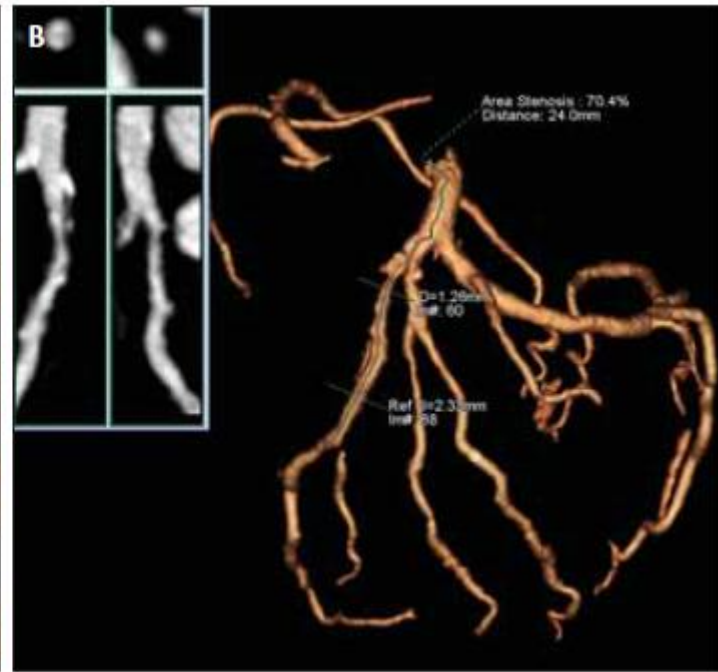
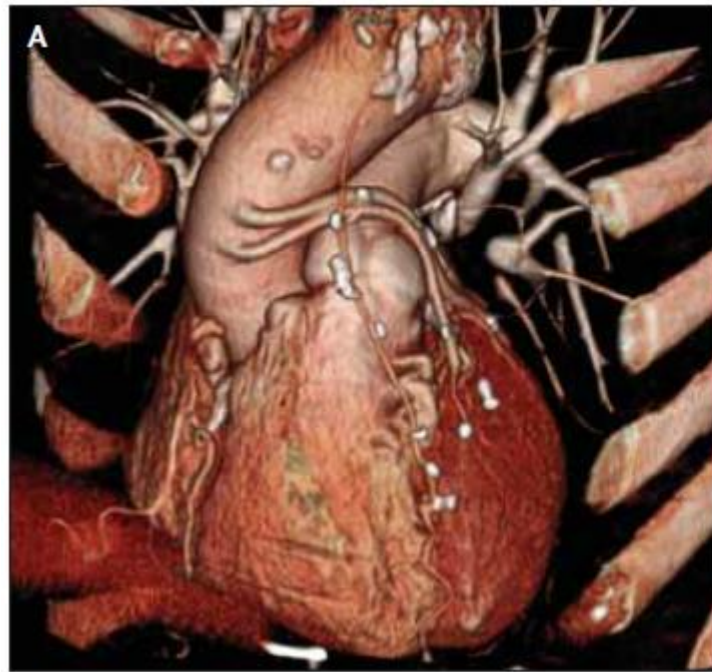
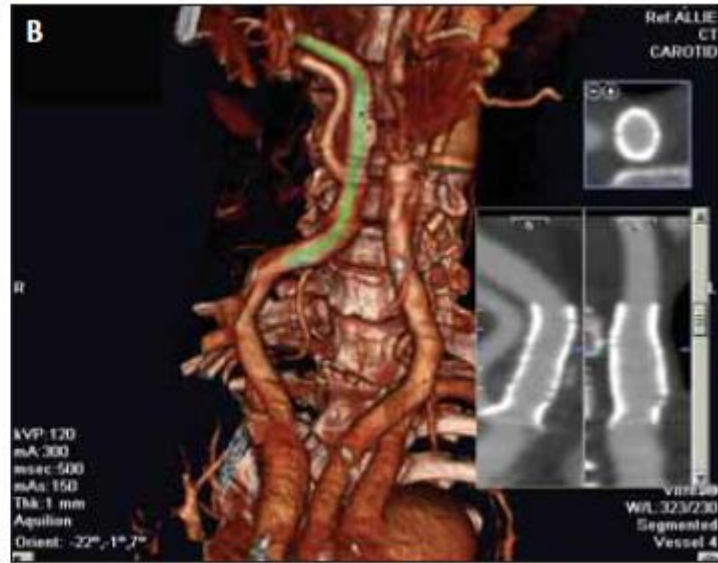
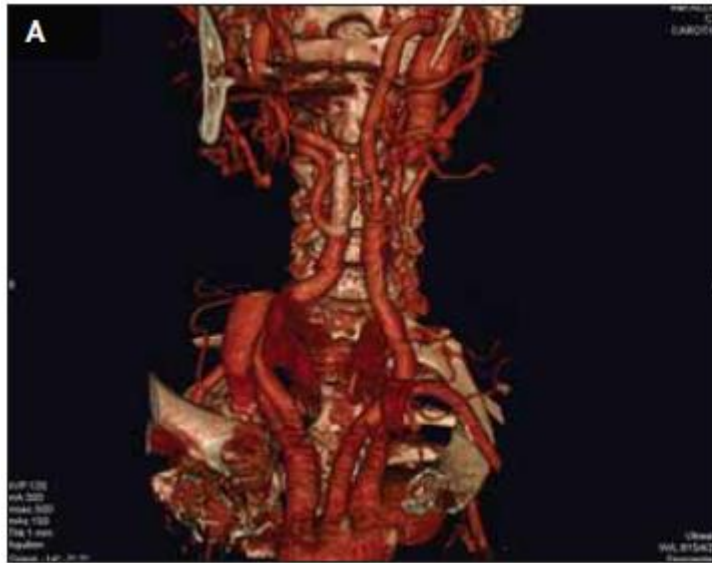


Non-Atherosclerotic Disease

- Diagnosis & Variant Treatment Modalities -

**Department of Thoracic and Cardiovascular Surgery
Kangbuk Samsung Medical Hospital,
Sungkyunkwan University, School of Medicine**

Joon Hyuk Kong

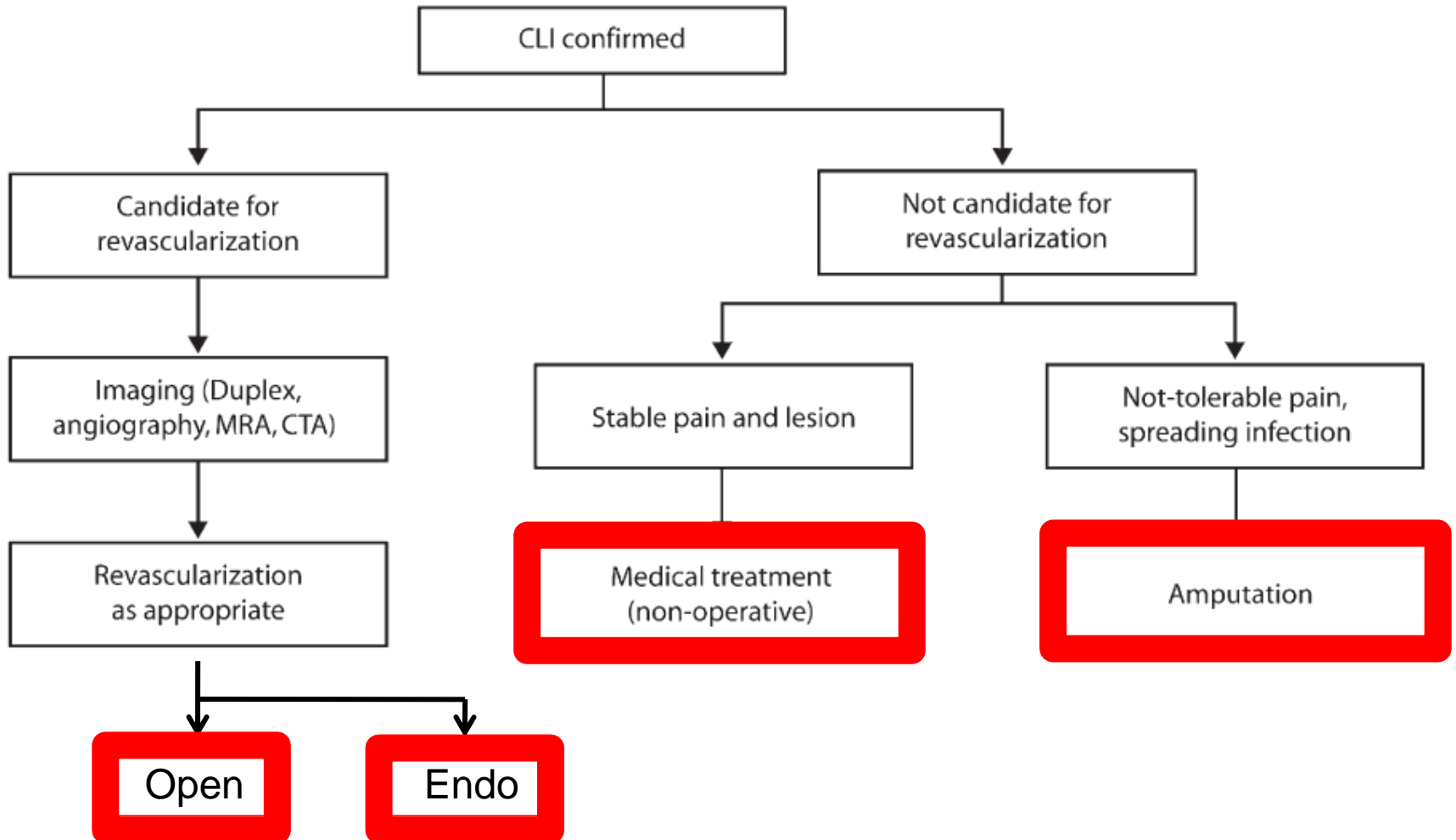


Overview

Critical Limb Ischemia is **not** a single group of patients



What is the Optimal Treatment for CLI?



First step for the treatment of CLI

- *Optimize modifiable risk factors*
 - Education
 - Lifestyle modification
 - Pharmacotherapy
 - Smoking cessation
- *Medical therapy alone*
 - For stable, uncomplicated tissue loss AND
 - Poor surgical candidate
(age > 75, significant CAD, CKD)
- *Schanzer et al. JVS 2008;47:774*
 - PREVENT III cohort
 - Statin 45%, B-blocker 59%, antiplatelet 80%
 - Only improved survival; statin use
 - **Suboptimal medical treatment** performed in patients with CLI than with CAD

When should **open surgery** be the *initial option for CLI*?

