Version 2.9

What's new with Valve and Aortic Sections?

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FRANKEL CARDIOVASCULAR CENTER
MICHIGAN MEDICINE

These slides are to be used for quality improvement by the MSTCVS member surgeon champions and data managers. Each slide includes the MSTCVS confidentiality statement.
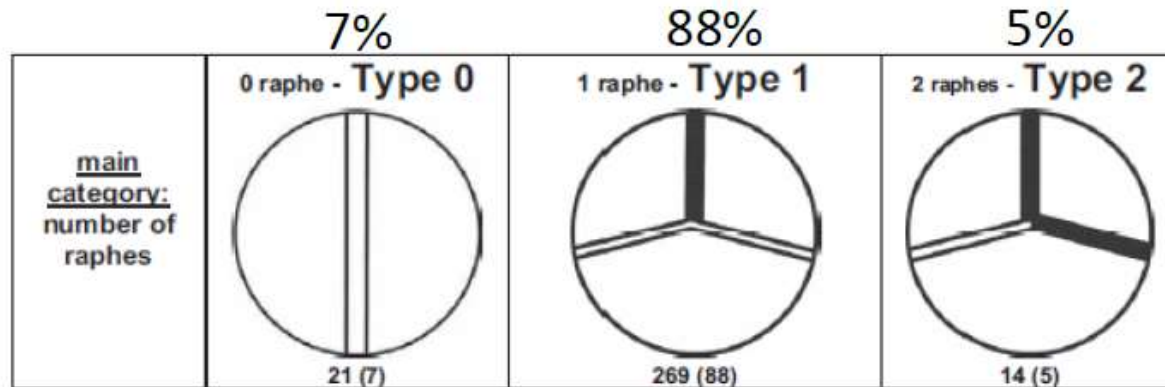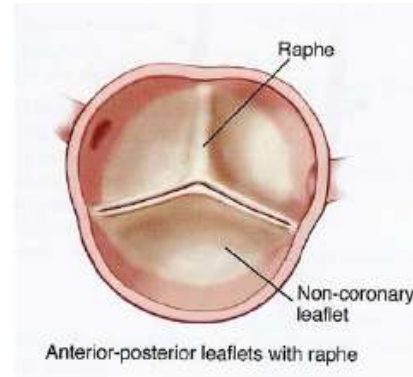
Section H-Hemodynamics/Cath/Echo

Aortic Valve

Seq#	Field Name	Details
1591	Eccentric Jet	-If AI is not None -Echo report-description of regurgitation
1616	Max Aortic Jet Velocity-Vmax	Find on Echo, common measurement for AS
1646	AV Disease Etiology	-New choices -Can only pick 1 -If multiple, Mixed Etiology -Not Documented added -Other Removed
1647	Sievers Class	If Etiology is Bicuspid

Sievers Class (#1647)

0 No Raphe

1 one Raphe

Raphe

Non-coronary leaflet

Anterior-posterior leaflets without raphe

Anterior-posterior leaflets with raphe

	7%	88%	5%
main category: number of raphes	0 raphe - Type 0	1 raphe - Type 1	2 raphes - Type 2
	21 (7)	269 (88)	14 (5)

Section H-Hemodynamics/Cath/Echo
Mitral Valve

Seq#	Field Name	Details
1681	Eccentric Jet	-If MR is not None -Echo Report-description of regurgitation
1731	MV Disease Etiology	-New choices -Can only pick 1 -If multiple, Mixed Lesion -Not Documented added -Other Removed
1746	MV Lesion	-New choices -Can only pick 1 -If multiple, Mixed Lesion -Not Documented added -Other Removed

Removed Carpentier Mitral leaflet motion classification

Section H-Hemodynamics/Cath/Echo

Tricuspid and Pulmonic Valves

Seq#	Field Name	Detail
1811	TV Etiology	-New choices -Can only pick 1 -If multiple, Mixed Lesion -Not Documented added -Other Removed
1855	PV Etiology	-Can only pick 1 -If multiple, Mixed Lesion -Not Documented added -Other Removed

Section K-Aortic Valve Surgery

Seq#	Field Name	Details
3395	Procedure Performed	-Procedures separated now -Separated TAVR from SAVR -More AV repair choices
3407, 3408, 3409	Surgical Valve Replacement Device Type Valve Type	-Device-added Surgeon Fashioned -Valve type-more detail for bioprosthetic valves
3460, 3461	Aortic Annular Enlargement Technique	Must choose annular enlargement technique
3462-3468	Root Procedure	Separated into With Valve, Valve Sparing and Reconstruction/Debridement Fill out Section M.2
3469	Patch Used	Was patch used for AV operation and what kind

Section K-Aortic Valve Surgery

Seq# 3409 Valve Type

Stented
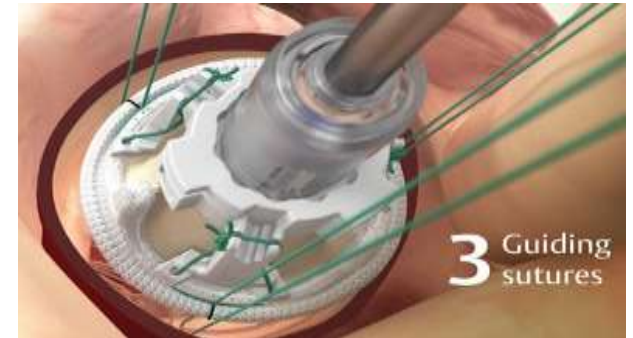
Stentless

Edwards Intuity Rapid
Deployment valve

Aortic Annular Enlargement

- Nicks (1969)
  - Into NC Cusp
- Nunez Modification (1983)
  - Resect posterior commissure
- Manougian (1978)
  - Between L & NC cusps
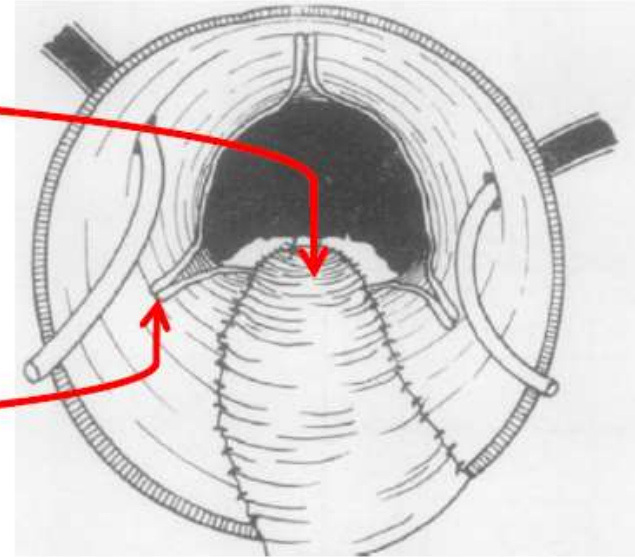
Konno (1975)
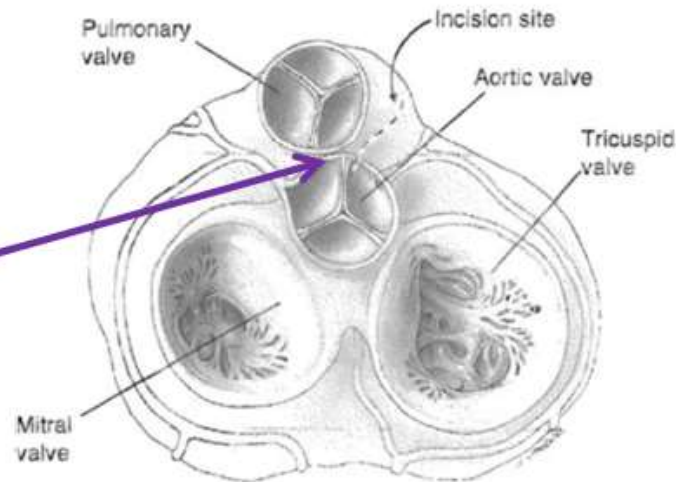
Section K-Valve Surgery

- ## Seq# 3500 Mitral Valve
  - – Very specific MV repair details-Seq# 3501-3591

AC=Lateral commissure
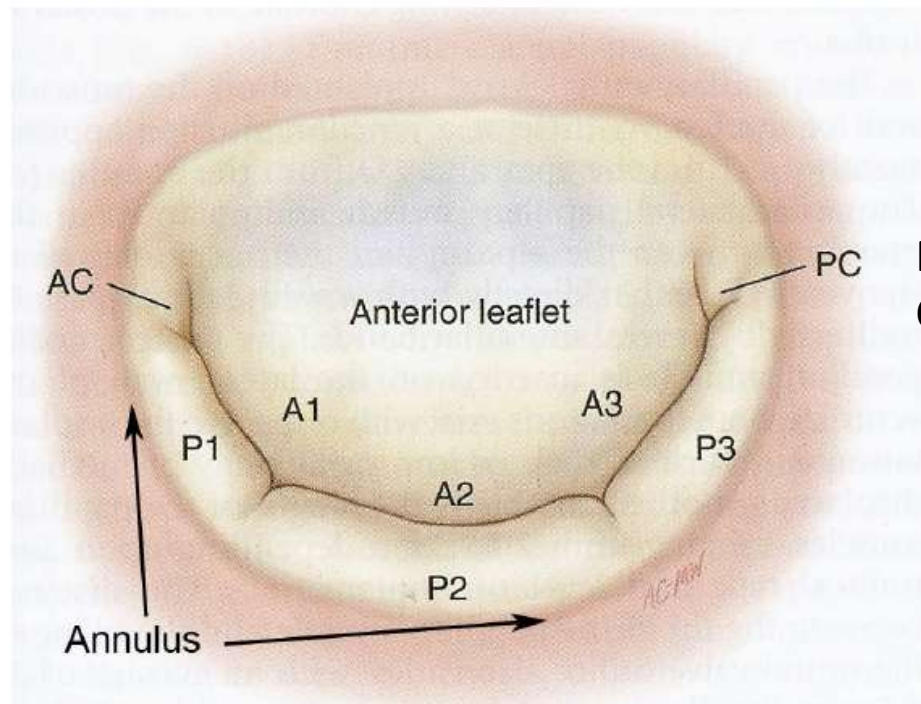
PC=Medial Commissure

Section K-Valve Surgery

- Seq#3640 Tricuspid Valve
  - Changed to Repair, Replacement or Valvectomy
    - From 2.81 Annuloplasty only, Reconstruction with annuloplasty and Reconstruction without annuloplasty = Repair in 2.9

- Seq#3701 Pulmonic Valve
  - Added Surgeon Fashioned Valve for Implant Type

Section K-Valve Surgery

- To prevent this

- Need Surgeon Input!!!!!

Seq# 2126
Did surgeon provide input for valve surgery data abstraction?

Section M.2
Aorta And Aortic Root Procedures

- Added 298 fields in this section
- Very specific procedural information
- Many fields are for multiple device/implants
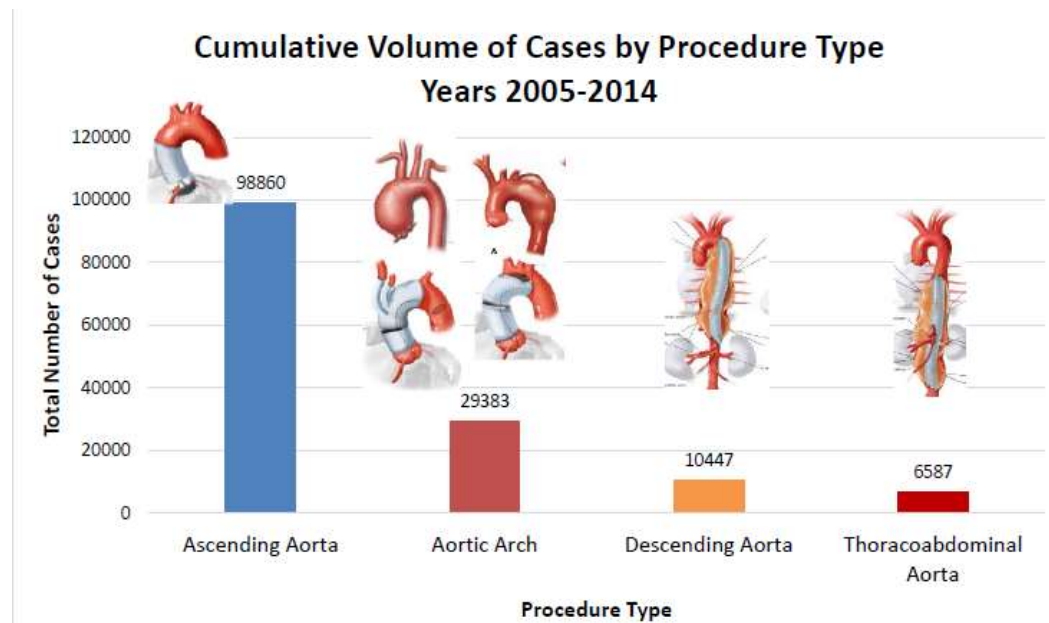
Cumulative Volume of Cases by Procedure Type
Years 2005-2014

