Peripheral vascular interventions

Overview of Subclavian & Innominate Artery Interventions

Dr Jacques Busquet
Vascular & Endovascular Surgery
Paris, France
Disclosure

None

Related to this presentation

TCT 2016

Cardiovascular Research Foundation
Subtotally occluded calcified ostial left subclavian artery

Accessible to endovascular revascularization
Subtotally occluded calcified ostial left subclavian artery

Accessible to endovascular revascularization
Subtotally occluded calcified ostial left subclavian artery

Accessible to percutaneous endovascular revascularization
Supra-aortic truncks

*Left Subclavian Artery*
Supra-aortic trunks

Innominate Artery
Duplex Scan Examination
Transcranial examination
Fields WS, Lemak NA. Joint study of extracranial arterial occlusion.

*JAMA* 1972; 222:1139-1143.

Arterial Supra-Aortic Trunks

Distribution of Atheromatous Disease

---

50%  
11%  
20%  
16%  
51%  
11%  
17%  
16%  
20%
Severe Proximal Innominate Artery Stenosis
Angioplasty & Stenting of Innominate Artery

Open Retrograde Access with Clamping of Common Carotid Artery for Cerebral Protection
Subclavian Artery Occlusive Disease
Fischer CM

A New Vascular Syndrome “the Subclavian Steal”

Subclavian Steal

Definition

Severe Stenosis or Occlusion of Pre-Vertebral Subclavian Artery

Reversed Flow in Vertebral Artery with Re-Injection of Subclavian Artery
Subclavian Steal Syndrome

Non-Predictive of Neurovascular Events

Marker of Atheromatous Disease

Hennevici M, Klemm C, Rantengerg W

The Sub-Clavian Steal Phenomenon: A Common Vascular Disorder with Rare Neurologic Deficit

Neurology 1988;38:669-673
Subclavian Steal

Hemodynamic Sequence
Subclavian Steno-Thrombosis
Reversed Vertebral Flow
Surgical Revascularization

Subclavian Artery
- Transversal Cervicotomy
- Carotido-Subclavian Transposition
- Carotido-Subclavian Bypass

Innominate Artery
- Sternotomy
- Aorto-Innominate Artery Bypass
- Endarterectomy
Kieffer E, Sabatier J, Koskas F, Bahnini A

Atherosclerotic Innominate Artery Occlusive Disease: Early and Long-Term Results of Surgical Reconstruction

148 patients operated for atherosclerotic lesions of supra-aortic trunks over a period of 20 years

Post-operative mortality was 5.4%

Survival rate was 77.5% at 5 years and 51.9% at 10 years follow-up

Late mortality is essentially caused by myocardial infarction (12% of the cases).
Carotido-subclavian transposition with a global patency rate of 96% at 5 years follow-up is justified as a first-choice technique in the treatment of subclavian artery obstructions
Carotid-Subclavian Direct Surgical Transposition
Operative Risks

- Coronary Risk
- Lymphatic Risk
  Left Subclavian Artery
- Neurologic Risk
  Right Subclavian Artery
Balloon Angioplasty

First Case Report

Bachman DM, Kim RM

Transluminal Dilatation for Subclavian Steal Syndrome

Angioplasty & Stenting


Subclavian Steal

3 Steps

- Permanent Steal
  Reversed Vertebral Flow

- Intermittent Steal
  Biphasic Flow

- Pre-Steal
  Test of Hyperhemia
Symptoms

- Cervical bruit
- No radial pulse
- Arm-to-arm BP difference 20-30mmHg
- Paresthesia of upper limb
- Induced with arm exercise
- Dizziness
- Drop attack
- Syncope
Case # 1

62 years old woman
Light tabagism
2 years follow-up
Progressive Subclavian Stenosis 60% → 80%
Anisotension
Vertigo > Syncope
Right arm claudication
Anatomical Variant

*Arteria Lusoria*

80% Prevertebral Proximal Stenosis
Intermittent Right Subclavian Steal

Arteria Lusoria
Arteria Lusoria

Intermittent Right Subclavian Steal
Intermittent Right Subclavian Steal
Intermittent Right Subclavian Steal
Humeral puncture
Local Anesthesia
Long Sheath
Heparinization
Angiographic Confirmation of the Lesion
Primary Stenting with balloon 7mm/40mm
Case report # 2

79 years old woman
Autonomous
Recurrent Syncopes

Normal Cerebral CT
Normal Electrophysiology

Initial Duplex Scan Underestimated
Restenosis Rate

From 4.5 to 14.6%

Follow up 14 to 36 months

V.M. Ochoa et al, Vascular Medicine 2010, 16 1: 29-34
Subclavian Coronary Steal Syndrome

Diethrich EB, Cozacov JC. Subclavian stent implantation to alleviate coronary steal through a patent internal mammary artery graft. J Endovasc Surg 1995;2:77-80

Left Subclavian Angioplasty to restore coronary flow in the affected LIMA graft
LSA Branch Thoracic Stent Graft

Frank Arko III, MD, Charlotte, NC, USA
Conclusion

Role of Duplex Scan

Surveillance of Asymptomatic Lesions

Indications for Surgical Revascularization

*Transposition or bypass*

Endovascular Techniques

*Humeral Percutaneous Access*

*Short Inflation - Vertebral Protection*

A new deal regarding anatomical fixation of thoracic endograft