- *5 conditions for “open first” approach agreed by ‘endo first’ vascular surgeons*
 - Common femoral artery pathology
 - Arterial occlusion by extrinsic compression pathology
 - Extensive foot gangrene / sepsis
 - Young patients and those requiring dependent-free soft tissue reconstructions where durability is paramount
 - Infrageniculate politeal and proximal tibial occlusion with single, distal tibial target vessel

Lawrence & Chandra. *EJVES* 2010;39:S32

1. Anatomy ; **Common Femoral Artery Disease**

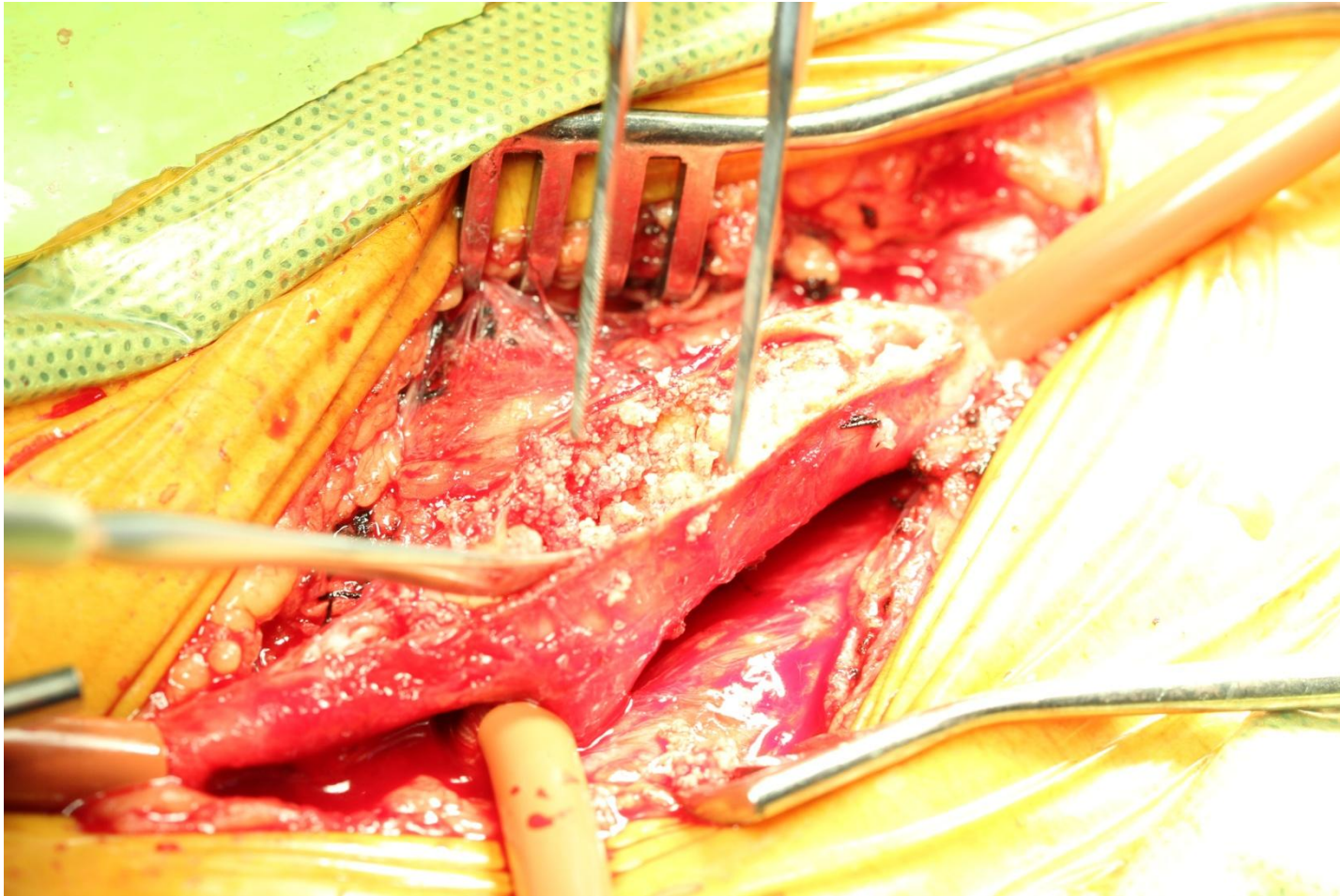
- External compression from the inguinal ligament
- Atherosclerosis often extends above the inguinal ligament
- Plaque burden is great and often calcified
- Easy surgical accessibility
- Role of profundaplasty



