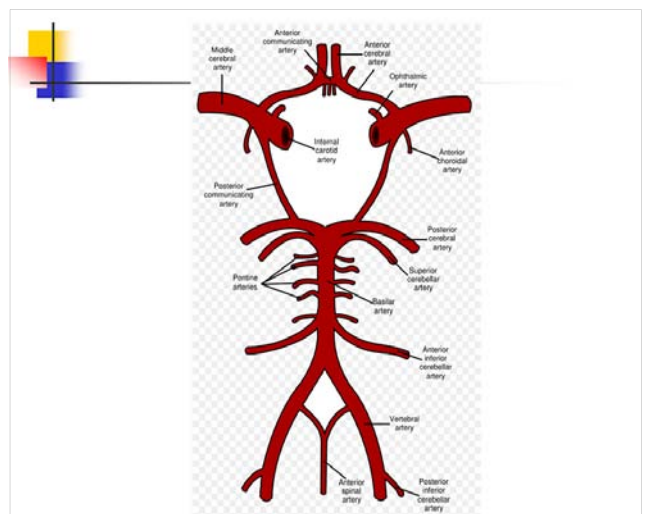
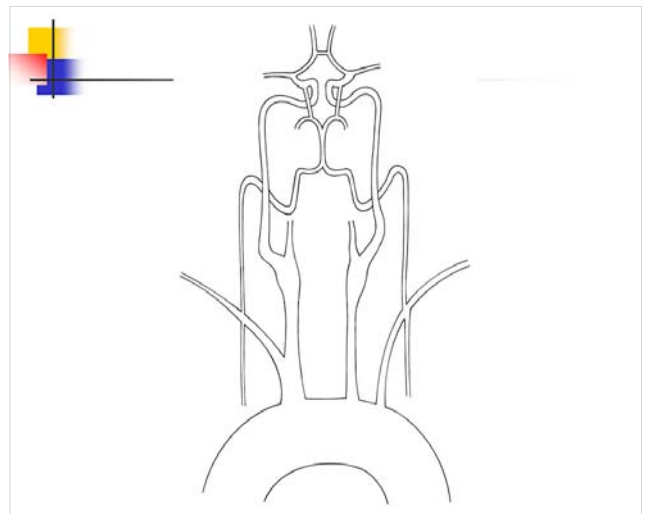
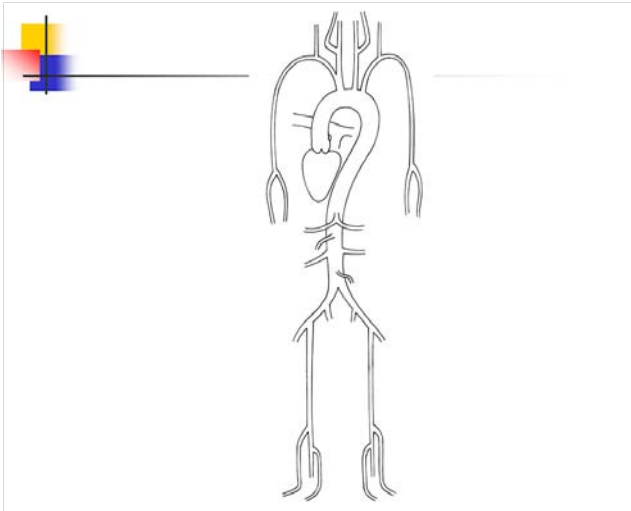
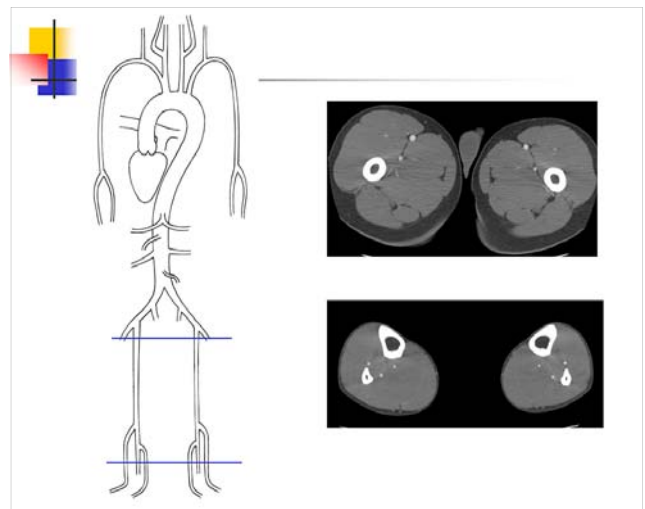
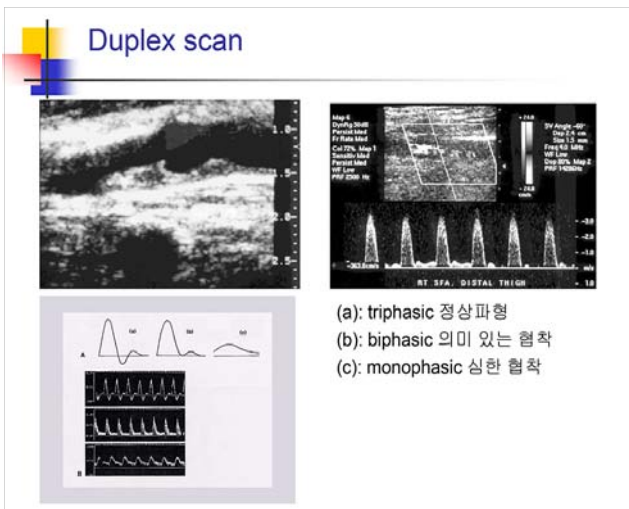
