Guide to Live Case Transmissions

During the Leipzig Interventional Course 2017 more than 85 interventional and surgical live cases are scheduled to be performed and transmitted to the auditorium. The aim of this booklet is to give you an overview about the live case schedule and to provide a practical guide through the procedures.

We hope for your understanding that with respect to the clinical needs of the patients changes of the schedule may occur. Furthermore, the anticipated procedural steps are just an outline of the procedure. Depending on the discretion of the operator the procedural strategy or the choice of material may vary.
**Case 01 – LEI 01: male, 68 years**

**Severely calcified SFA-occlusion right**

**Operators:** A. Schmidt, M. Ulrich

**Clinical data:**
- Severe claudication right calf, walking capacity 60 meters
- ABI right 0.65
- COPD, GOLD B
- Permanent atrial fibrillation

**Risk factors:** Arterial hypertension, smoker

**Angio:** Angiography elsewhere: total occlusion right SFA, calcified

**Procedural steps**

1. **Left groin retrograde and cross-over approach**
   - 0.035” SupraCore guidewire 190 cm (ABBOTT VASCULAR)
   - 7F-40 cm Balkin Up&Over Sheath (COOK MEDICAL)

2. **Guidewire passage and PTA of the occlusion right SFA**
   - 4.0/120 mm Armada 35 balloon (ABBOTT VASCULAR)
   - 0.035” Radiofocus soft angled guidewire, 260 cm (TERUMO)
   - 6.0/40 mm Armada 35 balloon (ABBOTT VASCULAR)
   - Conquest high pressure balloon (BARD)

   In case of failure to pass from antegrade:

3. **Retrograde approach via the distal SFA right**
   - 21 Gauge 9 cm Micropuncture needle (COOK MEDICAL)
   - 0.018” Connect guidewire 300 cm (ABBOTT VASCULAR)
   - 0.018” QuickCross support catheter 90 cm (SPECTRANETICS)

4. **Stenting**
   - 5.0 or 6.0/150 mm Supera Interwoven Selfexpanding Nitinol stent (ABBOTT VASCULAR)
   - Stenting of the SFA-ostium: 7.0/40 mm Absolute stent (ABBOTT VASCULAR)

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**Case 02 – DEN 01: male, 72 years (K-D)**

**CFA lesion left**

**Operators:** K. Deloose, J. Callaert, L. Maene

**Clinical data:**
- Current smoker, hypercholesterolemia, art. hypertension

**Duplex:**
- Monophasic signal left CFA

**CT-Angio:**
- High grade stenosis/occlusion left CFA

**Procedural steps**

1. **Cross-over access right CFA**
   - 6F 45 cm Destination sheath (TERUMO)

2. **Antegrade CFA recanalization**
   - 0.018” 300 cm Connect-Connect 250T (ABBOTT VASCULAR)

3. **Predilatation CFA lesion**
   - 0.018” Armada balloon (5, 6, 7 mm) (ABBOTT VASCULAR)

4. **Stent implantation**
   - 0.018” 6/7 mm VMI Supera stent (ABBOTT VASCULAR)

5. **Postdilatation**
   - 0.018” 5, 6, 7 mm Armada (ABBOTT VASCULAR)

6. **Plan B: Retrograde prox SFA puncture**
Case 04 – MUN 01: female, 76 years (K-M)

**Femoral occlusion left**

**Operators:** A. Schwindt, Ö. Sensebat

**Clinical data:**
- PAOD Rutherford IV left leg, rest pain at night, walking distance limited to 50 m
- ABI: right leg 0.9; left leg 0.6

**Risk factors:**
- CVRF: hyperlipidemia, hypertension, nicotin
- Carotid surgery 2013

**Duplex:**
- Triphasic signal left CFM, monophasic signal left popliteal distal

**CT-Angio:**
- Mid SFA occlusion severely calcified

**Procedural steps**

1. **Cross-over access right CFA**
   - 6F 55 cm Flexor sheath (COOK MEDICAL)
2. **Antegrade recanalization left SFA occlusion**
   - 0.018” Advantage guidewire (TERUMO)
   - 3.1F CXI support catheter (COOK MEDICAL)
3. **Vessel preparation left SFA**
   - Advance LP balloon 0.018” (3, 4, 5 mm) (COOK MEDICAL)
4. **Primary stenting**
   - Zilver PTX 6 mm (COOK MEDICAL)
5. **Postdilatation left SFA**
   - 0.035” Advance LP balloon (COOK MEDICAL)
6. **Plan B: Retrograde access left ATA**

**Treatment of 9 cm long SFA CTO with drug eluting stent**

**Operators:**
- A. Schwindt, Ö. Sensebat

**Clinical data:**
- PAOD Rutherford IV left leg, rest pain at night, walking distance limited to 50 m
- ABI: right leg 0.9; left leg 0.6

**Risk factors:**
- CVRF: hyperlipidemia, hypertension, nicotin
- Carotid surgery 2013

**Duplex:**
- Triphasic signal left CFM, monophasic signal left popliteal distal

**CT-Angio:**
- Mid SFA occlusion severely calcified

**Procedural steps**

1. **Right femoral access and crossover**
   - Insertion of 6F 45 cm Destination sheath (TERUMO)
2. **Stent PTA**
   - Stent PTA common iliac artery bilateral (Dynamic/BIOTRONIK)
3. **Recanalization left SFA**
   - v18 wire (BOSTON SCIENTIFIC) and Quick-cross catheter (SPECTRANETICS)
4. **Predilation**
   - 5 x 120 balloon (Advance 18/COOK MEDICAL)
5. **Stent implantation**
   - Zilver-PTX drug eluting stent (COOK MEDICAL)
6. **Puncture site closure with CELT 6F VCD**
Case 06 – NY 01: female, 63 years (G-D)

Left SFA occlusion – mildly calcified

Operators: P. Krishnan, V. Kapur, K. Gujja, F. Majeed, R. Lascano

Clinical data: Patient presents with 1 block life-style limiting severe left lower extremity claudication
Rutherford Grade 1, Category 3, Fontaine Stage IIB
Claudication symptoms have been getting progressively worse over the last few months
No rest pain or ischemic ulcers noted
ABI: Left ABI 0.58. Right ABI 0.65
Risk factors: PVD s/p right common iliac artery stent (10 x 40 mm Absolute stent)
Hypertension, hyperlipidemia, diabetes mellitus, sick sinus syndrome s/p Pacemaker

Procedural steps
1. Right groin access with retrograde cross-over approach
   - UF 4F diagnostic catheter (ANGIODYNAMICS)
   - 0.035” SupraCore guidewire, 300 cm (ABBOTT VASCULAR)
   - 7 F – 45 cm Pinnacle Sheath (TERUMO)
2. Passage through the left SFA occlusion
   - 0.035” Tempo Aqua Vert support catheter, 125 cm (MEDTRONIC)
   - 0.018” Connect 250 T guidewire, 300 cm (ABBOTT VASCULAR)
   - If unable to cross with 0.018” guidewire, switch to an 0.035” stiff angled glidewire (TERUMO)
3. Filter placement
   - Exchange to a Barewire through the support catheter (ABBOTT VASCULAR)
   - Emboshield Nav 6 filter placement (ABBOTT VASCULAR)
4. Directional atherectomy
   - Silver Hawk LS-M directional atherectomy - 4 quadrant cuts (MEDTRONIC)
5. PTA with drug-coated balloon
   - In.Pact Admiral 6.0 x 150 mm DCB (MEDTRONIC)
6. Stenting on indication
   - 5.5 x 150 mm Supera interwoven self-expanding Nitinol stent (ABBOTT VASCULAR)
Total occlusion left SFA

Operators: M. Ulrich, S. Bräunlich

Clinical data: Severe claudication left SFA, walking capacity 100 meters
Cerebral artery stenting of a symptomatic carotid stenosis 12/2015

Risk factors: Art. hypertension, smoker

Angio: Angiography during CAS: distal SFA-CTO left
ABI left 0.56

Procedural steps
1. Right groin retrograde and cross-over approach
   ■ IMA-diagnostic 5F catheter (CORDIS/CARDINAL HEALTH)
   ■ 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)
   ■ 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   ■ 6F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)

2. Passage and predilatation of the SFA-occlusion left
   ■ 4.0/100 mm Sterling OTW-PTA-balloon (BOSTON SCIENTIFIC)
   ■ 0.018” V-18 Control guidewire 300 cm (BOSTON SCIENTIFIC)
   ■ 0.018” Victory guidewire 18 gramm 300 cm (BOSTON SCIENTIFIC)

3. PTA/stenting SFA left
   ■ Distal CTO: Eluvia drug-eluting stent (BOSTON SCIENTIFIC)
   ■ Stenotic segments: Ranger DCB (BOSTON SCIENTIFIC)

Severely calcified SFA-CTO right

Operators: A. Schmidt, M. Ulrich

Clinical data: Severe claudication right calf, walking capacity 150 meters
Thromendartherectomy both groins 2014
Stenting/PTA left SFA 11/2016
CAD, PTCA 2000, CABG 2000
Art. hypertension, former smoker

Angiography: Severely calcified distal SFA-CTO right
ABI right 0.51

Procedural steps
1. Left groin retrograde and cross-over approach
   ■ IMA-diagnostic 5F catheter (CORDIS/CARDINAL HEALTH)
   ■ 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)
   ■ 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   ■ 7F S5cm Flexor Check-Flo Introducer, Raabe Modification (COOK MEDICAL)

2. Passage of the distal SFA-CTO
   ■ 0.018” Connect 250 T guidewire, 300 cm (ABBOTT VASCULAR)
   ■ 0.018” QuickCross support catheter 135 cm (SPECTRANETICS)

3. Angioplasty
   ■ 6.0/60 mm Lithoplasty balloon (SHOCKWAVE MEDICAL INC.)

4. Stenting only on indication
   ■ Supera Interwoven Nitinol stent (ABBOTT VASCULAR)
Heavily calcified severe right SFA disease

**Operators:** P. Krishnan, V. Kapur, K. Gujja, F. Majeed, R. Lascano

**Clinical data:** Patient presents with right lower extremity ischemic rest pain
Rutherford grade 2, category 4
Fontaine stage III
Symptoms have been getting progressively worse over the last few weeks
No ischemic ulcers noted.