(Total Number of Cases vs Procedure Type)

- Ascending Aorta: 98860
- Aortic Arch: 29383
- Descending Aorta: 10447
- Thoracoabdominal Aorta: 6587

Section M.2
Aorta and Aortic Root Procedures

- Clear identification of patient phenotype

- Implantation details/Device-specific information

- Accommodation for Concurrent and Staged Hybrid procedures

- Detailed perioprocedural/30 day outcomes

- Aortic-Specific long-term follow-up for post-marketing analyses
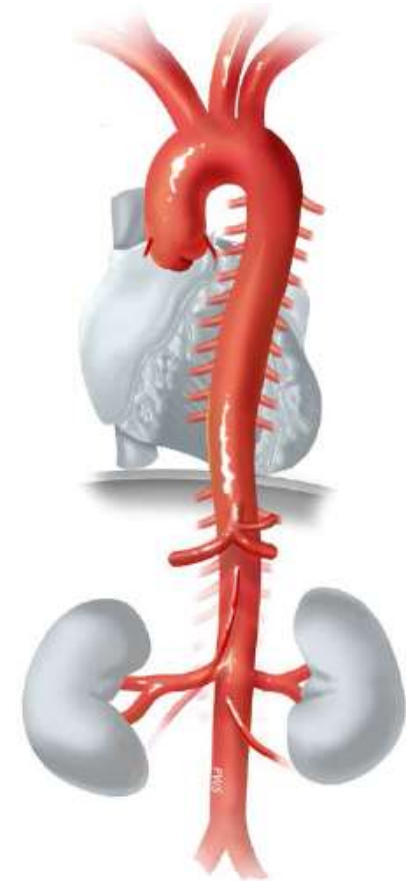
Section M.2

- To prevent this

- Need Surgeon Input!!!!!

Seq# 2129
Did surgeon provide input for aortic surgery data abstraction?

Normal Aortic Anatomy

Right common carotid artery
Right subclavian artery
Innominate artery
Aortic arch
Ascending aorta

Left common carotid
Left subclavian artery

Descending aorta
(thoracic portion)

Heart

Celiac artery

Diaphragm

Left renal artery

Right renal artery
Superior mesentaric artery (SMA)

Aorta (abdominal portion)

Lumbar arteries

Inferior mesentaric artery

Right common iliac artery

Internal iliac artery (hypogastric)

External iliac artery

Aortic Root Anatomy

Left common carotid artery

Innominate artery

Left subclavian artery

Aortic arch

Ascending aorta

Pulmonary artery

Sinus of Valsalva

Aortic root
  Leaflets
  Annulus
  Sinus of Valsalva
  Coronary arteries
  Sinotubular junction
  Commissural posts

Left coronary artery

Aortic Valve

Right coronary artery

RIGHT

LEFT

Normal Aortic Valve (3 leaflets)

Bicuspid Aortic Valve (2 leaflets)

Aortic Valve Calcification

Root Pathology

Seq# 4855

Aorto-Annular Ectasia
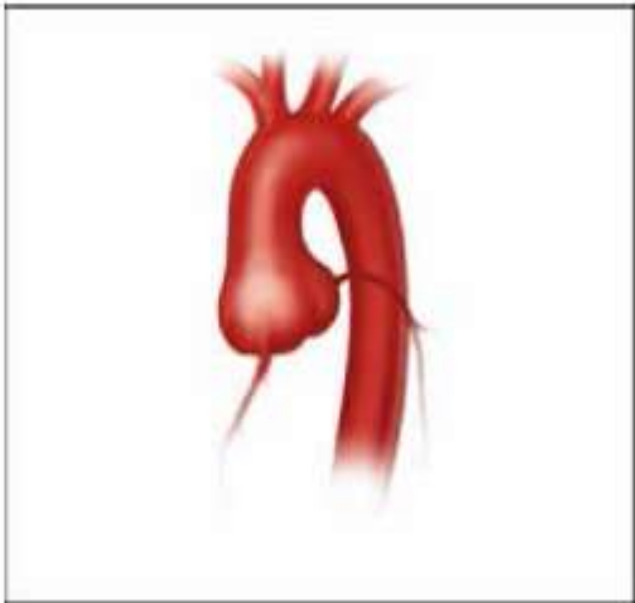
Seq# 4880

Sinus of Valsalva Aneurysm

Ascending Nomenclature
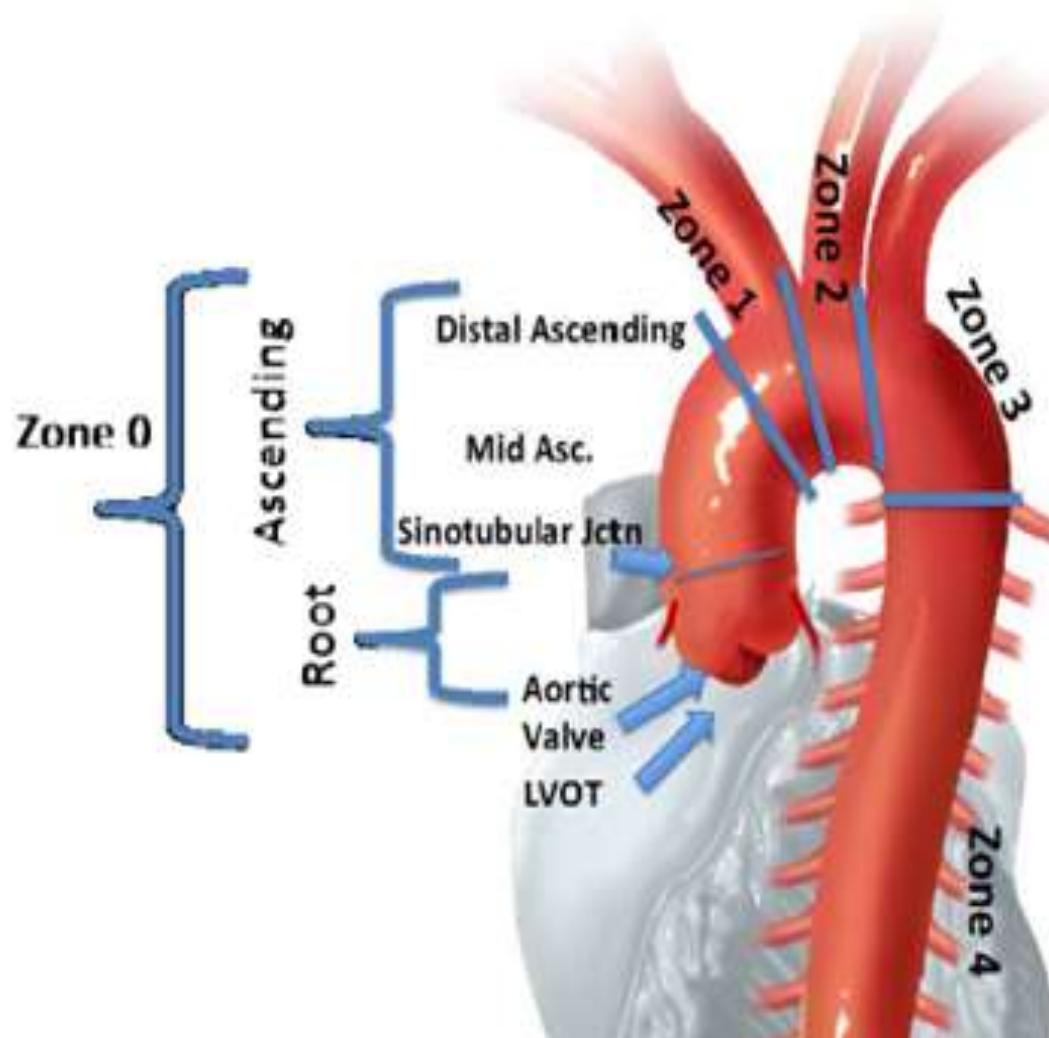
Arch Anatomy
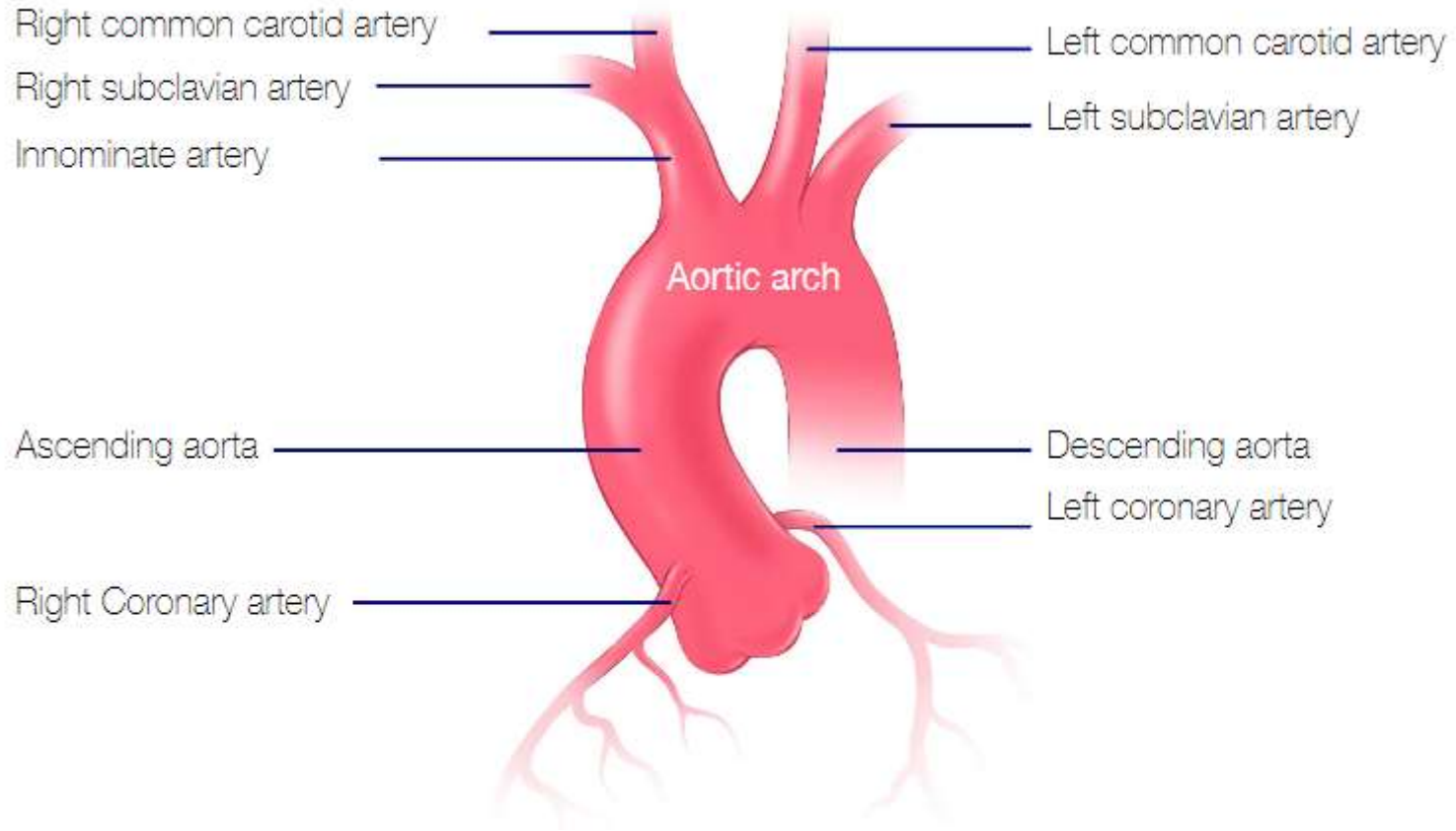
Seq#4882
Left Arch- normal