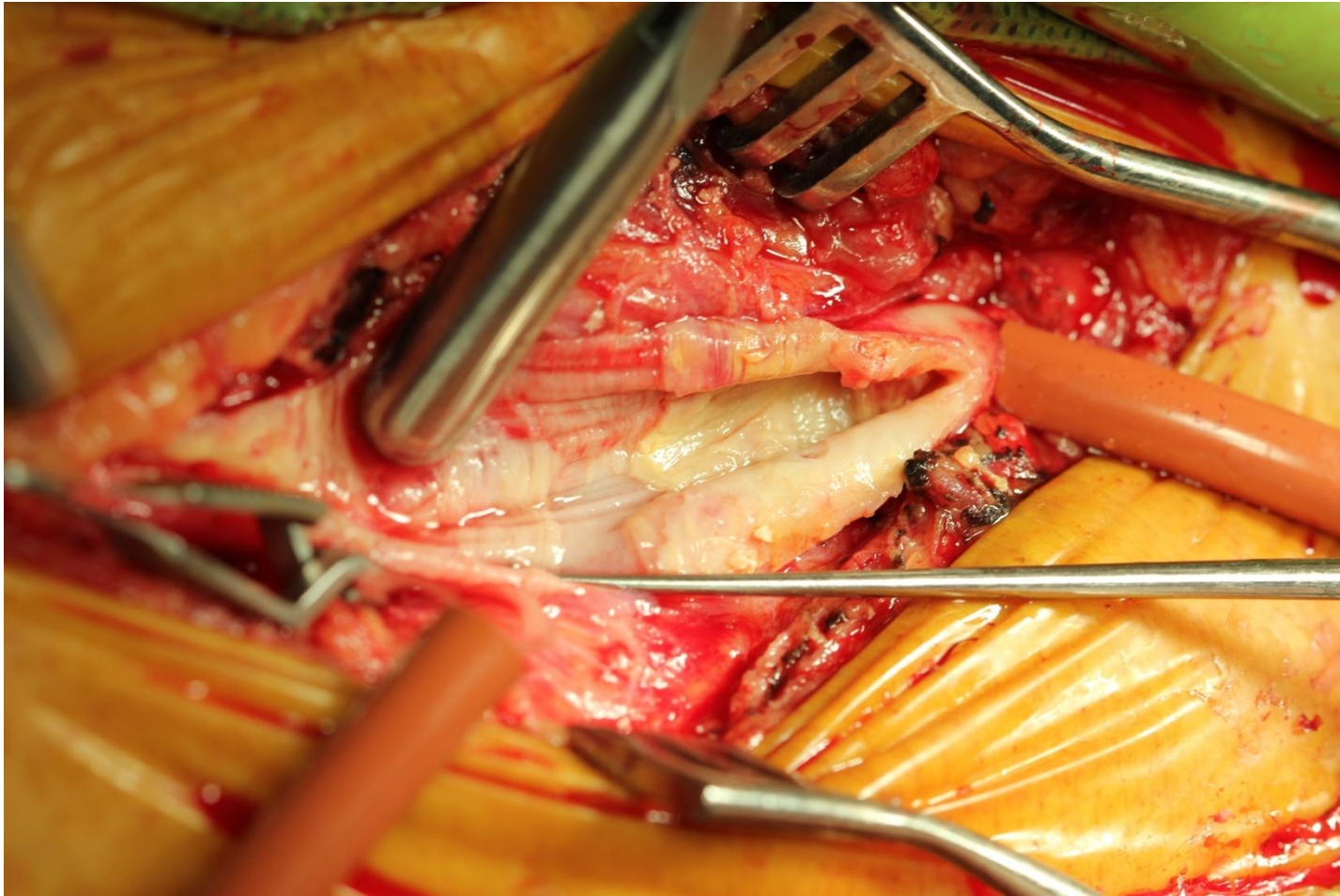


제7차 전공의 학술세미나

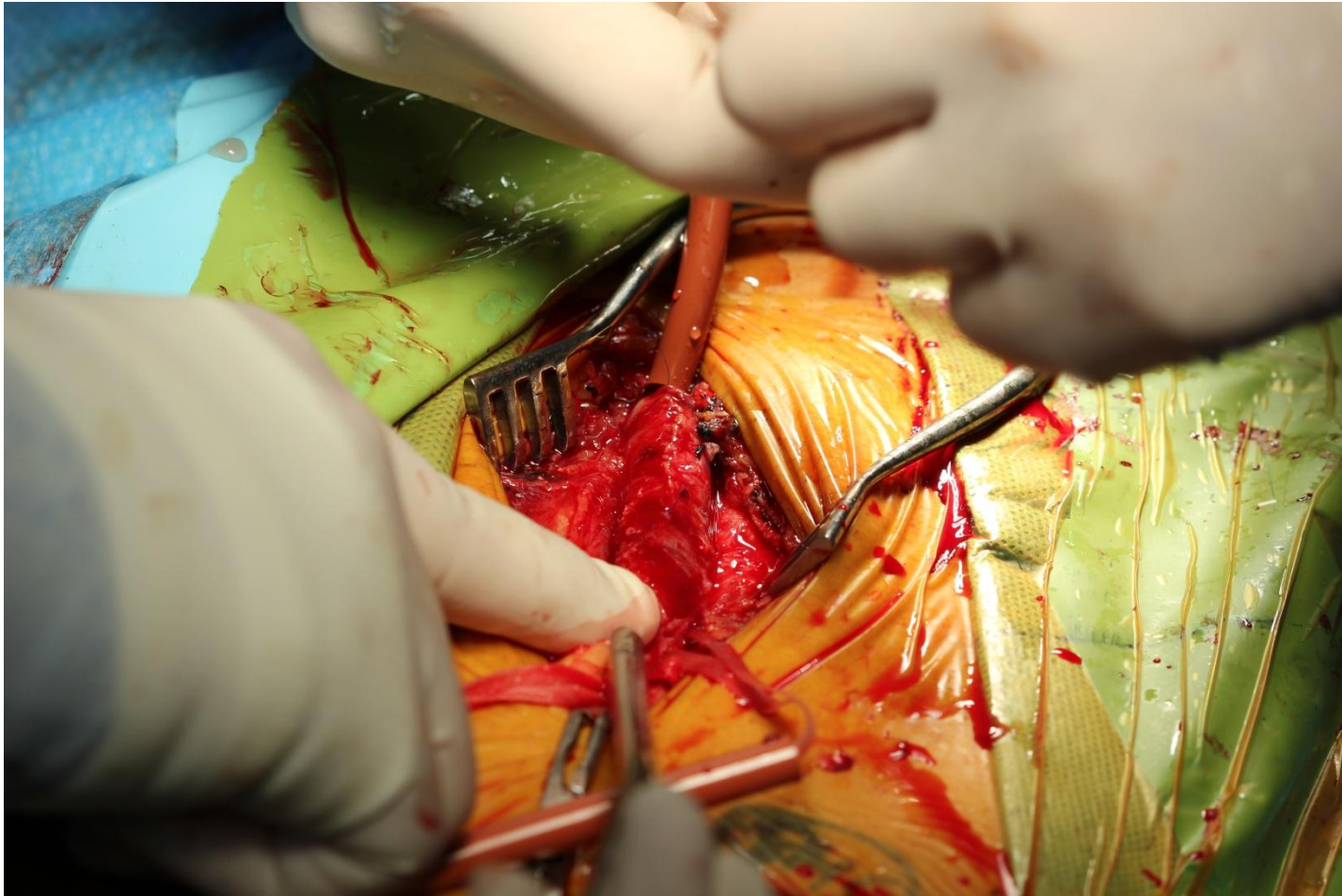
Op. Field

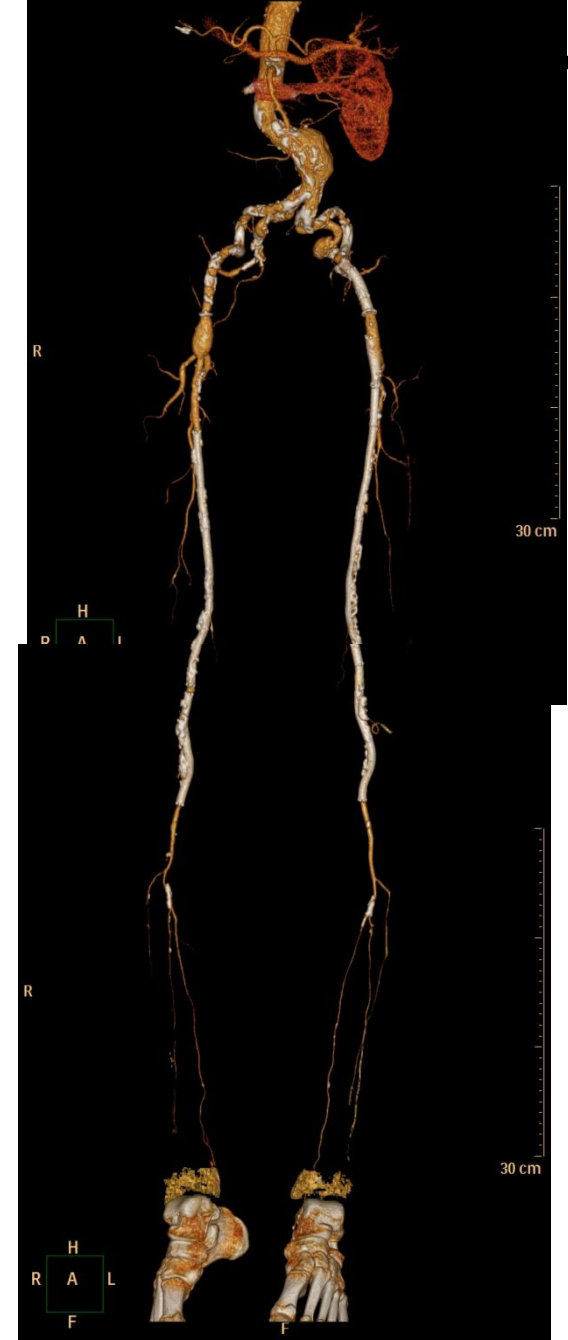
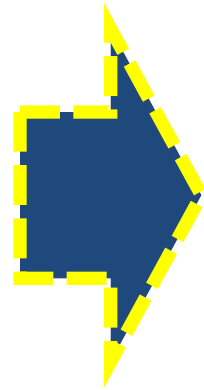
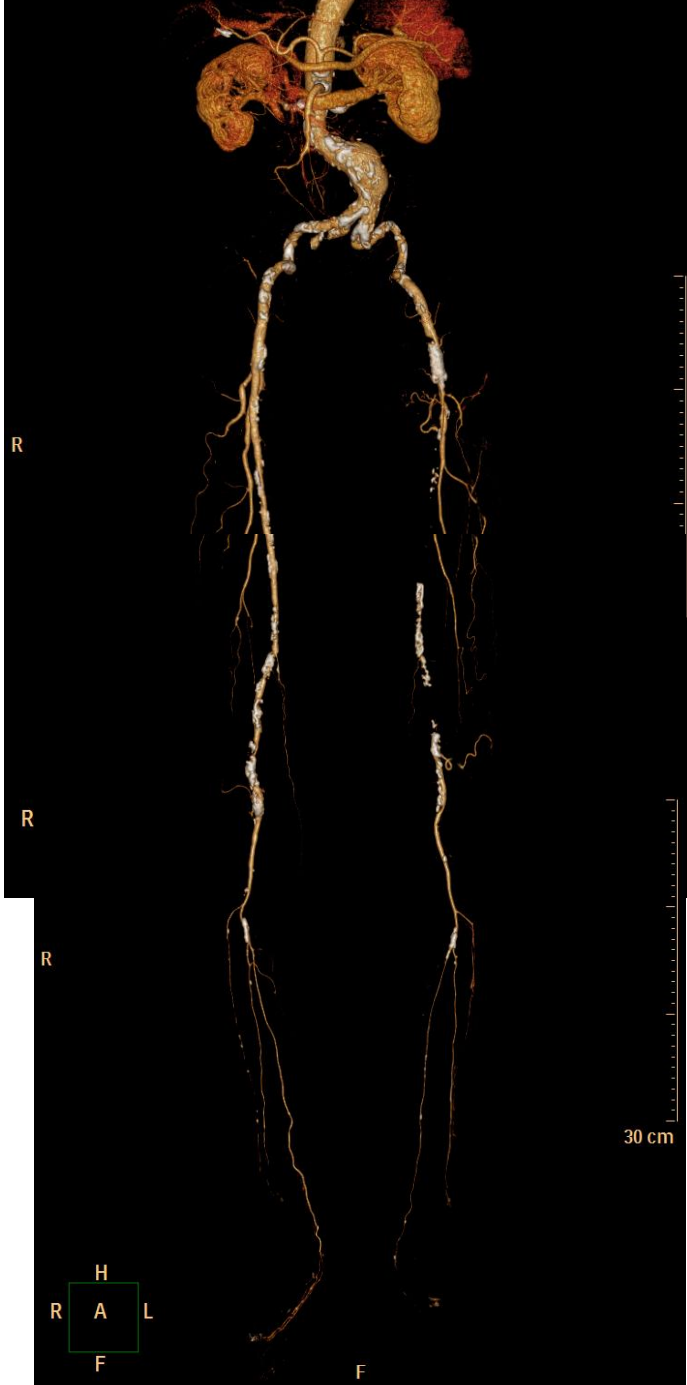


Op. Field



Op. Field

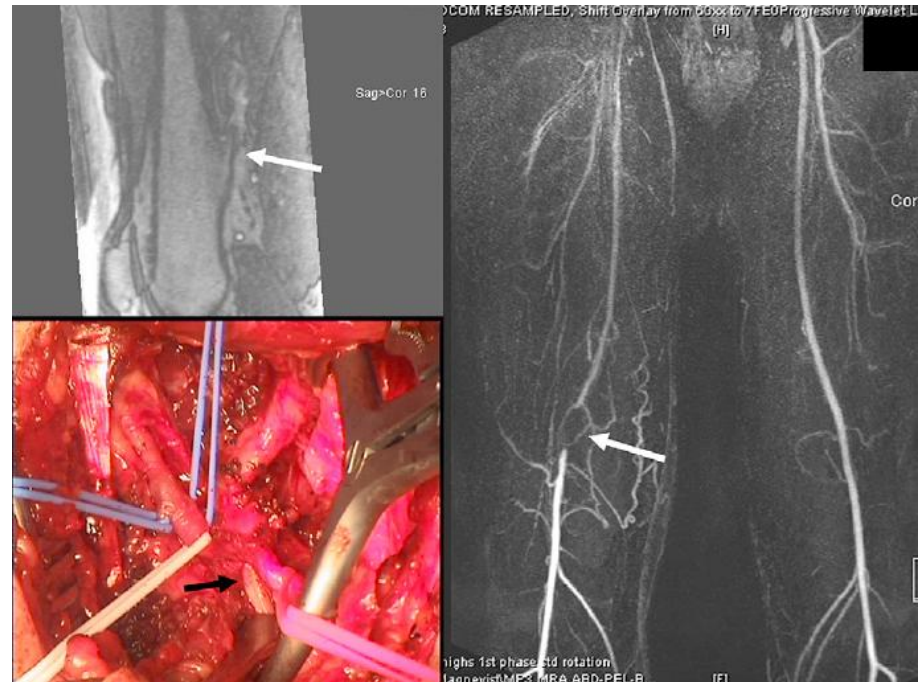




제7차 전공의 학술세미나

2. Pathology ; **extrinsic compression**

- Bony exostosis
- Popliteal entrapment, adventitial cystic dis

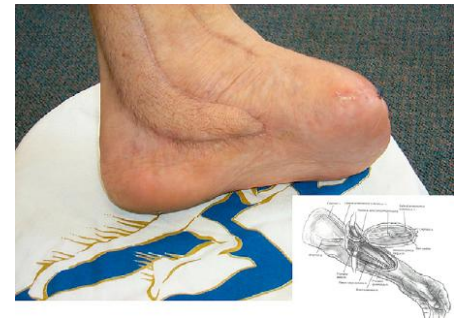


3. Physiology ; **extensive foot sepsis or gangrene**

- Maximum blood flow should be delivered.
- **Endovascular approach** ; risk of providing increased but **inadequate flow to the foot**, often mandating a higher level of amputation



4. Durability



- Who requires a durable procedure
 - **Young patient** for limb salvage
 - **For maintenance of a free flap or a distal procedure** that is dependent on the patency of the proximal procedure
 - Endovascular procedure ; shorter durability, needing repeated procedures for restenosis

5. Limited distal targets

- Occlusion of below-knee popliteal artery and the origins of all three tibial arteries
- Patients with a good conduit and a single distal target vessel
 - Endo; often loses that target during repeated endo procedure due to embolism or thrombosis.
 - Optimal situation for an Open procedure before that target is lost

Problems for bypass surgery on CLI

- **Tibial bypass** is *not perfect*.
 - Diffuse disease with calcifications
 - Poor distal runoff
 - Appropriate ‘vein’ conduit
- **Perioperative morbidity and mortality** is *not low*.
- **Functional outcome is different** than patency.
- Lifelong F/U – the need for revision

- Recent trends
 - Conduit availability is decreasing
 - Population aging
 - Increasingly seeing patients following multiple failures with extensive wounds

