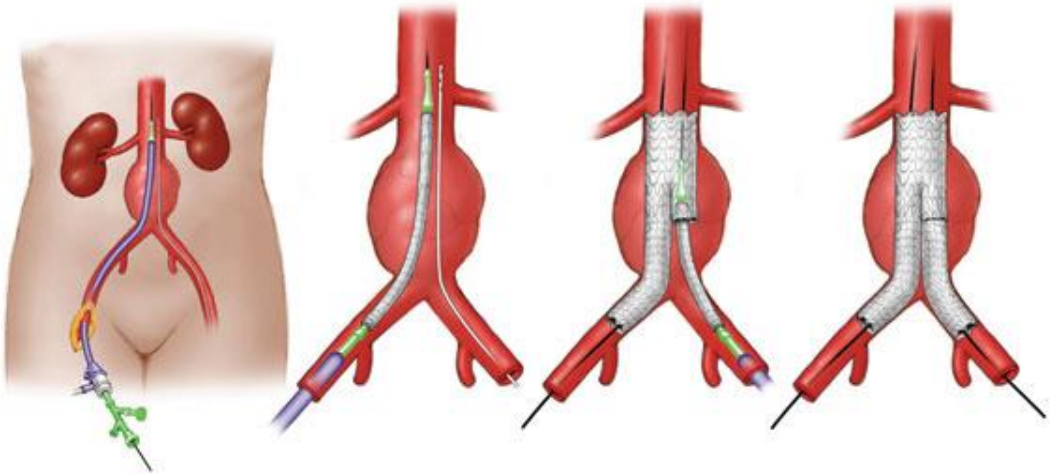

Reviewing a CTA and EVAR Case Planning

Professor Mark E. O'Donnell

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Northern Ireland Vascular Trainee Teaching Program

Royal Victoria Hospital – Wednesday 30th August 2017

Learning Outcomes

- Reviewing the CT angiogram in AAA patients.
- Calculating AAA dimensions.
- Planning the EVAR.
- Choosing your EVAR stent.
- EVAR Case Examples.

Computed Tomographic Imaging

	ST4	ST6	ST8
OBJECTIVE To understand, interpret and manipulate CT imaging and CT angiography			
KNOWLEDGE			
Understand how CT images are generated	3	4	4
Understand concepts of helical and multi-slice scanning	2	3	4
Understand that scans are performed in the axial plane	3	4	4
Understand CT spatial resolution	2	3	4
Recognise X-ray dose and risks associated with study	3	3	4
Recognise the need to tailor individual scan to clinical problem e.g. AAA elective vs. emergency, mesenteric/renal, carotid, peripheral, venous	2	3	4
Understand basic principles of image reformatting in various planes	2	3	4
Understand the principle behind image reconstruction and MIP images	2	3	4
Understand the use of intravascular and oral contrast agents	3	4	4
Recognise risks of intravascular contrast and how to avoid them	3	4	4
Understand common artifacts	3	4	4
CLINICAL SKILLS			
Explanation of CT and the risks to a patient	3	4	4
Able to manage contrast reactions	3	4	4
Able to recognise normal cross-sectional anatomy	3	4	4
Able to recognise vascular pathology on scans	3	4	4
TECHNICAL SKILLS			
Able to manipulate images on the console	1	2	3
Able to obtain appropriate measurements of blood vessels	1	2	3

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AAA > 5.5cm - What's Next ?

Medical Review and Optimisation

- Out-patient clinic visit - *"End-of-bed-o-gram";*
  - Systemic evaluation and past medical history.
  - How far can you walk ?
  - Risk Factor Modification - Smoking cessation, blood pressure, fasting glucose and lipids.
  - Best Medical Therapy – Antiplatelets and lipid lowering medication.

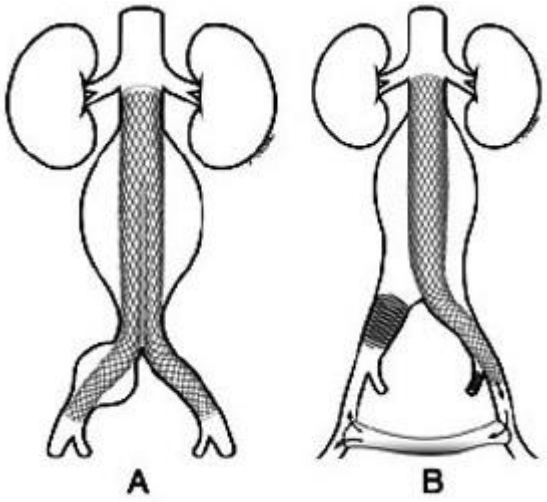
- Anaesthetic Assessment;
  - Cardiorespiratory function – ECHO / PFT's'.
  - Further optimisation – medical / procedural – PCI.

What are you going to consider simultaneously?

CT Angiography

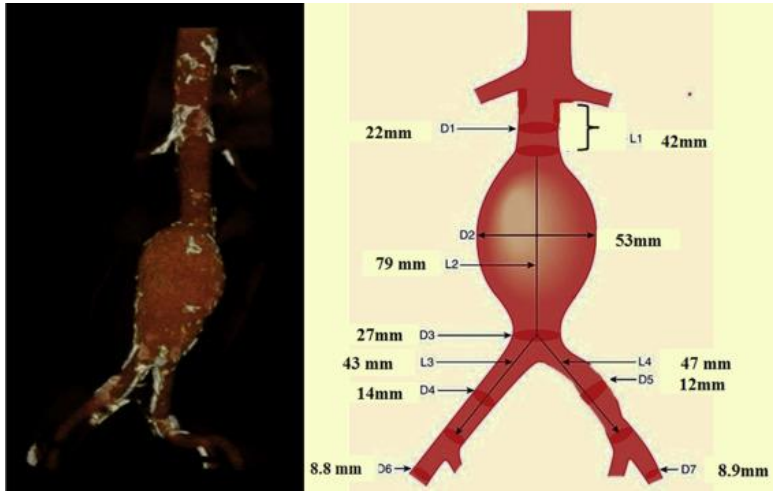
Reviewing the CT Angiogram

Reviewing the CT Angiogram



Is this patient suitable for EVAR ??????

Basic Anatomical Requirements for EVAR



Anatomical Characteristics		Size
Proximal Aortic Neck Length	L1	> 15mm
Proximal Aortic Neck Diameter	D1	< 32mm
Proximal Aortic Neck Angulation		<60 degrees
Common Iliac Length	L3 & L4	>10-15mm
External Iliac Diameter	D6 & D7	>7mm
Iliac Bifurcation Angulation		<90 degrees

EVAR Device Anatomical Criteria

	Gore Excluder	Cook Zenith	Gore Excluder Low Permeability	Endologix Powerlink	Cook Zenith Enlarged Neck	Medtronic Talent	Endologix Enlarged Neck	Gore Excluder Enlarged Neck	Summary
Year of Release	2002	2003	2004	2004	2006	2008	2009	2009	2002-2009
Neck Diameter (mm)	19-26	18-28	19-26	18-26	18-32	18-32	18-32	19-29	18-32
Neck Length (mm)	≥15	≥15	≥15	≥15	≥15	≥10	≥15	≥15	≥10-15
Neck Angle (degrees)	≤60	≤45	≤60	≤60	≤60	≤60	≤60	≤60	≤45-60
Iliac Fixation Length	≥10	≥15	≥10	≥10	≥15	≥15	≥15	≥10	≥10-15
Illiac Diameter (mm)	10-18.5	10-20	10-18.5	10-18.5	8-18	8-22	10-23	10-18.5	8-23

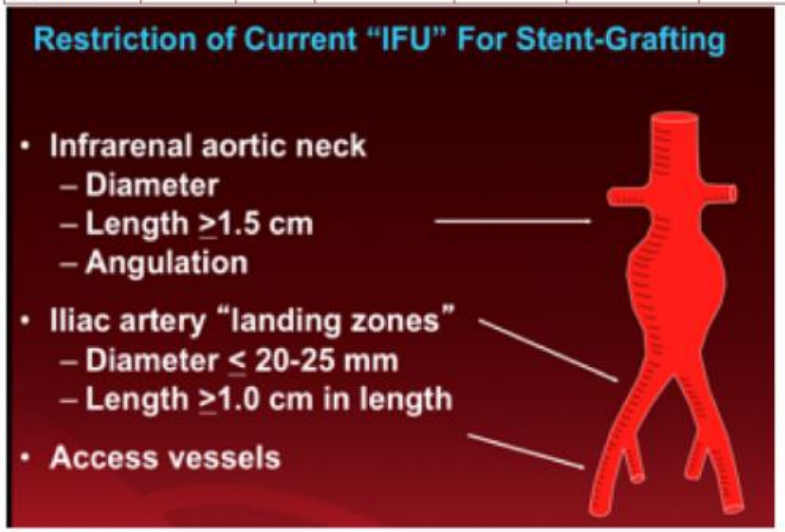


Figure 1. Anatomic criteria limitations as presented in the instructions for use for abdominal aortic aneurysm endovascular devices approved by the U.S. Food and Drug Administration.

(Above table modified from Schanzer et al. Predictors of abdominal aortic aneurysm sac enlargement after endovascular repair. Circulation. 2011.)

Gallardo & Schneider *Vascular Disease Management* 2012;9(6):E90-E96

Evolution of EVAR IFU Criteria

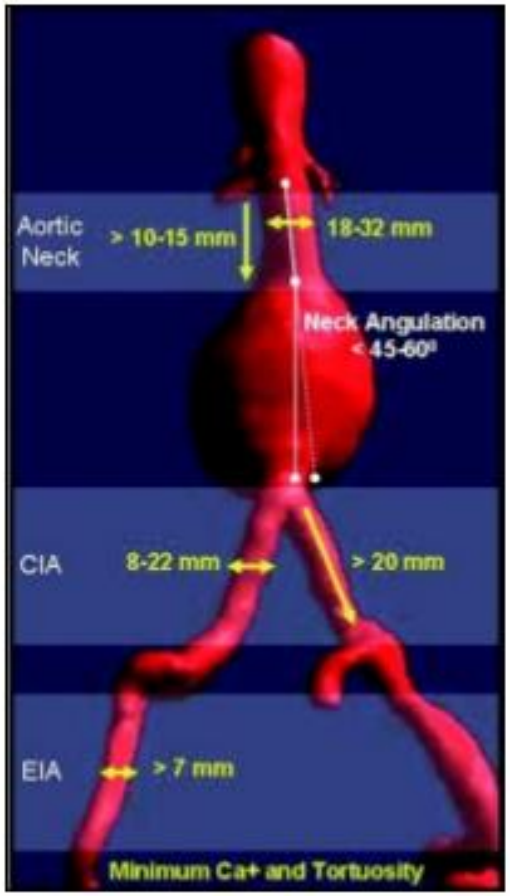


Table 2. Conservative, Liberal, and Time-Dependent Instructions For Use Definitions Used to Characterize Baseline Preoperative Anatomy

Conservative IFU	Aortic neck angle <45°
	Aortic neck length ≥15 mm
	Aortic diameter at lowest renal artery <28 mm
Liberal IFU	Aortic neck angle <60°
	Aortic neck length ≥10 mm
	Aortic diameter at lowest renal artery <32 mm
Time-dependent IFU	EVAR before 2006
	Aortic neck angle <60°
	Aortic neck length ≥15 mm
	Aortic diameter at lowest renal artery <28 mm
	EVAR in 2006 and 2007
	Aortic neck angle <60°
	Aortic neck length ≥15 mm
	Aortic diameter at lowest renal artery <32 mm
	EVAR in 2008
	Aortic neck angle <60°
	Aortic neck length ≥10 mm
	Aortic diameter at lowest renal artery <32 mm