Right Arch
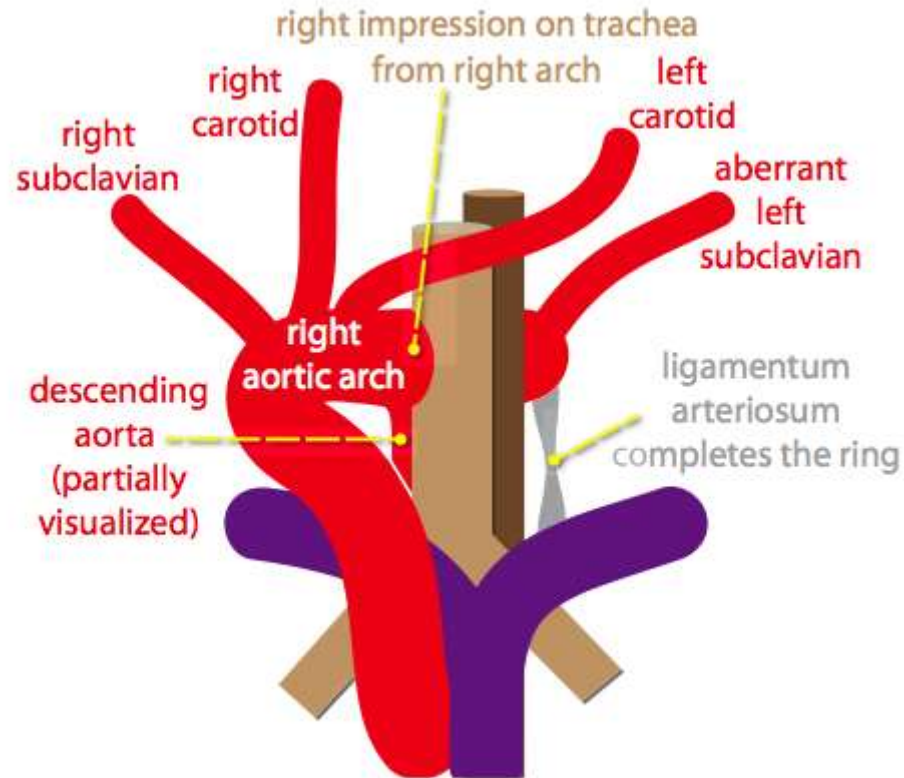
right impression on trachea
from right arch

right carotid
left carotid
right subclavian
aberrant left subclavian
right aortic arch
descending aorta (partially visualized)
ligamentum arteriosum completes the ring

Seq#4882
Right Arch -rare

Arch Anatomy

Normal arch

Bovine arch

Isolated vertebral

Aberrant right subclavian

Labels on diagrams: RCCA, LCCA, RSA, LSA, Innominate, and numbers 1–6
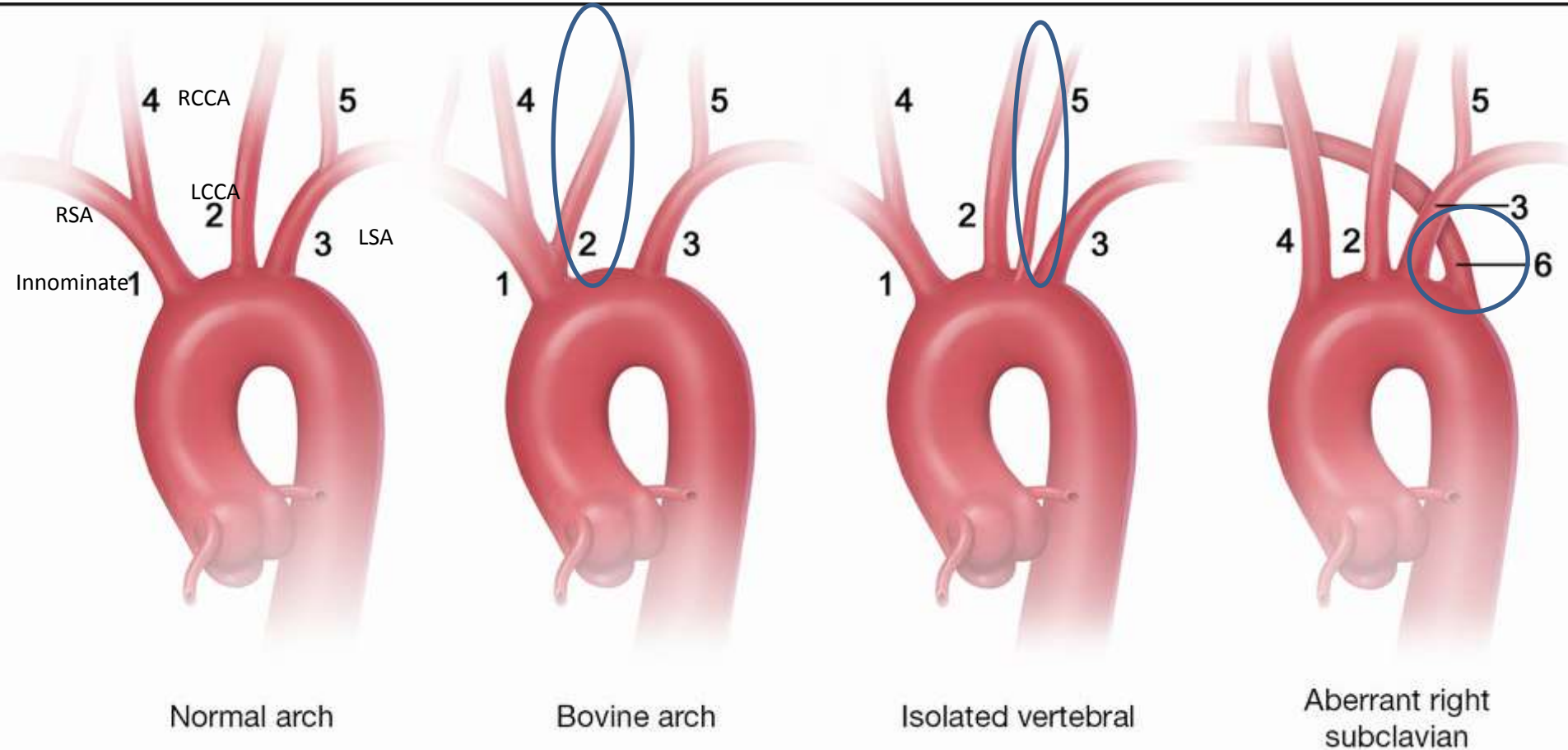
Seq# 4884-4888

Annals of Cardiothoracic Surgery

Arch Anatomy
Kommerell and ALSA/ARSA

- Kommerell-Seq#4886

Diverticulum of Kommerrell

Aberrant right subclavian artery aneurysm

Left common carotid artery

Left subclavian artery

Right common carotid artery

Aberrant right subclavian artery aneurysm

Kommerell
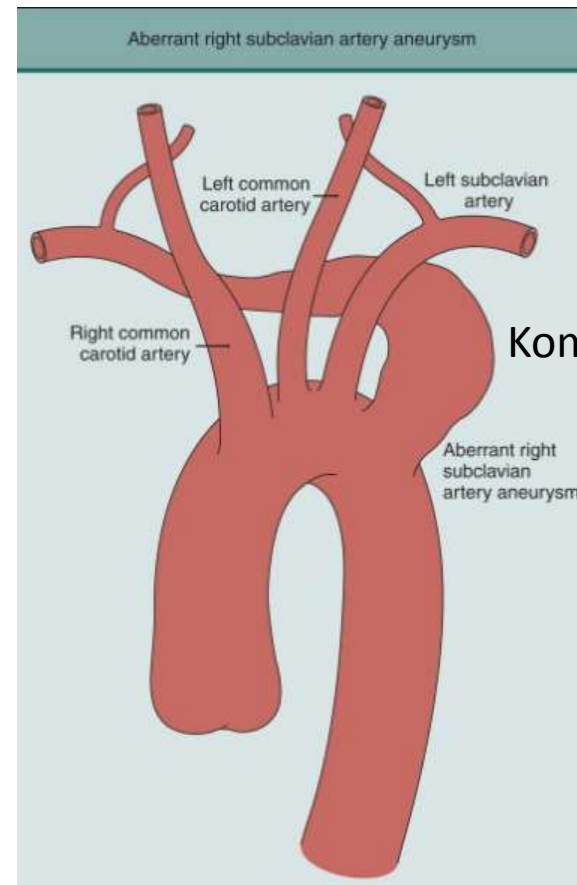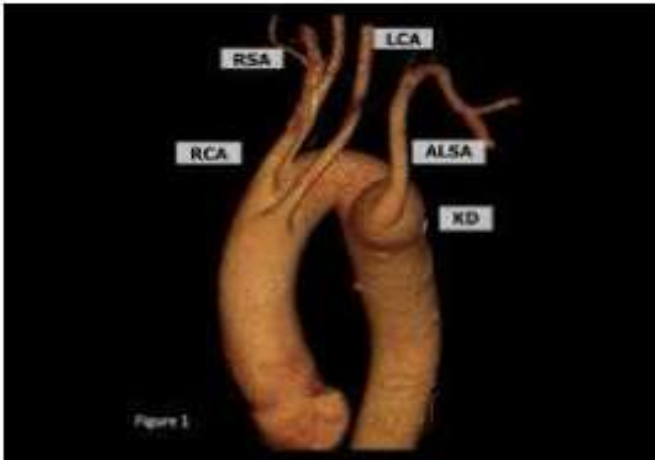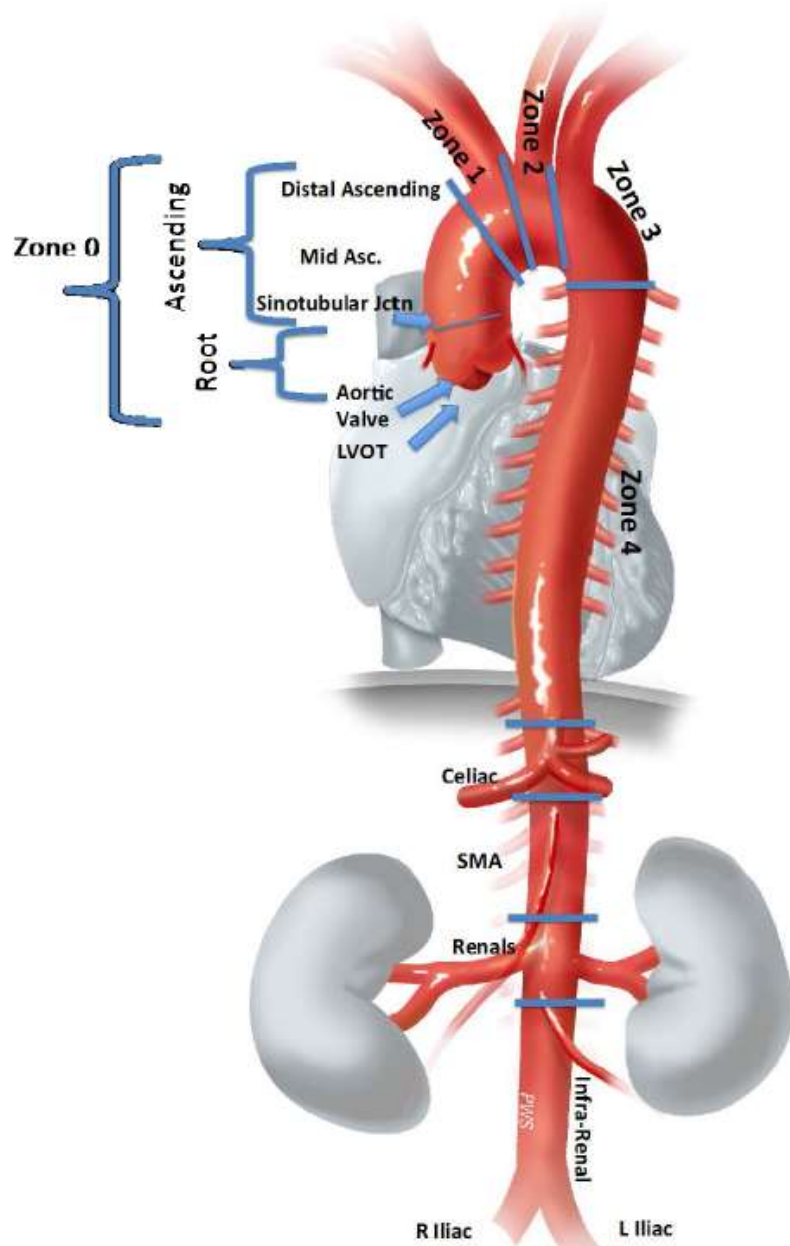
Important for Measurements
3D CT or non 3D CT
Also for Device/Implant Location