**Risk factors:** Hypertension, hyperlipidemia, diabetes mellitus, previous history of tobacco use

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1. **Procedural steps**
   1. **Left groin access with retrograde cross over approach**
      - UF 4F diagnostic catheter (ANGIODYNAMICS)
      - 0.035" SupraCore guidewire, 300 cm (ABBOTT VASCULAR)
      - 7 F – 45 cm Pinnacle Sheath (TERUMO)
   2. **Passage through the right SFA calcified stenosis**
      - 0.018" Trailblazer Vert support catheter, 135 cm (MEDTRONIC)
      - 0.014" Fielder guidewire, 300 cm (ASAHI)
   3. **Filter placement**
      - Exchange to a Barewire through the support catheter (ABBOTT VASCULAR)
      - Emboshield Nav 6 filter placement (ABBOTT VASCULAR)
   4. **Jetstream atherectomy of the right SFA calcified disease**
      - Jetstream 2.4/3.4 mm atherectomy (BOSTON SCIENTIFIC)
   5. **PTA with a non-compliant balloon**
      - Dorado 6 x 200 mm balloon (BARD)
   6. **Stenting and postdilatation**
      - 5.5 x 150 mm Supera interwoven self-expanding Nitinol stent (ABBOTT VASCULAR)
      - Dorado 6 x 150 mm balloon (BARD)

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Complex venous intervention of IVC and iliac vein

**Operators:** N. Kucher, T. Fuss

**Clinical data:** Iliofemoral DVT right side in 2014
Currently no anticoagulation therapy
Moderate renal insufficiency (atrophic left kidney)

**Risk factors:** Venous claudication while standing and walking (works as a chef de cuisine)
Leg swelling right > left
Hyperpigmentation right lower leg

**Procedural steps**
1. **Venous access with ultrasound guidance in both femoral and right IJ veins**
   - 10F sheath
2. **Wire crossage**
   - TERUMO 0.035" stiff angled
3. **Phlebography, IVUS**
4. **Predilation**
   - Atlas Balloon 14–20 mm (BARD)
5. **Implantation of dedicated Iliac vein stents**
   - IVC: Sinus XL 22–24 mm (OPTIMED),
   - Sinus-XL Flex 14 mm (OPTIMED)
6. **High-pressure postdilatation of stents**
   - Atlas balloon 14–20 mm (BARD)
**Case 11 – GAL 01: male, 58 years**

**Acute left leg swelling x 1/52**

**Operators:** G. O’Sullivan

**CTPA:**
- Positive for PE
- Negative for RV strain

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- Prone
- UltraSound guidance (SIEMENS)
- 10F sheath (CORDIS Brite Tip)
- 5000u IV Heparin
- Gentle ascending venography
- AngioJet Zelante (BSCI)- pulse spray: 30 mg tPA (Altpelase, Genentech) into 170cc N Saline
- Spray to all involved areas using a rotating direction over 5-10 minutes.
- WAIT 30 minutes
- AngioJet Zelante (BSCI)- Thrombectomy mode over 8 minutes
- Ascending venography
- Aspiration thrombectomy using an 8F Hockey Stick (CORDIS) concentrating on L ILV and L PFV
- IVUS (Volcano/PHILIPS)
- Pre-dilatation Bard Atlas 14/16 mm
- Stent underlying lesion (BARD Venovo; Veniti Vici, COOK MEDICAL Zilver Vena, OPTIMED Sinus Venous, BSCI Wallstent)
- Post dilatation: BARD Atlas 14/16mm to 20atm for 20 seconds
- IVUS (Volcano/PHILIPS)
- Cone Beam CTV (SIEMENS Artis Q)
- Pneumatic compression boots (TYCO)
- Class 2 thigh high compression stockings
- Ultrasound day 1 to confirm patency
- Full anticoagulation for 6/12

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**CTV:** Expanded low attenuation left common iliac vein extending to left femoral vein lower thigh.
Note involvement of left Internal Iliac Vein and Profunda Femoris Vein

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**Procedural steps**

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**Case 12 – LEI 05: male, 78 years (M-M)**

**Acute on chronic ischemia right leg**

**Operators:** S. Bräunlich, M. Ulrich

**Clinical data:**
- Very short walking capacity right since few weeks
- Persistent atrial fibrillation
- Diabetes mellitus, type 2
- Nicotin abuse

**Important items:**
- Angiography: Thrombotic/embolic occlusion right popliteal artery
- Chronic BTK-disease

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**Procedural steps**

1. Right antegrade femoral access
   - 6F 55 cm Check Flo Performer, Raab Modification (COOK MEDICAL)

2. GW-passage and thrombectomy
   - Rotarex 6F (STRAUB MEDICAL)

3. PTA and stenting on indication
   - Lutonix DCB (BARD)
Tuesday, 10:30 – 10:55 Live from Münster Main Arena 2 · Room 2

Case 13 – MUN 02: male, 78 years (B-W)

**Treatment of Tosaka III ISR right popliteal artery with Rotarex and drug eluting balloon**

**Operators:** A. Schwindt, Ö. Sensebat

**Clinical data:**
- PAOD Rutherford III, painfree walking distance 150 m
- Stent-PTA right popliteal artery 2009
- ABI right: 0,5; left: 1,0

**Risk factors:**
- CVRF: arterial hypertension, nicotine
- Angio-CT: ISR Tosaka III right popliteal artery

**Procedural steps**
1. **Left femoral access**
   - Crossover insertion 8F 45 cm TERUMO Destination sheath to right CFA
2. **Crossing of ISR**
   - 0,035” Advantage wire (TERUMO) and Quick-cross support catheter (SPECTRANETICS)
3. **Filter placement**
   - 6 mm Spider-Filter (MEDTRONIC) in distal right popliteal artery
4. **Thrombectomy popliteal stent**
   - 8F Rotarex (STRAUB)
5. **Postdilatation of stent**
   - Passeo 18 drug eluting balloon (BIOTRONIK)
6. **Closure of puncture site**
   - Angioseal 8F (ST. JUDE)

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Tuesday, 11:00 – 11:15 and 12:00 – 12:15 Live from Bern Main Arena 2 · Room 2

Case 14 – BER 02: female, 37 years (E-B)

**Iliofemoral venous intervention**

**Operators:** N. Kucher, T. Fuss

**Clinical data:**
- Acute left-sided iliofemoral deep vein thrombosis in 04/2008

**Risk factors:**
- Long distance flight, estrogen-containing contraceptives, no known thrombophilia (negative testing)
- Chronic venous insufficiency leg with Villalta Score: 9 points

**Procedural steps**
1. **Venous access with ultrasound guidance in left popliteal vein**
   - 10F sheath
2. **Reconstruction of iliac veins**
3. **Predilation**
   - Atlas balloon 12–14 mm (BARD)
4. **Implantation of dedicated iliac vein stents**
   - MT stent: Sinus obliquus 14 mm (OPTIMED)
   - Iliac veins: Sinus-XL Flex 14 mm (OPTIMED)
5. **High-pressure post-dilatation of stents**
   - Atlas balloon 14 mm (BARD)
**Chronic iliac venous occlusion**

**Operators:** G. O'Sullivan

**Clinical data:**
- Prior Left ilio-femoral DVT
- Subsequent leg swelling; significant weight gain and venous claudication
- No ulceration
- C4

**Direct CTV:**
- Synechiae with LEIV CIV; IVC normal; CFV scarred but patent; FV scarred; inflow dominant through Profunda

**Procedural steps**

- **Supine, general anaesthetic, urethral catheter**
- **Right internal jugular venous access**
  - COOK MEDICAL 10F 35 cm sheath
  - 8F 55 cm Hockey Stick
  - 5F COOK MEDICAL Tri-Force CTO sheath/catheter
- **Wires:**
  - Angled Hydrophilic 180 cm (MERIT MEDICAL)
  - Road Runner (COOK MEDICAL) 180 cm/Stiff Hydrophilic
  - ASAHI Astata 0.014” 30 g
- **Once across CONFIRM DOMINANT INFLOW**
- **ASSESS CFV-IVUS (Volcano/PHILIPS)**
  - 260 cm Lunderquist
- **Predilatation**
  - BARD Atlas 14/16 mm balloon to high pressure
- **Stenting**
  - COOK MEDICAL ZV/Optimed SV/Boston Wallstent/Veniti Vici/Bard Venovo
  - Post dilatation to nominal diameter stents with high pressure Bard Atlas balloons
- **Standard boots/stockings/US day 1/anticoagulation x 6/12**

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**Removal of tilted IVC filter (aortic penetration) and reconstruction of the IVC and iliac veins**

**Operators:** N. Kucher, G. Walker

**Clinical data:**
- Protein S deficiency and factor V Leiden mutation
- Ongoing anticoagulation therapy
- Recurrent ilio-femoral thrombosis despite medical therapy
- Implantation of permanent Simon™ filter (2004/USA)

**Risk factors:**
- Chronic venous insufficiency both legs with:
  - venous claudication, varicose veins, hyperpigmentation, leg swelling
  - Villalta-score: 6 points

**Procedural steps**

1. **Venous access**
   - Venous access with ultrasound guidance in both femoral veins (10F sheath)
   - Venous access IJ (18 F sheath)
2. **Filter extraction with endobronchial forceps from U access**
   - Forceps Alligator 2.5 mm x 55 cm hard foreign body double action (KARL STORZ)
3. **Reconstruction of IVC and iliac veins**
4. **Predilatation**
   - Atlas balloon 14–20 mm (BARD)
5. **Implantation of dedicated IVC and iliac vein stents**
   - IVC: Sinus XL 22 mm (OPTIMED)
   - Iliac veins: Sinus-XL Flex 14 mm (OPTIMED)
6. **High-pressure postdilatation of stents**
   - Atlas balloon 14–20 mm (BARD)
Tuesday, 13:30 – 15:00  Live from Galway    Main Arena 2 · Room 2
Case 17 – GAL 03: female, 35 years

Endovascular therapy of chronic deep vein obstructions

Operators: G. O’Sullivan

Clinical data: Previously treated (in Germany) for a GIST with surgery and radiotherapy.
Residual (PET –ve for > 3 years) LIF mass (Figure 1).
Weight gain
Left leg swelling and venous claudication
Huge cross pelvic collaterals (Fig 2/3).

Procedural steps

1. Supine, general anaesthetic, urethral catheter
2. Right IJV; Left femoral Vein
3. Access using a CTO catheter
   ■ Tri-Force Medical (COOK MEDICAL)
4. Predilatation
   ■ Atlas 14-16 mm to high pressure (BARD)
5. Stenting
   ■ Veniti Vici 16-120; 14-120
6. Postdilatation
   ■ Atlas 16 mm @16 atm for > 16 s (BARD)
   ■ IVUS (PHILIPS Volcano)
   ■ and Cone Beam CT (SIEMENS Artis Q) to confirm stent expansion

Initial pre-operative venography

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Tuesday, 15:10 – 15:35  Live from Münster    Main Arena 2 · Room 2
Case 18 – MUN 03: male, 87 years (S-W)

Carotid artery stenting in high grade asymptomatic right ICA stenosis

Operators: A. Schwindt, Ö. Sensebat

Clinical data: CVRF: hypertension
CHD, RCA-PTCA 2016 with DES
Aortic valve stenosis

Risk factors: In CC-Duplex high grade right ICA stenosis with vmax of 290 cm/sec.
MR-Angiogram: Type II aortic arch, 90% right ICA stenosis

Procedural steps

■ Right femoral access, aortic arch angiogram,
canalulation of right common carotid artery with 0,035 Advantage wire (TERUMO) and insertion of 6F 90cm shuttle-sheath (COOK MEDICAL)
■ Angiogram of lesion, placement of 0,014 Choice PT wire (BOSTON SCIENTIFIC) distal to lesion
■ Delivery of Nanoparasol filter (TERUMO) distal to lesion
■ Implantation of Roadsaver micromesh stent (TERUMO)
■ Postdilation of stent (Sterling RX, BOSTON SCIENTIFIC)
■ Filter capture and final angiogram
**Symptomatic left ICA disease in a patient with challenging access**

**Operators:** A. Micari, F. Castriota

**Clinical data:**
- Previous right ICA PTA
- In October 2016 right-sided haemyparesis (TIA)
- Duplex: 85% stenosis with significant flow acceleration (> 2.5 m/sec)

**Risk factors:**
- Hypertension, hypercholesterolaemia
- Known severe bilateral common femoral disease

**Procedural steps**
1. Right radial access (6F)
2. Left ICA wiring
3. 6F TERUMO Destination sheath
4. Distal filter positioning
5. Direct stenting with Roadsaver stent (TERUMO)
6. Postdilatation with a 5.0/20 mm balloon
7. Filter retrieval

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**Thoracic inlet syndrome with instent thrombosis**

**Operators:** N. Kucher, T. Fuss

**Clinical data:**
- Primary (spontaneous) upper extremity deep vein thrombosis 06/15 (Paget-Schroetter syndrome) → lysis and anticoagulant therapy
- Known bony exostosis of the first rib and the clavicula → resection the first rib and stenting of the subclavian vein in 12/15
- Recurrent swelling of the right arm → thrombus aspiration in a tertiary care hospital (11/16)

**Present state:**
- Swelling of the right arm since several weeks

**Procedural steps**
1. Venous access with ultrasound guidance in right femoral vein
   - 10F sheath
2. Wire crossoage
   - TERUMO 0.035” stiff angled
3. Phlebography
4. Predilatation
   - Dorado balloon 10 mm (BARD)
5. Implantation of dedicated vein stent (stent-in-stent)
6. High pressure postdilatation of stent
   - Atlas balloon 12 mm (BARD)
Central venous stenosis