Schanzer *Circulation* 2011;123:2848

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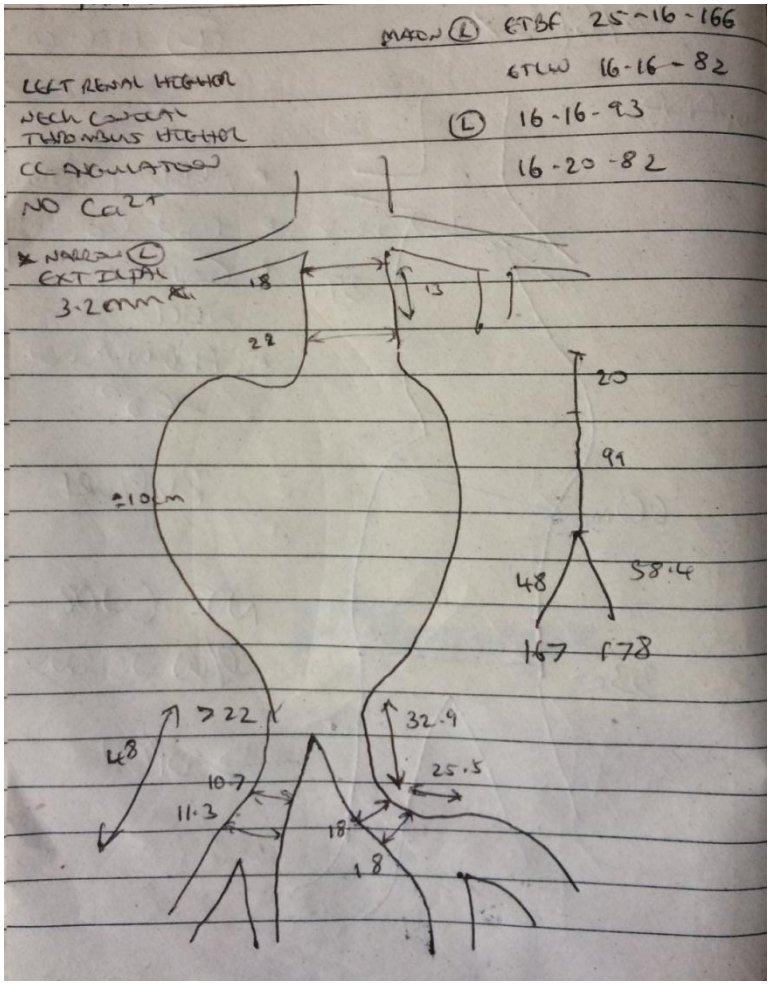
Planning EVAR

Planning EVAR



Three stage model

- One of the cornerstone models for understanding organizational change was developed by Kurt Lewin back in the 1940s, and still holds true today.
- His model is known as **Unfreeze – Change – Refreeze**, refers to the three-stage process of change he describes.
- Kurt Lewin, a physicist as well as social scientist, explained organizational change using the analogy of changing the shape of a block of ice.

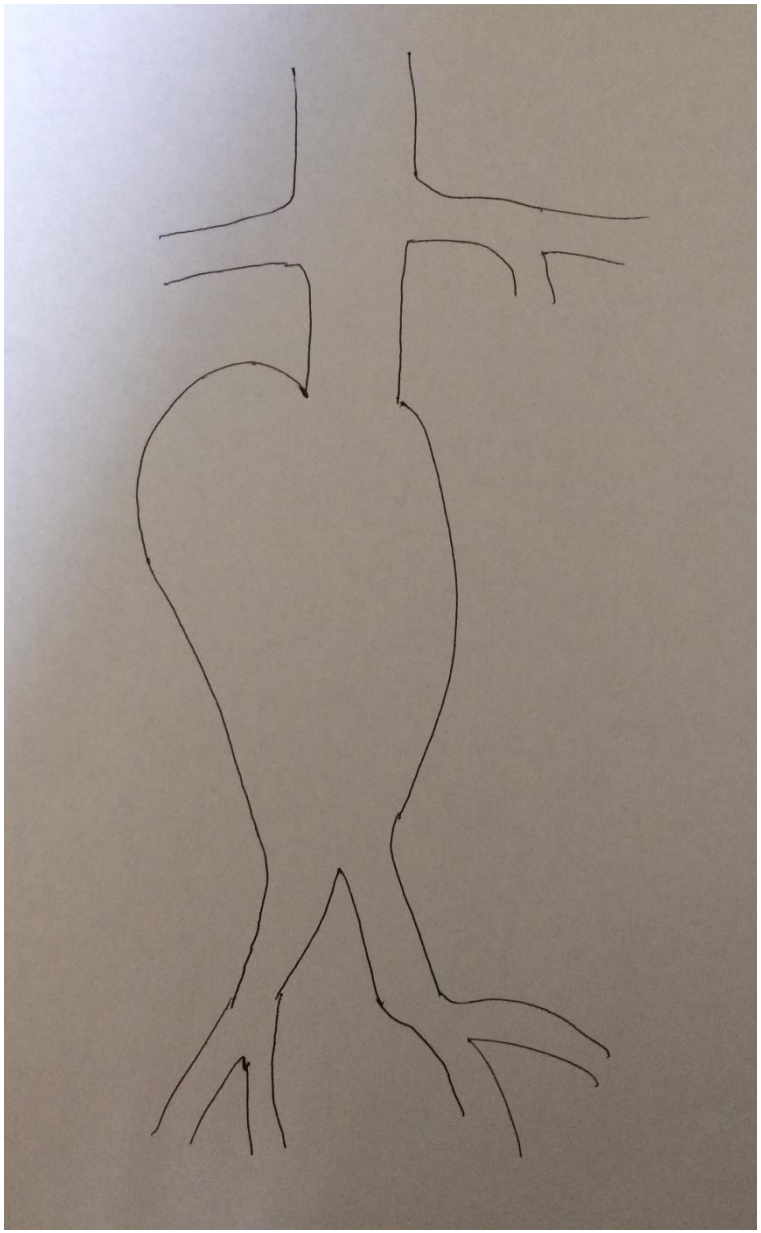
Stage 1 - Initial CT review

Stage 1 - Initial CT review

- Ensure contrast-enhanced.
- Review the slice thickness.
- Scroll down axial and then coronal.
- Form an initial impression of AAA in its entirety.
- Draw the AAA.

Stage 1 - Initial CT review

- Ensure contrast-enhanced.
- Review the slice thickness – Centricity
- Scroll down axial and then coronal.
- Form an initial impression of AAA in its entirety.
- Draw the AAA.



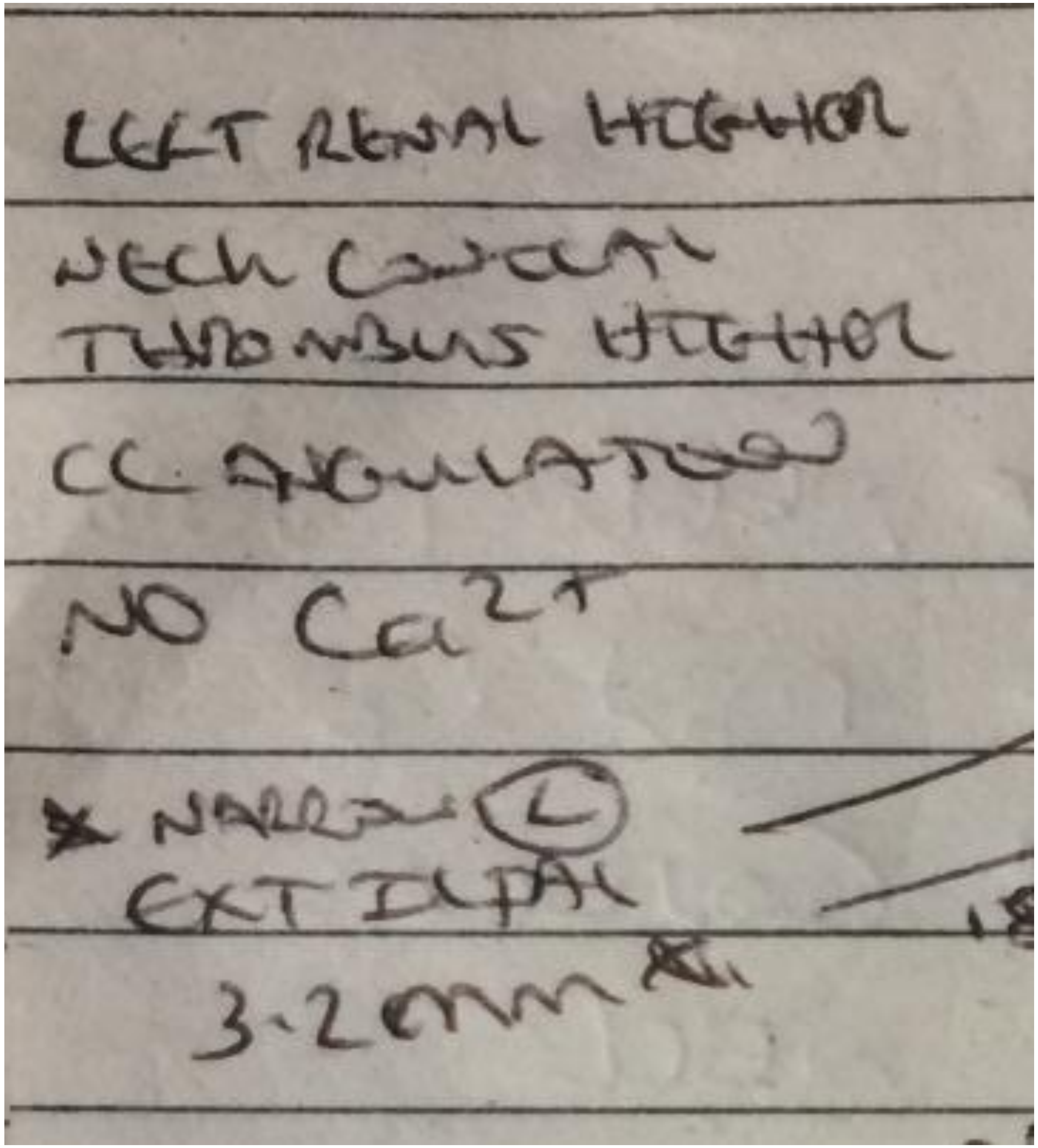
Stage 2 – Adverse Morphology

Stage 2 – Adverse Morphology

- Celiac Axis and SMA
- Renals
- Proximal Neck
- Risk factors for Type II Endoleak
- Aortic bifurcation diameter
- Iliac Vessels
- Access vessels

Stage 2 – Adverse Morphology

- Celiac Axis and SMA – patency and overall quality.
- Renals – quantity, patency and “lowest”.
- Proximal Neck – quality, angulation, calcification and thrombus.
- Risk factors for Type II Endoleak – IMA, lumbars and sacral.
- Aortic bifurcation diameter – greater than 16mm.
- Iliac Vessels – size, tortuosity and calcification.
- Access vessels – suitable for stent insertion.