Aortic Aneurysms

Seq# 4725

Ascending Thoracic Aortic Aneurysm (TAA)
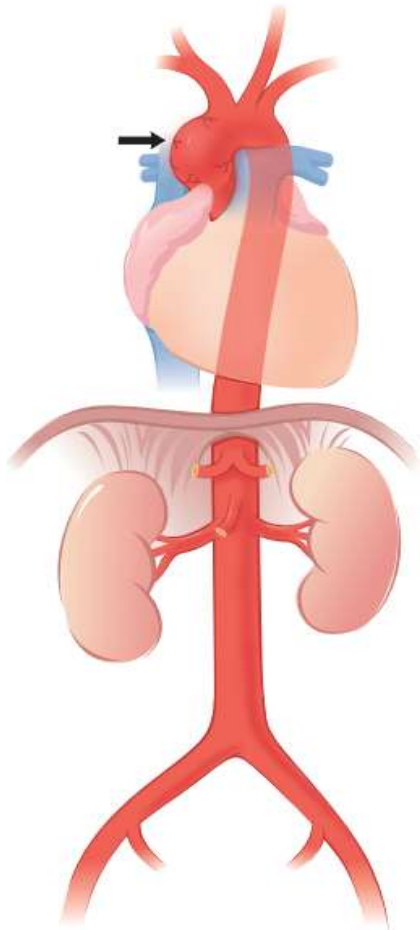
Descending Thoracic Aortic Aneurysm (TAA)
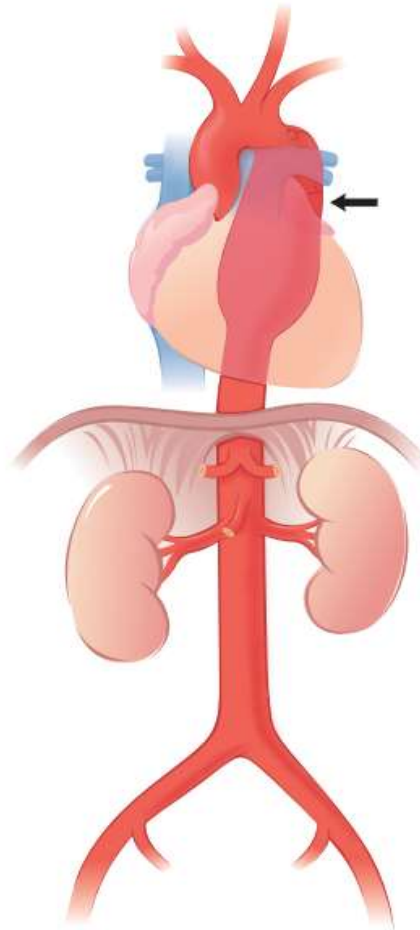
Abdominal Aortic Aneurysm (AAA)
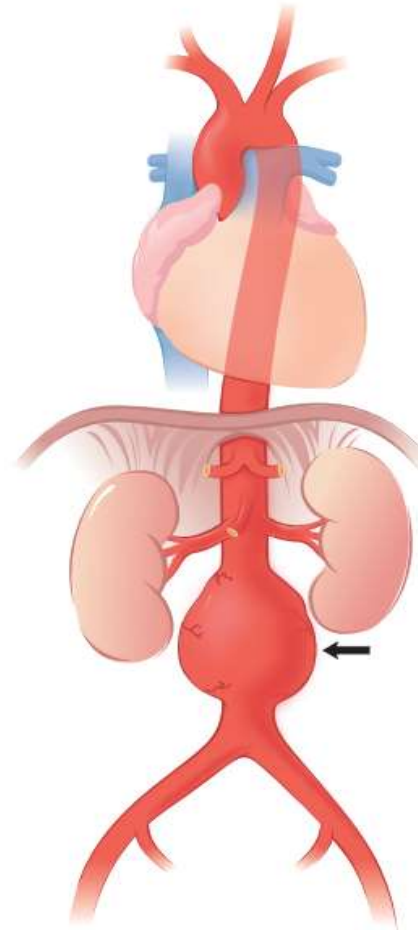
Fusiform Aneurysm

Saccular Aneurysm

Aneurysms
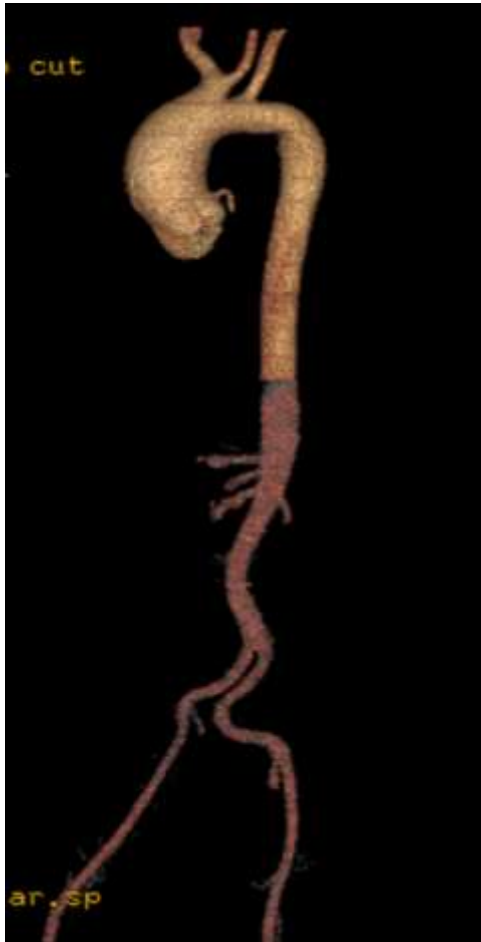
Large Saccular Aneurysm
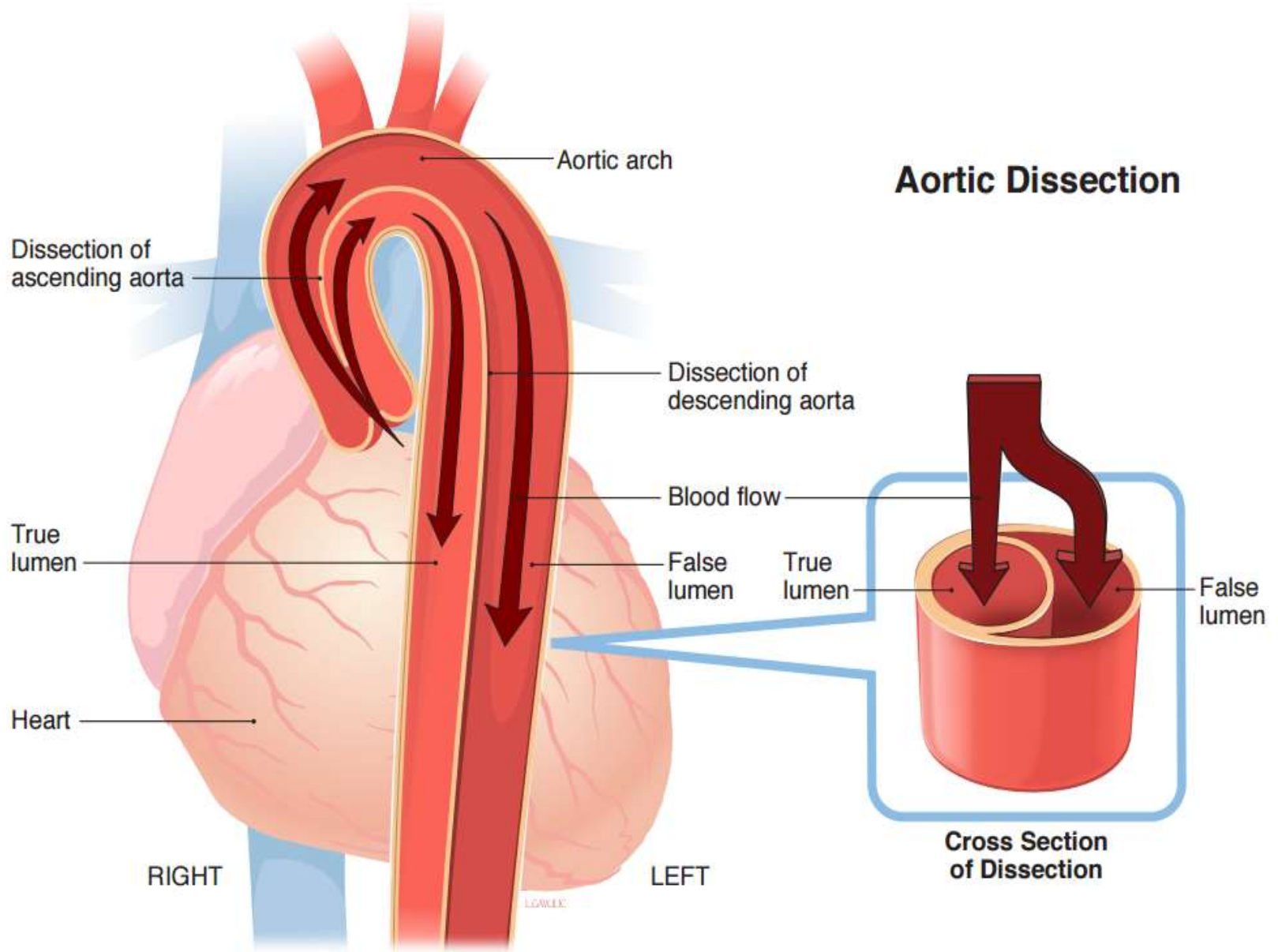
Aortic Dissection