Operators: G. O'Sullivan

Clinical data: 48 year old long term dialysis patient:
Removal R IJV dialysis catheter (2015) resulted in fragment being left behind.
Subsequent SVC occlusion
Angled venography shows complete occlusion SVC
Running out of venous access options

Pre-op imaging: CT Thorax post IV with multiplanar reformats
Short segment occlusion SVC with catheter fragment embedded in wall
Multi-planar venography reveals occlusion with no nipple

Procedural steps
1. Access from above and below with radio-opaque sheaths
   - Choose best angles
   - Cone Beam CT (SIEMENS Artis Q)
2. Attempt to cross
   - Standard hydrophilic wires: CTO kit TriForce (COOK MEDICAL)
   - Back end of wires: TIPS set (COOK MEDICAL or GORE)
3. CardioThoracic back up and immediate pericardiocentesis tray
   If successful:
4. GENTLE balloon dilatation to 6/8/10 mm
5. Stent placement
   - Veniti Vici 14 mm diameter stent; back up: Gore Viabahn 13 mm diameter
6. IVUS to confirm patency
7. Cone Beam CTV

Symptomatic left ICA stenosis

Operators: F. Castriota, A. Micari

Clinical data: Minor stroke in November 2016 (right-sided hemiparesis and dysarthria).
Previous right ICA PTA (2011)
Risk factors: Hypertension, family history of CV disease
Duplex: Good result of previous RICA stenting
Severe left ICA stenosis (PSV 3.2 m/sec)

Procedural steps
1. Right femoral access
2. Proximal protection
   - MoMa 9F (MEDTRONIC)
3. Direct stenting with X-Act
   (ABBOTT VASCULAR)
4. Postdilatation with 5.0/20 mm balloon
5. Debris aspiration (if any)
**Tripple protection approach in a high-grade left ICA stenosis**

- **Operators:** R. Langhoff, A. Behne

- **Clinical data:** Coronary heart disease, aortocoronary bypass, PAD, PTA left SFA 2011, right SFA 2015

- **Risk factors:** Hypertension, hyperlipidemia

- **Procedural steps**
  1. **Transfemoral retrograde approach**
     - 8F short sheath (TERUMO)
     - Diagnostic 5F catheter Weinberg shape (COOK MEDICAL)
     - TERUMO stiff angled 0.035” wire into left ECA
  2. **Exchange to**
     - Vista Brite Tip IG guiding catheter MPA1 shape into left CCA (CORDIS)
  3. **Distal protection**
     - Filter Wire EZ (BOSTON SCIENTIFIC) into distal ICA left
  4. **Stenting**
     - Roadsaver Carotid Micromesh stent (TERUMO) 8 x 25 mm
  5. **Carotid postdilatation**
     - 5 x 20 mm Paladin balloon with integrated embolic protection (40 micron pore size) (CONTEGO-MEDICAL)
  6. **Paladin filter closure and combined filter/balloon-system removal**
     - removal of the distal EPD-Filter Wire EZ
     - removal of guiding catheter (wire controlled)
  7. **Closure of puncture site**
     - Angioseal 8F
     - transfer patient to ICU

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**Flush-occlusion right SFA after CEA right groin**

- **Operators:** A. Schmidt, S. Bräunlich

- **Clinical data:** Severe claudication right calf, walking capacity 50 meters, CEA and patch-plastic 9/2014 right groin, Stenting right SFA 2009, PTA left SFA (Lithoplasty), CAD, MI and PTCA 2009, Art. hypertension, former smoker

- **Angio:** Flush-occlusion right SFA, stent within the SFA-occlusion right ABI right 0.57

- **Procedural steps**
  1. **Left groin retrograde and cross-over approach**
     - IMA-diagnostic 5F-catheter (CORDIS/CARDINAL HEALTH)
     - 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)
     - 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
     - 7F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)
  2. **Right SFA CTO-puncture (stent-puncture)**
     - 18 Gauge 7 cm needle
     - 0.035” stiff angled Glidewire, 190 cm (TERUMO)
     - 6F – 10 cm Radiofocus-Introducer (TERUMO)
  3. **Passage of the CTO**
     - Retrograde passage into the right CFA:
       - Pioneer-Plus Reentry-system (VOLCANO)
       - 0.014” Floppy ES Guidewire, 300cm (ABBOTT VASCULAR)
       - Snaring if the retrograde guidewire into the the cross-over-sheath
     - Final guidewire-passage into the popliteal artery from antegrade:
       - 0.035” siff angled Glidewire 260 cm (TERUMO)
  4. **PTA/stenting**
     - Armada 35 5.0/100 mm balloon (ABBOTT VASCULAR)
     - Supera Interwoven Nitinol stent (ABBOTT VASCULAR)
     - SFA-ostium: Viabahn 7.0/50 mm (GORE)
     - or Absolute stent (ABBOTT VASCULAR)
Severe right SFA ISR in a Rutherford III patient

Operators: A. Micari, F. Castriota

Clinical data: Known history of multiple iliac and femoral interventions (from 2012 to 2016)
Upper limbs chronic ischaemia
Rutherford III right limb ischaemia

Risk factors: Type II diabetes mellitus; hypertension; hypercholesterolaemia

Procedural steps:
1. Left femoral access (cross-over approach)
2. Spider filter distal positioning (MEDTRONIC)
3. Lesion preparation through balloon dilation
4. Drug-eluting balloons

Long SFA occlusion right

Operators: R. Langhoff, M. Boral

Clinical data: PAOD Rutherford 3, claudication right calf at 50 meters
Recanalization SFA stent and PTA with DCB for claudication 11/2016

Risk factors: Coronary heart disease, aortocoronary bypass
Hypertension, hyperlipidimia, diabetes type II
ABI 0.6 right, 1.0 left after intervention

Angiography: Distal SFA occlusion right side

Procedural steps:
1. Left femoral access and cross-over approach
   ■ 6F 45 cm cross-over sheath Fortress (BIOTRONIK)
2. Recanalisation right SFA
   ■ 0.018” Advantage glidewire (TERUMO)
   ■ 0.018” CXI support catheter (COOK MEDICAL)
   Back-up material:
   ■ Connect 250T CTO-wire (ABBOTT VASCULAR)
   ■ Outback reentry system (CORDIS)
3. PTA
   ■ Passeo18 balloon 3 x 150 mm (BIOTRONIK)
   ■ 5 mm Passeo18 Lux DEB (BIOTRONIK),
4. Stenting
   ■ Pulsar18 stent 5 x 200 mm (BIOTRONIK)
5. Postdilatation
   ■ 5 x 200 mm Passeol 8 balloon (BIOTRONIK)
6. Puncture site closure
   ■ Angioseal 6F (TERUMO)
Case 27 – DEN 03: male, 81 years (W-E)

**Femoropopliteal occlusion left: REACT**

**Operators:** K. Deloose, J. Callaert, L. Maene

**Clinical data:** Rutherford 5 left leg since 3 months (non healing ulcers toes)
Hypercholesterolemia, smoking, art. hypertension
Previous angioplasty left fempop area

**Duplex:** Triphasic signal left CFA, no signal popliteal (occlusion), weak monophasic signal ATA left

**CT-Angio:** 1 mm slice CT-Angio → occlusion Hunter’s canal → Trifurcation

**Procedural steps**

1. **Left CFA antegrade access**
2. **Antegrade recanalization**
   - 0.018” Advantage guidewire (TERUMO)
   - 3.6F CXI support catheter (COOK MEDICAL)
3. **Vessel preparation**
   - Passeo balloon (3, 4, 5 mm) (BIOTRONIC)
4. **Adding PTX**
   - Passeo Lux (3, 4, 5 mm) (BIOTRONIC)
5. **Scaffolding: full lesion coverage (REACT)**
   - 6 mm Pulsar 18 (BIOTRONIC)
6. **Postdilatation**
   - 5, 6 mm Passeo balloon (BIOTRONIC)
7. **Plan B: Retrograde prox ATA access left**

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Case 28 – COT 04: male, 66 years (M-B)

**Rapid progression of right ICA stenosis in a 66 years old patient**

**Operators:** F. Castriota, A. Micari

**Clinical data:** Known moderate carotid disease (regular FU assessments)
Dec 2016: severe RiCA stenosis (‘soft’ plaque, PSV 3.0 m/sec), severely progressed from the previous evaluation (12 months before, PSV 1.9 m/sec)

**Risk factors:** Hypertension, hypercholesterolaemia, family history of CV disease

**Procedural steps**

1. **Right femoral access**
2. **MoMa 9F proximal protection** (MEDTRONIC)
3. **Direct stenting with Roadsaver stent** (TERUMO)
4. **Postdilatation with 5/20 mm balloon**
5. **Debris aspiration (if any)**
Progressive, asymptomatic internal carotid stenosis right

**Operators:** A. Schmidt, S. BrauNich

**Clinical data:** Progressive ICA-stenosis right, peak systolic velocity 5.8 m/sec.
(1) CAD with CABG 2000
(2) PAOD, Rutherford 3–4, ABI 0.63 right, 0.93 left,
(3) stenting of the distal SFA and P3-segment 2015,
(4) peripheral bBypass surgery left leg,
(5) Art. hypertension, severe atherosclerosis of the aorta,
(6) formerly impaired walking distance

**Angiography:** Angiography during PTCA 12/2016, short, high-grade stenosis right ICA

**Procedural steps**
1. **Right groin access**
   - 9F 25 cm Radiofocus Introducer (TERUMO)
   - 5F Judkins Right diagnostic catheter (CORDIS/CARDINAL HEALTH)
   - 0.035” soft angled Glidewire, 190 cm (TERUMO)
   - 0.035” SupraCore 190 cm guidewire (ABBOTT VASCULAR)

2. **Cerebral protection**
   - MoMa proximal protection system (MEDTRONIC)

3. **Predilatation and stenting**
   - 3.5/20 mm MiniTrek Monorail balloon (ABBOTT VASCULAR)
   - 8/30 mm CGuard stent (InspireMD)

4. **Postdilatation**
   - Paladin® Carotid Post-Dilatation balloon
     with integrated embolic protection (CONTEGO MEDICAL)

5. **Aspiration and declamping with the Paladin-filter in place**

6. **Retrieval of the Paladin-system**

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Popliteal reocclusion with impaired single vessel run-off

**Operators:** R. Langhoff, A. Behne

**Clinical data:** PAOD, Rutherford 3–4, ABI 0.63 right, 0.93 left,
(1) stenting of the distal SFA and P3-segment 2015,
(2) peripheral bBypass surgery left leg,
(3) Art. hypertension, severe atherosclerosis of the aorta,
(4) severely impaired walking distance

**Risk factors:**

**Procedural steps**
1. Antegrade access right common femoral
   - 5F TERUMO Destination 45 cm

2. Recanalisation of the occluded stent in the P3 segment

3. PTA and stenting
   - Cr8 BTK 4 x 38 mm DES (ALVIMEDICA)

4. Recanalisation of the ATA and peroneal, PTA with 2.5 and 3 mm balloon

5. Back-up: retrograde access via peroneal artery

6. Closure of puncture site by manual compression
Calcified SFA-CTO right

Operators: S. Bräunlich, J. Schuster

Clinical data: Severe claudication right calf, walking capacity 100 meters
PTA/stent left SFA 12/2015
Diabetes mellitus, type 2, insulin-dependent
Art. hypertension, former smoker

Angio: Angiography right SFA during PTA/stent left SFA:
short, moderately calcified SFA-CTO right
ABI right 0.61

Procedural steps

1. Left groin retrograde and cross-over approach
   ■ IMA-diagnostic SF catheter (CORDIS/CARDINAL HEALTH)
   ■ 0.035" angled soft Radiofocus guidewire, 190 cm (TERUMO)
   ■ 0.035" SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   ■ 6F 55 cm Flexor Check-Flo Introducer, Raabe Modification (COOK MEDICAL)