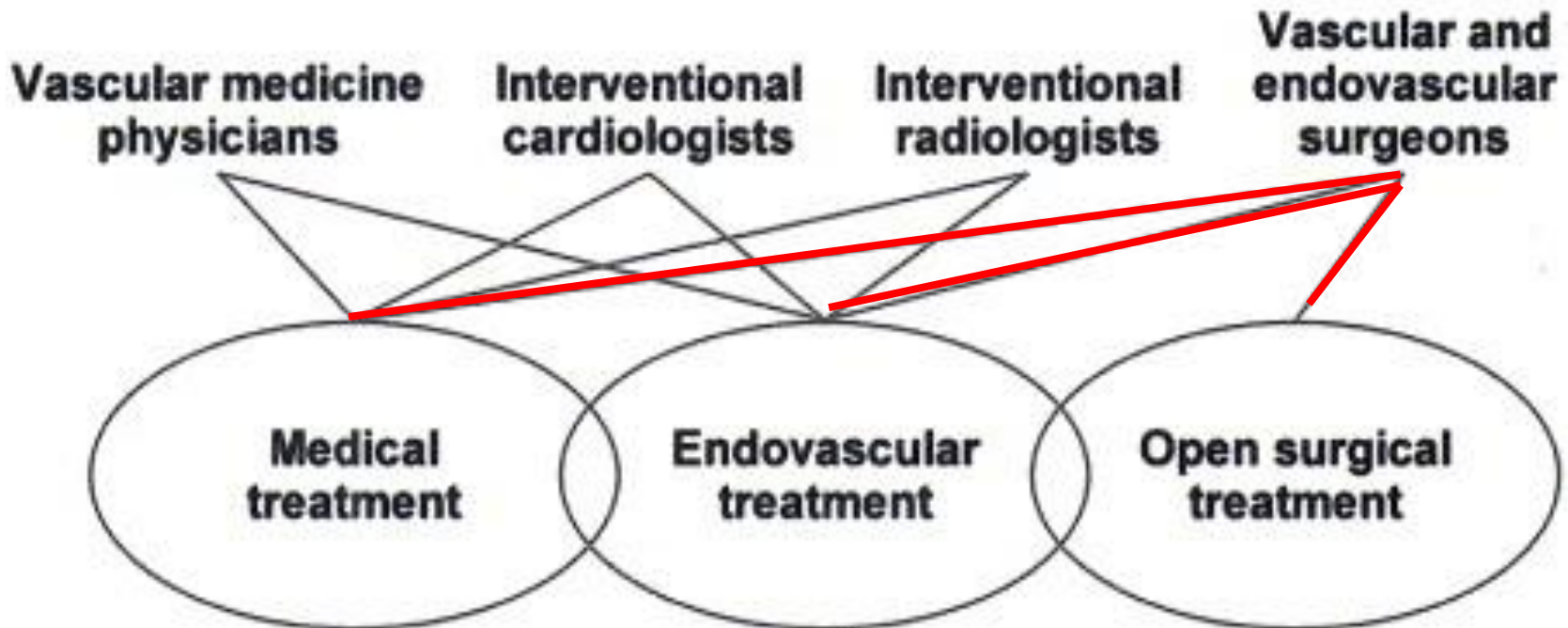
- What do we do with all of these patients ?

Angioplasty AND Surgery

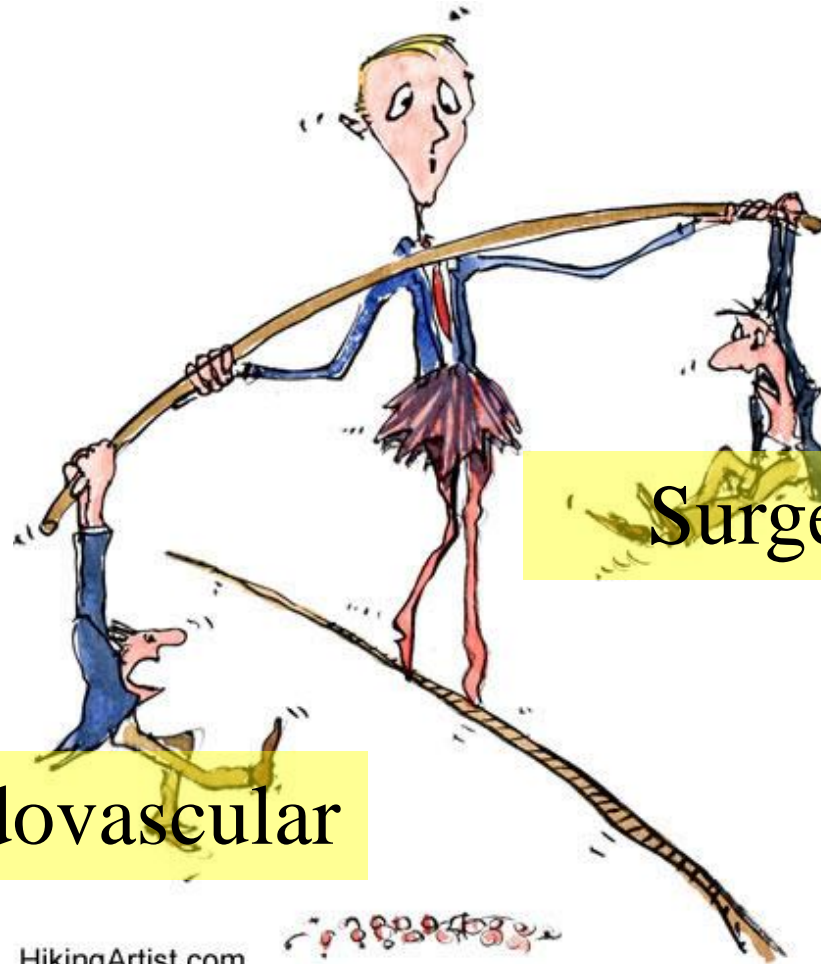
- *Intervention works*
 - *Lowers morbidity*
 - *Faster recovery*
 - *Limits wound morbidity*
 - *Especially helpful in the elderly*
- *Surgery works*
 - *With good conduit and favorable target*
 - *Can be used for intervention failures early*
 - *In healthy individuals, it offers the best chance of long-term success*

Good luck to all **Bi-Vascular Surgeons** !

Vascular Specialists



Vascular Surgeon with Balance



Endovascular

Surgery

HikingArtist.com

Pathophysiology & Diagnosis & Variant Treatment Modalities

PAD can be silent or cause symptoms ranging from exertional pain to critical limb ischemia

Typical¹	Atypical¹
<p data-bbox="131 479 967 715">Intermittent claudication: pain, ache, cramp, numbness, muscle fatigue in calves, thighs or buttocks; exacerbated by exercise and relieved by rest</p> <p data-bbox="131 951 967 1058">Critical limb ischemia: rest pain, ulcers, gangrene</p>	<p data-bbox="1039 479 1850 715">Decreased walking ability: (speed or distance) for reasons other than classical symptoms of intermittent claudication</p> <p data-bbox="1039 1008 1837 1115">Pain in other areas: e.g. general aching</p>

Differentiating *True Claudication* from *Pseudoclaudication*

	Intermittent Claudication	Pseudoclaudication
Character of discomfort	Cramping, tightness, tiredness	Same or tingling, weakness, clumsiness
Location of discomfort	Buttock, hip, thigh, calf, foot	Same
Exercise induced	Yes	Yes or No
Distance to claudication	Same each time	Variable
Occurs with standing	No	Yes
Relief	Stop walking	Often muse sit or change body positions

Differential Diagnosis

- Chronic compartment syndrome
- Venous claudication
- Nerve root compression
- Symptomatic Baker Baker's cyst
- Spinal cord compression
- Hip arthritis
- Inflammatory arthritis

Differential diagnosis of acute limb ischemia

Table 32. Differential diagnosis of acute limb ischemia

Conditions mimicking acute limb ischemia

- Heart failure (especially if associated with chronic occlusive disease)
- Acute DVT
- Acute compressive neuropathy

Nonatherosclerotic causes of acute limb ischemia

- Arterial trauma (especially iatrogenic)
- Aortic/arterial dissection
- Arteritis with thrombosis (eg, giant cell arteritis, thromboangiitis obliterans)
- Spontaneous thrombosis associated with a hypercoagulable state
- Popliteal cyst with thrombosis
- Popliteal entrapment with thrombosis
- Vasospasm with thrombosis (eg, ergotism)

Causes of acute limb ischemia in atherosclerotic patients

- Thrombosis of an atherosclerotic stenosed artery
 - Thrombosis of an arterial bypass graft
 - Embolism from heart, aneurysm, plaque, or critical stenosis upstream (including cholesterol or atherothrombotic emboli secondary to endovascular procedures)
 - Thrombosed aneurysm (especially popliteal aneurysm)
-



Schema

- **Arterial occlusive disease**

- Clinical:

- **Acute arterial occlusion**

- Acute embolism
 - Acute thrombosis

- **Chronic arterial occlusion**

- Cause:

- Atherosclerosis
 - Vasculitis, Arteritis
 - Takayasu's arteritis
 - Buerger's disease

- **Arterial aneurysm**

- Anatomical: Aortic, other arterial

- Cause:

- Nonspecific (degenerative),
Connective tissue disease
Mycotic,
Others

- Patologic : True vs. False aneurysm



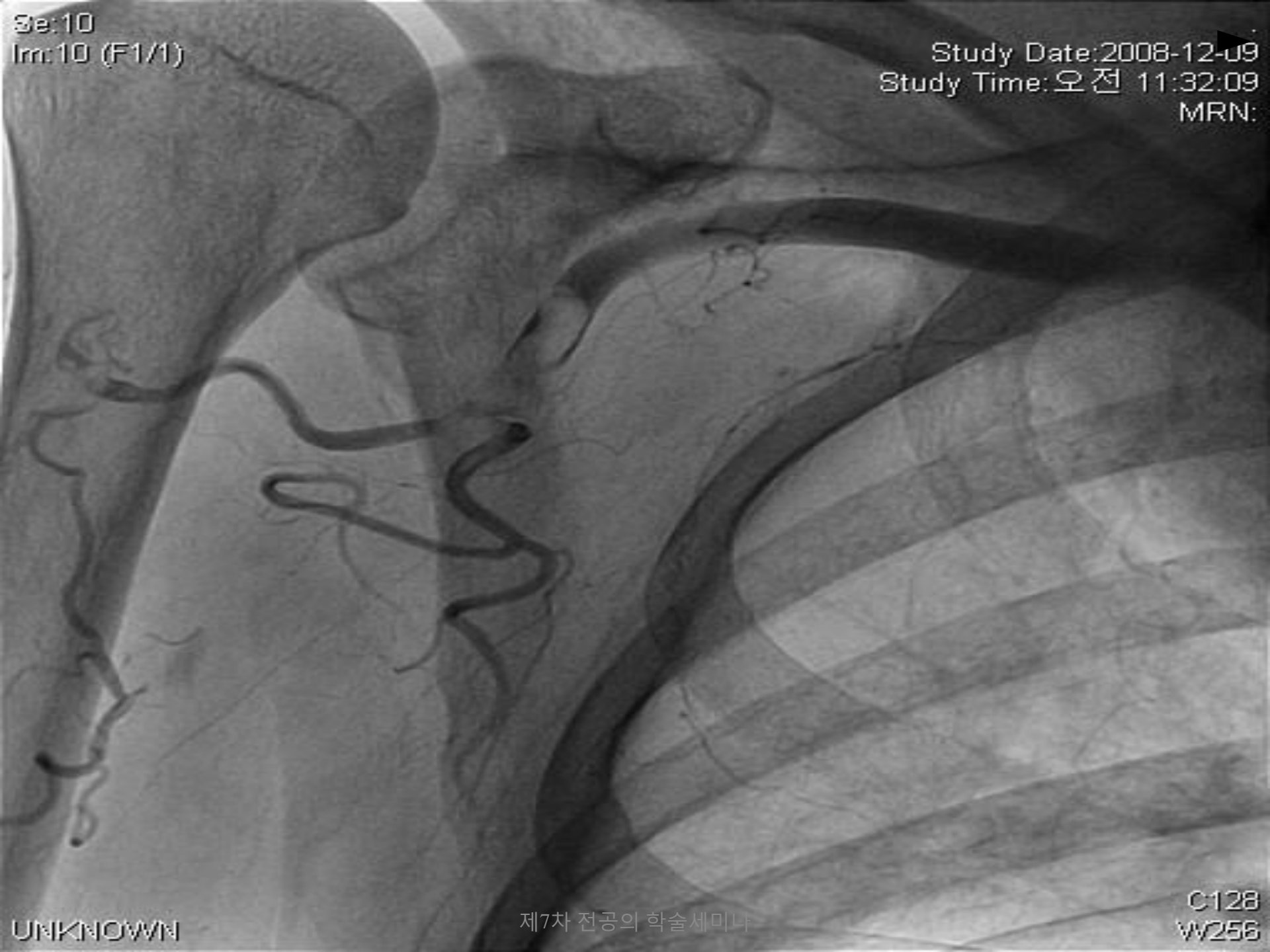
Schema

- Acute limb ischemia
- Chronic limb ischemia

Acute Limb Ischemia

Se:10
Imm:10 (F1/1)