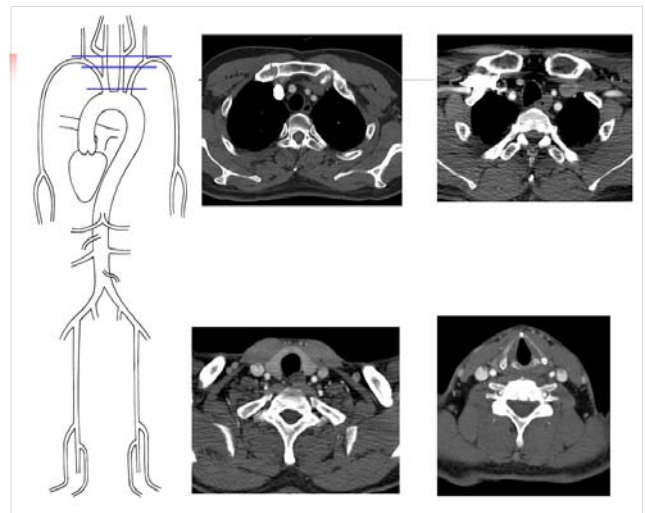
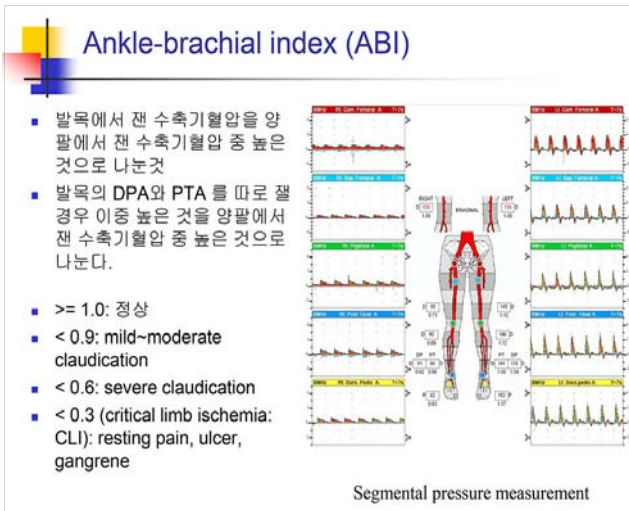
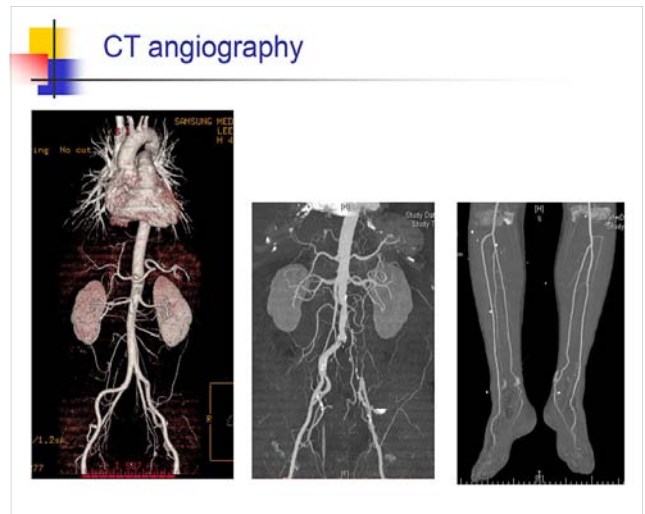
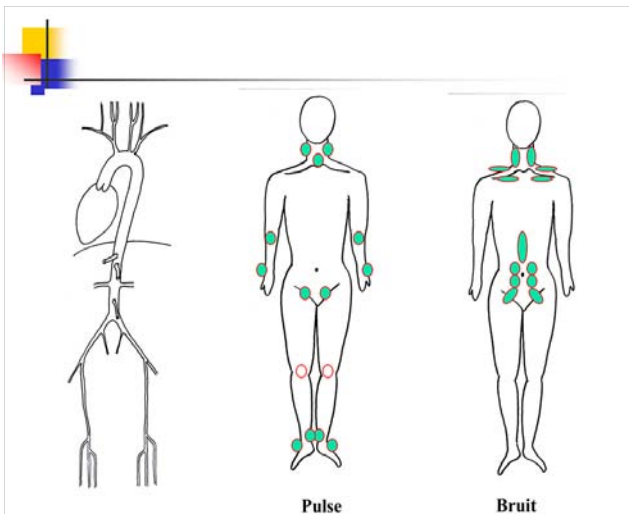