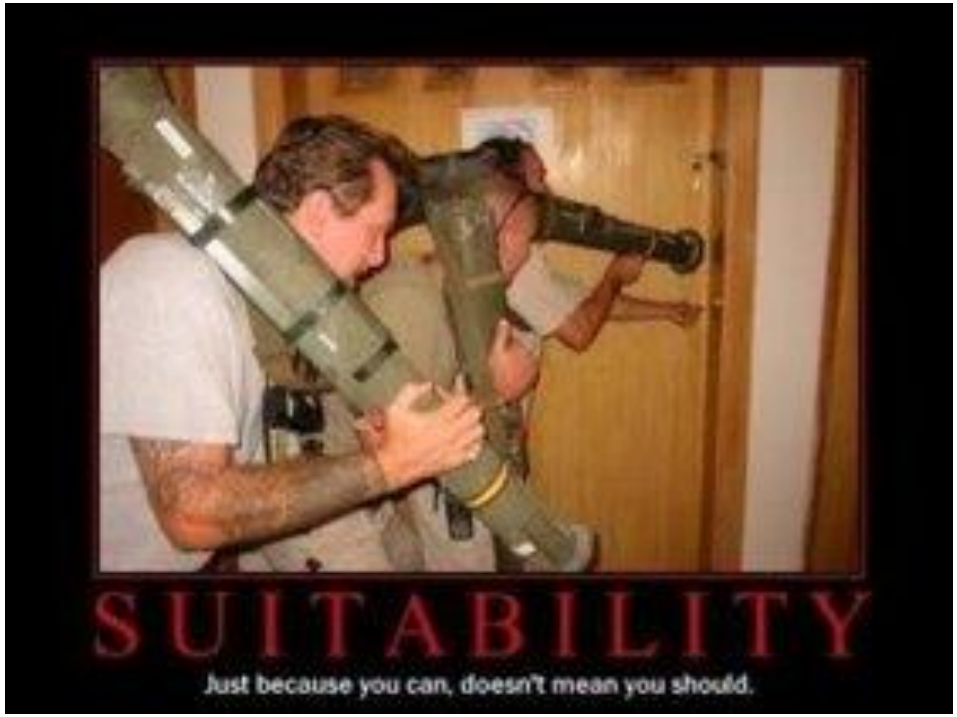

LEFT RENAL HIGHER

NECK CORTICAL THROMBUS HIGHER

CC AGULATION

NO Ca^{2+}

* NARROW (L) EXT ILIAC
3.2mm dia

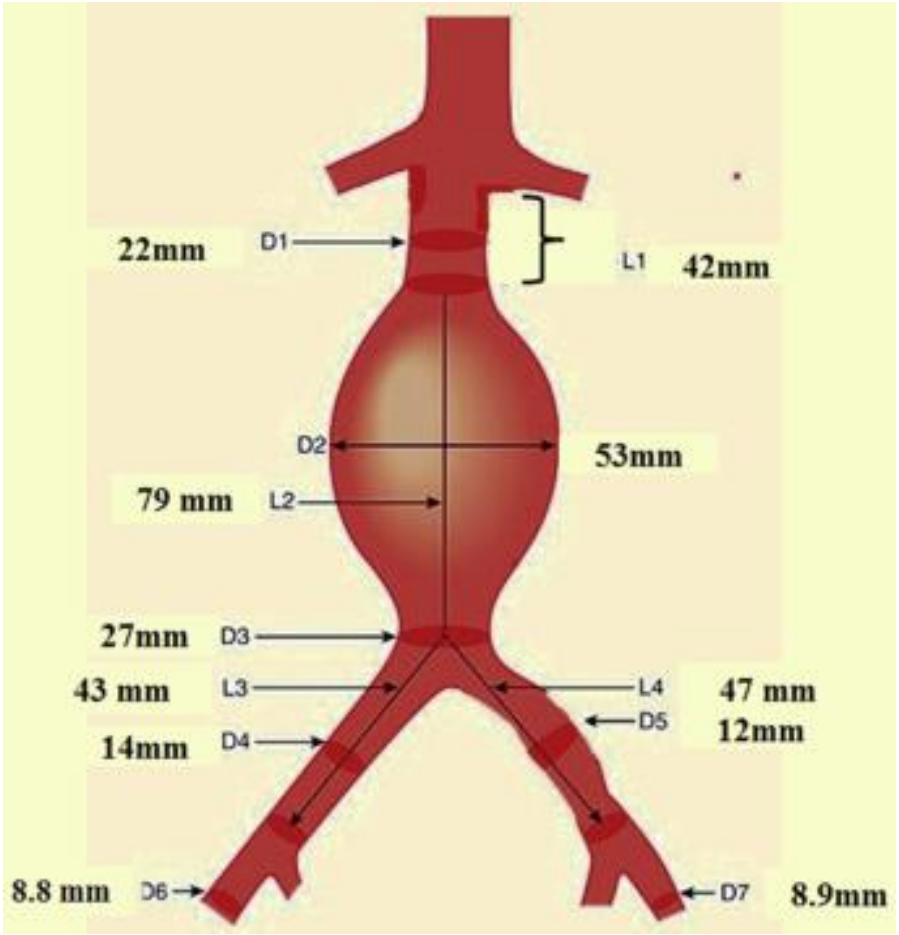

SUITABILITY
Just because you can, doesn't mean you should.