Study Date:2008-12-09
Study Time:오전 11:32:09
MRN:



UNKNOWN

제7차 전공의 학술세미나

C128
W256

Definition

- Sudden occlusion of an artery is commonly due to either emboli or trauma & it may also happen when thrombosis occur *on plaque pre-existing atheroma.*

Cause - Emboli

Origin of Acute Arterial Embolism:

Cardiac	80%
Af	50%
MI	25%
Valve and Others	5%
Non-Cardiac	10%
Aneurysm	6%
Prox. Artery	3%
Paradoxical	1%
Unknown	10%

Occlusion Site - Emboli

Sites of occlusion emboli to the lower limb:

Abdominal bifurcation	10-15%
Iliac artery branch	15%
Femoral artery branch	40%
Popliteal artery	10%
Upper extremity	10%
Cerebral artery	10-15%
Mesenteric & Intraabdominal	5%

Cause - Trauma

- It is important to determine a history of **arterial trauma, arterial catheterization**, intra-arterial drug induced injection, aortic dissection, limb fractures.

Cause - Thrombosis

- Thrombosis usually occur on a pre-existing atherosclerotic lesion.
- Occasionally thrombosis occur on relatively normal artery in patients with hypercoagulable states
 - ex: Pt with malignancy, polycythemia or pt taking high doses of oestrogen.



Clinical Features

- The **5 (6) P's**
 - Pain.
 - Pallor.
 - Pulselessness.
 - Paraesthesia.
 - Paralysis.
 - Perishing cold.

Embolism vs Thrombosis

	Acute arterial embolism	Acute arterial thrombosis
Cause	AF, MI, MS etc	Atherosclerotic lesion
Sx.	More sudden	Pre-existing claudication
Angio.	<ol style="list-style-type: none"> 1. Clear cut off lesion 2. No or minimal collateral 3. No or minimal arterial calcification 4. Normal opposite leg artery 	<ol style="list-style-type: none"> 1. Irregular 2. Well developed collateral 3. Arterial calcification 4. Diseased opposite leg artery
Tx.	Embolectomy + Anticoagulation	Thrombolytic therapy + Bypass op (or endovascular intervention)
Prognosis		
ampu.	Lower	Higher (x 2)
mortality	Higher	Lower

Management

Immediately

- Anticoagulant with heparin to prevent propagation of thrombus & distal thrombosis & this achieved by giving a bolus of 10,000 units of heparin intravenously & an infusion of about 1000 units of heparin per hour after that.
- In pt thrombosis is thought to be the dx arteriography should be considered to define the extent of problem before revascularization.



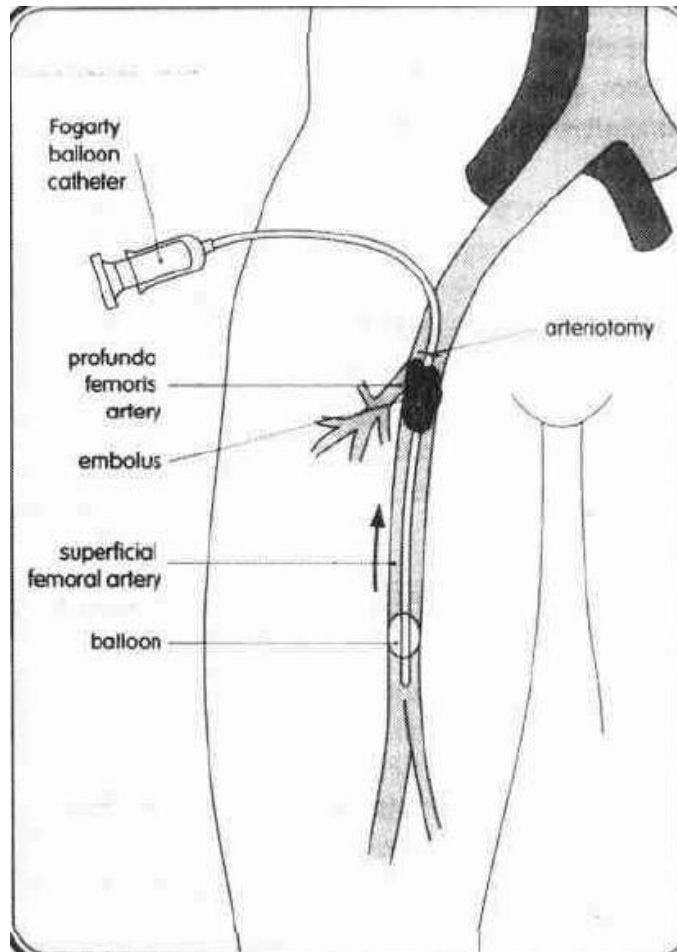
???????

- Is it possible to remove thrombus or emboli with Fogarty Catheter?
- Is it possible to treat underlying cause (origin of emboli or origin of thrombus)
- If not, what should we do?

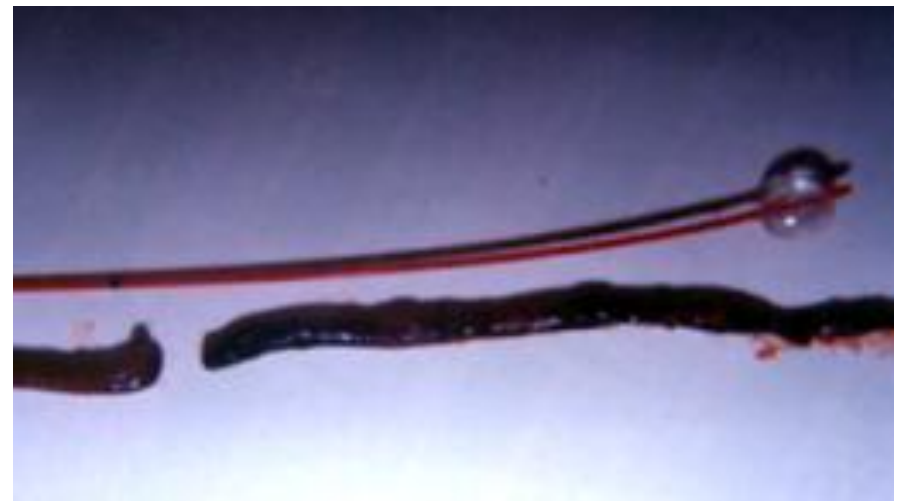
Embolectomy

- This operation usually performed under local anaesthesia.
- A groin incision is made **& the common femoral artery is opened.**
- often the clot is found in the artery a **Fogarty balloon catheter** is passed in turn into the proximal & distal arteries the balloon is inflated & the catheter withdrawn removing the clot.

Embolectomy



Fogarty's balloon catheter



Thrombolytic Therapy

- Percutaneous intra-arterial thrombolytic therapy.
- Takes approximately 12-72 hours to dissolve the clot.
- Agents used: streptokinase, urokinase & tissue plasminogen activator.
- Mechanism: The convert plasminogen to plasmin which the active lytic agent.

Table 34. Contraindications to thrombolysis³

Absolute contraindications

1. Established cerebrovascular event (excluding TIA within previous 2 months)
2. Active bleeding diathesis
3. Recent gastrointestinal bleeding (within previous 10 days)
4. Neurosurgery (intracranial, spinal) within previous 3 months
5. Intracranial trauma within previous 3 months

Relative contraindications

1. Cardiopulmonary resuscitation within previous 10 days
2. Major nonvascular surgery or trauma within previous 10 days
3. Uncontrolled hypertension (systolic >180 mm Hg or diastolic >110 mm Hg)
4. Puncture of noncompressible vessel
5. Intracranial tumor
6. Recent eye surgery