2. Guidewire passage and PTA of the occlusion right SFA
   ■ 4.0/40 mm Pacific Plus balloon (MEDTRONIC)
   ■ 0.018" Connect 250 T guidewire, 300 cm (ABBOTT VASCULAR)

3. Stenting
   ■ NitiDES drug-eluting stent (ALVIMEDICA)
**ATA recanalization and dexamethason-injection with a Bullfrog-Device**

**Operators:** A. Schmidt, Y. Bausback

**Clinical data:**
- Critical limb ischemia left forefoot, ulceration dig I left
- PTA of tibioperoneal trunk stenosis left 12/2015, only minor healing tendency
- Diabetes mellitus, type 2

**Angiography:**
- Total occlusion of the anterior tibial artery

---

**Procedural steps**

1. **Left antegrade access**
   - 6F 55 cm Flexor Check-Flo Introducer, Raabe Modification (COOK MEDICAL)

2. **Guidewire passage of the ATA-CTO**
   - 0.014” Command ES guidewire, 300 cm (ABBOTT VASCULAR)
   - 3.5/120 mm Armada 14 balloon (ABBOTT VASCULAR)

3. **Arterial wall-injection of dexamethason**
   - BullFrog Micro-Infusion-Device (MERCATOR MEDSYSTEMS)

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**SFA-CTO right**

**Operators:** A. Schmidt, Jia Xin

**Clinical data:**
- Severe claudication right calf, walking capacity 100 meters
- CAD, PTCA 12/2015
- Art. hypertension, former smoker, diabetes mellitus type 2

**Duplex:**
- AFS-occlusion right, approximately 15 cm in length
- Minor calcifications
- ABI right 0.67

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**Procedural steps**

1. **Left groin retrograde and cross-over approach**
   - IMA-diagnostic 5F catheter (CORDIS/CARDINAL HEALTH)
   - 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)
   - 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   - 6F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)

2. **Guidewire passage of the SFA-CTO**
   - 0.018” CXC support catheter 135 cm (COOK MEDICAL)
   - 0.018” Connect guidewire, 300 cm (ABBOTT VASCULAR)

3. **Predilatation and DCB-treatment**
   - 5.0/120 mm Pacific Plus balloon (MEDTRONIC)
   - Orchid drug-coated balloon (ACOTEC)

4. **Stenting only on indication**
   - Epic Nitinol stent (BOSTON SCIENTIFIC)
De novo long SFA occlusion

**Operators:** T. Bisdas, Ö. Sensebat, St. Stahlhoff

**Clinical data:** PAD Rutherford 4 right limb, ABI 0.4, pulses only in the right common femoral artery

**Risk factors:** Arterial hypertension, hyperlipidemia, past smoker, COPD/in Angio-CT

**Procedural steps**
1. Puncture of the right CFA, 6F sheath (Destination, TERUMO), cross over approach
2. Crossing the lesion with Quick Cross catheter (SPECTRANETICS), Advantage .035 wire (Terumo) or 0.018” (V18, BOSTON SCIENTIFIC)
   In case of subintimal recanalisation use of Outback recanalisation catheter (CORDIS/CARDINAL HEALTH) and 0.014” wire (Command, ABBOTT VASCULAR)
3. Predilatation with 5 x 300 mm PTA
4. Implantation of a 6 x 250 mm Viabahn stent-graft and use of additional Viabahn stent-grafts if necessary (GORE)
5. Postdilatation with 5 x 250 mm PTA catheter
6. Control angiography and closure of the puncture site with Angio-Seal closure device (ANGIOCLINIC)

In-Stent reocclusion right SFA

**Operators:** A. Schmidt, M. Ulrich

**Clinical data:** Severe claudication right calf, walking capacity 150 meters PTA with DCB and spotstenting right SFA 12/2014 PTA and stenting left SFA 11/2014 CAD with PTCA 2003 Art. hypertension, current smoker

**Angiography:** SFA-reocclusion right, Nitinol stent within the occlusion
**Total occlusion left SFA**

**Operators:** S. Bräunlich, A. Schmidt

**Clinical data:** Critical limb ischemia left foot, minor ulcerations dig 1 and 3  
Severe claudication left calf, walking capacity 60 meters  
Rutherford class 5  
PTA of a right SFA-stenosis 12/2016  
CAD with PTCA 2014,  
Art. hypertension, diabetes mellitus, current smoker

**Angiography:** During PTA right SFA:  
Long SFA and PI-segment occlusion left, moderately calcified

**Procedural steps**

1. Right groin retrograde and cross-over approach  
   - IMA-diagnostic SF catheter (CORDIS/CARDINAL HEALTH)  
   - 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)  
   - 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)  
   - 6F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)

2. Guidewire passage  
   - 0.035” stiff, angled Glidewire, 260 cm (TERUMO)  
   - 0.035” Seeker support catheter, 135 cm (BARD)

3. Angioplasty  
   - VascuTrak 5.0/300 mm balloon (BARD)  
   - Lutonix GEOALIGN marking system DCB 6.0/120 mm (BARD)

4. Stenting on indication  
   - LifeStent (BARD)

**Procedural steps**

1. Right femoral access and cross over approach  
   - Micropuncture technique (COOK MEDICAL)

2. 7F braided ANL sheath 45 cm (COOK MEDICAL)

3. 0.035” CXI support catheter (COOK MEDICAL), 0.035” hydrophilic wire (TERUMO)  
   If fails will utilize either Wingman CTO catheter (REFLOW MEDICAL)
   or Pioneer re-entry (VOLCANO)

4. Balloon angioplasty with Mustang PTA catheter (BSC)  
   and Impact DCB (MEDTRONIC)
   If needs stent will use Supera (ABBOTT VASCULAR)
   reassess tibial for intervention at that time

5. Sheath removal with Perclose (ABBOTT VASCULAR)
Case 39 – LEI 13: female, 57 years (B-B)

Total chronic occlusion left SFA

**Operators:** S. Bräunlich, M. Ulrich

**Clinical data:** Severe claudication left SFA, walking capacity 100 meters
- PTA with stenting right SFA 1/2016
- PTA with DCBs for restenosis right SFA 12/2016
- PTA/stenting iliac arteries bilateral 2009
- Art. hypertension, smoker

**Angiography:** During PTA right SFA: total occlusion left SFA
- ABI left 0.67

**Procedural steps**

1. **Right groin retrograde and cross-over approach**
   - IMA-diagnostic SF catheter (CORDIS/CARDINAL HEALTH)
   - 0.035" angled soft Radiofocus guidewire, 190 cm (TERUMO)
   - 0.035" SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   - 6F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)

2. **Passage of the occlusion left SFA**
   - 0.035" Radiofocus angled stiff guidewire, 260 cm (TERUMO)
   - 0.035" CXC support catheter, 135 cm (COOK MEDICAL)
   - Exchange to 0.018" SteelCore guidewire (ABBOTT VASCULAR)

3. **PTA and stenting on indication**
   - Luminor DCB 5.0/120 mm (iVASCULAR)
   - VascuFlex Multi-LOC (B.BRAUN)
SFA instent restenosis

Operators: G. Ansel, M. Jolly

Clinical data: HTN, hyperlipidemia, PAD. Previous aortic, bilateral iliac and SFA intervention now with recurrent right leg symptoms and angiographic restenosis of Rt SFA stent that was originally placed 3/2016. Recurrent Rutherford class 2 right calf symptoms

Risk factors: Duplex peak systolic velocity in stent 352 cm/sec
Resting ABI on left 0.97 decreased to 0.56 on treadmill

Procedural steps
1. Vascular access left groin with micropuncture (COOK MEDICAL)
2. Contralateral access with 7F braided ANL sheath (COOK MEDICAL)
3. Phoenix atherectomy (Volcano/PHILLIPS) of instent restenosis, DEB INPACT balloon (MEDTRONIC)
4. Distal protection with Wirion (GARDIA)

EVAR with Treo abdominal stent graft

Operators: T. Bisdas, M. Austermann, G.F. Torsello

Clinical data: Asymptomatic AAA (increase of diameter > 1 cm over the last year)

Risk factors: Arterial hypertension, smoking, hyperlipidemia, previous stroke, previous laparotomy for rectal Ca, CKD stage III, COPD

Procedural steps
1. Puncture of right and left CFA, percutaneous approach (Prostar XL, ABBOTT VASCULAR), control angiography
2. Implantation of the main body of Treo abdominal stent graft (BOLTON MEDICAL) (bifurcated endograft)
3. In situ sizing
4. Implantation of the contralateral limb
5. Implantation of the ipsilateral extension through the detachable sheath
6. Closure of the puncture sites
**Progressive abdominal aneurysm, 61 mm**

**Operators:** A. Schmidt, D. Branzan

**Clinical data:** Progressive aneurysm of the infrarenal aortic aneurysm, now max. diameter 61 mm
Irregular neck distal of the renal arteries (calcification/thrombus)
Small caliber external iliac arteries bilateral
Minor stroke 2003, CEA carotid artery bilateral 2006 and 2007
Lung cancer with lobectomy 2013

**CT-scan:** Progressive diameter from 50 mm (3/2016) to 61 mm (1/2017)

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**Procedural steps**

1. **Bifemoral percutaneous approach in local anaesthesia**
   - Preclinical with 2 Proglide closure devices both sides (ABBOTT VASCULAR)

2. **Guidewire positioning**
   - Lunderquist GW 180 cm (COOK MEDICAL)

3. **Implantation of a bifurcational stentgraft**
   - Ovation Stentgraft (ENDOLOGIX)
   - Cannulation of the contralateral limb:
     - SF Amplatz Left diagnostic catheter (CORDIS/CARDINAL HEALTH)
     - 0.035” soft angled short Radiofocus glidewire (TERUMO)

4. **PTA**
   - Proximal seal: Reliant balloon (MEDTRONIC)
   - Graft-bifurcation: 12/40 mm Admiral balloon (MEDTRONIC)

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**EVAR + left iliac branched device**

**Operators:** S. Haulon

**Clinical data:** Incidental finding of AAA during work-up for intermittent claudication
CTA: AAA 51 mm, aneurysm proximal right CIA, dilatation distal left CIA
Plan: EVAR + left iliac branched device + embolisation right IIA

**Risk factors:** Former smoker, hypertension

**History:** Aortic valve stenosis, CVA, bilateral inguinal hernia repair, lumbar herniated disc repair

**Present state:** Duplex supra-aortic vessels: normal
Cardiac ultrasound: EF 74%, AS (3.13 cm²), Ao asc 45 mm

**Procedural steps**

1. L: 10F sheath, Lunderquist, dilators (up to 20F)
   - 50 U/kg Heparin

2. R: SF55 sheath, TERUMO, SIM, AMI embolized (Amplatzer 6 mm)

3. R: 10F Right IIA embolized (Coils 10 mm)

4. R: 10F sheath, wire exchange: starter, TERUMO, Rosen-GW stiff wire (COOK MEDICAL), 12F sheath, 45cm; tip positioned above aortic bifurcation

5. L: ZBIS advanced into distal aorta, unsheath until preloaded catheter of ZBIS appears; exchange wire of preloaded catheter for 260 cm TERUMO

6. R: Snare through-and-through (tat)-wire (Terumo, 0.035”) – advance dilator of 12F sheath

7. R: 12F dilator connects to tip of preloaded catheter - secure both ends with clamps

8. Position C-arm and open branch of ZBIS (COOK MEDICAL)

9. Advance 12F dilator into ZBIS (pull & push, ‘nobody holds the wire’)

10. Puncture valve of 12F TERUMO catheter to catheterize IIA, angio

11. Wire exchange/Rosen
Case 43 – LIL 01 continued

Procedural steps (cont.)