let's get down to
'de nitty-gritty

Stage 3 – EVAR Planning

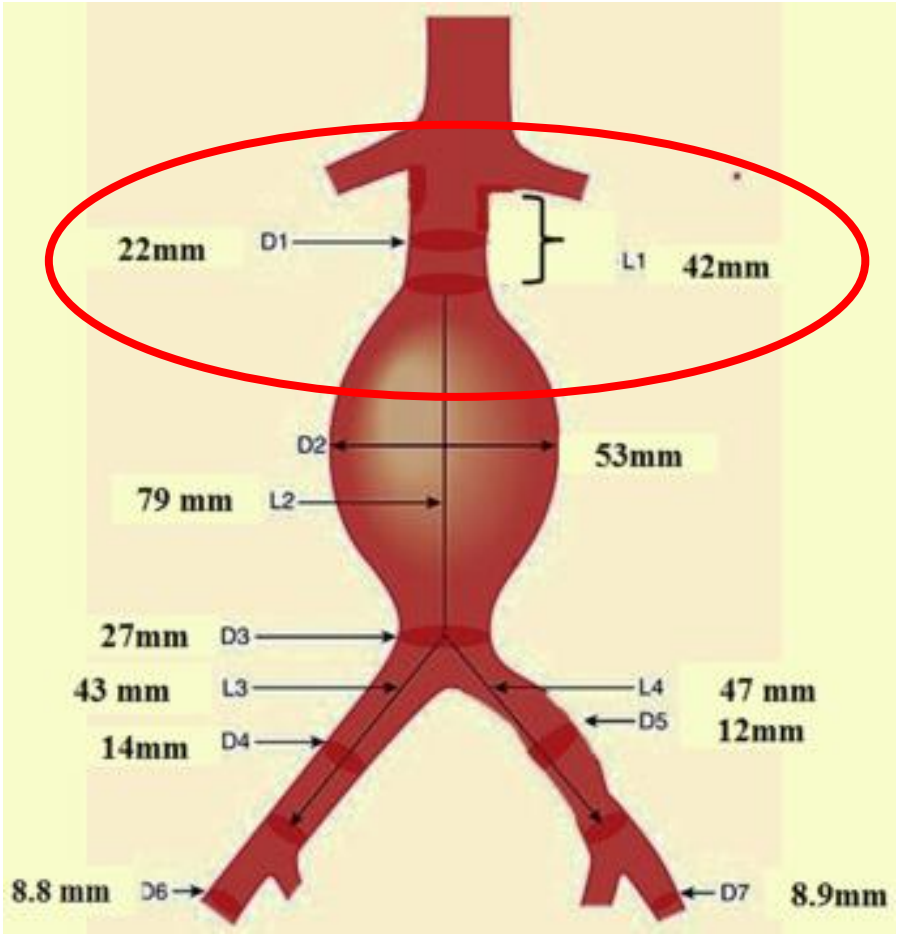
Stage 3 – EVAR Planning – Proximal Neck

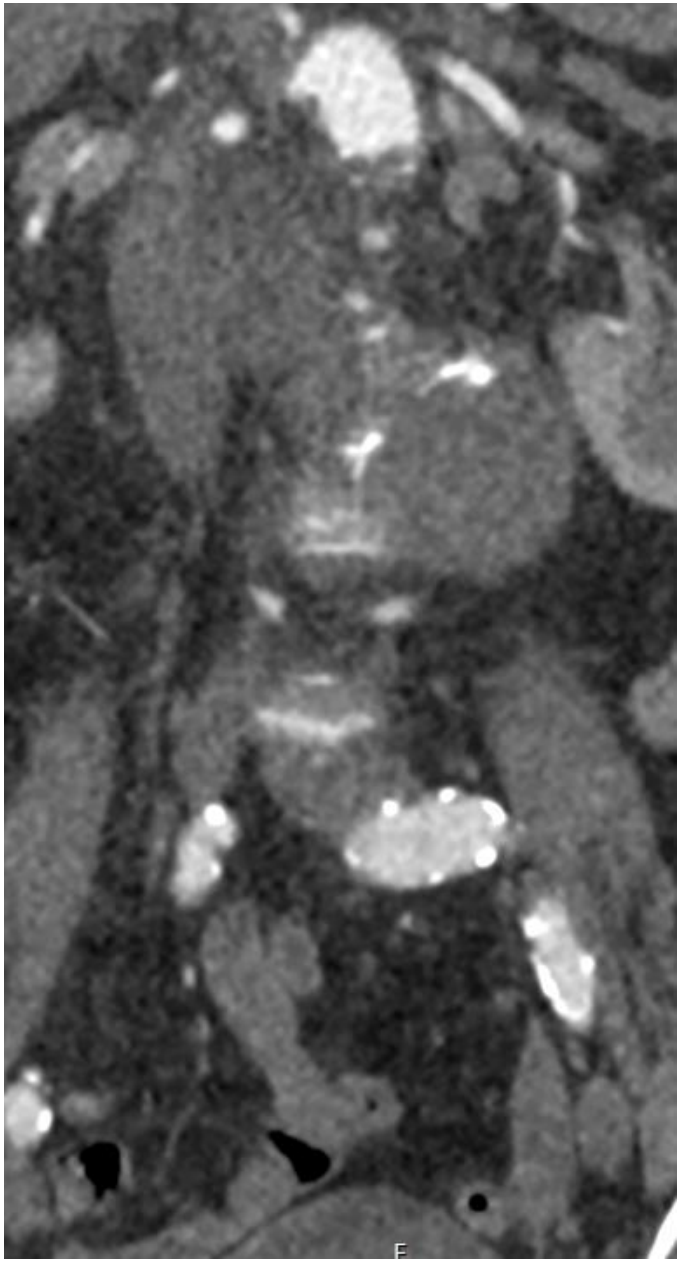
- Diameter
- Length

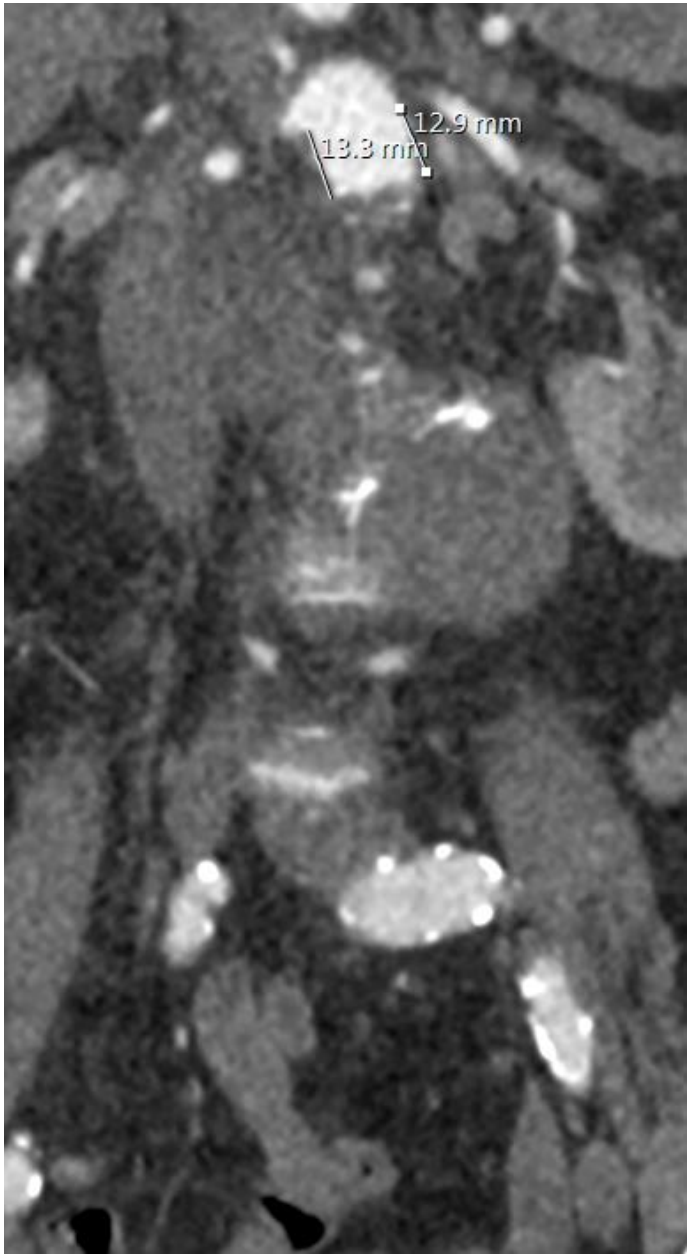


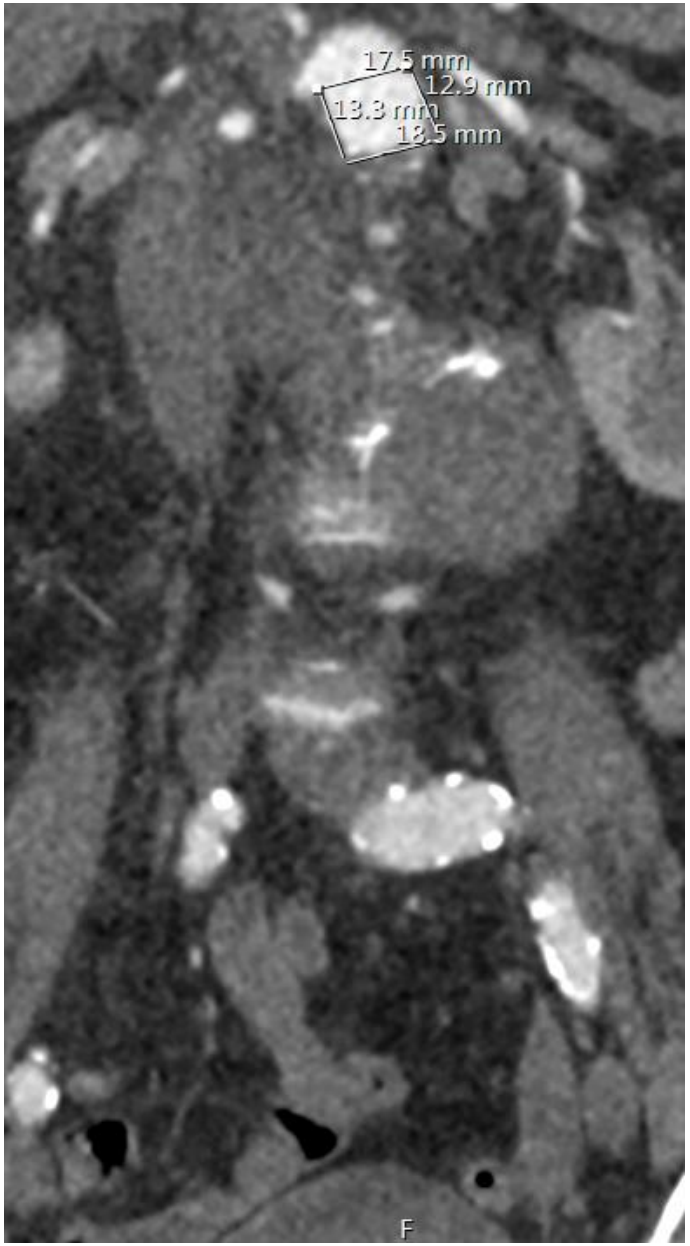
Stage 3 – EVAR Planning – Proximal Neck

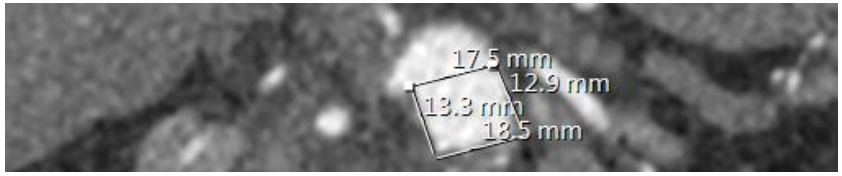
- Diameter – D1
- Length – L1





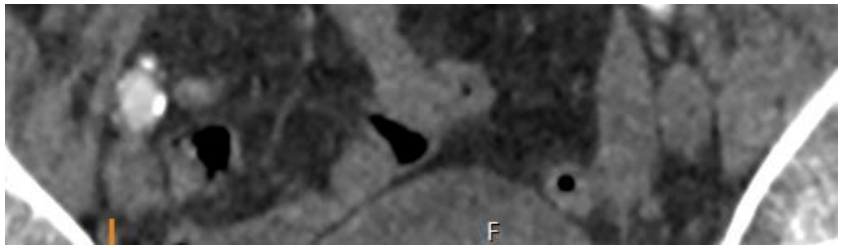

12.9 mm
13.3 mm

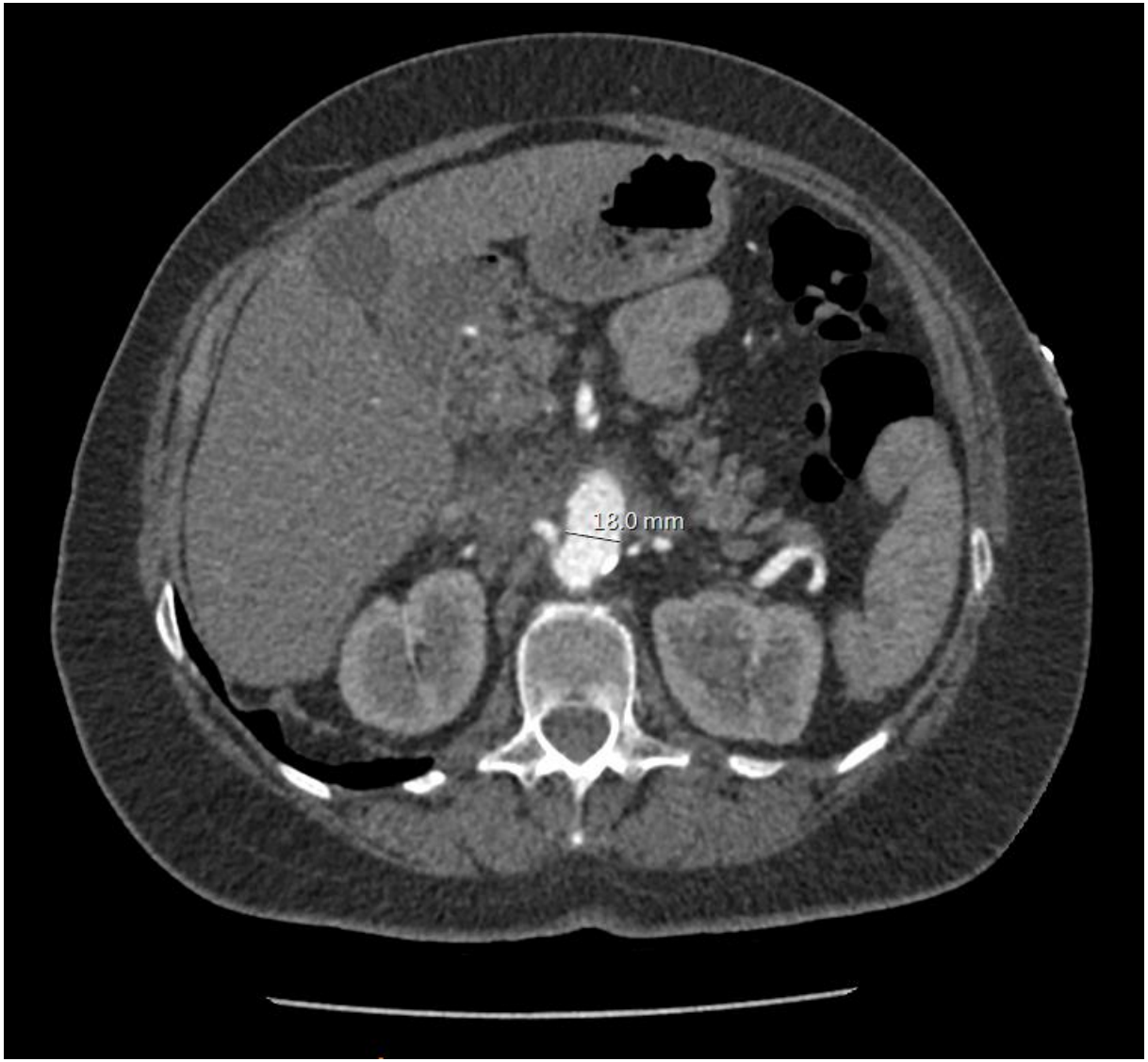

17.5 mm
12.9 mm
13.3 mm
18.5 mm
F

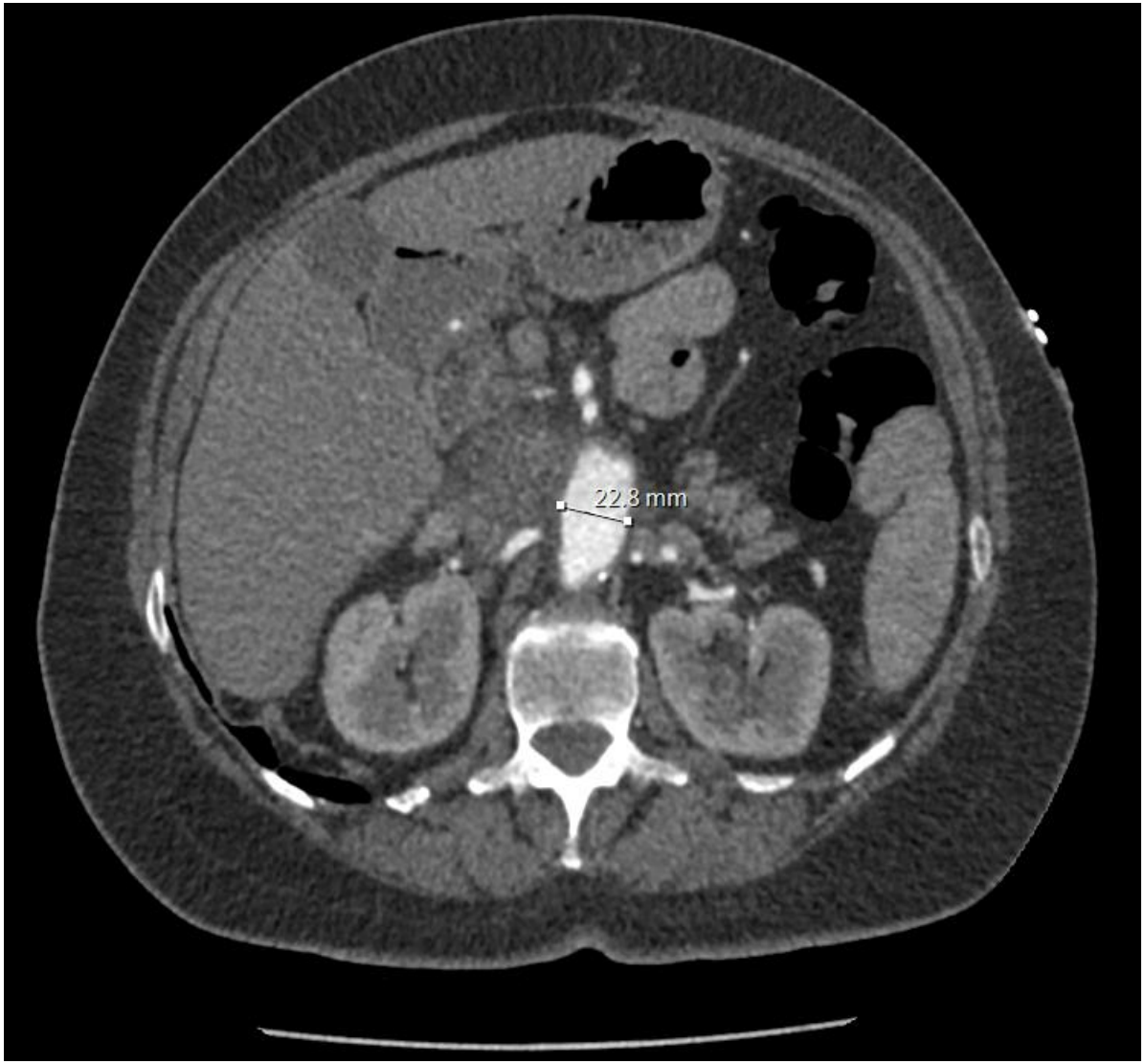