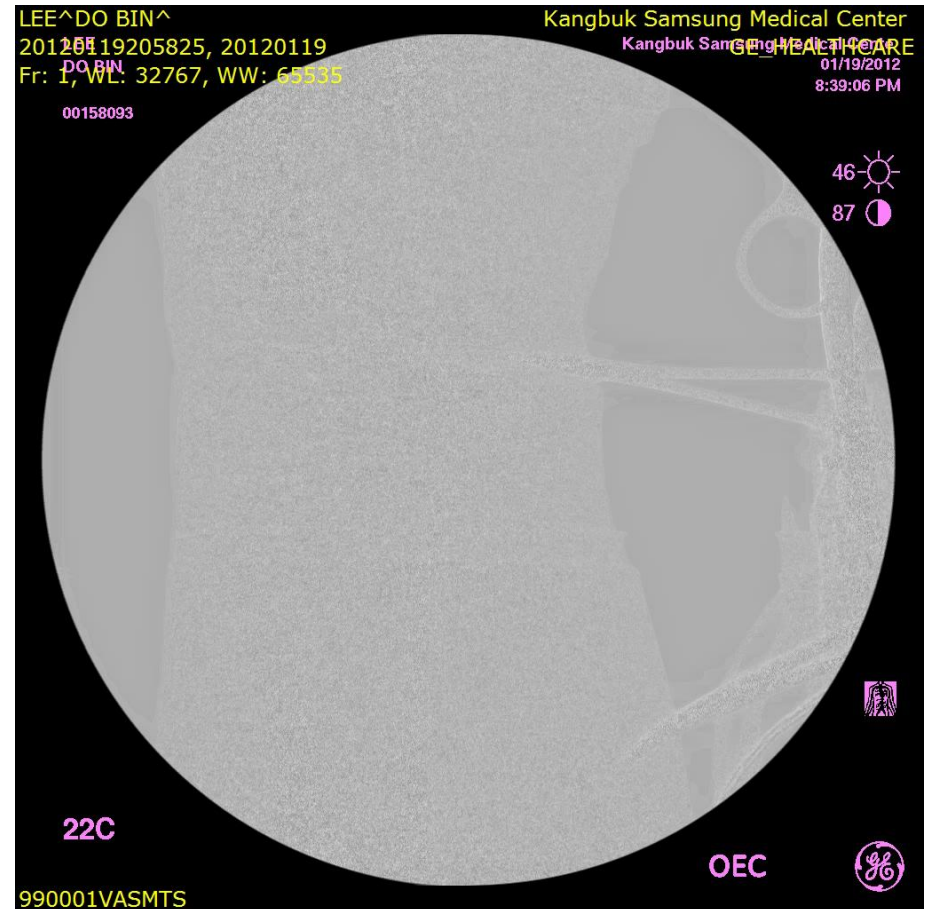
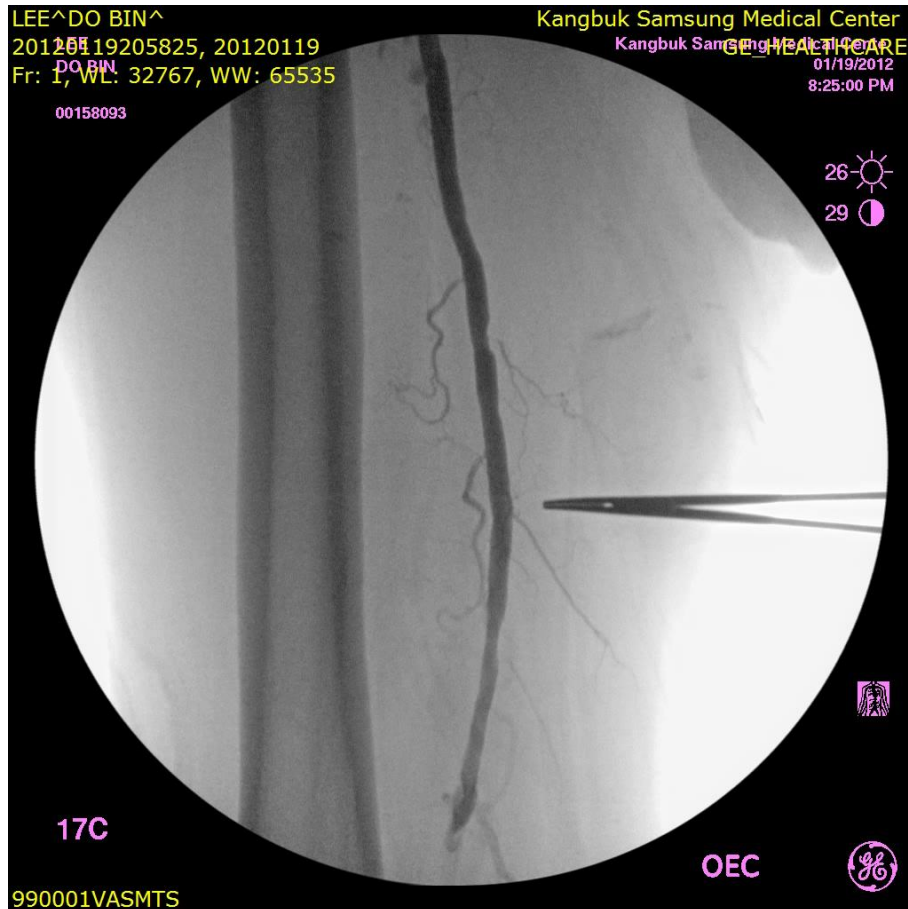
Minor contraindications

1. Hepatic failure, particularly those with coagulopathy
 2. Bacterial endocarditis
 3. Pregnancy
 4. Diabetic hemorrhagic retinopathy
-

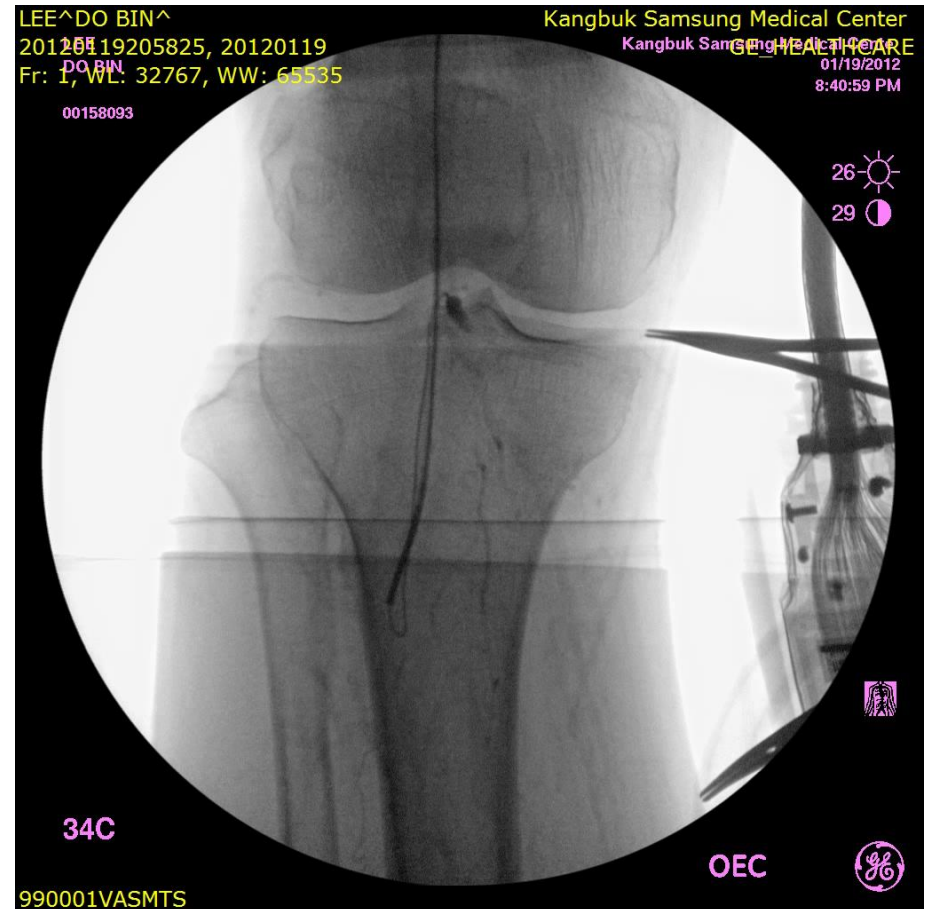
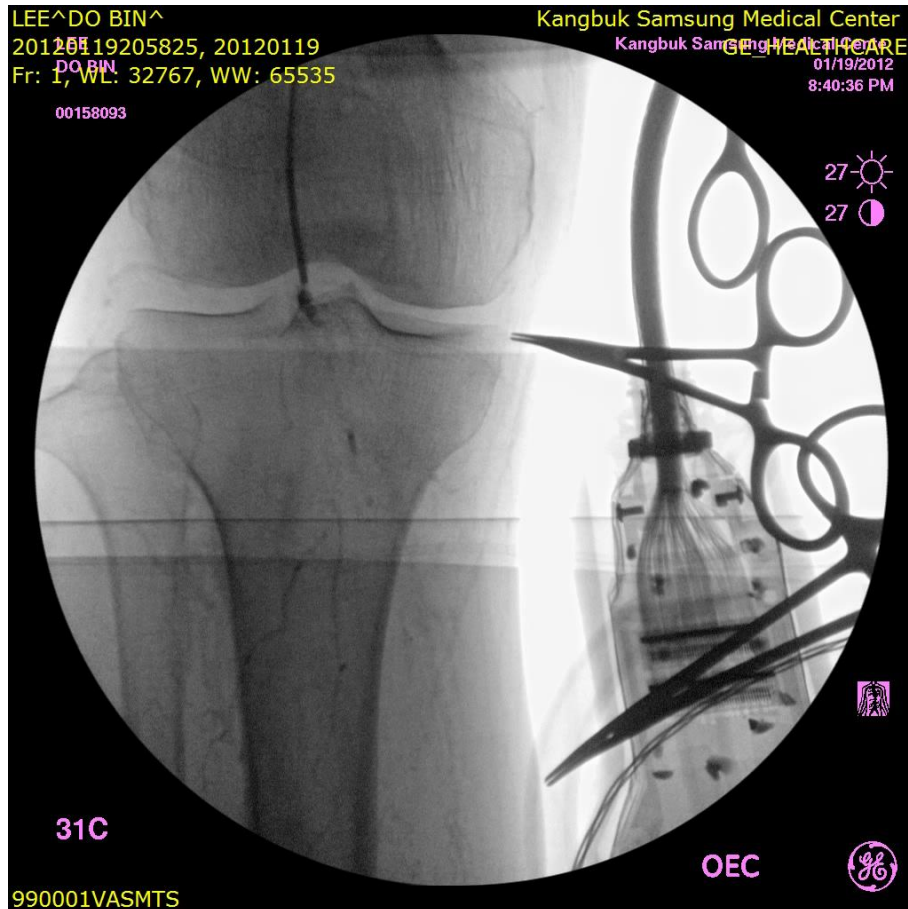
Case Presentation