내과 의사가 알아야 할 혈관질환

성균관대학교 의과대학 내과학교실

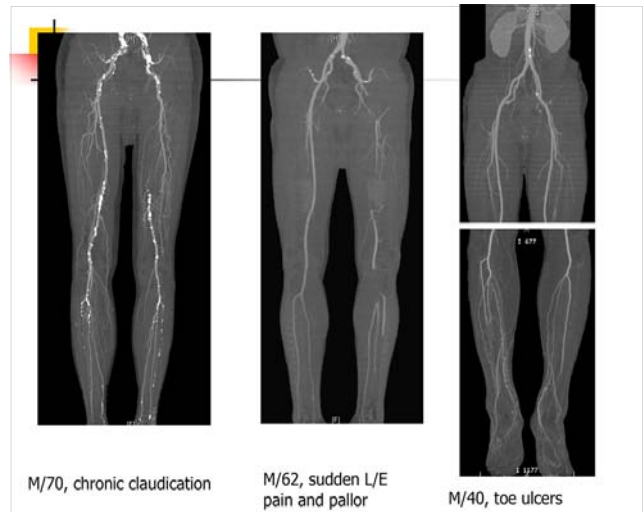
김 덕 경





PAOD (PVD)

PAOD: peripheral arterial occlusive disease
PVD: peripheral vascular disease



PAOD

- Lesion; site, severity
- Acute (thrombus) vs chronic
- Collaterals
- Calcification +/-
- Atrophy

PAOD: dry foot



PAOD

Acute: embolism

Sudden onset of Sx
Abrupt cut-off
Wall enhancement
No ~ little collateral
다른 혈관 비교적 깨끗
Cardiac ds

ASO

Old age
Large artery
다른 혈관 병변 +

Chronic

Gradual onset
Collateral +

TAO

Young age
Medium ~ small sized
손도 징병
Cork-screw type collateral

Foot ulcer: ischemic ulcer



DM foot: neuropathic ulcer



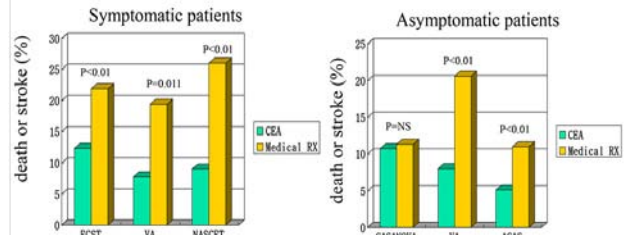
Carotid stenosis

Blue toe syndrome: cholesterol embolism



Carotid stenosis: natural history

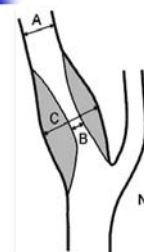
- Stroke의 60%는 carotid stenosis 때문
- 80% of major strokes occur w/o prodrome
- Asymptomatic 80% stenosis: 6% risk of stroke/yr
- Symptomatic stenosis: 10% risk of stroke/yr