12. Over Rosen, advance 55 cm 7F sheath into 12F to IIA, tat-wire under tension
13. Advance bridging stentgraft in 7F sheath,
14. Remove tat-wire
15. Pull down ZBIS, depending on angle of IIA
16. Pull back 7F sheath and inflate bridging stent
17. Advance 7F sheath again into stentgraft – dilate distal seal if required – Angio
18. Finish deployment of ZBIS – release trigger wires
19. Secure branch/stentgraft with balloon while removing nose cone
20. Continue with EVAR
21. R: release proximal stent
22. L: iliac angiogram
23. L: contralateral limb insertion holding the main body, deployment
24. R: finish bifurcated endograft deployment + distal attachment release
27. R: ipsilateral limb insertion & deployment + IIE stenting
   (Nitinol stent LUMINEX 10*60 mm)
28. R+L: CODA balloon (COOK MEDICAL)
29. L: Long angio catheter/Angiogram +/- non-contrast CBCT
30. R+L: sheaths retrieval + close groins

Case 44 – MUN 06: male, 88 years (E-K-H)

3-fenestrated endovascular repair of a type Ia Endoleak after EVAR 2008 with preloaded delivery system

Operators: M. Austermann, T. Bisdas, C.F. Torsello

Clinical data: Rapidly growing abdominal aneurysm up to 9 cm in diameter after EVAR 2008

Risk factors: PAD, renal impairment, obesity, art. hypertension

Procedural steps

1. Percutanous approach both groins (Prostar XL, ABBOTT VASCULAR) 14F sheath (COOK MEDICAL) both groins.
2. First angiography through the right groin and use of the fusion technique.
   Changing of the left 14F sheath for a 20F sheath in order to test the access
3. Placement of the 3-fenestrated Zenith-tube-endograft with a double wide scallop (COOK MEDICAL) via the left groin
4. Cannulation of the renal arteries through the delivery-system by means of the preloaded wire
   Cannulation of the SMA through the fenestration from the right groin
5. Advancement of 7 F sheath into the SMA
   Removal of the preloaded wire and advancement of the 6 F sheath into the RA’s
6. Complete release of the endograft and stenting of the fenestrations with covered stents (Advanta VI2, MAQUET) and flaring
7. Closure of the accesses. (Prostar XL, ABBOTT VASCULAR)
Case 45 – JEN 01: male, 80 years (M-H)

**TACE in HCC**

**Operators:** R. Aschenbach, F. Bürckenmeyer

**Clinical data:** 80 years old male with weight loss
CT and MRI proofed HCC in central right liver lobe

**History:** Child B cirrhosis

1. Canulation celiac trunk with guiding catheter
2. Large FOV – Dyna-CT for feeder evaluation
3. Chemoembolisation with doxorubicin
   - Embozene Tandem 40µm

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Case 46 – LEI 15: male, 82 years (N-C)

**Chemosaturation of liver metastases**

**Operators:** J. Fuchs, M. Moche

**Clinical data:** Uveal melanoma 07/2013, enucleation of the right eye 08/2013,
unresectable liver metastases 03/2016,

**Risk factors:** Type 2 diabetes mellitus, hypertension

1. Evaluation procedure (some days) prior to treatment:
   - Anatomical mapping
   - Embolization (to avoid reflux or infusion into GI or visceral arteries)
2. US-guided venous and arterial access to avoid multiple punctures
   Establishment of 10F jugular venous return sheath, 18F femoral venous sheath for the venous isolation catheter and 4F femoral arterial sheath
3. Full Heparinization (about 30.000 IE) with ACT control (> 450 sec!)
   Arterial catheter placement for Infusion into hepatic artery
   Connection and start of extracorporeal circuit
4. Isolation of the hepatic veins by inflation of the double balloon catheter
   Check for proper isolation with DSA (no leakage!) and fixation the catheter
5. Closing the Bypass-line to bring the filters of the extracorporeal circuit online
   CAVE: Watch out for blood pressure drop
6. Start of arterial infusion of Melphalan (3 mg/kg) with injector (25 ml/min)
   Check intermittently for arterial spasms (if any consider nitroglycerin)
   After Melphalan is fully injected, 30 min wash-out period is applied
7. Deflation of the balloons and disconnection of the filters
   Removal of arterial and venous catheters
   Removal of the sheaths after coagulation status has been normalized
Case 47 – MUN 07: male, 69 years (N-K)

Embolization of persistent type II Endoleak via superior-inferior mesenteric artery and hypogastric artery with alcohol-copolymer

Operators: A. Schwindt, Ö. Sensebat

Clinical data: EVAR with INCRAFT-Endograft 12/2015 – in follow up aneurysm expansion from initially 53 mm to up to date 58 mm

Important items: Mitral and aortic valve insufficiency grade 1
CVRF: arterial hypertension
Angio-CT 12/2016: persisting flow in the aneurysm sac via IMA and lumbar L4

Procedural steps
1. Left transbrachial access, aortic angiogram in oblique projection, canulation of superior mesenteric artery
2. Insertion of 6F 90 cm shuttle sheath (COOK MEDICAL) into SMA, canulation of middle colic artery with 4F 120 cm glidecath (TERUMO) and choice PT wire (BOSTON SCIENTIFIC)
3. Insertion of Echelon microcatheter (MEDTRONIC) into endoleak, preparation of catheter with DMSO, embolization of endoleak with Onyx L 34 (MEDTRONIC)
4. Retrieval of microcatheter, selective angiogram of right hypogastric artery; if necessary selective embolization of lumbar arteries L4 with Onyx L34 in case of remaining endoleak

Case 48 – JEN 02: female, 44 years (G-D)

Pre-operative uterine fibroid embolisation

Operators: R. Aschenbach, F. Bürckenmeyer

Clinical data: Abdominal pain and abnormal intermenstrual bleeding

Imaging: MRI proofed a 4 cm right-sided uterine fibroid

Procedural steps
1. Canulation of both uterine arteries
   - RIM-catheter
   - 2.7 F Progeat Microcatheter (TERUMO)
2. Embolisation
   - Gelatine Sponge/Gelbeads 500-700 µm (VASCULAR SOLUTIONS)
Coiling of lumbal arteries and inferior mesenteric artery before EVAR

**Operators:** M. Moche, J. Fuchs

**Clinical data:**
- Incidental finding of an eccentric infrarenal AAA with 5.1 cm diameter
- 4.5 mm IMA
- 3 mm lumbal artery 3 (already embolised)
- 4 mm lumbal artery 5 with common trunc
- Art. hypertension, hyperlipidemia, former smoker

**CT-scan:** AAA with max. 51 mm diameter, eccentric, potentially old containt rupture

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**Procedural steps**

1. **Right groin access**
   - 4F sheath CFA
   - 4F sidewinder cath

2. **Embolisation of IMA**
   - 4F sidewinder cath.
   - 5 mm Amplatzer Vascular Plug4 (AGA MEDICAL CORPORATION)

3. **Embolisation of lumbal arteries 5**
   - VortX Diamond Coils (BOSTON SCIENTIFIC)
   - POD Anchor Coil (PENUMBRA)

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Tibial occlusion

**Operators:** G. Ansel, M. Silver

**Clinical data:**
- 87 year old male with nonhealing ulceration of the bilateral feet

The patient was treated successfully 3 weeks ago for the right foot with opening of the infrainguinal vasculature and now presents for the left leg, Rutherford class VI due to location and depth

**Current state:** CAD, cardiomyopathy with ejection fraction of 17%, DM II, HTN, hyperlipidemia

**Procedural steps**

1. Antegrade femoral access with micropuncture (COOK MEDICAL)
   - 6 F short sheath (Terumo)

2. If needed balloon angioplasty and drug coated balloon of proximal popliteal artery (BARD)

3. CTO traversal
   - 0.018” gold tippid glide wire (TERUMO)
   - 0.018” CXI catheter (COOK MEDICAL)

4. Angioplasty of anterior tibial artery (MEDTRONIC)

5. If tibioperoneal trunk is attempted with use CTO catheter (REFLOW MEDICAL)

6. Sheath removal
   - Mynx system (CARDINAL/CORDIS)
Restenosis right SFA after DCB-treatment

**Operators:** S. Bräunlich, M. Ulrich

**Clinical data:** CLI with ulceration DS and restpain right foot
PTA with DCBs 3/2016 right SFA
PTA left SFA 2/2015
DAC, PTCA 2012
Diabetes mellitus, type 2

**Procedural steps**

1. Left femoral retrograde and cross-over approach
   - 6F 55 cm Check-Flo Performer, Raab Modification (COOK MEDICAL)

2. Guidewire passage of the SFA-restenosis and filter positioning
   - PT2 0.014” guidewire, 300 cm (BOSTON SCIENTIFIC)
   - Wirion protection system (GARDIA MEDICAL)

3. Atherectomy and PTA with DCBs
   - Jetstream XC (BOSTON SCIENTIFIC)
   - Legflow drug-coated balloon (CARDIONOVUM)

The role of photoablation and DCB for in-stent restenosis

**Operators:** U. Teichgräber, R. Aschenbach

**Clinical data:** 59y old male with PAD after Supera stent implantation in 2015 in the distal femoral-popliteal artery. Presenting now with a chronic stent occlusion.

**Imaging:** DSA and Duplex are demonstrating a chronic stent occlusion

**Procedural steps**

1. Guidewire crossing of the occluded in-stent segment
   - 0.035"stiff hydrophilic guidewire (TERUMO)
   - Quick-Cross support catheter (SPECTRANETICS)

2. Laser atherectomy
   - 2.5 mm Turbo Elite laser catheter (SPECTRANETICS)

3. Balloon PTA
   - Two 6/80 mm Stellarex DCB catheter (SPECTRANETICS)
**Case 53 — LEI 18: male, 65 years (V-D)**

**Total occlusion of the common iliac artery**

*Operators:* S. Bräunlich, M. Ulrich

*Clinical data:* Severe claudication left leg, Rutherford class 3  
Diabetes mellitus, type 2  
Art. Hypertension, former smoker

**Procedural steps**

1. **Brachial approach**
   - 6Fr. 90cm Check-Flo Performer (COOK MEDICAL)

2. **Left femoral approach**
   - 7Fr 25cm Sheath (TERUMO)

3. **Guidewire passage**
   - Connect Flex 0.018” 300cm Guidewire /ABBOTT VASCULAR
   - Pacific 4.0/40mm-Ballon (MEDTRONIC)

4. **Stenting**
   - LifeStream covered stent (BARD)

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**Case 54 — LEI 19: female, 71 years (E-D)**

**SFA-occlusion right**

*Operators:* S. Bräunlich, M. Ulrich

*Clinical data:* Severe claudication right leg, walking capacity 100 meters  
PTA/stenting left SFA 12/2016  
PTA iliac left 12/2015  
Art. hypertension, current smoker

**Angiography:** During PTA left SFA 12/2016: Long SFA-occlusion right, moderately calcified

**Procedural steps**

1. **Left groin retrograde and cross-over approach**
   - IMA-diagnostic 5F catheter (CORDIS/CARDINAL HEALTH)
   - 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)
   - 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)
   - 6F Balkin Up&Over Sheath, 40 cm (COOK MEDICAL)

2. **Passage of the occlusion right SFA**
   - 0.035” Radiofocus angled stiff guidewire, 260 cm (TERUMO)
   - 0.035” TrailBlazer support catheter, 135 cm (MEDTRONIC)
   - Exchange to 0.018” SteelCore guidewire (ABBOTT VASCULAR)

3. **PTA and stenting on indication**
   - Luminor DCB 5.0/120 mm (iVASCULAR)
   - VascuFlex Multi-LOC (B.BRAUN)
**Treatment of the left GSV with ELVeS Radial slim™**

**Operators:** M. Ulrich, C. Harzendorf

**Clinical data:** Chronic venous disease C2EpAs2Pr (CEAP)
Symptoms: feeling of heaviness and dysesthesia in the left leg

**Duplex:** Complete insufficiency of the left great saphenous vein Hach 2
Side branch varicose veins below the left knee
Competent deep veins
No Thrombosis