- **Embolectomy:** antegrade approach at Rt CFA

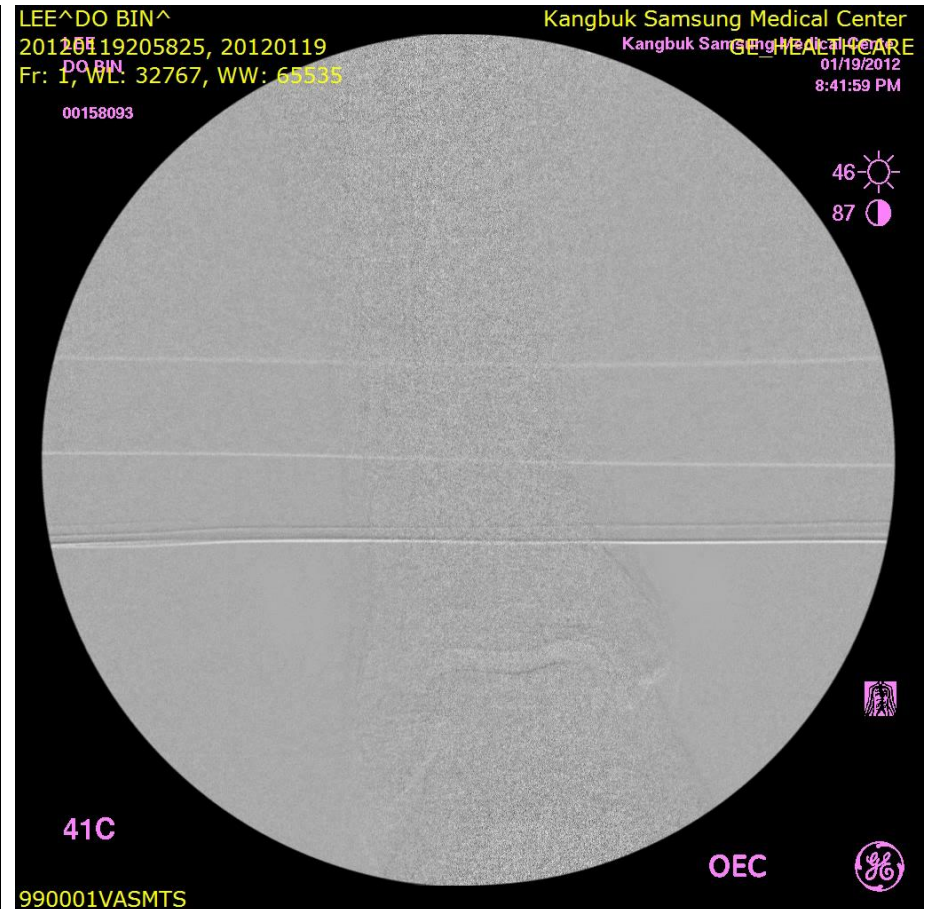
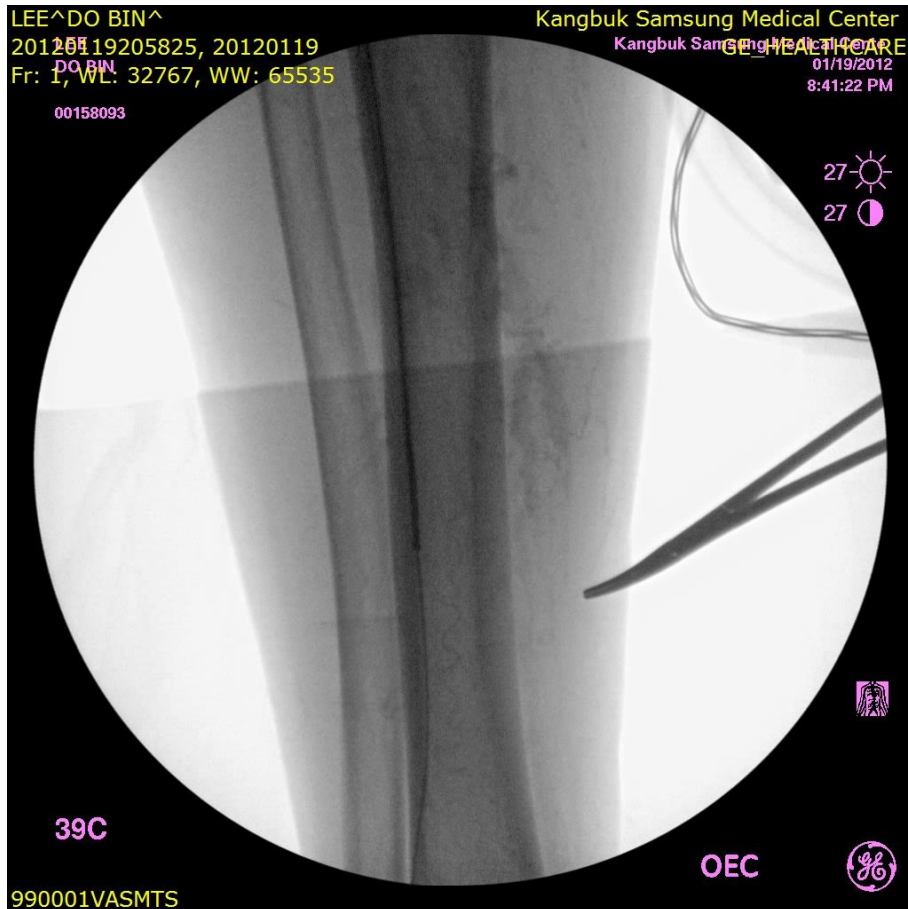
Diagnostic Angio