Quiz: 다음 foot ulcer의 원인은?



Carotid stenosis % 측정법



$$\text{NASCET} = \frac{A-B}{A}$$

$$\text{ECST} = \frac{C-B}{C}$$

같은 협착의 서로 다른 %	
NASCET	ECST
30	65
40	70
50	75
60	80
70	85
80	90
90	97

Internal carotid artery 협착% 측정시 NASCET 방법이 ECST 방법보다 낮게 재어진다.

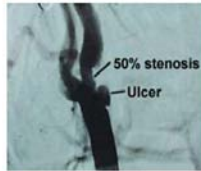
NASCET으로 쓴다.

* NASCET; North American Symptomatic Carotid Endarterectomy Trial
ECST: European Carotid Surgery Trial

시술 또는 수술의 적응증

NASCET criteria 기준으로

- Asymptomatic
 - > 80%
 - or
 - > 50% with ulcerated plaque
- Symptomatic
 - > 50%



Symptomatic의 정의: 최근 6개월 이내에 non-disabling stroke or TIA

Copyright: YourSurgery.Com

Two patterns of aortic aneurysm



- Above ligamentum arteriosum
 - neural crest
 - smooth, no Ca++ (때로 +)
 - not related to risk factors
 - no debris or clot

MFS related disorders, BAV

- Below ligamentum arteriosum
 - Mesoderm
 - irregular, Ca++
 - risk factor +
 - debris & clot

Degenerative aneurysm

JACC 2010;55:841-857

Carotid intervention: CEA vs stent

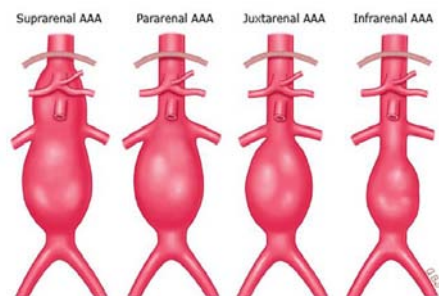
- High risk patient: stent
- Low risk patient: CEA
- High risk patients
 - 80세 이상
 - CAD, CHF, severe COPD
 - Prev CEA with restenosis
 - Contralateral occlusion of carotid artery
 - Hostile neck
 - Prev radiation Rx, Prev neck surgery, Lesion distal or proximal to the usual cervical location (above C2, below clavicle)

Heterogeneity between TAA and AAA

	AAA	TAA
Epidemiology	More common	Rare
Risk factor	HT, smoking, obesity	HT, smoking
Gender (M:F)	2-5 : 1	1.7 : 1
Average of patients at the time of diagnosis	65-70 yrs old	60-65 yrs old
Pathology	Associated with atherosclerosis	Associated with medial degeneration
Genetics	20% by genetic predisposition	20% by genetic syndrome
Embryology	From mesoderm	From neural crest
Structure and mechanics	Lesser elastin collagen content Lesser distensibility	Greater elastin collagen content Greater distensibility
MMP	More consistent role of MMPs	Inconsistent role of MMPs
TGF-beta signaling	???	TGF-beta contributes to aneurysm