**Procedural steps**

1. Puncture of the distal GSV with 16G Introducer
   Puncture of sidebranches with 18G Introducer
   Introducing of Laser Fiber (ELVeS Radial slim™ BOLITEC)
   Ultrasound control of the tip position at GSV junction
2. Application of the tumescent anesthesia around the left great saphenous vein
3. Treatment of the left GSV with 10 W/70Joul/cm
4. Foam sklerotherapy of sidebranches with Aethoxysklerol
5. Applying compression bandage left leg
6. Injection of a LMWH for thrombosis prophylaxis
**Multilevel disease with CLI right**

**Operators:** A. Schmidt, Y. Bausback

**Clinical data:** Critical limb ischemia right leg, rest pain, Rutherford class 4
PTA SFA and popliteal artery right and failed antegrade recanalization of a tibioperoneal trunk occlusion right elsewhere 12/2015
Persistent atrial fibrillation

**Angiography:** High-grade stenosis SFA and popliteal artery right, occlusion of the tibioperoneal trunk
ABI 0.21

1. **Left groin retrograde and cross-over approach**
   - 0.035” SupraCore guidewire 190 cm (ABBOTT VASCULAR)
   - 6F-40 cm Balkin Up&Over Sheath (COOK MEDICAL)

2. **Guidewire-passage of the SFA/popliteal stenoses and PTA**
   - predilatation with 0.014” NanoCross balloon (MEDTRONIC)

After failed antegrade GW-passage:

3. **Retrograde passage via the peroneal artery**
   - 21 Gauge 7 cm needle (COOK MEDICAL)
   - 0.018” V-18 Controll-GW 300 cm (BOSTON SCIENTIFIC)
   - 0.018” QuickCross support catheter 90 cm (SPECTRANETICS)

4. **PTA with a drug-coated balloon**
   - Chocolate Touch 6.0/120 mm (TriREME MEDICAL)

**Multilevel stenotic disease and Long PT and plantars/arch occlusion**

**Operators:** M. Manzi, L.M. Palena, C. Brigato

**Clinical data:**
- Rutherford 5, TcPO2 = 17 mmHg
- TUC 3c 1° toe and heel
- Persistent stenotic disease and Long PT and plantars/arch occlusion

**Angiography:** US guided left antegrade CFA access 6F, CO2 angiography

**Procedural steps**

1. US guided left antegrade CFA access 6F, CO2 angiography

2. 4F BER, V18 CW intraluminal, subintimal when failure
   - Command 0.014” (ABBOTT VASCULAR) re-enter
   - Retrograde distal when failure

3. SFA and POP treatment with POBA or DEB (discussion)

4. US guided closure device deployment
**Case 58 – BK 01: male, 66 years (K-K)**

**Excimer laser assisted drug coated balloon recanalisation of popliteal ISR**

**Operators:** T. Zeller

**Clinical data:** Calf claudication left leg after 100m since 3 months (PAOD Fontaine IIb/Rutherford 3)
Stent recanalisation left popliteal artery 2012
DCB angioplasty and stent-in-stent angioplasty of left popliteal ISR 01/2016

**Present state:** CVRF: arterial hypertension, ex nicotine, hypercholesterinemia
ABI at rest: right leg: 1.1; left leg: 0.3
Duplex: instent reocclusion of left popliteal artery

**Procedural steps**

1. Antegrade access, 6F, left CFA
2. Crossing attempt of the popliteal artery occlusion
   - 0.014" Advantage 14 GW (TERUMO)
3. Laser debulking of the occlusion
   - Turbo elite, 2.3 mm (SPECTRANETICS)
4. Postdilatation
   - 5/100 mm Stellarex DCB (SPECTRANETICS)

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**Case 59 – LEI 22: male, 71 years**

**Diffuse subtotal stenosis distal SFA / popliteal artery**

**Operators:** S. Bräunlich, M. Ulrich

**Clinical data:** Restpain and Severe claudication left leg, Rutherford class 4
CAD, PTCA 2012, Chronic heart failure, EF 35%
Diabetes mellitus, type 2
Art. hypertension, former smoker

**Present state:** Left distal SFA and popliteal artery with long subtotal stenosis,
Moderately calcified, diffuse BTK-stenoses
ABI left 0.32

**Procedural steps**

1. Right groin retrograde and cross-over approach
   - 6F 55 cm Check-Flo Performer, Raabe Modification (COOK MEDICAL)
2. Guidewire passage
   - PT2 0.014" 300cm guidewire (BOSTON SCIENTIFIC)
   - QuickCross support catheter (SPECTRANETICS)
3. PTA
   - AngioSculpt scoring balloon 5.0/100 mm (SPECTRANETICS)
   - Exchange to a 0.035" SupraCore guidewire (ABBOTT VASCULAR)
   - Stellarex DCB (SPECTRANETICS)
Stent recanalisation of right SFA with implantation of a 3-dimensional helical stent

Operators: Dr. Rastan, Dr. Noory
Clinical data: PAOD Rutherford 3 / Fontaine IIb right leg (walking distance 30 m)
Mild aneurysm ascending aorta (45 mm)
Present state: CVRF: arterial hypertension
ABI at rest: right leg: 0.5; left leg: 0.7
Duplex: occlusion of distal SFA with reperfusion proximal popliteal artery

Procedural steps
1. Right antegrade access
   ■ 6F Avanti sheath (CORDIS)
2. Intraluminal crossing attempt distal SFA
   ■ 0.035" TERUMO glidewire
3. Predilatation
   ■ 4 mm Powerflex balloon (CORDIS)
4. Implantation of a BioMimics stent (VERYAN)
5. Postdilatation
   ■ 6/20 mm Powerflex balloon (CORDIS)
6. Sheath removal with Femoseal (TERUMO)

OCT-guided atherectomy for popliteal artery CTO with Pantheris150

Operators: A. Schwindt, N. Abu-Bakr
Clinical data: PAOD Rutherford III right leg, painfree walking distance 150 m
ABI right: 0.6; left: 1.3
Present state: CVRF: hyperlipidemia, hypertension
Carotid TEA right 2010, left 2016
bilateral DVT, warfarin therapy
CCD and Angio-CT: occlusion of right popliteal artery

Procedural steps
1. Right antegrade access
   ■ After angiogram insertion of 7F 45 cm Destination sheath (TERUMO)
2. Recanalization of popliteal artery
   ■ Ocelot 200 OCT guided recanalization catheter (AVINGER)
3. Filter placement
   ■ 6 mm Spiderfilter (MEDTRONIC) in PIII segment
4. OCT-guided atherectomy of lesion
   ■ 7F Pantheris calcium cutter with aim of residual stenosis of less than 30%
5. Post PTA
   ■ Passeo Lux drug eluting balloon (BIOTRONIK)
6. Filter removal
7. Closure of puncture site
   ■ 8F Angioseal (ST.JUDE)
Case 61b – LEI 22b: male, 72 years (W-J)

**Total ATA-oclusion, CLI left forefoot**

**Operators:** A. Schmidt and S. Bräunlich

**Clinical data:**
- Critical limb ischemia left, gangrene Dig 2-4
- CAD, PTCA 2012, chronic heart failure, NYHA II-III
- Art. Hypertension, diabetes mellitus type 2
- Previous PTA / stenting BTK for CLI 2010
- Failed recanalization-attempt 1/2017

**Angiography:** from previous unsuccessful recanalization attempt

**Angiography images:**

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**Procedural steps**

1. **Left antegrade access:**
   - 6Fr-55cm Check-Flo Sheath, Raabe Modification (COOK MEDICAL)

2. **Retrograde access via dorsalis pedis artery**
   - 2.9 Pedal Introducer Access Set (COOK MEDICAL)

3. **Passage of the occlusion (retrograde)**
   - CXI support-catheter, 0.018”, 90 cm (COOK MEDICAL)
   - Hydro-ST 0.014” Guidewire, 300cm (COOK MEDICAL)
   - Approach CTO 25gramm Guidewire, 300cm (COOK MEDICAL)

4. **PTA (BTK-bifurcation in kissing technique)**
   - retrograde: Advance Micro Balloon 3.0/120mm, 90cm (COOK MEDICAL)
   - antegrade: Advance LP 3.0/40mm Balloon (COOK MEDICAL)
**Case 62 – LEI 23: female, 70 years (C-L)**

**Total occlusion of the common iliac artery left**

**Operators:** S. Bräunlich, A. Schmidt

**Clinical data:** Severe claudication left, walking capacity 50-100 meters
Art. hypertension, nicotine-abuse
CAD, PTCA 11/2015

**Angiography elsewhere:** Common iliac artery occlusion left
moderately calcified

**Procedural steps**

1. **Left femoral access**
   - 7F 25 cm Radiofocus Introducer (TERUMO)
   - 0.035" SupraCore guidewire 300 cm (ABBOTT VASCULAR)

2. **Antegrade and retrograde guidewire passage**
   - brachial:
     - 5F Judkins Right diagnostic catheter 125 cm (CORDIS/CARDINAL HEALTH)
     - from femoral:
     - 5F Multipurpose diagnostic catheter 80 cm (CORDIS/CARDINAL HEALTH)
     - 0.035" stiff angled glidewire, 260 cm (TERUMO)

3. **Predilatation and stenting of the aorto-iliac bifurcation**
   - Armada 35 6/40 mm ballon (ABBOTT VASCULAR)
   - LifeStream covered stent 7/58 bilateral in kissing-technique (BARD)

**Baseline angio 10/2014 Result after implantation of 8mm balloon expandable stents into each CIA origin**

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**Case 63 – BK 03: female, 41 years (G-A)**

**Stentgraft reconstruction of ISR of aortic bifurcation**

**Operators:** Dr. Noory, PD Dr. Rastan

**Clinical data:** Bilateral PAOD Rutherford 2 / Fontaine IIa
Bilateral CIA stent-angioplasty 10/2014
Bilateral chronic venous insufficiency

**Present state:** CVRF: ex-smoker, hyperlipidemia, obesity
ABI at rest: right leg: 0.8; left leg: 0.6
Duplex: Bilateral high grade ISR at the origin of the CIA

**Procedural steps**

1. **Bilateral retrograde access**
   - 23 cm long 7F sheath into the CFA (CORDIS)

2. **Crossing of ISR**
   - 0.035" guidewire (TERUMO)

3. **Bilateral stentgraft implantation in a modified kissing stent fashion**
   - BeGraft 8 mm (BENTLEY)

4. **Sheath removal**
   - Femoseal (TERUMO)
Thursday, 15:39 – 16:06   Live from Münster   Main Arena 1 · Room 1

Case 64 – Mun 09: male, 57 years (M-J)

High grade shunt stenosis treated with scoring balloon, provisional stenting with covered self-expandable stent

**Operators:** A. Schwindt, G.F. Torsello

**Clinical data:** Endoshunt-creation with EverlinQ-System 9/2015
Surgical elevation of brachial vein 4/2016
Since 5/2016 double puncture use of endoshunt

**Risk factors:** High grade stenosis of shunt-vein mid upper arm in CCD with resulting shunt dysfunction

1. Antegrade puncture of shunt-vein at cubital fossa
2. Sheath insertion
   - 6F 10 cm sheath (TERUMO)
3. Passage of lesion
   - 0.014" wire (choice PT, BOSTON SCIENTIFIC)
4. PTA
   - Angiosculpt scoring balloon (SPECTRANETICS)
5. Bailout stenting
   - Covera-covered stent (BARD)

Thursday, 16:44 – 17:08   Live from Bad Krozingen   Main Arena 1 · Room 1

Case 65 – BK 04: female, 56 years (B-M)

Directional atherectomy & DCB of right CFA

**Operators:** A. Rastan, T. Zeller

**Clinical data:** PAOD Rutherford 2 / Fontaine IIb right leg
Recanalisation left CIA 12/2016
Stent reconstruction of aortic bifurcation 2014

**Present state:**
CVRF: ex-smoker, hyperlipidemia
ABI right leg: 0.6; left leg: 1.0
Duplex: high grade stenosis of right CFA

1. Left transbrachial retrograde access
2. Filter placement
   - 6 mm Spider filter (MEDTRONIC) distal right SFA
3. Directional atherectomy
   - Turbohawk SX-C (MEDTRONIC)
4. Drug coated balloon angioplasty
   - 7/40 mm Impact Pacific (MEDTRONIC)
5. Stenting on indication
**TEVAR of a subacute Type B aortic dissection**

**Operators:** A. Schmidt, D. Branzan

**Clinical data:** Acute Type-B dissection 6 weeks ago, since then intermittent thoracic pain. CT 4 weeks later: diameter-increase of the descending aorta of 5 mm. Coiling of intercostal arteries to reduce the risk of spinal cord ischemia during TEVAR. Art. hypertension, former smoker.