Aortic arch

Dissection of ascending aorta

Dissection of descending aorta

Blood flow

True lumen

True lumen

False lumen

False lumen

Heart

RIGHT

LEFT

Cross Section of Dissection

Types of Aortic Dissections
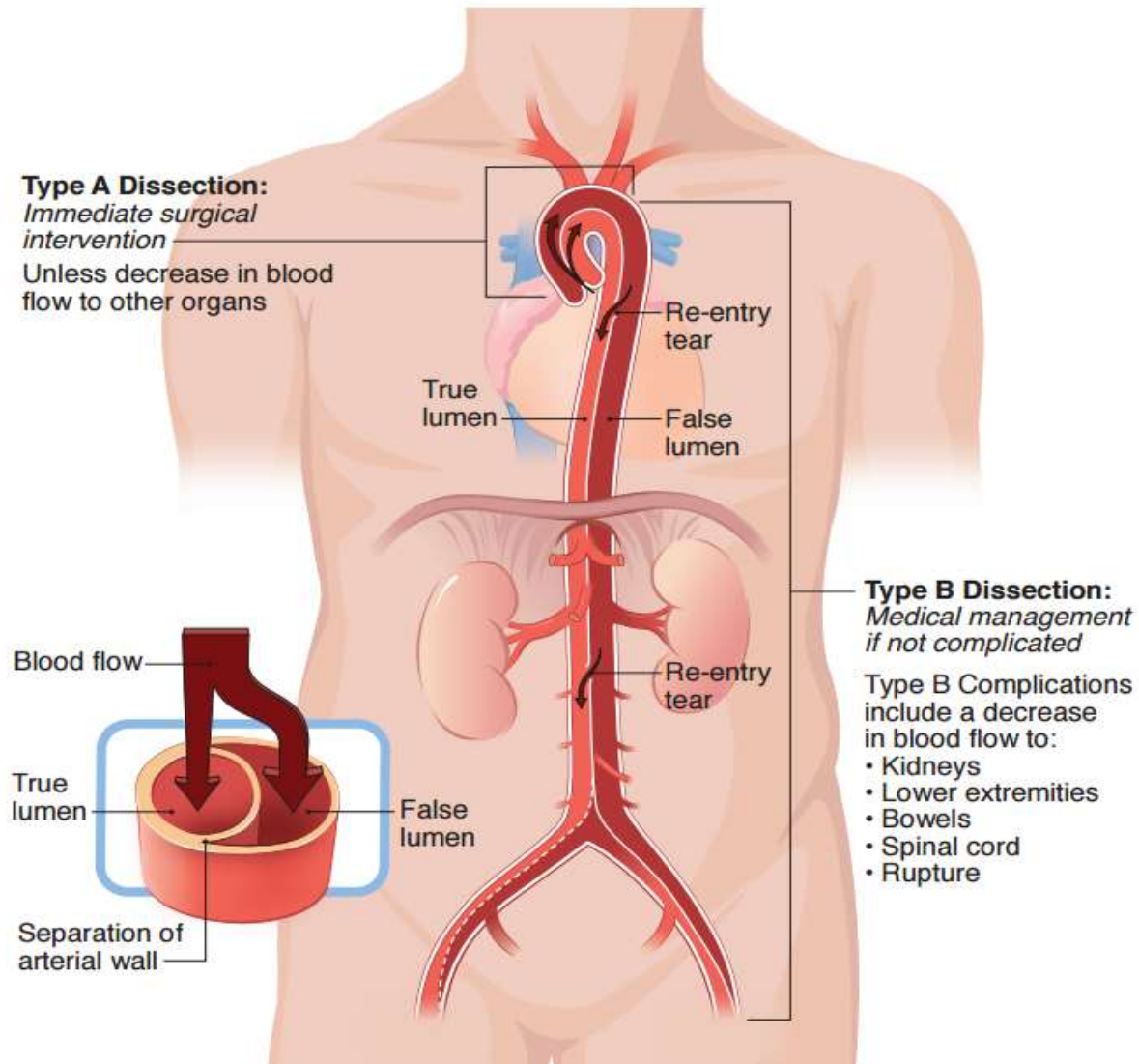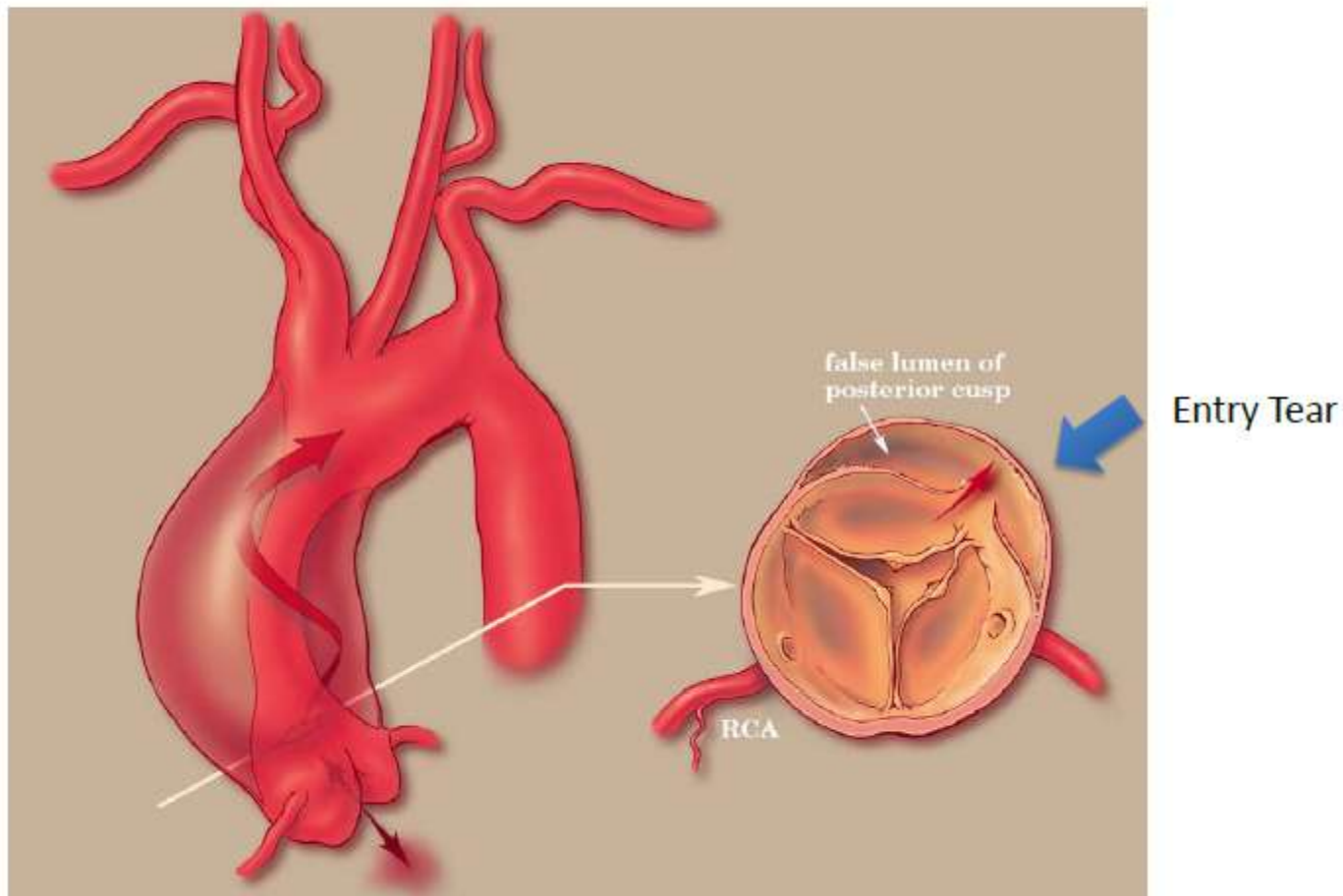
Type A Dissection:
Immediate surgical intervention
Unless decrease in blood flow to other organs

Re-entry tear

True lumen

False lumen

Blood flow

True lumen

False lumen

Separation of arterial wall

Re-entry tear

Type B Dissection:
Medical management if not complicated

Type B Complications include a decrease in blood flow to:
• Kidneys
• Lower extremities
• Bowels
• Spinal cord
• Rupture

Aortic Dissection

false lumen of posterior cusp

Entry Tear

RCA

STJ-Mid tear

Zone 3 tear

A (II)

B (IIIa)

A (I)

B (IIIb)

Seq#4745 Timing
Hyperacute (<48hr)
Acute (48hr-2weeks)
Subacute (>2wks-90days)
Chronic (> 90days)
Acute on Chronic
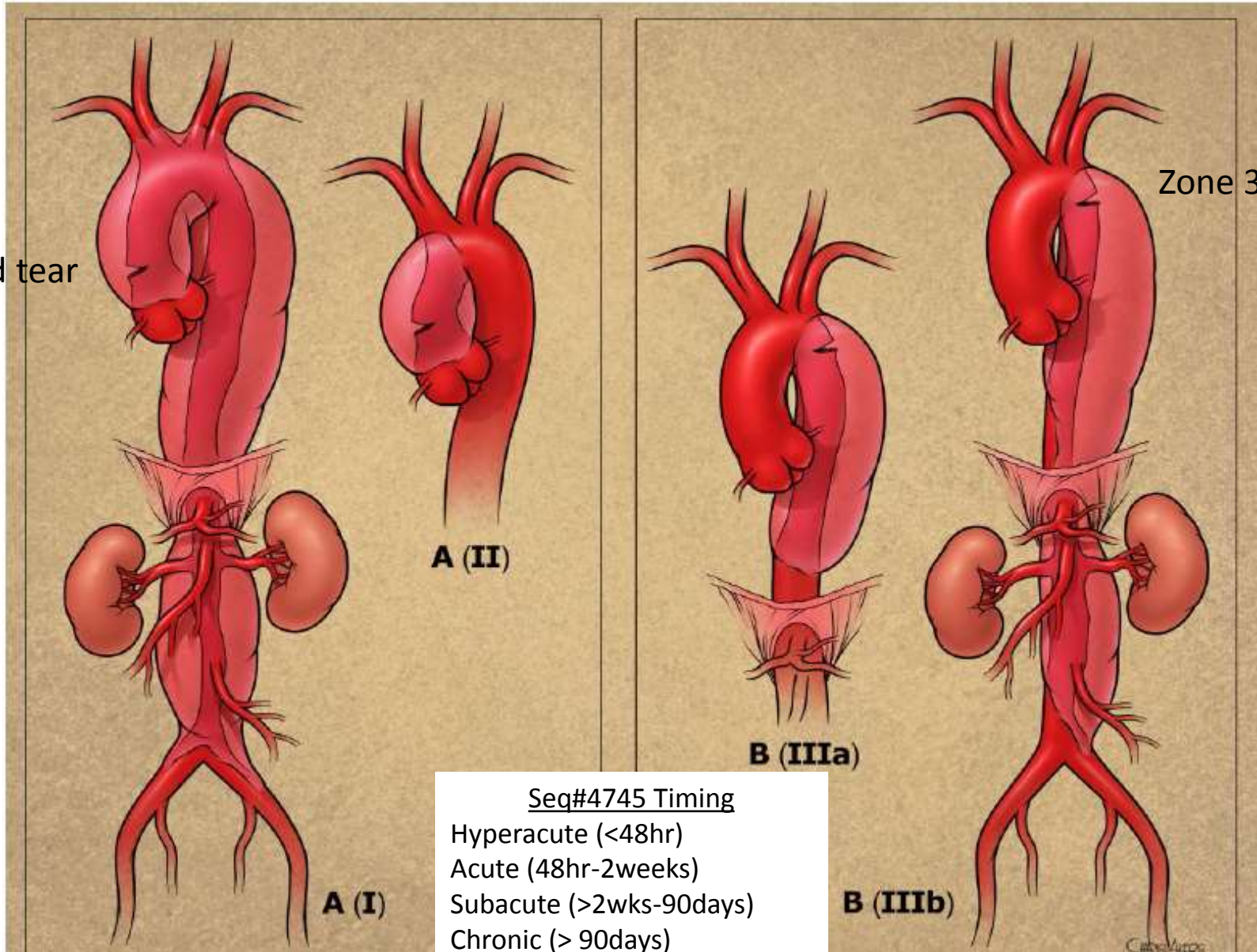
Aortic Dissection

Bovine Arch

Malperfusion Syndromes
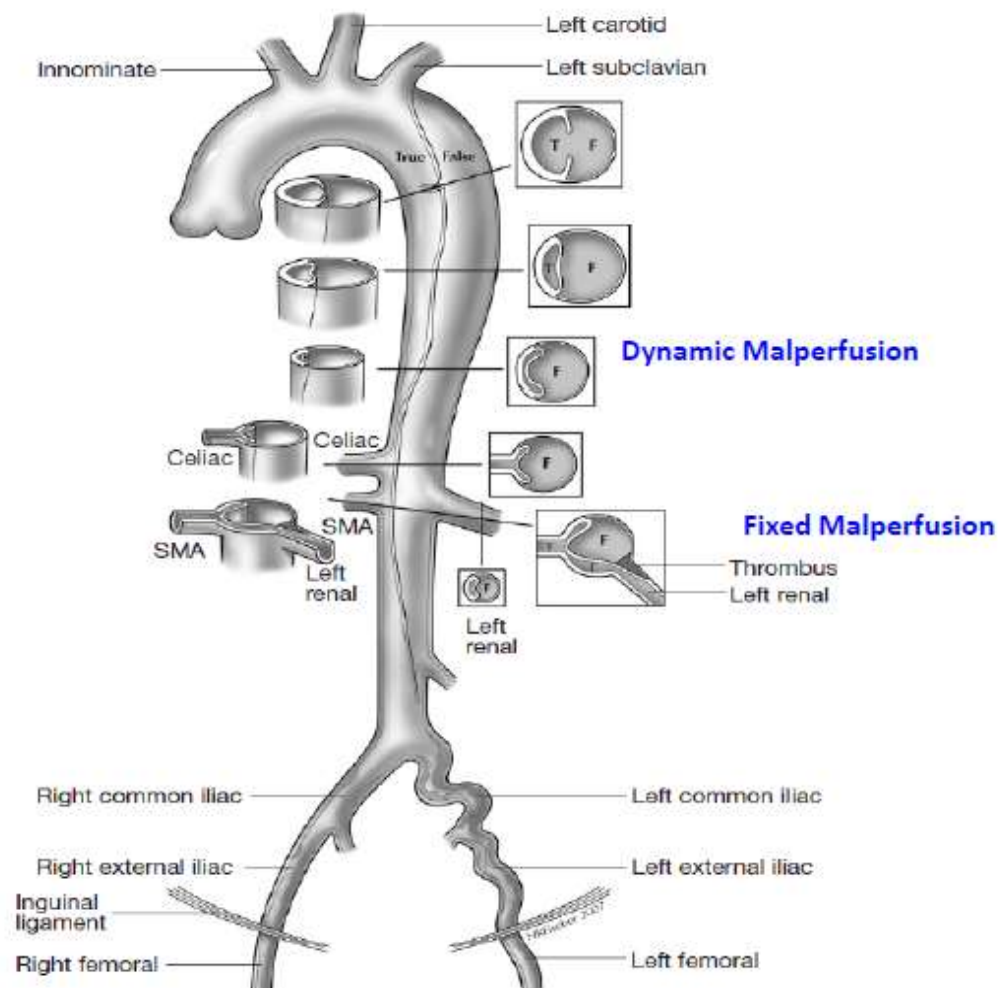
Operative procedures

