheral vascular interventions. Guidewires are crucial for crossing lesions, accessing target vessel and playing a “load horse” role as well.[1] Today we have so many choices in guidewires for different scenarios. To improve the procedural success, selection of an appropriate guidewire is important. Before the procedure, operator has to know the structural design of the devices. Different crossing techniques require different devices.

Materials and Methods: Five characteristics of a guidewire; size, length, stiffness, coating, and tip configuration are important. Larger-diameter wires have greater rail support, smaller diameters have increased flexibility and trackability.[2] The core material of a guidewire affects flexibility, support, steering, and tracking. In general, stainless steel is easier to torque and is more rigid, providing better columnar support. Nitinol is more flexible and kink resistant. Combinations of stainless steel with nitinol wires provides high torquability and columnar shaft strength with kink-resistance tips.[3] Steering and durability of a guidewire is affected by tip design. Transmission of force increases by the core extending to the tip. It makes the wire more durable and steerable. A core that does not extend to the tip is delicate, flexible, and soft. Coils provide tactile feedback, radiopacity and maintain constant overall diameters. Polymer covers/sleeves provide optimal lubricity to overcome resistance and access to the lesion. Visibility is an important component for wire visualization under fluoroscopy. Typically they are 100 to 120 cm in length but can also be 260 to 300 cm (good rule of thumb to follow is that the guidewire should be twice the length of the longest catheter being used). Most commonly used size is 0.018“/0.035“ (upper extremity) and 0.014“/0.018“ (lower extremity). Tip configurations are; straight, angled tip and J shape. Varying degrees of shaft stiffness (e.g. extra support, super stiff wires) allow advancement of stiff devices. In

peripheral intervention cases, the most widely utilized sizes are 0.014, 0.018, and 0.035 inch.

An "ideal catheter" should be able to sustain high-pressure injections, to track well, be non-thrombogenic, have good memory, and should torque well. Flush, diagnostic and the support catheters are different types. Length depends on location and sizes vary 5 to 8 French.[4]

Conclusion: Understanding device characteristics is crucial. Advancements in guidewire and catheter design results in improved procedural success. The choice of an appropriate guidewire is critical for the lower limb arterial revascularization.

Keywords: Guidewire, catheter, peripheral intervention

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(OP-11)

Endovascular Treatment Strategies for Total Aortoiliac Disease

Yüksel Dereli

Necmettin Erbakan University Meram Faculty of Medicine, Department of Cardiovascular Surgery, Konya, Turkey

Objectives: Open surgery is the traditional treatment of aortoiliac lesions. However, endovascular treatment has emerged as a less invasive option over the last decade. The aim of this study is to analyze our results with endovascular treatment of these iliac lesions.

Materials and Methods: In this study, a total of 82 patients, 96 limbs with aortoiliac occlusive disease, were enrolled. We performed a retrospective analysis of endovascular interventions for severe aortoiliac lesions performed from September 2015 to October 2018, to evaluate technical success, perioperative mortality and patency.

Results: Technical success was achieved in all patients. There was no mortality in this study. Primary patency rate was 85.6% after a mean follow-up of 20 months.

Conclusion: Abdominal aortic occlusion frequently affects the bifurcation of the aorta. Total occlusion of the infrarenal abdominal aortic and iliac arteries is rare but difficult to treat with many potential complications. Conventional open surgery is the traditional treatment of aortoiliac lesions. However, as morbidity and mortality rates of open surgery are not negligible, endovascular treatment has advanced as a less invasive option over the last decade. Many patients with iliac arterial disease may in fact be unsuitable candidates for this type of major operation due to comorbidities. The risks of renal insufficiency, embolization and access complications are not insignificant however, most can be prevented or managed without significant clinical consequence. Endovascular treatment should be considered a first-line theraphy option for all patients with aortoiliac disease, especially those with high-risk cardiovascular comorbidities.

Keywords: Aortoiliac disease, total occlusion, endovascular treatment