**CT-scan:** 2 focal dissections of the descending thoracic aorta, both have an entry without reentry, max. diameter of the aorta 46 mm.

**Procedural steps**

1. **Bilateral femoral access**
   - Preloading of Proglide-Systems right (ABBOTT VASCULAR)

2. **Positioning of guidewire**
   - LunderQuist 0.035” 260 cm (COOK MEDICAL)

3. **Implantation of 2 thoracic stentgrafts**
   - Ankura thoracic graft (LifeTech)
   - Stentgraft from left subclavian artery to the celiac trunk
Endovascular repair of an AAA with Endurant Endograft and additional proximal fixation with Heli-FX EndoAnchors

**Operators:** M. Austomann, Ö. Sensebat, St. Stahlhoff

**Clinical data:** Growing abdominal aortic aneurysm with conical neck from 4.5 cm to 5.5 cm PAD with severe calcified and stenosed iliac arteries

**Risk factors:** CAD – PTCA and PM-Implantation 5/16, chronic heart failure, carotid stenosis both sides, PAD – venous bypass 11/06

**Procedural steps**

1. Percutaneous approach both groins
   - Prostar XL (ABBOTT VASCULAR)
   - Placement of 14F sheath (COOK MEDICAL)

2. Placement of Endurant bifurcated endograft (MEDTRONIC) just below the RA’s

3. Additional fixation of the proximal sealing zone
   - Heli-FX Endoanchors (MEDTRONIC)

4. Closure of the groin
   - Prostar XL (ABBOTT VASCULAR)

For case information please download the LINC 2017 App or visit the LINC 2017 website.
**Thursday, 14:27 – 14:50  Live from Münster  Main Arena 2 · Room 2**

**Case 70 – MUN 11: male, 71 years (P-R)**

**Endovascular repair of an inflammatory AAA 5,7 cm with Endurant Endograft**

**Operators:** M. Austermann, T. Bisdas, G.F. Torsello  
**Clinical data:** Inflammatory abdominal aortic aneurysm with abdominal pain  
**Risk factors:** Art. hypertension, obesity

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**Procedural steps**

1. Percutaneous approach both groins  
   - Prostar XL (ABBOTT VASCULAR)  
   - Placement of 14 F sheath (COOK MEDICAL)

2. Placement of Endurant bifurcated endograft (MEDTRONIC) just below the RA`s

3. Closure of the groin

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**Thursday, 15:28 – 16:05  Live from Lille  Main Arena 2 · Room 2**

**Case 71 – LIL 02: male, 61, years (H-M)**

**FEVAR for dissecting TAAA**

**Operators:** S. Haulon

**Clinical data:**  
- 2013: type B aortic dissection, conservative treatment  
- 2014 aneurysmatic evolution infrarenal aorta: Open AAA tubular repair  
- Aneurysmatic evolution descending thoracic and thoraco-abdominal aorta, with a maximum diameter 61 mm  
- November 2016: TEVAR  
- January 2017: FEVAR  
- Risk factors: Smoker, hypertension

**History:**  
- Gastric ulcers, pancreatitis, OSA, GORD

**Present state:**  
- At present asymptomatic  
- Renal function: creatinine 12 mg/l, GFR 64  
- Cardiac ultrasound: normal EF, mild AI, otherwise normal  
- Duplex carotid arteries: normal  
- Spirometry: mild obstructive pattern

**Procedural steps**

1. L: 7F sheath/Lunderquist/dilators (up to 20F) + 100 U/kg Heparin (Target ACT≥250)  
2. L: 20F sheath above the aortic bifurcation  
3. L (through 20F): Two 7F sheaths, one 6F sheath  
4. L (through 20F): Advance marked angio catheter through 7F sheath  
5. R: 10F sheath/Lunderquist/dilators up to 20F  
6. Fluoroscopy to locate fenestrated endograft markers  
7. R: Advanced fenestrated endograft (COOK MEDICAL)  
8. Aortic angiogram/fenestrated endograft deployment

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Continued on next page
9. **L**: Catheterization of the fenestrated endograft lumen through 6F sheath with C2/KMP catheter and TERUMO wire
10. Advance 6F sheath to the endograft lumen
11. C2/RIM/DAV + TERUMO /Roadrunner through 6F for renal artery catheterisation
12. Renal angiogram +/- nitro injection
13. Exchange TERUMO for a Rosen
14. Advance 6F to the renal artery
15. Advance stent into the parking position
16. **L**: Through last 7F sheath advance C2+ Terumo to catheterize fenestrated endograft lumen
17. Advance 7F below the fenestration of SMA
18. C2/VS1 + TERUMO /Roadrunner through 7F sheath to catheterize SMA
19. Vessel angiogram to check position in main trunk
20. Exchange Terumo for Amplatz (BOSTON SCIENTIFIC ) wire
21. Advance 7F in the target vessel
22. Advance stent into parking position
23. 16-19 for the coeliac trunk
24. **R**: Release reducing ties / proximal attachment and distal attachment
25. **R**: Nose capture & retrieval under fluoroscopy/Molding with CODA balloon (COOK MEDICAL)
26. **L**: Renal artery stent deployment (1/3 aortic lumen) after 6F retrieval
27. **L**: Flare the stent inside the aortic portion with 10–20 mm balloon
28. **L**: Advance 6F in the renal stent/selective angiogram
29. **L**: SMA stent deployment (1/3 aortic lumen) after 7F retrieval
30. **L**: CT stent deployment (1/3 aortic lumen) after 7F retrieval
31. **L**: Flare the stent inside the aortic portion with 10–20 mm balloon
32. **R**: Remove fenestrated device delivery system
33. **L**: Pull back 20F sheath in common iliac
34. Continue with EVAR procedure
35. CODA balloon at the level of overlaps (COOK MEDICAL)
36. Long angio catheter/Angiogram +/- non-contrast CBCT

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**Case 72 – MUN 12**: female, 74 years (D-I)

**Standard branched-EVAR for a TAAA-type Crawford 3**

**Operators:** M. Austermann, O. Sensebat, G.F. Torsello

**Clinical data:** Rapidly growing TAAA Crawford 3 now 71 mm in diameter with chronic back pain

**Risk factors:** Art. hypertension, COLD, epilepsy under med. therapy, osteoporosis, hostile abdomen

**Procedural steps**

1. Percutaneous approach both groins Prostar XL (ABBOTT VASCULAR) 14F (COOK MEDICAL) both groins
2. Left axillary access 5F sheath via cut down
3. Placement of the T-Branch-endograft (COOK MEDICAL) with four branches and the bifurcated device (Unibody with the iliac limbs-COOK MEDICAL) and direct closure of the groins to avoid SCI
4. Cannulation of celiac trunk, SMA and renal arteries through the branches and implantation of the bridging stentgrafts (Advanta V12 – MARQUET, Viabahn – GORE, Covera – BARD)
5. Final angiography, closure left axillary access (Prostar XL, ABBOTT VASCULAR)
Stent reconstruction of aortic bifurcation in a patient with Leriche syndrome

Operators: Prof. Zeller, Dr. Noory

Clinical data: Bilateral buttock and leg claudication after 50 to 100 meters (PAD Rutherford 2 / Fontaine IIb) since a couple of months

Present state: CVRF: arterial hypertension, ex nicotine
ABI at rest: right leg: 0.8; left leg: 0.8; post exercise 0.6 / 0.6
Duplex: distal occlusion of infrarenal abdominal aorta and the origins of both CIAs
Patent inferior mesenteric artery, bilateral internal and external iliac arteries

Procedural steps
1. Retrograde access
   ■ Insertion of 6F 90 cm shuttle sheath via left brachial artery and insertion of a 23 cm long 7F sheath into each CFA
2. Antegrade crossing attempt of the aortic occlusion
   ■ 5F vertebral catheter, 0.035” Glidewire (TERUMO) into one of the CIAs
3. Predilatation
   ■ 5 mm Admiral balloon (MEDTRONIC)
4. Retrograde crossing attempt of the contralateral CIA
5. Predilatation
   ■ 5 mm Powerflex balloon (CORDIS)
6. Stenting of distal abdominal aorta
   ■ Smart 14/40 mm stent (CORDIS)
7. Stenting of both CIAs
   ■ Isthmus balloon expandable stents (ALVIMEDICA)

Hybrid operation for ilio-femoral occlusion

Operators: T. Bisdas, M. Austermann, St. Stahlhoff

Clinical data: Rutherford 3 right limb, ABI:0.4, no peripheral pulses
Risk factors: Arterial hypertension, hyperlipidemia, current smoker (30 p/y)

Procedural steps
1. Cut down right groin, Puncture of the CFA and recanalisation of the EIA occlusion with a 0.035” wire (Advantage, TERUMO) or an 0.018” wire (V18, BOSTON SCIENTIFIC)
   Use of a Quick Cross catheter (SPECTRANETICS)
2. Arteriotomy and endarterectomy of CFA and proximal SFA
   Use of a ring stripper and a Forgarty catheter for endarterectomy of the EIA
3. Stenting of the EIA with a 7 x 80 mm Complete stent (MEDTRONIC)
4. Patchplasty of the CFA with a Dacron Patch (MAQUET) and control angiography
5. Wound closure
**Thursday, 09:30 – 11:30  Live from Abano Terme**  
**Technical Forum · Room 3**

**Case 75 – ABT 02: female, 77 years (M-G)**

**AT and PT long occlusion, lateral plantar and DP occlusion revascularization**

**Operators:** M. Manzi, L.M. Palena, C. Brigato  
**Clinical data:** PAOD Rutherford 5  
TUC 3c lesion in non healing TMA  
TcPO2= 8 mmHg  
**Risk factors:** DM, hypertension

**Procedural steps**

1. **US guided Left antegrade CFA access 6F, CO2 angiography**  
2. **4F BER, V18 CW intraluminal, subintimal when failure**  
Command 0,014 re-enter (ABBOTT VASCULAR)  
Retrograde distal when failure
3. **POBA or DEB discussion**
4. **US guided closure device deployment**

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**Thursday, 09:30 – 11:30  Live from Leipzig, Department of Angiology**  
**Technical Forum · Room 3**

**Case 76 – LEI 26: male, 81 years (H-L)**

**CLI, popliteal artery occlusion**

**Operators:** A. Schmidt, S. Bräunlich  
**Clinical data:** Critical limb ischemia with gangrene dig 4/5 left, Rutherford 5  
Failed recanalization of a popliteal occlusion left  
CEA left femoral bifurcation 1/2017  
CAD, PTCA 2004  
Chronic heart failure, EF 40%  
Diabetes mellitus, type 2  
Chronic renal insufficiency with GFR 55 ml/min

**Present state:**  
Angiography before CEA left groin  
ABI left 1.3, mediasclerosis

**Procedural steps**

1. **Left groin retrograde and cross-over approach**  
   ■ IMA-diagnostic 5F catheter (CORDIS/CARDINAL HEALTH)  
   ■ 0.035” angled soft Radiofocus guidewire, 190 cm (TERUMO)  
   ■ 0.035” SupraCore guidewire, 190 cm (ABBOTT VASCULAR)  
   ■ 6F 55 cm Check-Flow Performer, Raabe Modification (COOK MEDICAL)
2. **Guidewire passage**  
   second attempt from antegarde:  
   ■ 0.018” Connect Flex guidewire, 300 cm (ABBOTT VASCULAR)  
   ■ 0.018” Seeker support catheter, 135 cm (BARD)