Ascending Aortic Aneurysm Repair

A. Before Surgery

Ascending aortic aneurysm

Aortic root

B. After Surgery

Graft repair

Aortic valve
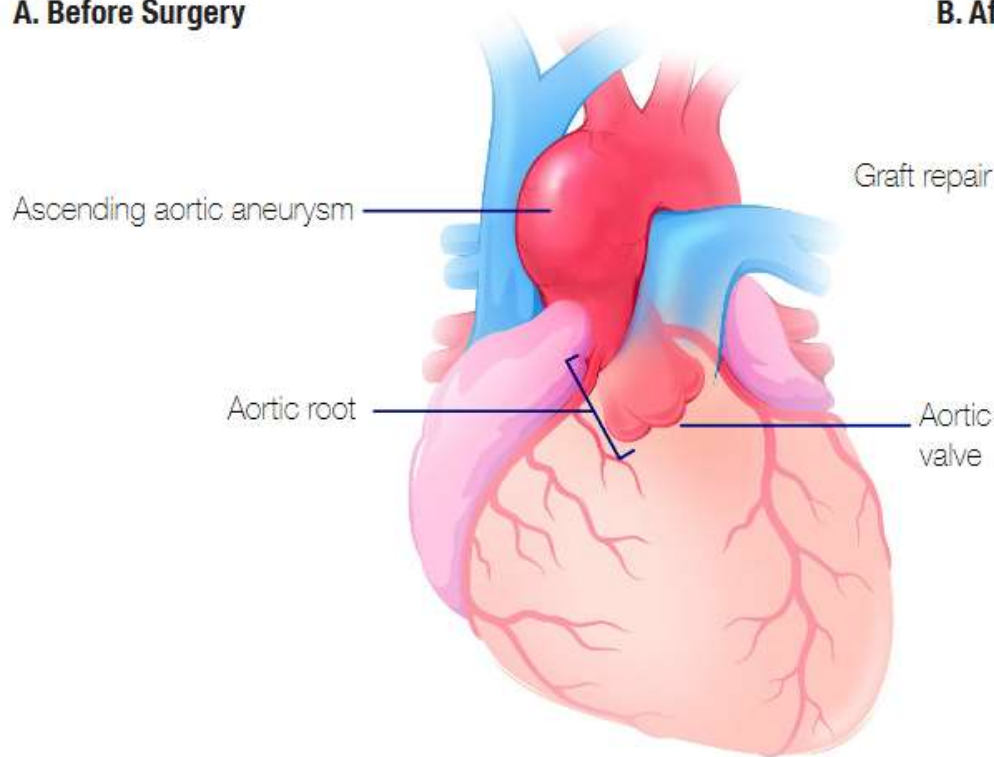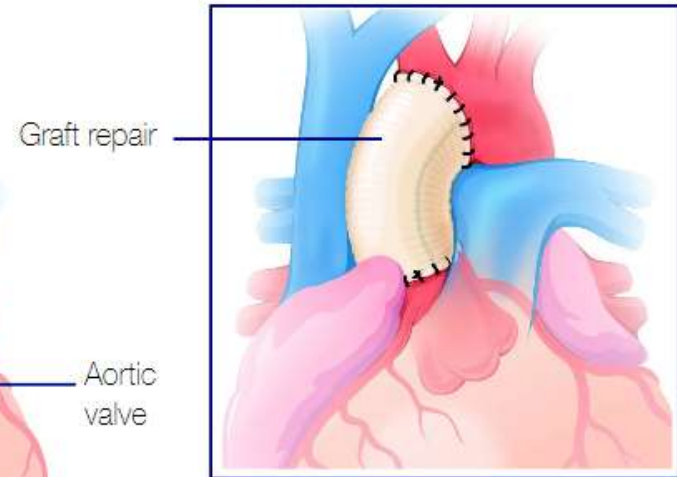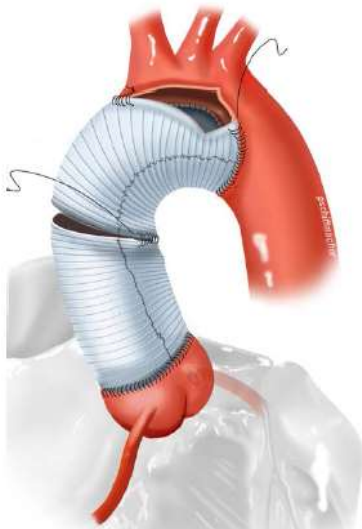
Open Arch

Hemi Arch

Zone 2 Arch

Zone 3 Arch

Zone 3 Arch Elephant trunk

Zone 3 Arch Frozen Elephant trunk
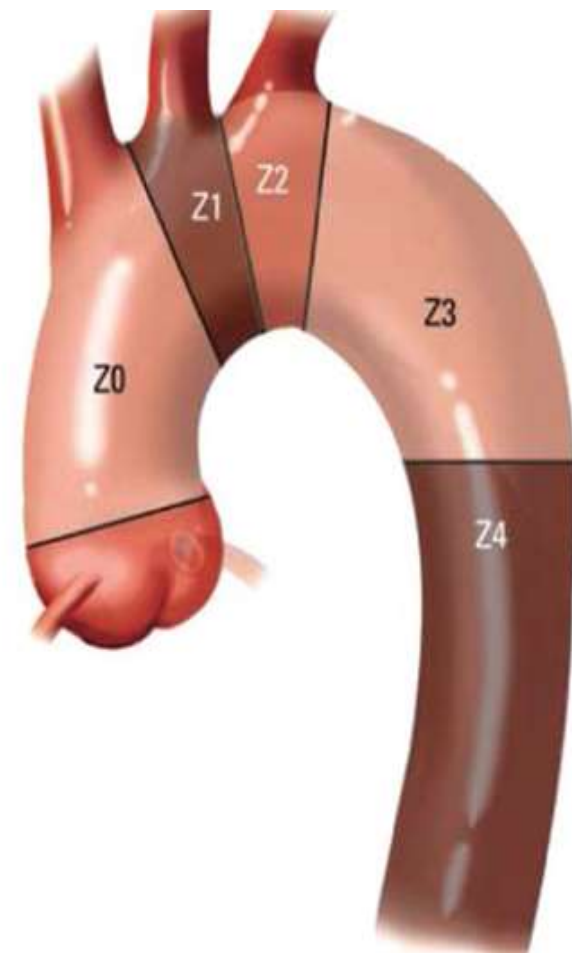
Frozen Elephant Trunk
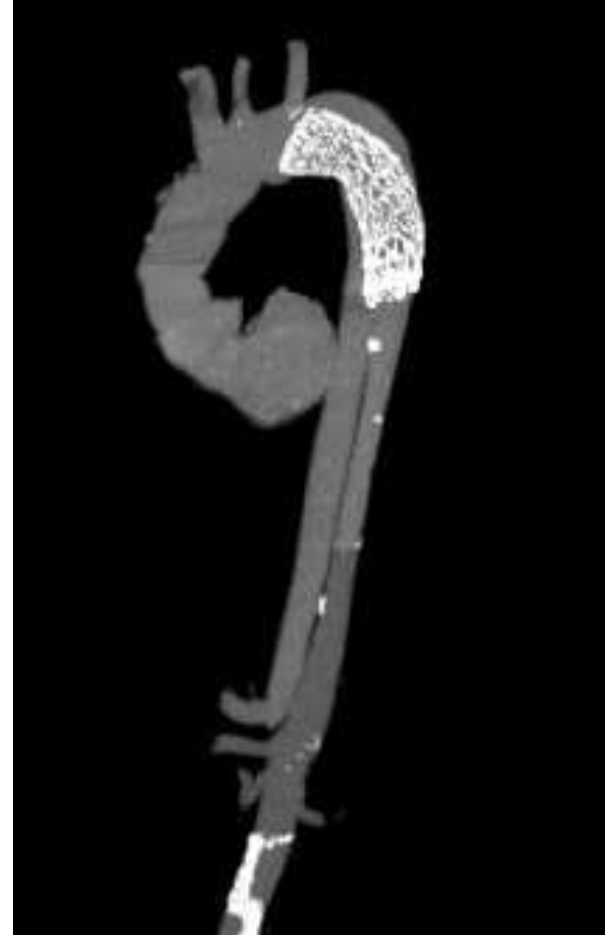
Open Descending and Thoracoabdominal
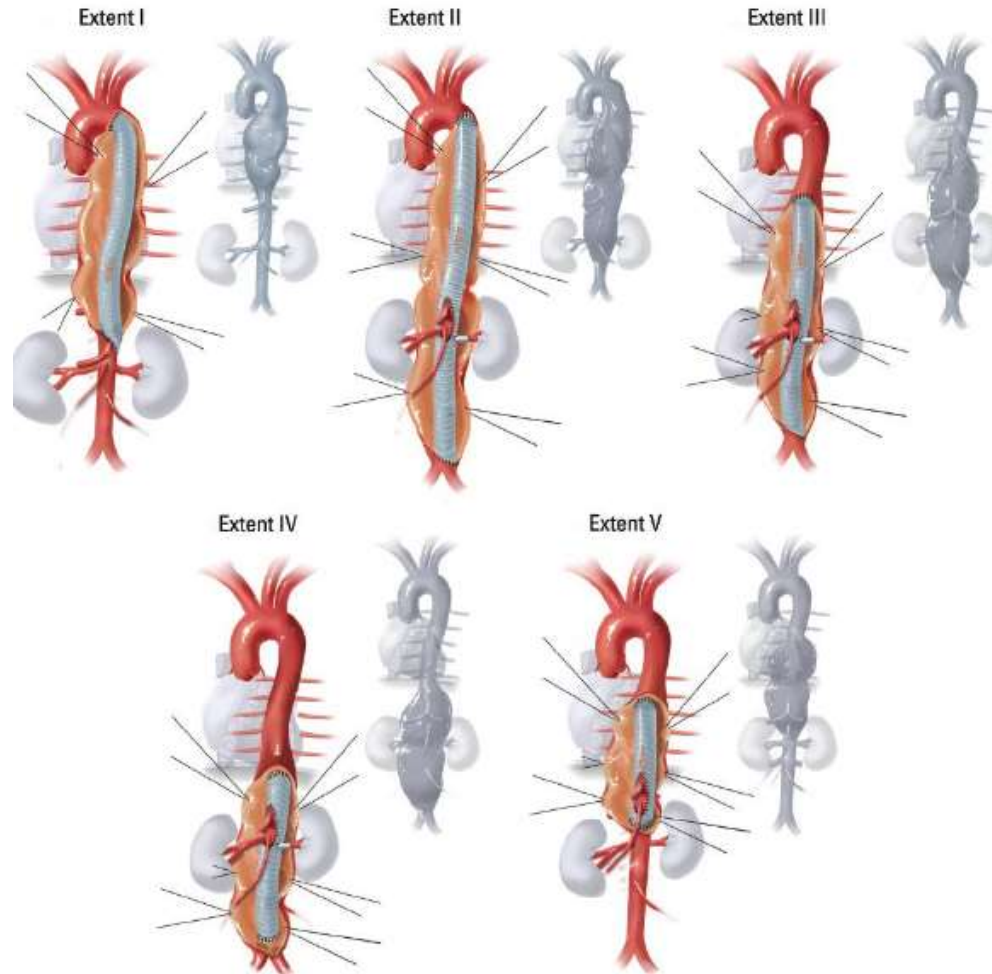
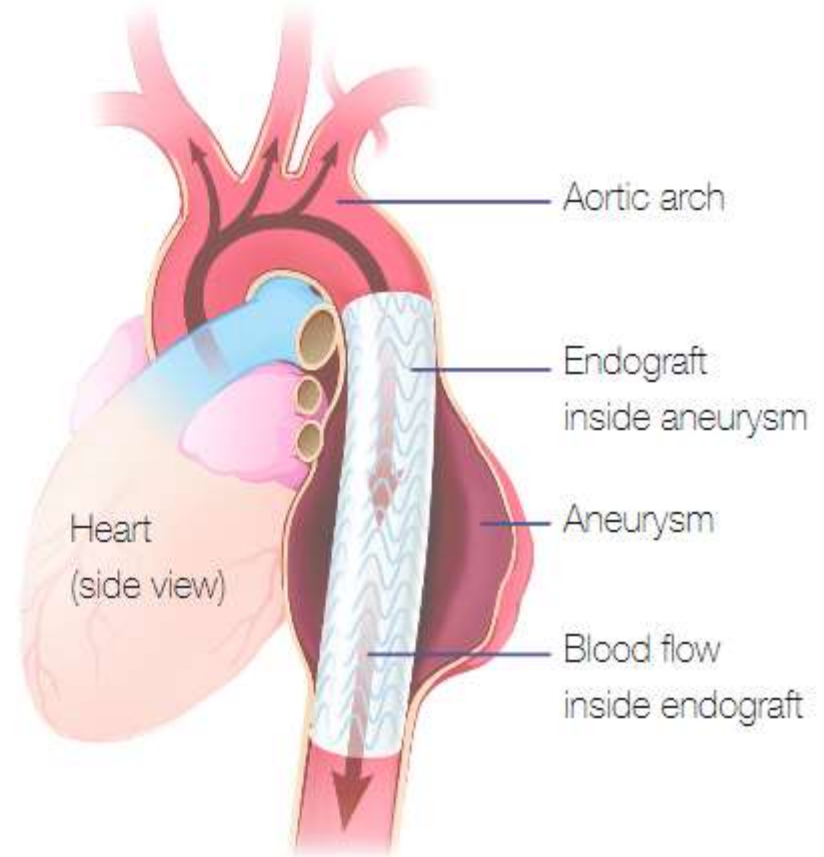Extent I Extent II Extent III Extent IV Extent V