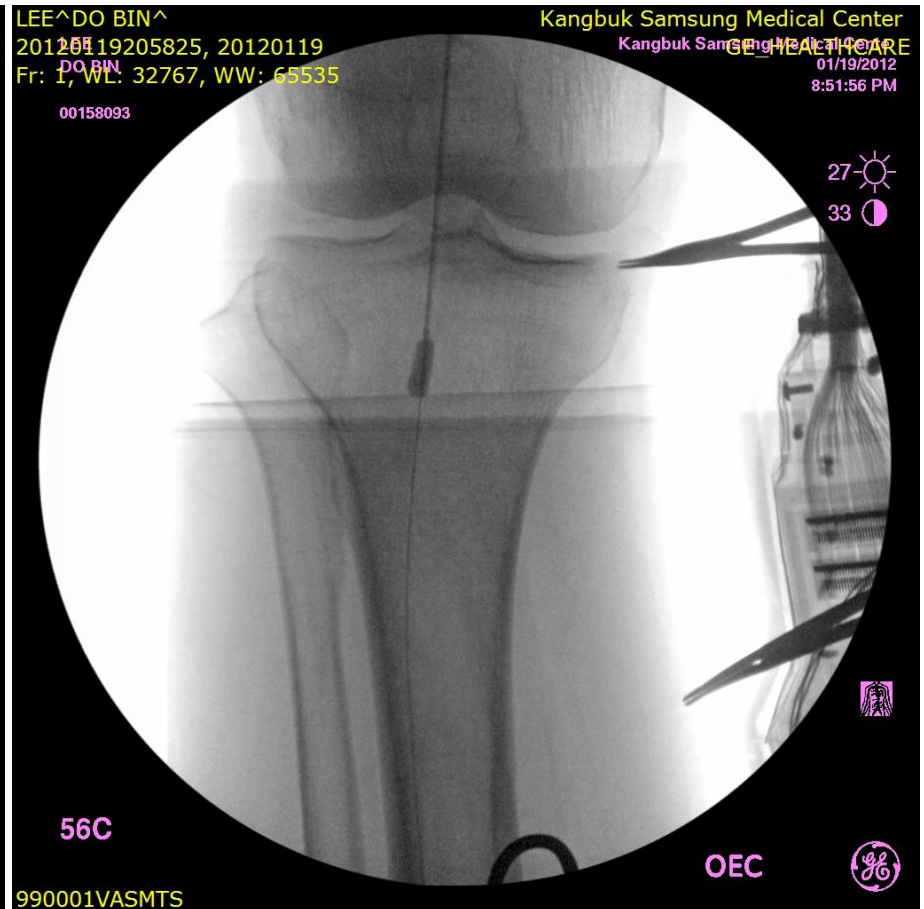
035 Wire & Cobra Passage



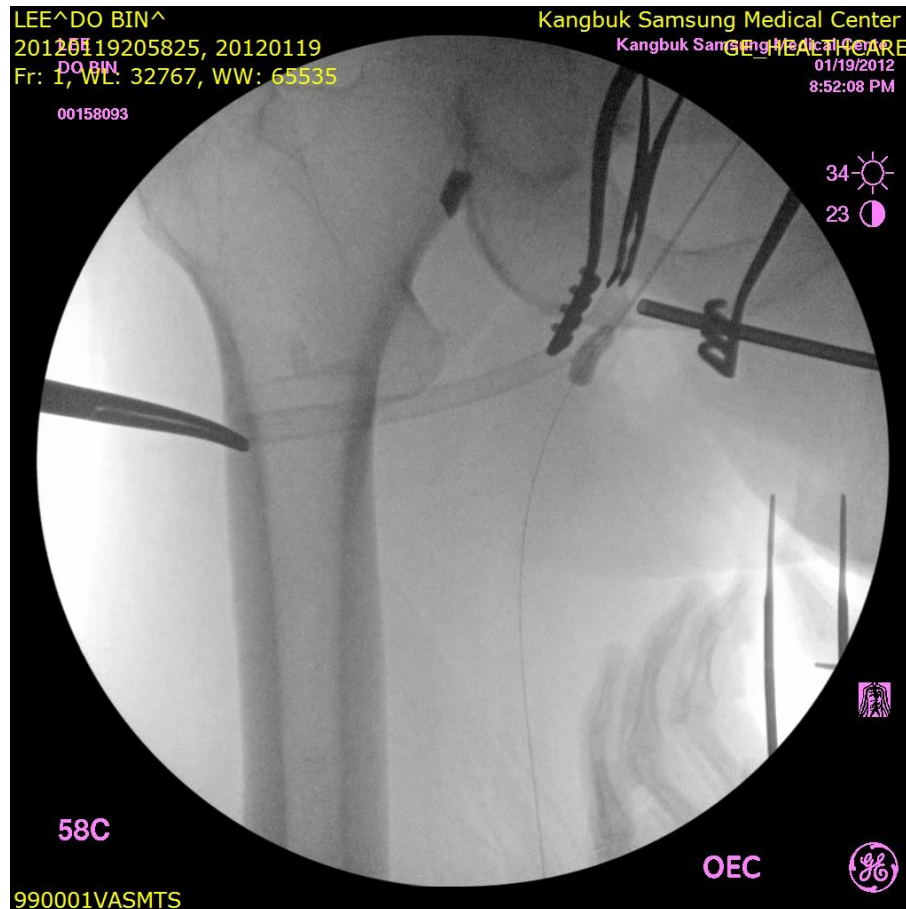
035 Wire & Cobra Passage



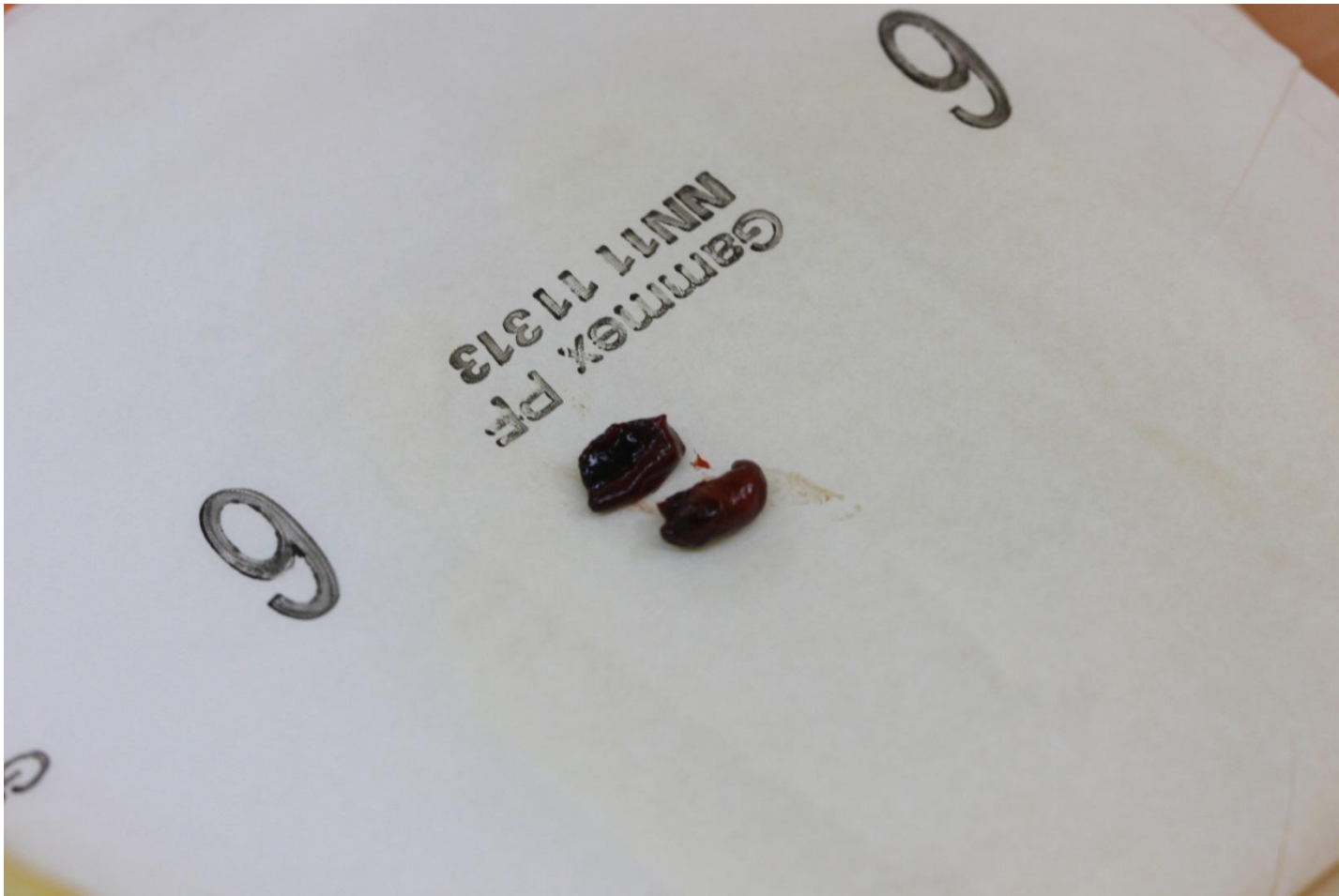
018 Wire Exchange & Forgaty Balloon



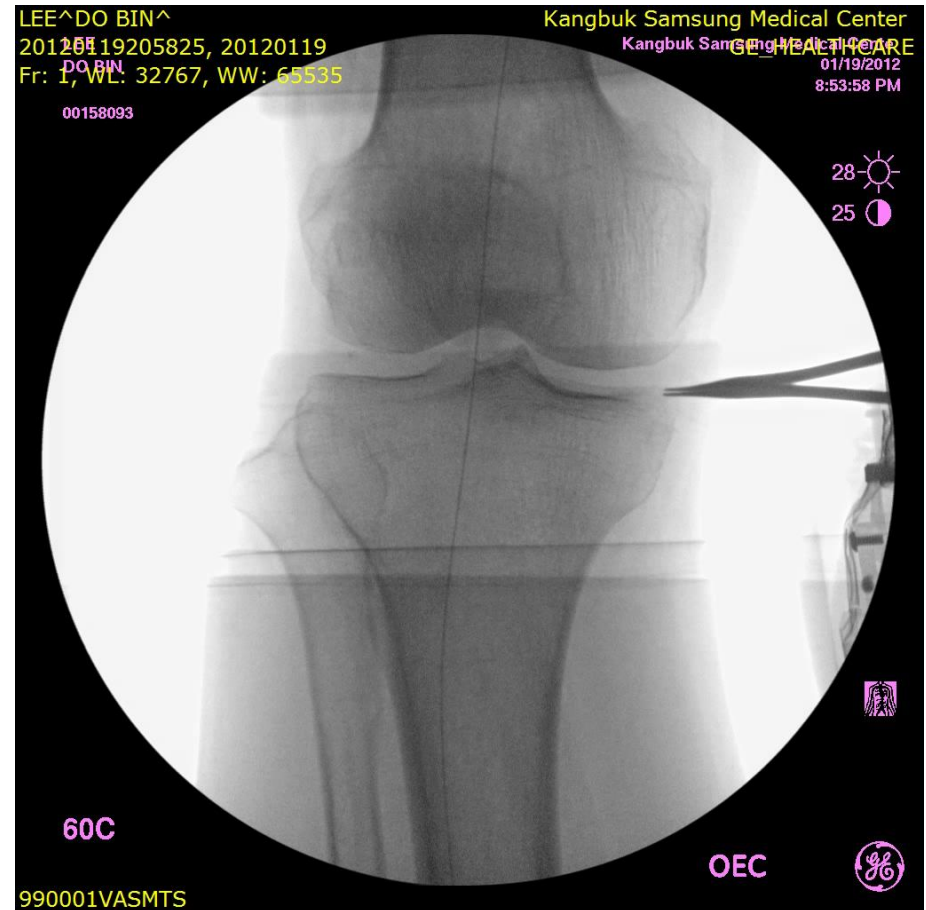
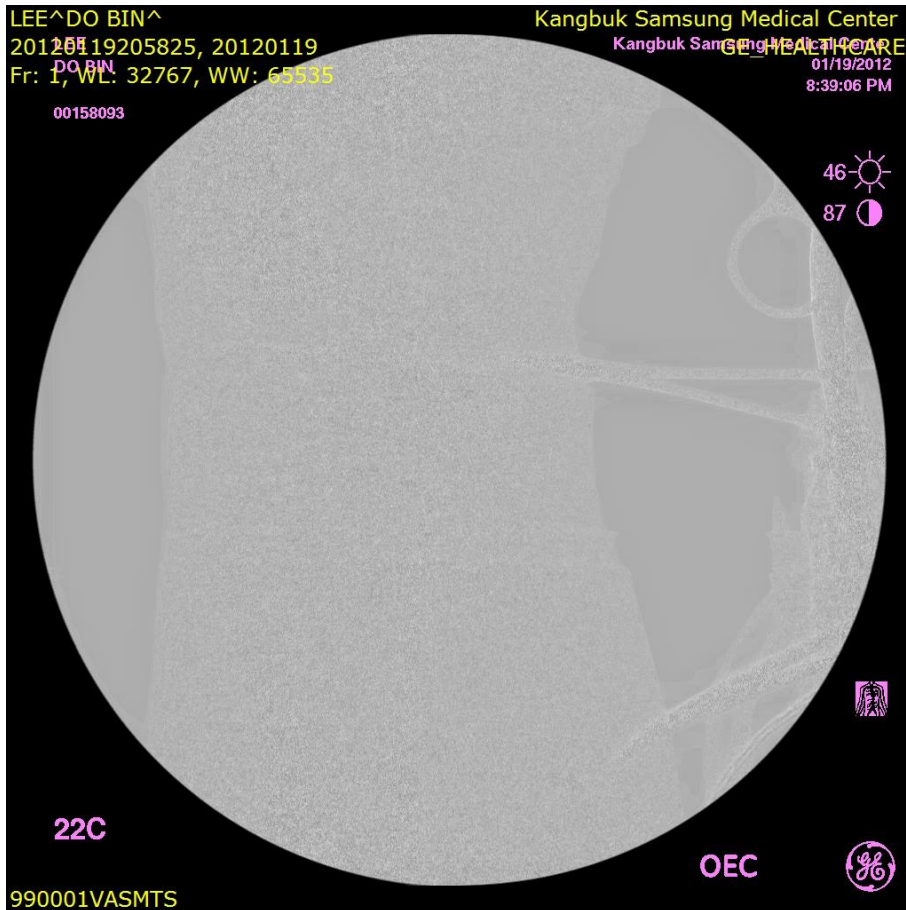
018 Wire Exchange & Forgaty Balloon



Embolus



Completion Angio



Case – Other Hospital

- CIA CTO due to combination of Thrombosis and Stenosis

Initial and PTA



PTA and Stent



PTA and 2nd Stent



Mechanical Aspiration



Mechanical Aspiration




Mechanical Aspiration



Final Angio



Chronic Limb Ischemia



Pain
Color change
Motor weakness

Definition

- It is the decrease in arterial blood supply to the tissues **due to partial occlusion of arteries.**
- **Stenosis or occlusion** produces symptoms & signs that are related to the organ supplies by the artery.
- The severity of symptoms is related to **the size of the vessel occluded & alternative routes (collaterals) available for blood flow.**



Causes

- Popliteal artery entrapment
- Mucinous cystic degeneration
- Buerger's disease
- Abdominal aortic coarctation
- Emboli
- Fibrodysplasia
- Pseudoxanthoma elasticum
- Persistent sciatic artery
- Iliac artery syndrome of cyclist
- Primary arterial tumors
- Raynaud's disease

Definition of Burger's Disease

- It is occlusive disease of small & medium size arteries, thrombophlebitis of superficial or deep veins & Raynaud's syndrome.
- It occurs in male patients with heavy smoking & usually under the age of 30 years.

Characteristics of Burger's disease

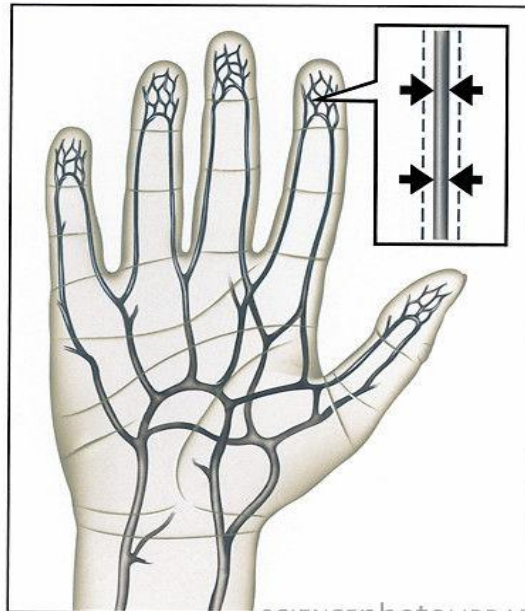
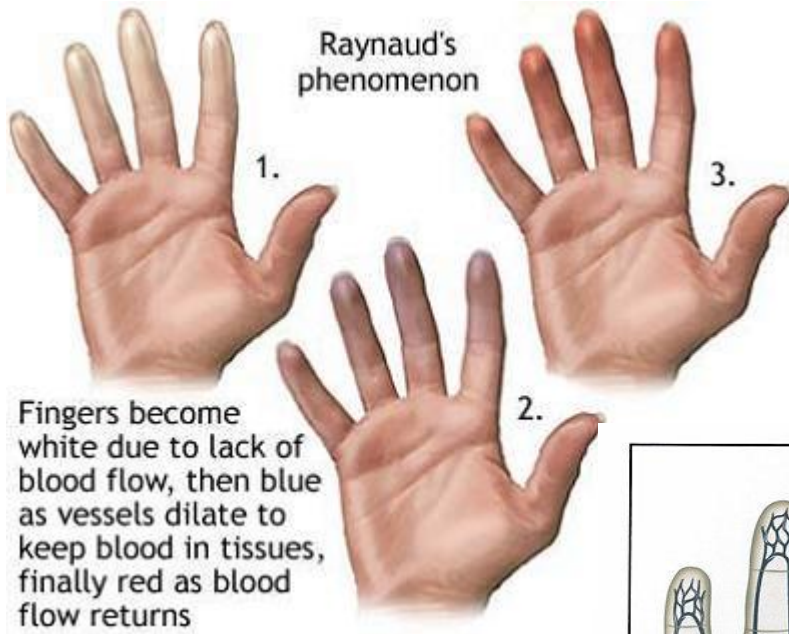
Histology:

Localised **inflammatory changes** occur in walls of arteries and veins leading to thrombosis.

Clinical picture:

- **The usual symptoms** and signs of arterial occlusive disease are present.
- **Gangrene of the toes and fingers** is common and progressive.

Raynaud's Disease



SCIENCEPHOTOLIBRARY