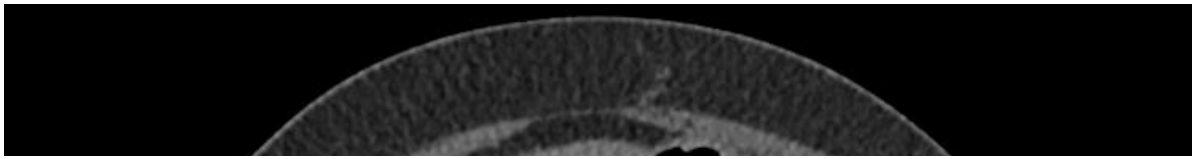
CORONAL DIAMETERS AS A GUIDE ONLY

GO TO AXIALS FOR DIAMETERS IN MAJORITY OF CASES



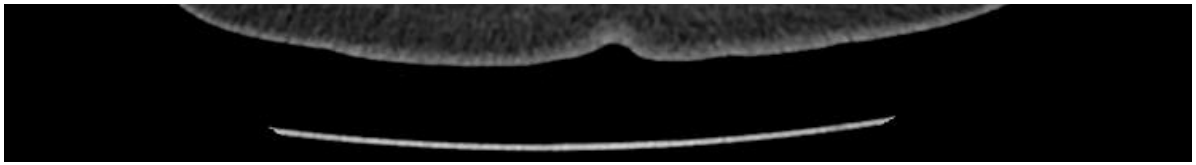

18.0 mm


22.8 mm

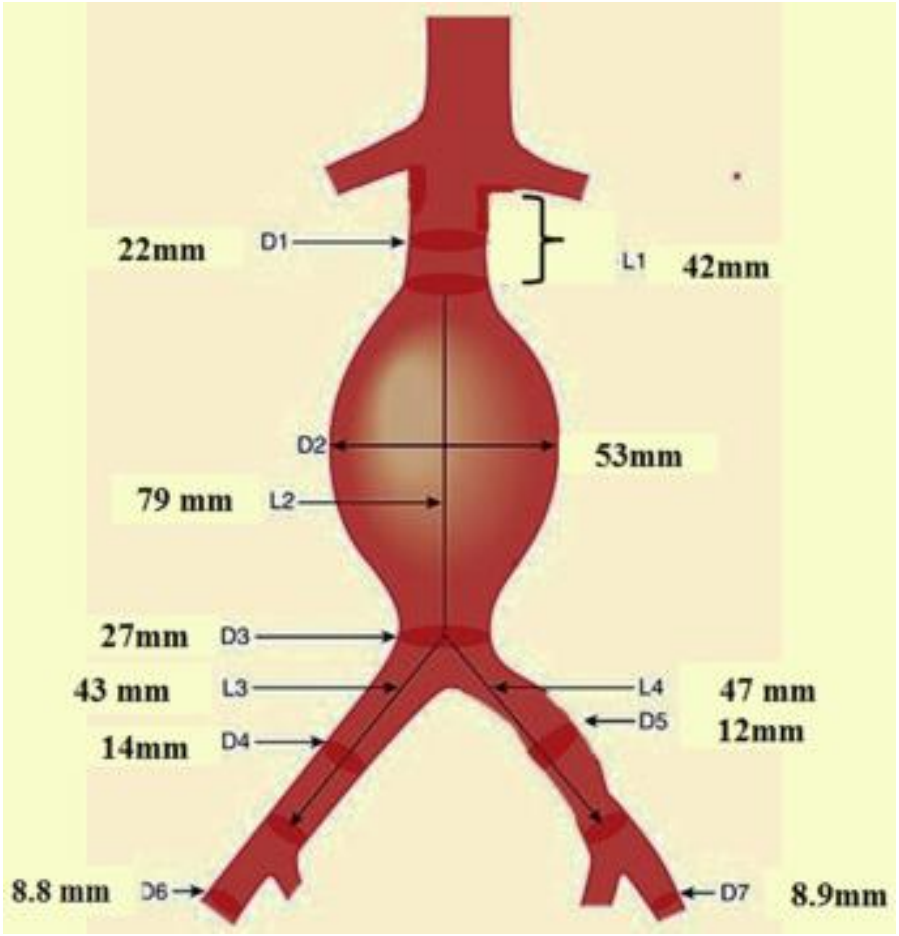


TAKE TWO PROXIMAL NECK DIAMETERS OVER A LENGTH OF 15MM IF POSSIBLE

THEREFORE NEED TO KNOW SLICE THICKNESS



Stage 3 – EVAR Planning – Confirm AAA Size – D2



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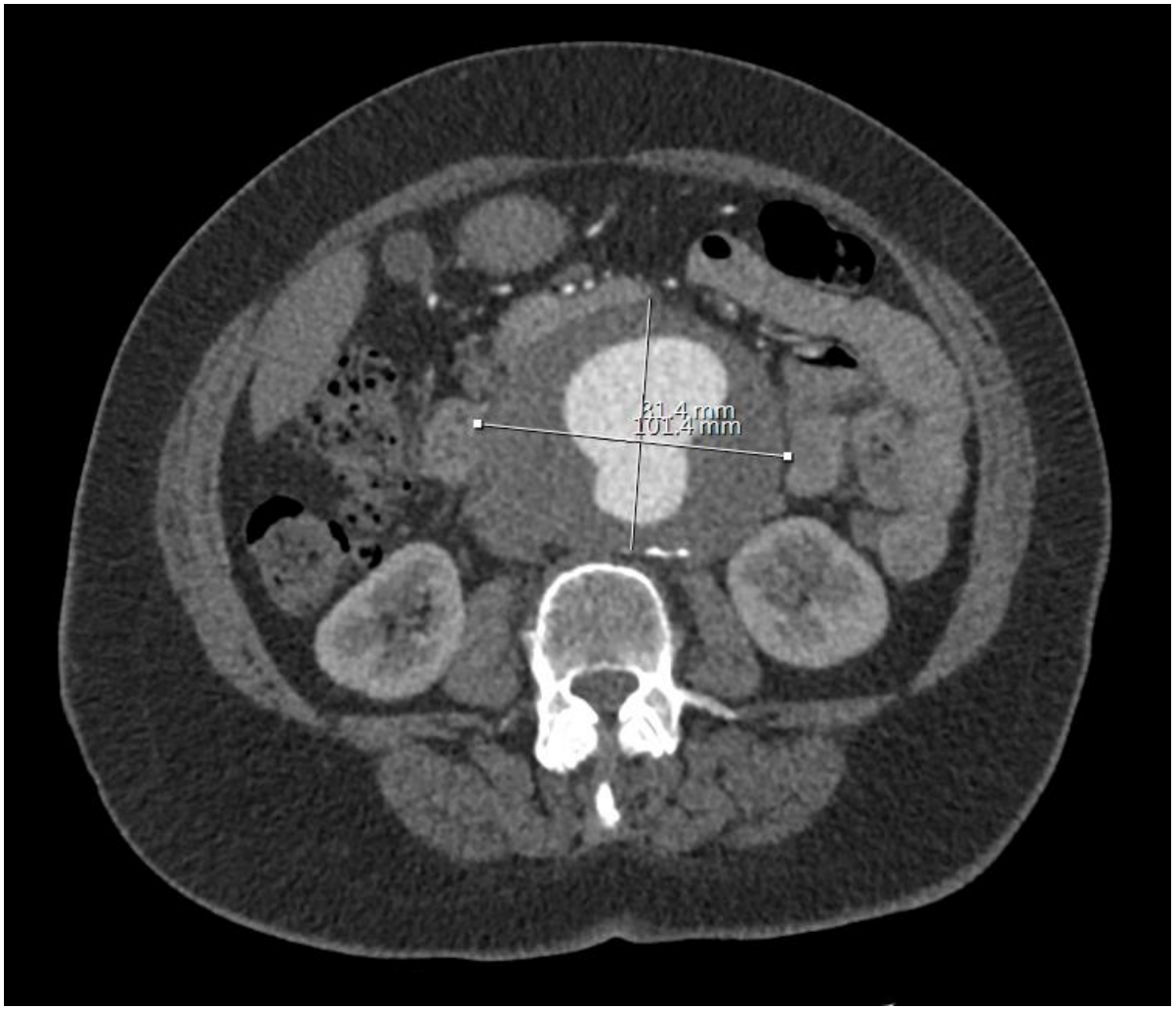
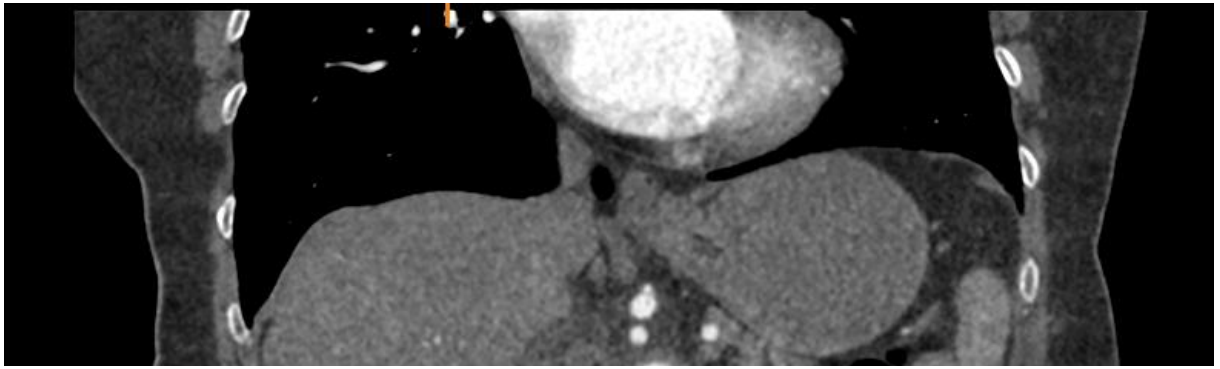
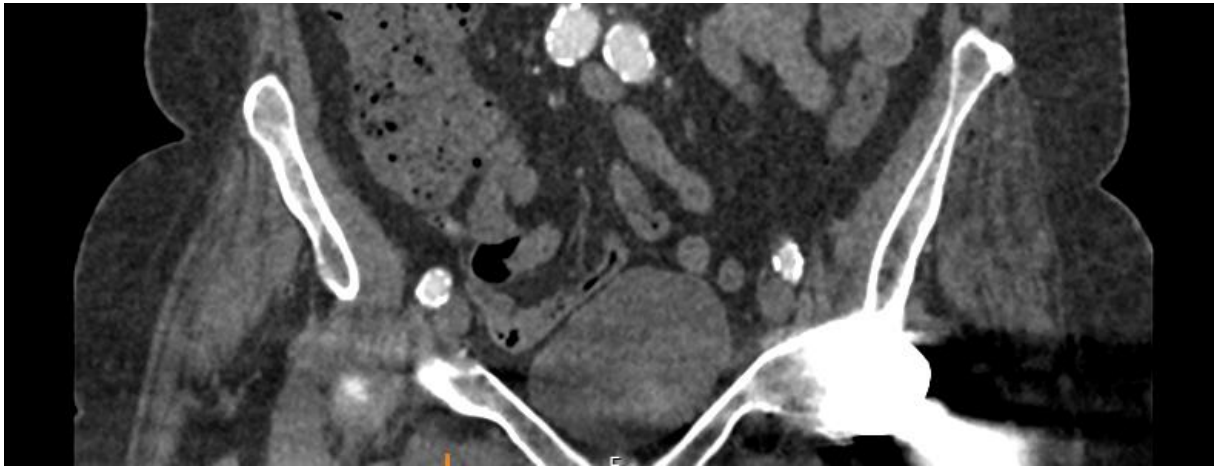