   In case of failure of GW-passage from antegrade:
3. **Retrograde approach via the posterior tibial artery**  
   ■ 2.9F sheath (pedal puncture set) (COOK MEDICAL)  
   ■ 0.014” CTO-Approach 25 gramm guidewire, 300 cm (COOK MEDICAL)  
   ■ 0.018” CXI support catheter 90 cm (COOK MEDICAL)  
   ■ Advance Micro-Balloon 3.0/120 mm, 90 cm (COOK MEDICAL)
4. **PTA of the distal SFA/popliteal artery occlusion**  
   ■ AngioSculpt 4.0/100 mm Scoring balloon (SPECTRANETICS)  
   ■ Stellarex 4.0 or 5.0/120 mm DCB (SPECTRANETICS)
5. **Stenting on indication**  
   ■ Supera Interwoven Nitinol stent (ABBOTT VASCULAR)
Case 77 – LEI 27: male, 69 years (S-F)

Extremely calcified SFA CTO left, "pave and crack"-technique

**Operators:** A. Schmidt, M. Ulrich

**Clinical data:** Restpain during night and severe calcification left, Rutherford 4
Failed recanalization attempt left leg 11/2015
PTA/stenting right SFA-CTO 12/2016
Art. hypertension, diabetes mellitus, type 2
Former smoker

**Procedural steps**

1. **Right groin retrograde and cross-over approach**
   - IMA 5F diagnostic catheter (CORDIS/CARDINAL HEALTH)
   - 0.035" soft angled Radiofocus guidewire, 190 cm (TERUMO)
   - 0.035" SupraCore guidewire 190 cm (ABBOTT VASCULAR)
   - 7F 55 Check-Flo Performer Sheath, Raabe Modification (COOK MEDICAL)

2. **Antegrade guidewire passage**
   - 0.035" Stiff angled Glidewire, 260 cm (TERUMO)
   - CXC 0.035" support catheter, 135 cm (COOK MEDICAL)

3. **Retrograde guidewire passage:**
   - Access via the proximal anterior tibial artery:
     - 7 cm 21 Gauge needle (COOK MEDICAL)
     - 0.018" V-18 Control guidewire, 300 cm (BOSTON SCIENTIFIC)
     - 4Fr-10cm Radiofocus Introducer (TERUMO)
     - Pacific Plus 4.0/40 mm balloon, 90 cm (MEDTRONIC)

4. **PTA and stenting**
   - 6.0/20mm Admiral Xtreme Balloon (MEDTRONIC)
   - 7.0/20 Conquest non-compliant high-pressure balloon (BARD)
   - In case of inability to open the balloons fully
     - implantation of a Viabahn 7.0/100 mm (GORE)
   - Relining with Supera Interwoven Nitinol stent (ABBOTT VASCULAR)

Case 78 – BK 07: male, 62 years, (B-N)

Combined antegrade and retrograde recanalisation of right ATA & PTA

**Operators:** T. Zeller

**Clinical data:** Non-healing crural ulcer right calf (PAOD Fontaine IV / Rutherford 5)
11/2016 recanalisation of right SFA, popliteal artery & TPT
11/2014 recanalisation of right SFA, popliteal artery & TPT (DCB and spot stenting)
DVT right leg 10/2014

**Risk factors:** CVRF: hyperlipidemia, obesity
ABI at rest: right leg: 0.6; left leg: 1.0
Duplex: persistent occlusion of right ATA /& PTA

**Procedural steps**

1. **Antegrade sheath insertion 6F, right CFA**
   - Insertion of a 5F Envoy guiding catheter (CORDIS)

2. **Attempt to antegradeley recanalise the PTA**
   (predilatation followed by DCB, Chocolate touch, TRIREME)

3. **Retrograde recanalisation of ATA** (predilatation followed by DCB)

4. **Sheath removal in the groin with Femoseal (TERUMO)**
Case 79 – ABT 03: male, 82 years (C-A)

BTK and BA calcified long occlusion; distal arterovenous fistula?

Operators: M. Manzi, L.M. Palena, C. Brigato

Clinical data: Non Healing TMA

CLI

Previous antegrade and retrograde revascularization attempts with rupture of balloon, retrieval failure and stent deployment to fix it

Risk factors: DM, hypertension, ischemic cardiac disease, chronic renal failure;

Procedural steps

1. US guided antegrade CFA access and 6F sheath

2. CTO 0,014” wire for antegrade AV creation in mid proximal PT
   When failure occurred: US guided distal retrograde tibial vein puncture, retrograde vein wiring, antegrade PT artery wall to wall puncture reaching the vein
   Retrograde wire externalization through the needle and in-artery retrieval

3. Antegrade wire progression in the foot vein and outflow check

4. High pressure POBA for valves rupture

5. Discussion for stenting (covered, Supera)

6. US guided closure device deployment
4-fenestrated endovascular repair of a 7 cm post-dissection TAAA

Operators: M. Austermann, T. Bisdas, St. Stahlhoff

Clinical data: Post-dissection thoracoabdominal aneurysm with a diameter of 7 cm Aszendens and aortic arch repair by frozen elephant trunk in the acute phase and endovascular extension to open the true lumen but still increase of the still perfused false lumen.

Risk factors: Art. hypertension, CAD

Procedural steps

1. Percutaneous approach both groins (Prostar XL, ABBOTT VASCULAR)
   14 F (COOK MEDICAL) both groins
   Careful cannulation of the true lumen

2. Angiography to locate CT, SMA and RRA coming out of the true lumen and use of fusion technology

3. Changing the left 14F sheath for a 22F sheath
   Placement of three 5F sheaths into the 22F sheath and pre-cannulation of the right renal artery and SMA by using fusion technology.

4. Placement of the 4-fenestrated Zenith-endograft (tube) (COOK MEDICAL) via the right groin
   Cannulation of the SMA and RRA through the fenestrations

5. Advancement of 7 and 8 F sheaths into the target vessels
   Complete release of the endograft and stenting of the fenestrations for the SMA and RRA with covered stents (Advanta V12-Maquet) and flairing
   Cannulation of the CT and stenting

6. Cannulation of the fenestration for the LRA, perforation of dissection membrane and cannulation of the LRA coming out of the false lumen and implantation of another bridging stentgraft (Advanta V12)

7. Placement of the distal bifurcated graft and the iliac extensions
   Closure of the accesses

FEVAR of a juxtarenal aneurysm

Operators: A. Schmidt, D. Branzan

Clinical data: Incidental finding of a juxtarenal aortic aneurysm with progression to 61 mm max. diameter Accessory renal arteries on both sides Coiling of intercostal and lumbar arteries before FEVAR to reduce the risk of spinal ischemia Coiling of the accessory right renal artery CAD, PTCA 2012 heart failure, EF 40% Thyreoidectomy 1/2017

Important items: CT-scans and Stentgraft-plan

Procedural steps

1. Bilateral femoral access and left axillar percutaneous access
   ■ Preloading of Proglide-Systems (ABBOTT VASCULAR) for all 3 access-sites

2. Implantation of the CMD thoracoabdominal stentgraft (JOTEC)

3. Implantation of E-ventus covered stents into the visveral arteries (JOTEC)

4. Implantation of the bifurcated component with extension into the common iliac arteries
Case 82 – MUN 15: female, 52 years (S-M)

1-fenestrated and 3-branched endovascular repair of a postdissection

Operators: M. Austermann, O. Sensebat, G.F. Torsello

Clinical data: TEVAR for a acute Dissection Stanford B 8/2015 in another clinic
Now rapid growing thoracoabdominal aneurysm distal of the graft with involvement of the iliac arteries

Risk factors: Marfan's disease, art. hypertension, DM 2

Procedural steps
1. Percutanous approach both groins (Prostar XL, ABBOTT VASCULAR)
   14 F (COOK MEDICAL) both groins
   Careful cannulation of the true lumen
   Left axillary access S F sheath via cut down
2. Angiography via the right groin and use of fusion technology
   Precannulation of the left renal artery
3. Placement of the 1-fenestrated and 3 branched CMD-Zenith-endograft (tube)
   (COOK MEDICAL) via the left groin and cannulation of the LRA through the fenestration
   and placement of the bridging stentgraft
4. Placement of the distal bifurcated graft and the iliac side branch
   on the right side and closure of the groins to avoid SCI
5. Cannulation of celiac trunk, SMA, right renal artery and the right hypogastric artery
   through the branches and implantation of the bridging stentgrafts
   (Advanta V12 – MARQUET, Viabahn – GORE, Covera – BARD)
6. Closure of the axillary access

Case 83 – LEI 29: female, 65 years (H-T)

Severely calcified SFA occlusion, “pave and crack”-technique

Operators: S. Braunlich, A. Schmidt

Clinical data: Critical limb ischemia right, ulcerations dig 2 / 3, Rutherford 5
Endstage renal failure, chronic hemodialysis until 1997
Renal transplantation 1997
Art. hypertension

Present state: CO2-angiography
ABI right: mediasclerosis

Procedural steps
1. Left groin retrograde and cross-over approach
   ■ IMA 5F diagnostic catheter (CORDIS/CARDINAL HEALTH)
   ■ 0.035” soft angled Radiofocus guidewire, 190 cm (TERUMO)
   ■ 0.035” SupraCore Guidewire 190 cm (ABBOTT VASCULAR)
   ■ 6F-55 cm Check-Flo Sheath, Raabe Configuration (COOK MEDICAL)
2. Antegrade guidewire passage
   ■ 0.035” Stiff angled Glidewire, 260 cm (TERUMO)
   ■ CXC 0.035” support catheter, 135 cm (COOK MEDICAL)
   In case of guidewire passage failure:
3. Retrograde approach via the distal SFA
   ■ 9 cm 21 Gauge needle (COOK MEDICAL)
   ■ 0.018” V-18 Control guidewire, 300 cm (BOSTIN SCIENTIFIC)
4. PTA and stenting
   ■ 6.0/20 mm Admiral Xtreme balloon (MEDTRONIC)
   ■ 7.0/20 Conquest non-compliant high-pressure balloon (BARD)
   In case of inability to open the balloons
   fully implantation of a Viabahn 7.0/100 mm (GORE)
   ■ Relining with Supera Interwoven Nitinol stent (ABBOTT VASCULAR)
### Calcified BTK-CTOs, CLI

**Operators:** A. Schmidt, M. Ulrich  
**Clinical data:** Critical limb ischemia left foot, ulcerations at the forefoot, Rutherford 5  
PTRA/stenting left SFA 11/2015 and 7/2016  
Failed recanalization attempt right posterior tibial artery 1/2017  
Diabetes mellitus, type 2  
CAD, PTCA 2005, chronic heart failure, EF 45%  
Chronic renal insufficiency, GFR 41ml/min  
Intermittent atrial fibrillation  
**Present state:** Angiography during recanalization attempt left elsewhere with GW-perforation of the posterior tibial artery

### Common carotid artery ostium stenosis

**Operators:** S. Bräunlich, M. Ulrich  
**Clinical data:** Asymptomatic high-grade stenosis of the ostium of the common carotid artery left  
Art. hypertension, diabetes mellitus, type 2  
Former smoker  
**Duplex:** Duplex-sonography because of recurrent dizziness: severe flow-disturbance of the proximal common carotid artery and slow flow

**Procedural steps**

1. **Right groin access**  
   - 5F Judkins Right diagnostic catheter (CORDIS/CARDINAL HEALTH)  
   - Intubation of the CCA left  
   - In case of failure: no-touch-technique using a 8F Judkins Right guiding catheter (MEDTRONIC)  
   - 0.035” soft angled glidewire, 190 cm (TERUMO)  
   - 0.018” V-18 Control guidewire, 300 cm (BOSTON SCIENTIFIC)

2. **Predilatation and stenting**  
   - 5.0/20 mm Sterling Monorail balloon (BOSTON SCIENTIFIC)  
   - 8.0/28 mm LifeStream covered stent (BARD)
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