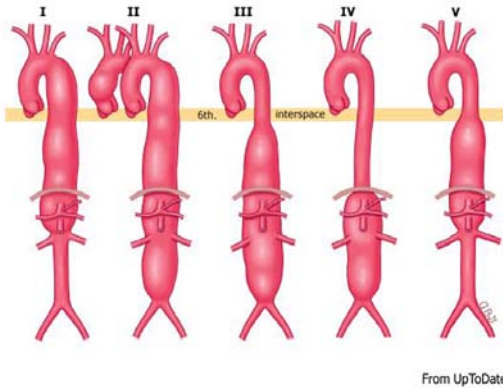
Aortic aneurysm

Classification of AAA



From UpToDate

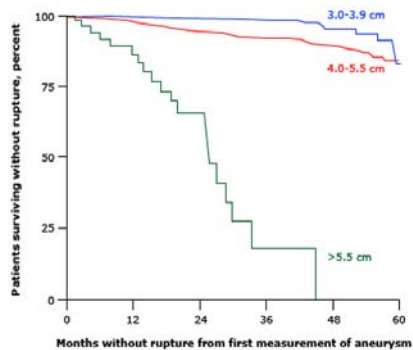
Classification of TAA: Safi modification of Crawford classification



Measurement of aneurysm size



AAA rupture primarily occurs in larger aneurysms



수술 또는 시술의 적응증

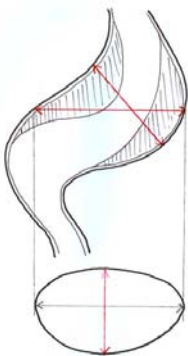
단위 (CM)

	Marfan	BAV	Degenerative
Ascending Ao	4.5 (~ 5.0)	(5.0 ~) 5.5	5.5
Descending Ao	6.0		6.5
Abd Ao	5.0		5.0 (~ 5.5)

1) 빨리 자라거나 2) 대동맥박리의 가족력이 있거나 3) 동맥류로 인한 다른 합병증이 있으면 더 일찍

MFS: 체구가 작거나 여성의 경우 → cross sectional area to height ratio > 10

Measurement of aneurysm size

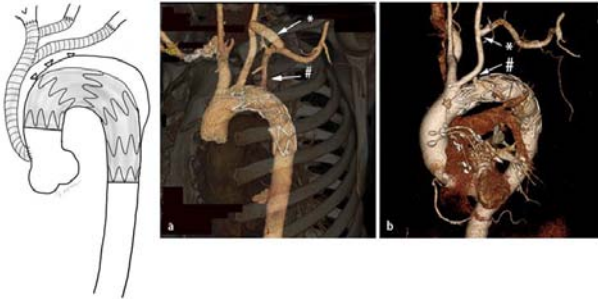


- Center line에 perpendicular plane (orthogonal plane)의 max diameter를 잰다.
- angulation이 심하지 않을 경우 (<25°)
 - Axial plane에서 max diameter (Axial CTmax)를 잰다.
- angulation이 심할 경우 (>25°)
 - coronal or sagittal plane reconstruction view에서 maximal diameter를 잰다 (Oblique CTmax)
 - 이 것이 불가능하면 axial plane에서 min diameter (Axial CTmin)으로 대체한다.
- 3D-MDCT에서 diameter를 재는 software를 사용 Orthogonal CTmax를 잰다.

Open repair vs endovascular

- 일반적으로
 - 젊고 수술의 위험도가 낮으면 수술
 - Endovascular의 favorable anatomy를 갖고 있고 수술의 위험도가 높으면 endovascular
 - Endovascular의 favorable anatomy를 갖고 있고 수술의 위험도가 낮아도 고려 가능

Hybrid TEVAR

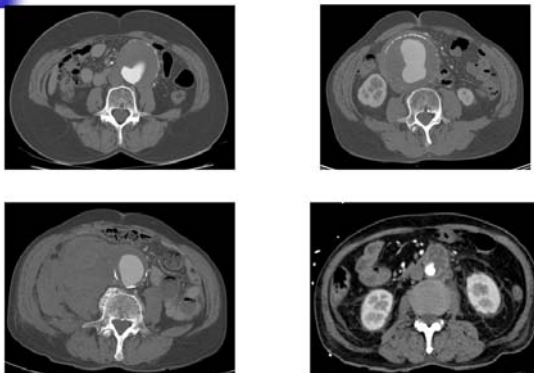


<http://www.kmpnews.co.kr/news/articleView.html?idxno=10096>
<http://link.springer.com/article/10.1007/s00398-013-1021-3/fulltext.html>

Aortic dissection

- Cr 이 높아도 가능한 한 aorta CT angiography를 찍는다.
- Type A vs type B
- True dissection vs IMH vs combined
- True lumen vs false lumen
- Major organ perfusion
 - originates from TL vs FL
 - ischemia
- Entry vs reentry
- Dynamic process; evolving
- HT 여부: heart LVH를 본다.
 - 2ndary HT의 원인: RAS, adrenal gland
- Syndromatic features

Quiz: 다음 AAA의 감별진단은?