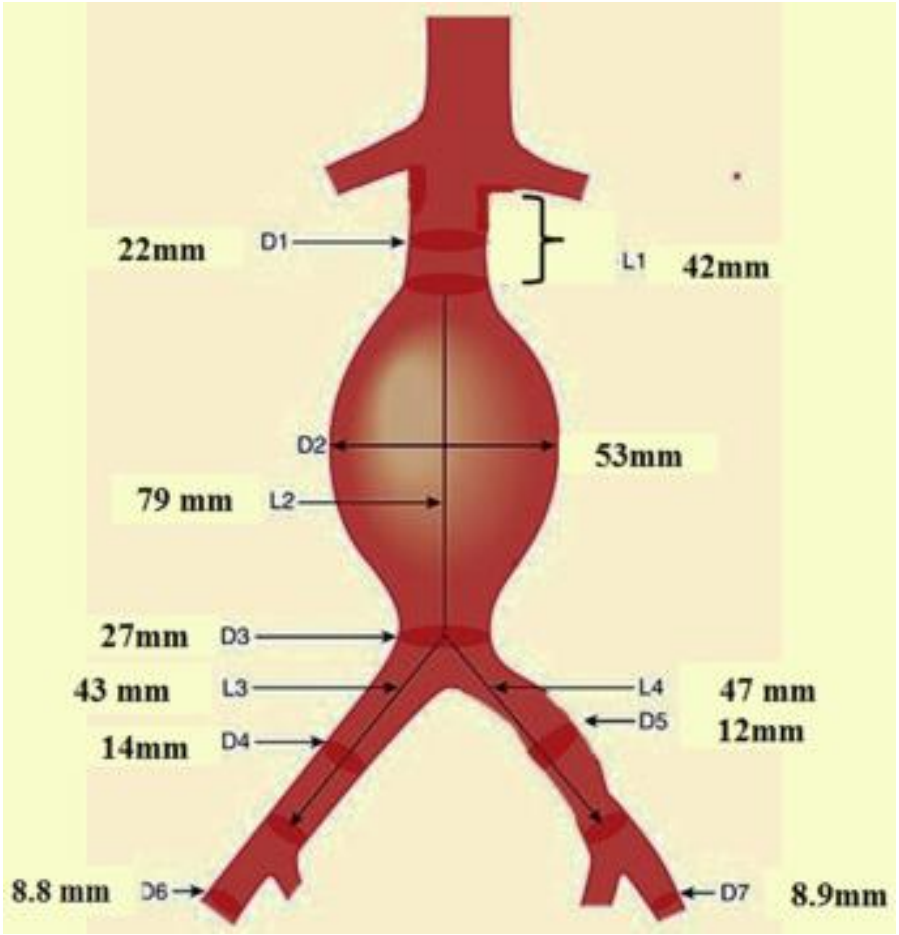

117.0 mm



BEWARE OF SILLY MEASUREMENTS



Stage 3 – EVAR Planning – Aortic Bifurcation Diameter >16mm – D3



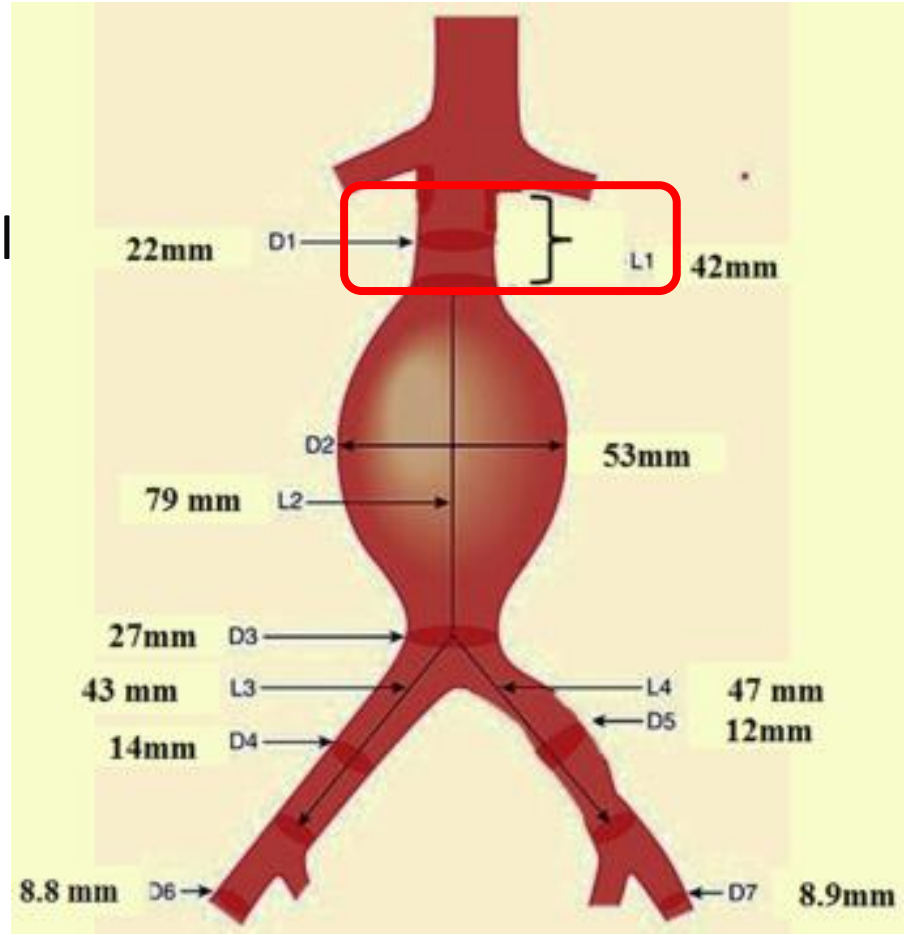

117.0 mm

Stage 3 – EVAR Planning – Aortic Length

Stage 3 – EVAR Planning
Total Aortic Length = level of lowest renal to aortic bifurcation

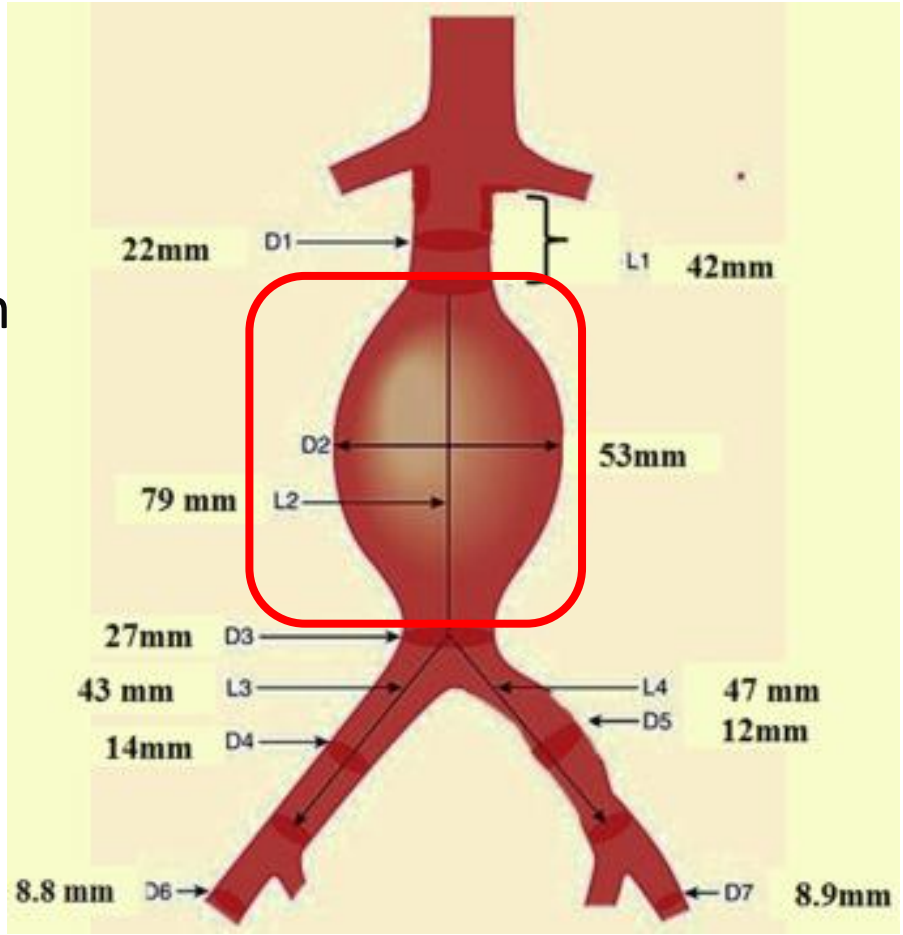
Stage 3 – EVAR Planning – Aortic Length

- Aortic Length:
  - L1 = Proximal Neck Length



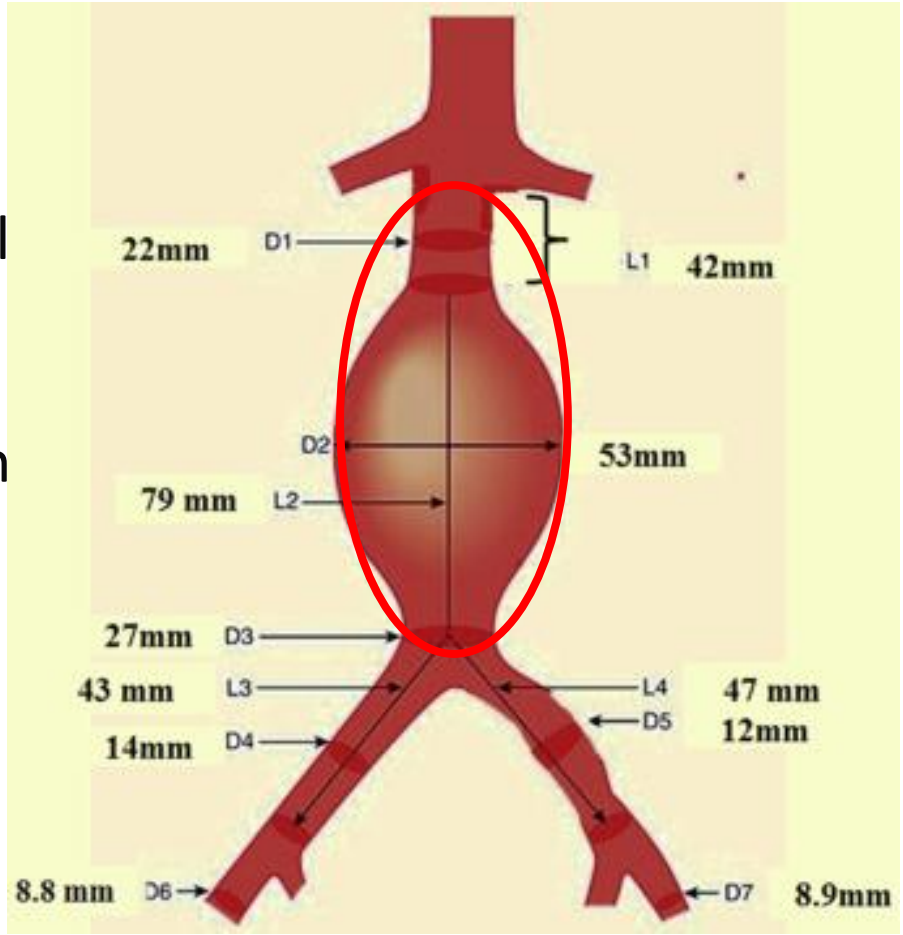
Stage 3 – EVAR Planning – Aortic Length

- Aortic Length:
  - L2 = Main Aortic Length



Stage 3 – EVAR Planning
Total Aortic Length = level of lowest renal to aortic bifurcation

- Aortic Length:
  - L1 = Proximal Neck Length
  - L2 = Main Aortic Length
- Total Aortic Length = L1 + L2