Endograft Repair of Aortic Aneurysm

A. Catheter Placement

A catheter is placed into an artery through a small incision in the groin. The endograft is then guided up through the artery to the location of the aneurysm

B. Aorta with Endograft

Catheter with endograft inside the aorta

Incision

Aortic arch

Endograft inside aneurysm

Aneurysm

Heart (side view)
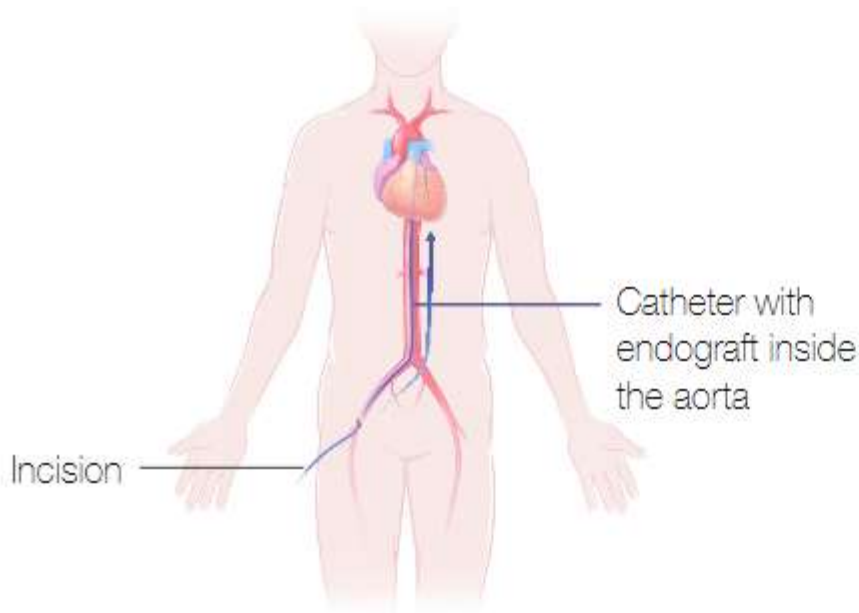
Blood flow inside endograft

Aortic Arch Anatomy in the TEVAR era:
All about the Landing Zones

- Define complexity of the Arch for various TEVAR procedures.

- Zone 0 , 1 and often 2 requires some form of branched graft or debranching procedure
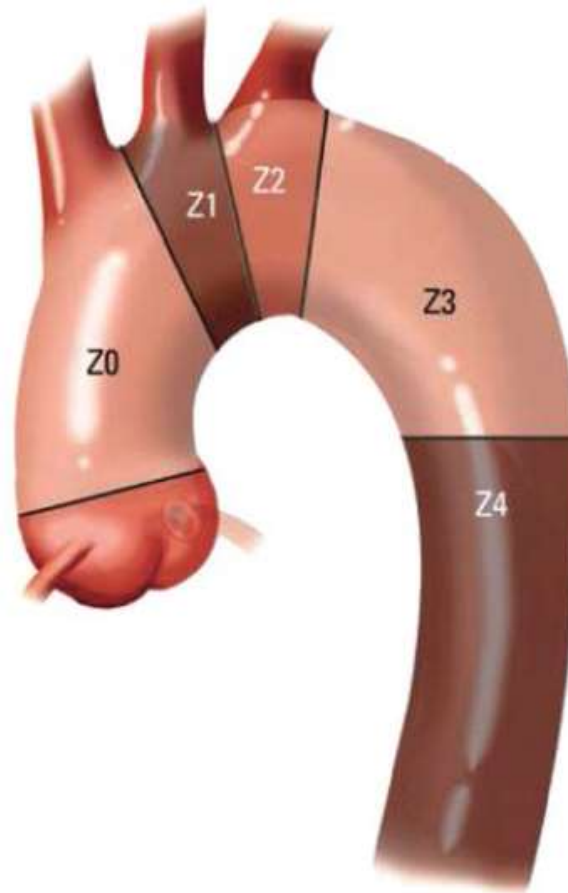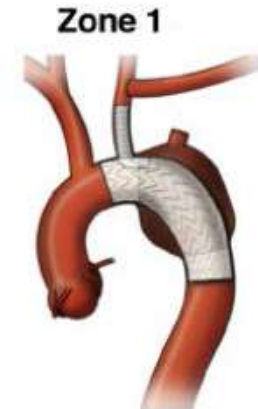
Total Endovascular Examples
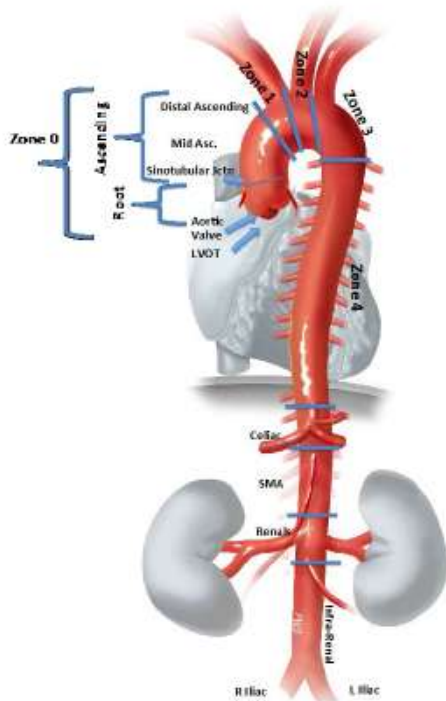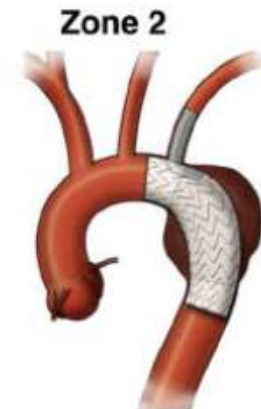

Ascending TEVAR Graft
ZONE 0

C

Zone 0 Single branch with
double transposition

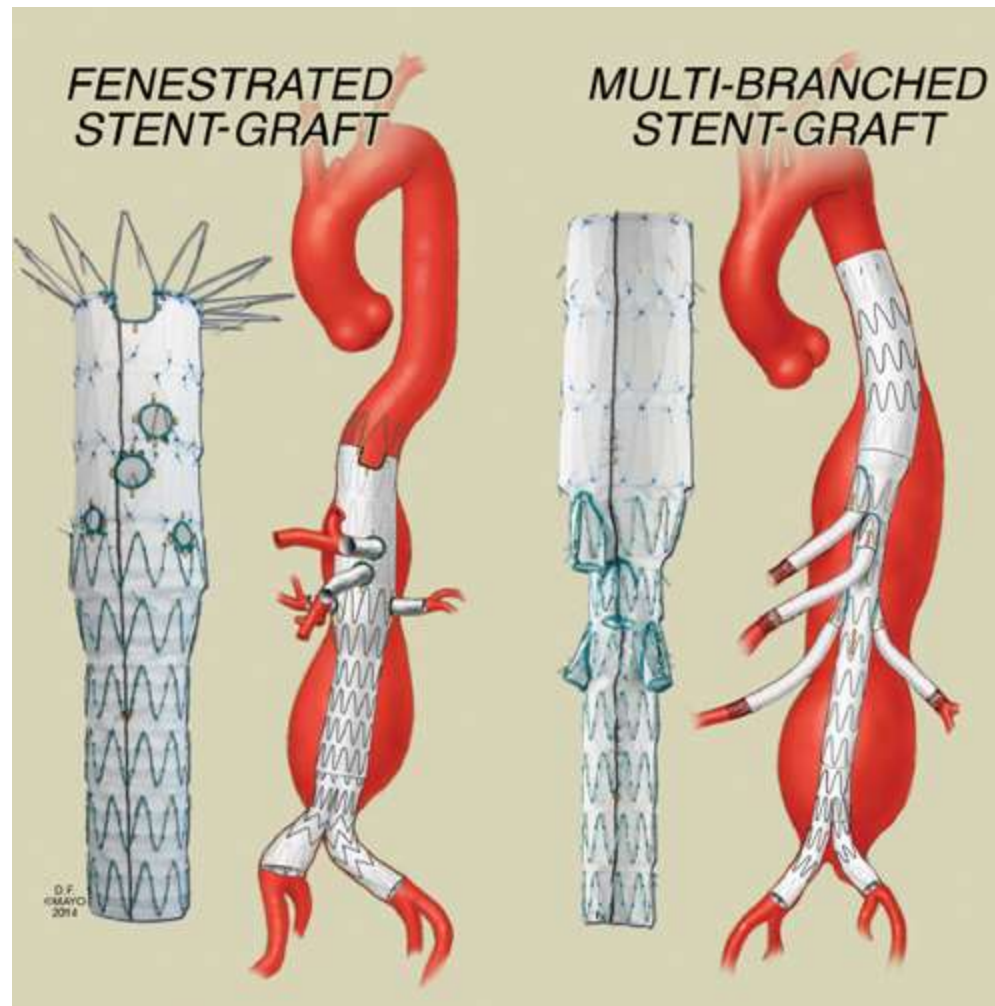Zone 1 Single Branch
with C-S Bypass

Zone 3 TEVAR

Single Branched
Graft for Zone 2

Arch and Visceral Vessel Management

FENESTRATED STENT-GRAFT
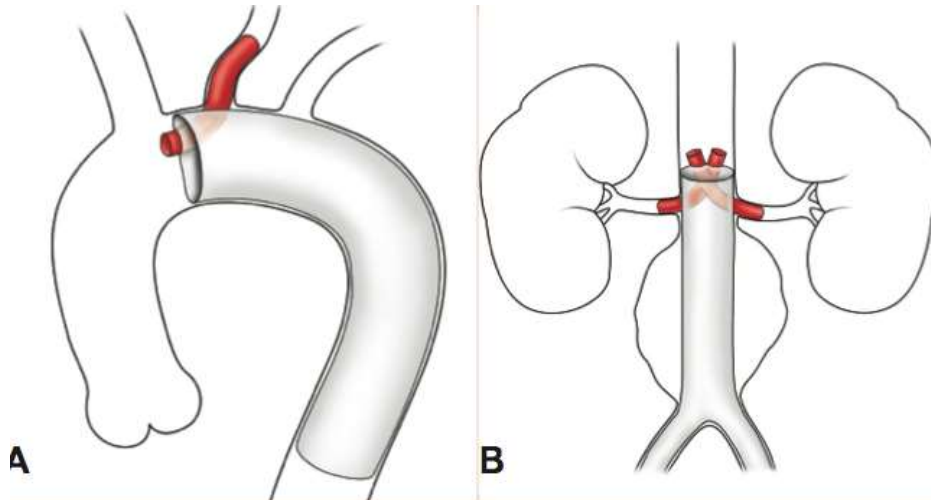
MULTI-BRANCHED STENT-GRAFT

Parallel Grafts

Figure 1. Single short left common carotid artery chimney (A). Bilateral renal artery chimneys (B).
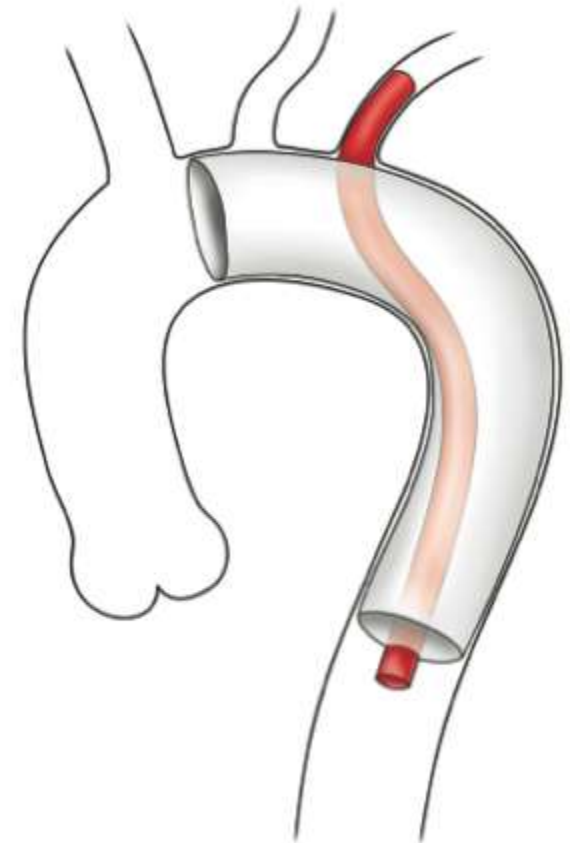