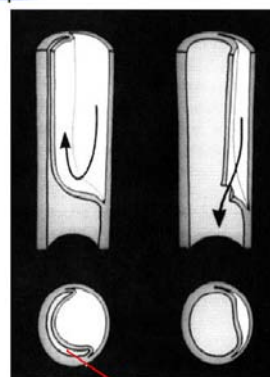
* ruptured AAA, * inflammatory AAA, * mycotic AAA, * simple AAA

True lumen vs false lumen

1. False lumen being larger than the true lumen in >90% of cases, a compressed true lumen is perhaps the key radiographic finding
2. True lumen may be localized by its continuity with an undissected segment of aorta
3. The presence of intraluminal thrombus is a fairly good marker of the false lumen

Aortic dissection

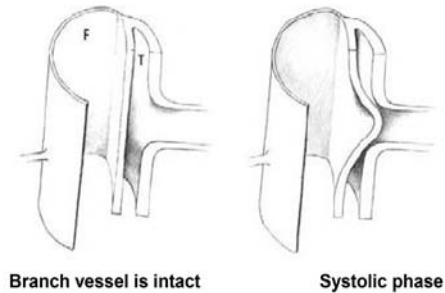
Reentry의 여부가 TL의 collapse를 결정



- (Lt)
Increase false lumen diameter
→ compression true lumen
- (Rt)
Reentry induce blood flow from high pressure false lumen to low pressure true lumen
→ increase distal blood flow of true lumen

Collapsed slit-like true lumen

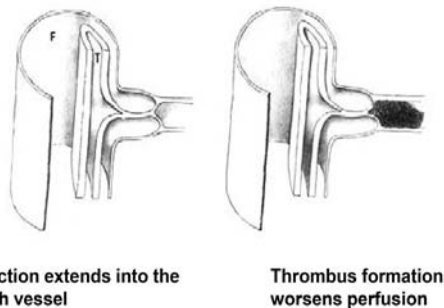
Dynamic obstruction



Aortic dissection

- Cr 이 높아도 가능한 한 aorta CT angiography를 찍는다.
- Type A vs type B
- True dissection vs IMH vs combined
- True lumen vs false lumen
- Major organ
 - originates from TL vs FL
 - ischemia
- Entry vs reentry
- Dynamic process; evolving
- 2ndary HT의 원인: RAS, adrenal gland
- Syndromatic features
 - Marfan syndrome

Static obstruction



Calculation of systemic score

DE FORM

CRITERIA

SYSTEMIC CALCULATOR

TESTING INFO

DIFFERENTIAL DIAGNOSES

RELATED DISORDERS

RESOURCES

CALCULATION OF SYSTEMIC SCORE

Clinical manifestations of MPS in other organ systems were critically evaluated for their specificity and diagnostic utility based on expert opinion and the available literature. Several of the "minor" criteria from the old ESH scoring system were eliminated, but the most important systemic features were included in the "systemic score".

Feature

Value

Click to include

Wrist/Ankle thumb sign

+

0

The thumb sign is positive when the entire distal phalanx of the thumb extends beyond the other bony part of the joint with or without the existence of the "club" or "saber" to examine to allow maximal abduction. The wrist sign is positive when the tip of the thumb covers the entire length of the fifth finger when wrapped around the carpalometacarpal joint.