20.1 mm


99.1 mm

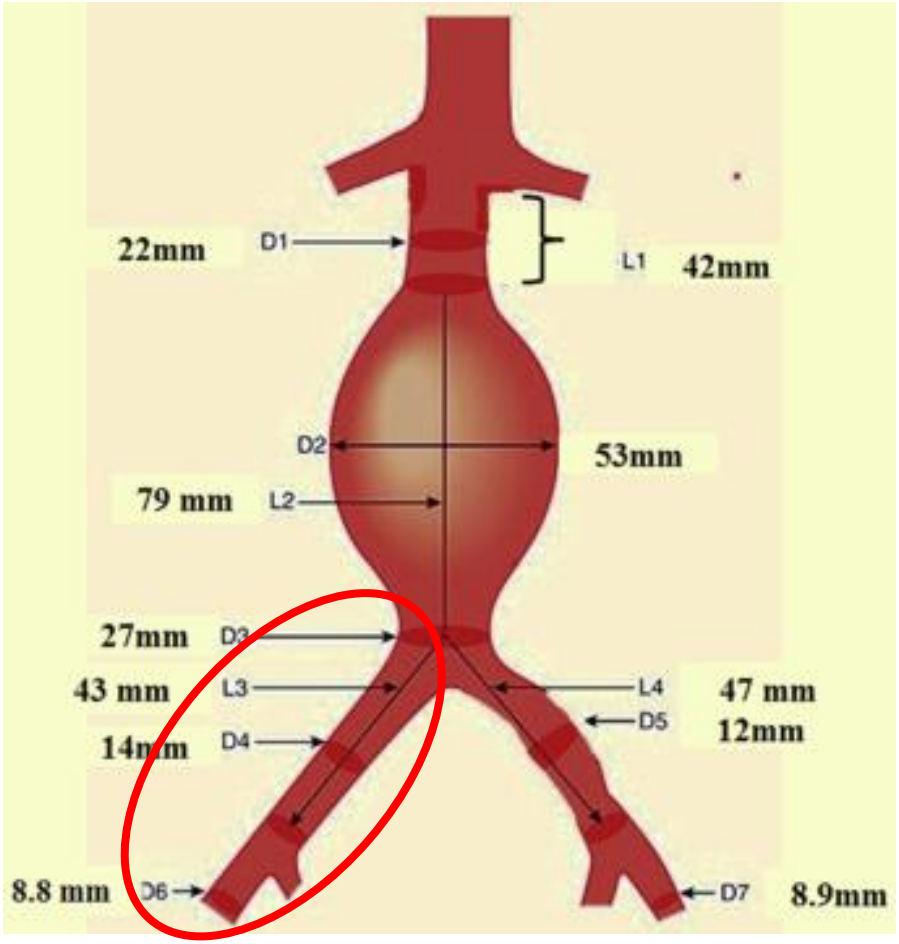
Stage 3 – EVAR Planning – Iliac arteries

Stage 3 – EVAR Planning – Iliac - Diameter

Stage 3 – EVAR Planning
Iliac Length = length from aortic bifurcation to iliac bifurcation

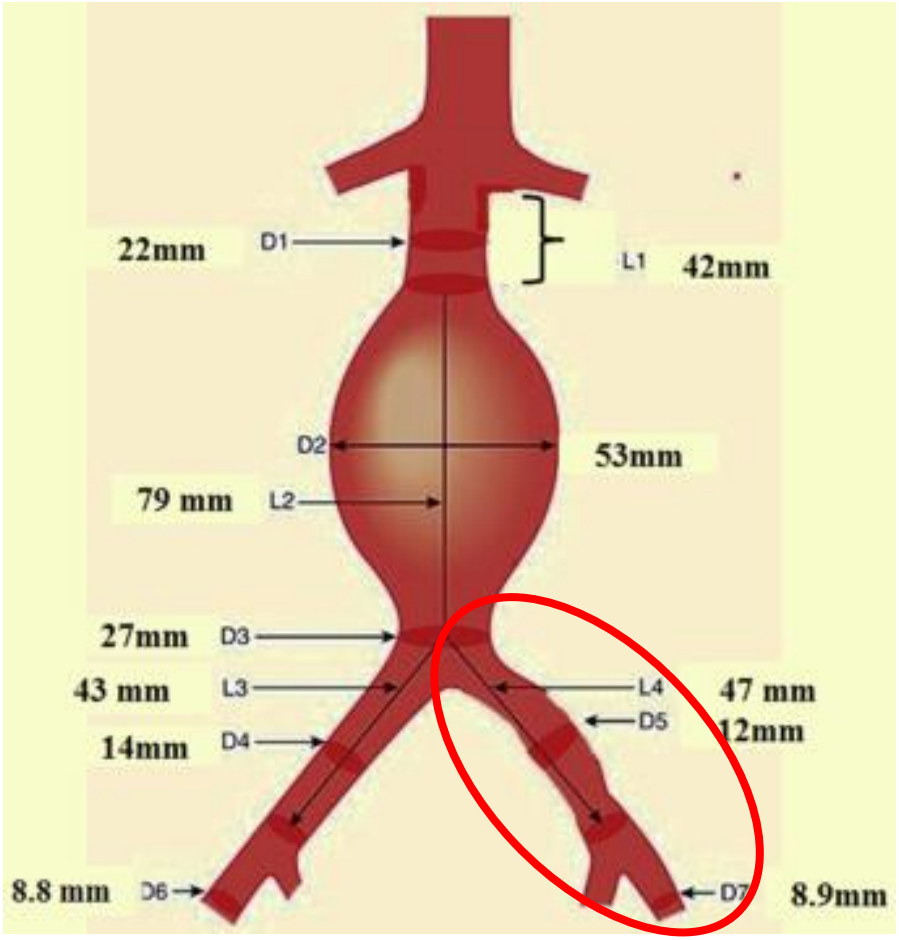
Stage 3 – EVAR Planning – Right Iliac

- Diameter
  - D4
- Length
  - L3



Stage 3 – EVAR Planning – Left Iliac

- Diameter
  - D5
- Length
  - L4



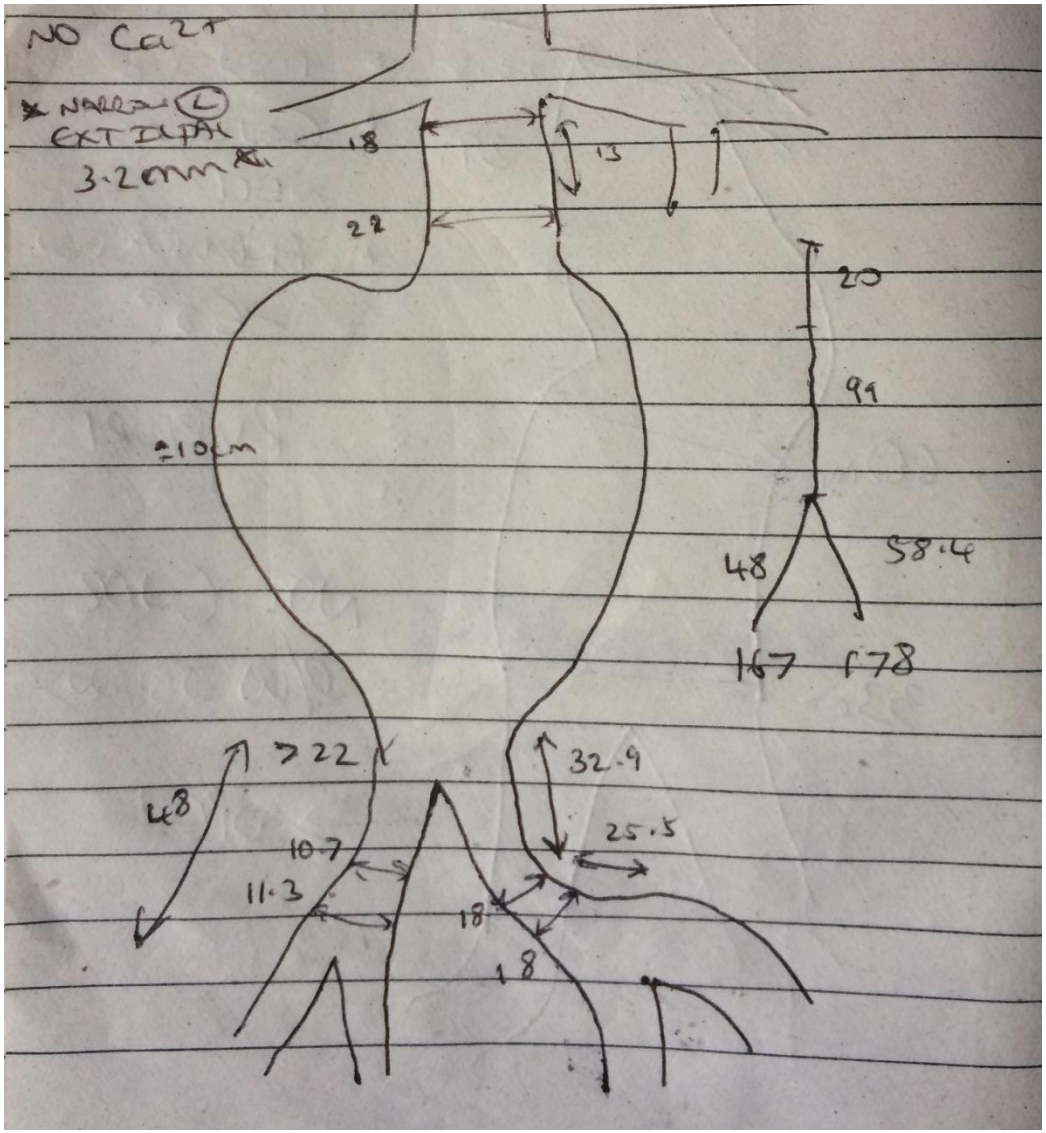

11.3 mm


48.4 mm

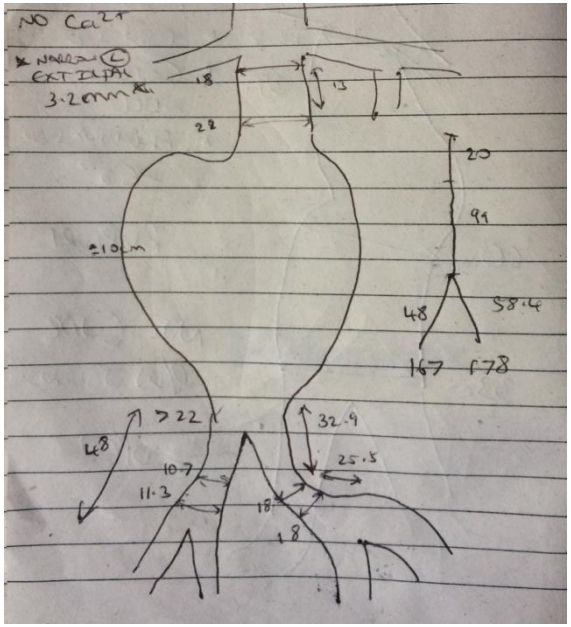

18.0 mm
18.0 mm


31.3 mm


26.9 mm

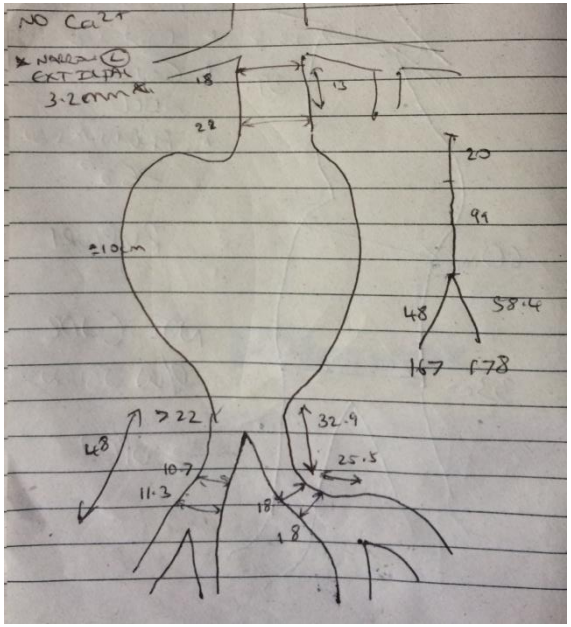

NO Ca2+
18
13
22
20
99
±10cm
48
58.4
167
178
>22
48
32.9
25.5
10.7
11.3
18
18

Basic AAA Measurements



Anatomical Characteristics		Size
Proximal Aortic Neck Diameter	D1	22mm
Proximal Aortic Neck Length	L1	20mm (not 13mm)
Main Aortic Length	L2	99mm
Common Iliac Diameter	D4 D5	Right 11mm Left 18mm
Common Iliac Length	L3 L4	Right 48mm Left 58mm
External Iliac Diameter	D6 & D7	>10mm

Basic AAA Measurements



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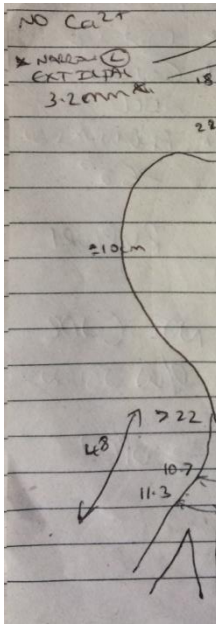
Common Iliac Length	L3 L4	Right 48mm Left 58mm
External Iliac Diameter	D6 & D7	>10mm