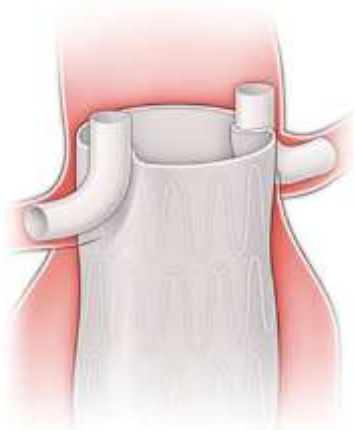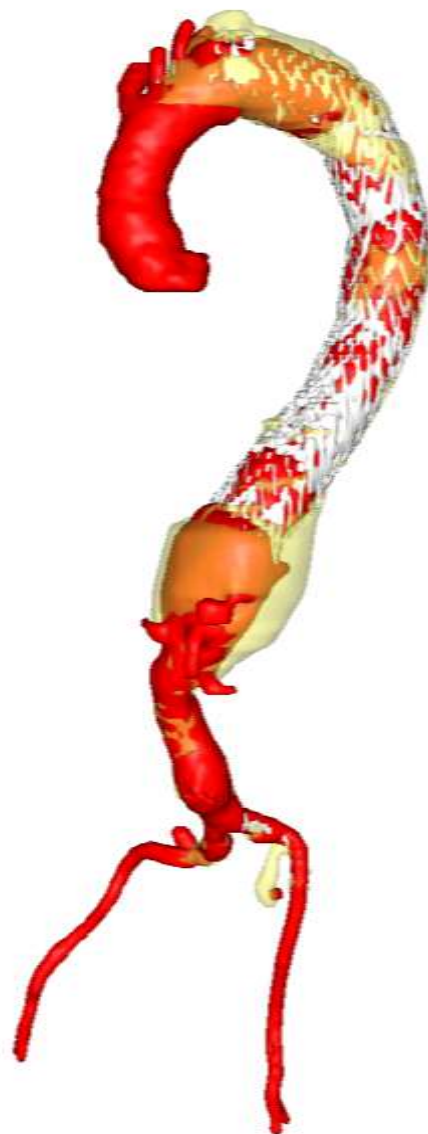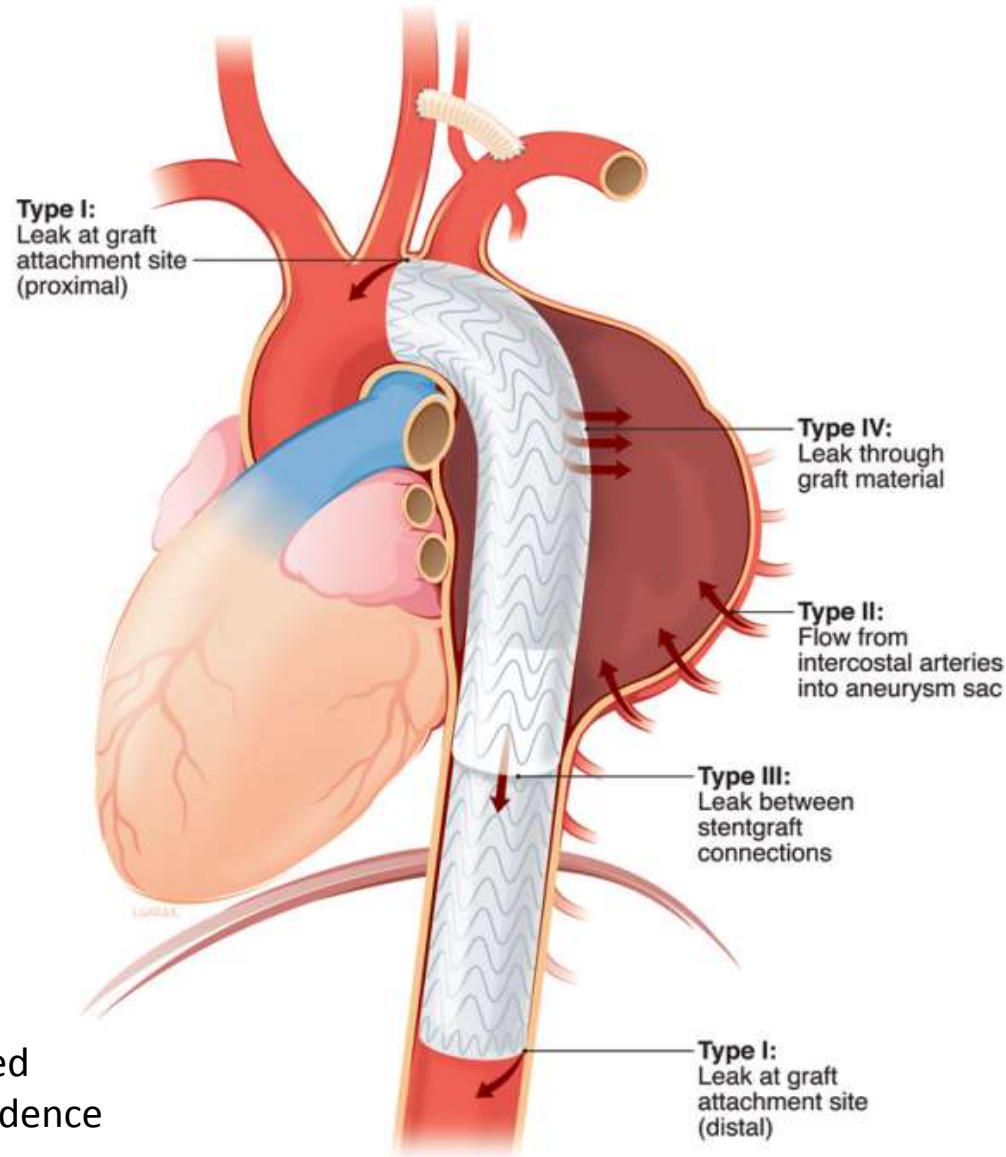Figure 2. Long periscope graft for the left subclavian artery.

Carotid-Subclavian Bypass
LCC stent

Seq#4620-4660

Types of Endoleaks

Type I:
Leak at graft
attachment site
(proximal)

Type IV:
Leak through
graft material

Type II:
Flow from
intercostal arteries
into aneurysm sac

Type III:
Leak between
stentgraft
connections

Type I:
Leak at graft
attachment site
(distal)
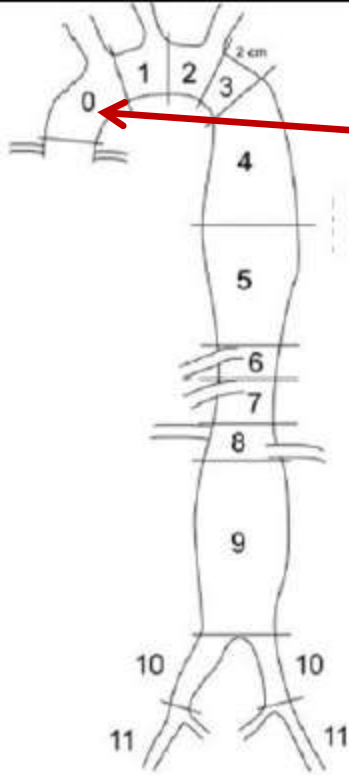
Type V:
Endotension=continued
expansion without evidence
of a leak

# Devices/Implant Location

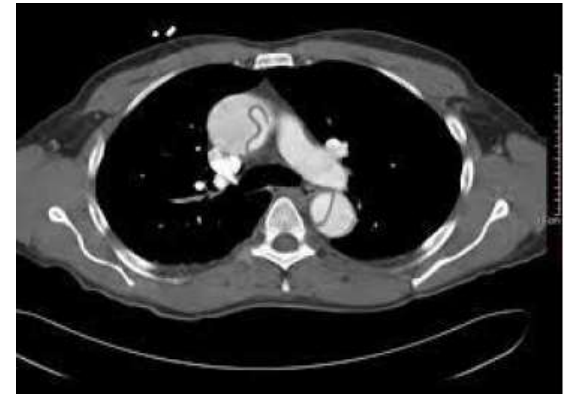|	
X.	No additional devices inserted (only for locations 2 – 15)
A.	Below sinotubular junction
B.	Sinotubular junction to mid ascending
C.	Mid ascending to distal ascending
D.	Zone 1 (between innominate and left carotid)
E.	Zone 2 (between left carotid and left subclavian)
F.	Zone 3 (first 2 cm. distal to left subclavian)
G.	Zone 4 (end of zone 3 to mid descending aorta ~ T6)
H.	Zone 5 (mid descending aorta to celiac)
I.	Zone 6 (celiac to superior mesenteric)
J.	Zone 7 (superior mesenteric to renals)
K.	Zone 8 (renal to infra-renal abdominal aorta)
L.	Zone 9 (infrarenal abdominal aorta)
M.	Zone 10 (common iliac)
N.	Zone 11 (external iliacs)

Location (Letter)	Delivery Method	Outcome	Model #	UDI
ADevLoc01 (5450)	ADevDelMeth01 (5455)	ADevOut01 (5460)	ADevModel01 (5465)	ADevUDI01 (5470)
ADevLoc02 (5475)	ADevDelMeth02 (5480)	ADevOut02 (5485)	ADevModel02 (5490)	ADevUDI02 (5495)

Questions?

Post-CABG pseudoaneurysm
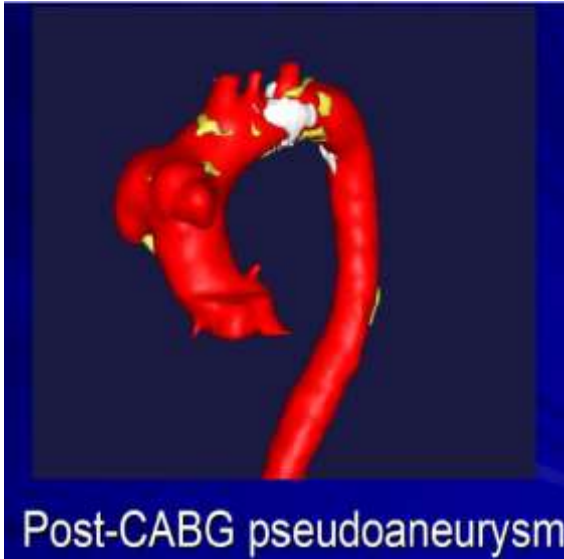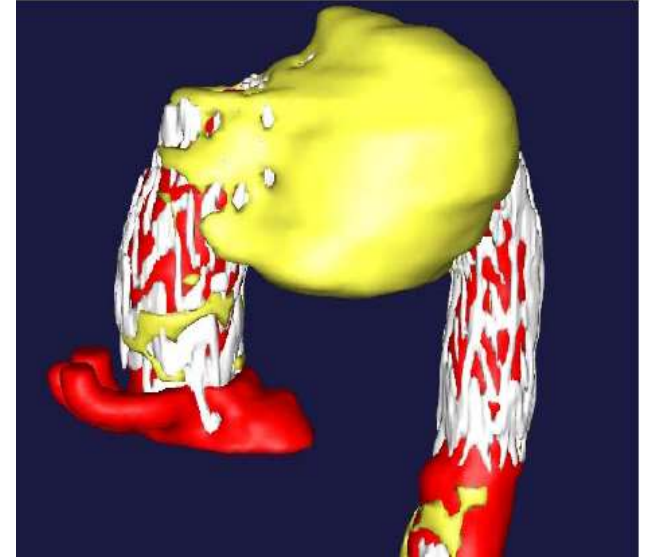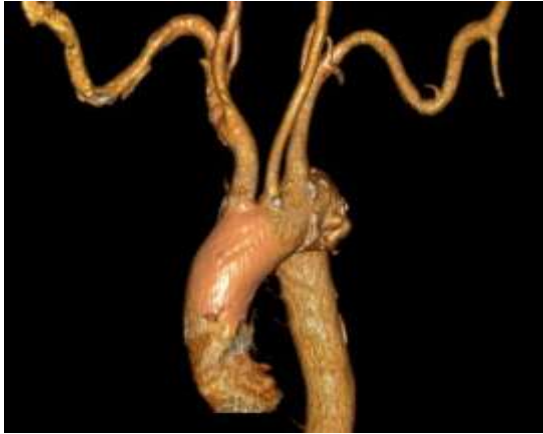
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