Wrist/DE thumb sign

+

2

Pericardial Calcification

+

2

Pericardial or Chest Rigidity

+

1

Irregular Heartbeat

+

2

Palm Flat Feet

+

1

Symptomatic Pseudotumor

+

2

Diast Emphyse

+

2

Proteinuria/albuminuria

+

1

Encephal or Thoracic/abdominal Hypertension

+

1

Reduced Blood Extension

+

1

3/4's Flat Features

+

1

Goiter Signs

+

1

Severe Myopia

+

1

Mild Visual Impairment

+

1

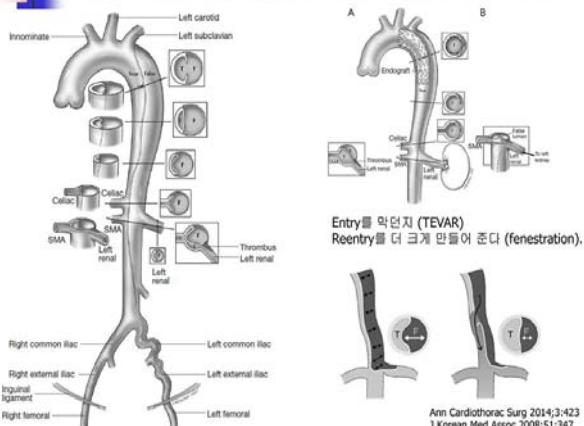
Reduced Upper Segment/ Lower Segment & Increased arm span : Height

+

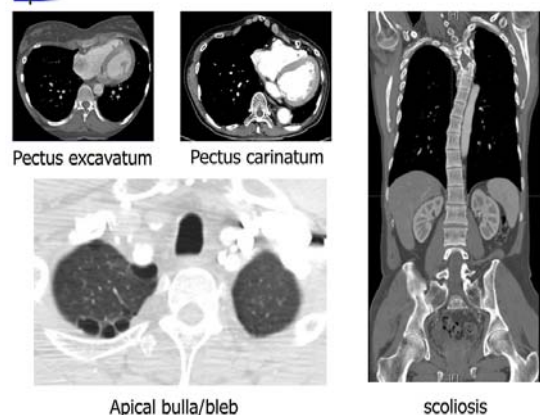
0

Open to calculate

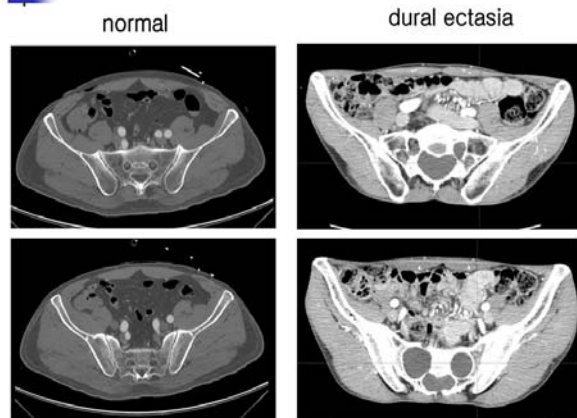
Complicated type B AD with malperfusion



Systemic findings in CT



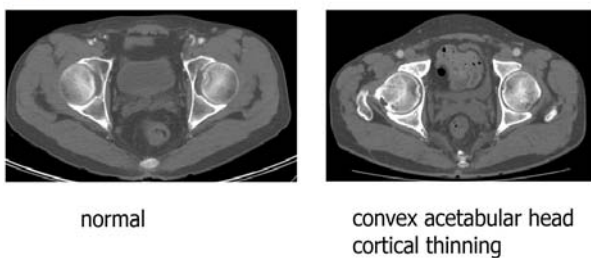
Lumbosacral dural ectasia



SCA stenosis

- 양팔의 혈압 차이가 있어 우연히 발견
- 주로는 왼팔이 막힘
- 원인
 - 젊은 여자: Takayasu arteritis
 - 50대 이후 (특히 risk factor +): ASO
- 증상
 - 대부분 없다
 - Arm claudication
 - VBI Sx이 있는 경우: subclavian steal syndrome이라 부른다.

Protrusio acetabuli



SCA stenosis

- Vertebral artery 전, 후에 따라 다른 증상
- SCA stenosis
 - Steal (-)
 - Steal (+)
 - VBI (-): 거의 모든 환자
 - VBI (+): "SCA steal syndrome"
- 진단
 - Duplex scan
 - Reactive hyperemia test with ICD
 - CT-angiography U/E
- True BP를 알아 고혈압 치료가 중요



Subclavian artery stenosis

SCA steal syndrome