Try to aim for 20mm to 30mm stent length into iliac artery

Basic AAA Measurements



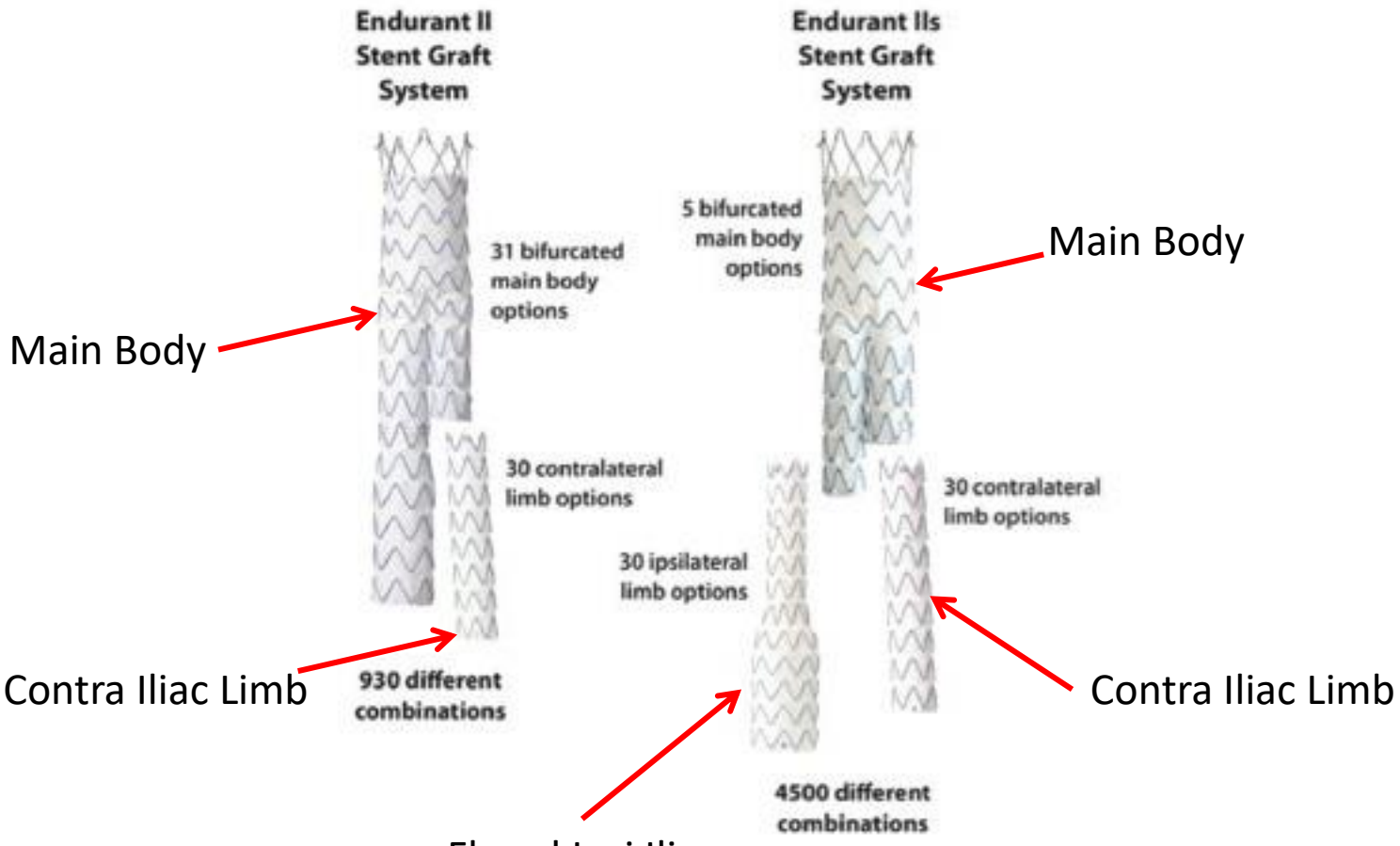
DO NOT STRESS ABOUT LENGTHS IN MORE COMPLEX ANATOMIES

MEASURING PIGTAIL CATHETERS

Size
22mm
nm (not 13mm)
99mm
Right 11mm Left 18mm
Right 48mm Left 58mm
>10mm

Medtronic Endurant

Medtronic Endurant



Medtronic Endurant EVAR Planning Sheet

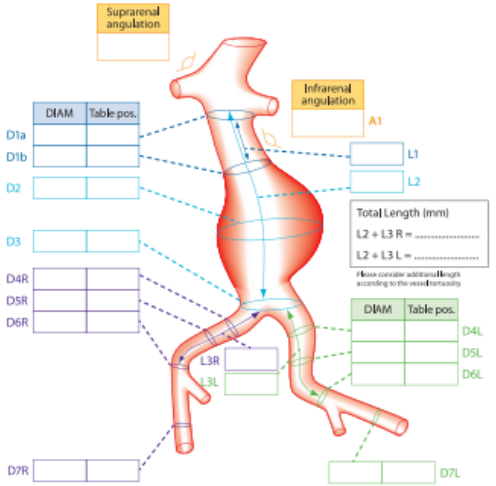
Endurant™ II/IIs
AAA Stent Graft System

FOR USE BY PHYSICIAN ONLY

Date of CT Study: | Patient ID: | Patient DOB: / /

CT Slice Thickness: | Implanting Physician: | Hospital Name:

Evaluation Date: | Procedure Date:



SMA patent?
☐ Yes ☐ No

Lowest renal artery
☐ Right ☐ Left

Disease Progression Risk
Proximal neck:
☐ Short (L1)
☐ Wide (D1a)
☐ Angled (A1)
☐ Conical (% change D1/L1)

Proximal neck thrombus
☐ Nil ☐ Mild
☐ Moderate ☐ Severe

Proximal neck calcification
☐ Nil ☐ Mild
☐ Moderate ☐ Severe

Consider EndoAnchors?
☐ Yes ☐ No

Lumbar patent?
☐ Yes ☐ No

IMA patent?
☐ Yes ☐ No

Right iliac calcification
☐ Nil ☐ Mild
☐ Moderate ☐ Severe

Left iliac calcification
☐ Nil ☐ Mild
☐ Moderate ☐ Severe

Coil hypo
☐ Right ☐ Left
☐ No

Proposed bifur side
☐ Right ☐ Left

Please reference appropriate product *Instructions for Use* for a more detailed list of indications, warnings, precautions and potential adverse events and sizing guidelines.

Drawing

Comments

QTY	Product Code	QTY	Product Code

Physician Signature: _____

Medtronic

Medtronic Endurant EVAR Stents – Product Codes

PRODUCT CODES

ENDURANT II BIFURCATIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETBF	23	13	C	124	E	18
ETBF	23	13	C	145	E	18
ETBF	23	13	C	166	E	18
ETBF	23	16	C	124	E	18
ETBF	23	16	C	145	E	18
ETBF	23	16	C	166	E	18
ETBF	25	13	C	124	E	18
ETBF	25	13	C	145	E	18
ETBF	25	13	C	166	E	18
ETBF	25	16	C	124	E	18
ETBF	25	16	C	145	E	18
ETBF	25	16	C	166	E	18
ETBF	28	13	C	124	E	18
ETBF	28	13	C	145	E	18
ETBF	28	13	C	166	E	18
ETBF	28	16	C	124	E	18
ETBF	28	16	C	145	E	18
ETBF	28	16	C	166	E	18
ETBF	28	20	C	124	E	18
ETBF	28	20	C	145	E	18
ETBF	28	20	C	166	E	18
ETBF	32	16	C	124	E	20
ETBF	32	16	C	145	E	20
ETBF	32	16	C	166	E	20
ETBF	32	20	C	124	E	20
ETBF	32	20	C	145	E	20
ETBF	32	20	C	166	E	20
ETBF	36	16	C	145	E	20
ETBF	36	16	C	166	E	20
ETBF	36	20	C	145	E	20
ETBF	36	20	C	166	E	20

ENDURANT IIs BIFURCATIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ESBF	23	14	C	103	E	18
ESBF	25	14	C	103	E	18
ESBF	28	14	C	103	E	18
ESBF	32	14	C	103	E	20
ESBF	36	14	C	103	E	20

LIMBS*

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)	Total Contralateral Covered Length with EVER's Bifurcated†	Total Ipsilateral Covered Length with Ells Bifurcated‡
ETLW	16	10	C	82	E	14	136	155
ETLW	16	10	C	93	E	14	147	166
ETLW	16	10	C	124	E	14	178	177–197
ETLW	16	10	C	156	E	16	210	209–229
ETLW	16	10	C	199	E	16	253	252–272
ETLW	16	13	C	82	E	14	136	155
ETLW	16	13	C	93	E	14	147	166
ETLW	16	13	C	124	E	14	178	177–197
ETLW	16	13	C	156	E	16	210	209–229
ETLW	16	13	C	199	E	16	253	252–272
ETLW	16	16	C	82	E	14	136	135–155
ETLW	16	16	C	93	E	14	147	146–166
ETLW	16	16	C	124	E	14	178	177–197
ETLW	16	16	C	156	E	16	210	209–229
ETLW	16	16	C	199	E	16	253	252–272
ETLW	16	20	C	82	E	16	136	155
ETLW	16	20	C	93	E	16	147	166
ETLW	16	20	C	124	E	16	178	177–197
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ETLW	16	24	C	82	E	16	136	155
ETLW	16	24	C	93	E	16	147	166
ETLW	16	24	C	124	E	16	178	177–197
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ETLW	16	24	C	199	E	16	253	252–272
ETLW	16	28	C	82	E	16	136	155
ETLW	16	28	C	93	E	16	147	166
ETLW	16	28	C	124	E	16	178	177–197
ETLW	16	28	C	156	E	16	210	209–229
ETLW	16	28	C	199	E	16	253	252–272

*The limb mates with the AUI stent graft on the ipsilateral side.

†These calculations assume the minimum 30 mm overlap between the bifurcated stent graft and the contralateral iliac limb per the Endurant II Stent Graft System Instructions For Use. When using the 124 mm length bifurcated stent graft, subtract 10 mm from Total Contralateral Covered Length with Bifurcated.

‡The 3-5 stent overlap is available only with select limbs. Please refer to the Instructions For Use for more information.

AORTIC EXTENSIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETCF	23	23	C	49	E	18
ETCF	25	25	C	49	E	18
ETCF	28	28	C	49	E	18
ETCF	32	32	C	49	E	20
ETCF	36	36	C	49	E	20
ETTF	23	23	C	70	E	18
ETTF	25	25	C	70	E	18
ETTF	28	28	C	70	E	18
ETTF	32	32	C	70	E	20
ETTF	36	36	C	70	E	20

ILIAC EXTENSIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETEW	10	10	C	82	E	14
ETEW	13	13	C	82	E	14
ETEW	20	20	C	82	E	16
ETEW	24	24	C	82	E	16
ETEW	28	28	C	82	E	18

AUI

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETUF	23	14	C	102	E	18
ETUF	25	14	C	102	E	18
ETUF	28	14	C	102	E	18
ETUF	32	14	C	102	E	20
ETUF	36	14	C	102	E	20

Converting Patient AAA Lengths into Grafts – Main Body

- Main body – ETBF.

- Product Configurations;
  - First Number = Top Neck Diameter.
  - Second Number = Iliac Diameter.
  - Distal Design = C.
  - Total Covered Length.
  - Delivery System = E.

  - E.g.. ETBF-28-20-C-166.

Endurant™ II/IIs

AAA Stent Graft System

ENDURANT™ II/IIs PRODUCT CODE DESCRIPTION

ET	B	F	23	13	C	124	EE	18

Product Name
ET - Endurant™ II
ES - Endurant™ IIs

Device Configuration
B - Bifurcations
L - Limbs
E - Iliac Extension
C - Extensions & Cuffs
T - Abdominal Tubes
U - Aorto-uni-iliac (AUI)

Proximal Design
F - FreeFlo
W - Open Web

Proximal Graft Diameter

Distal Graft Diameter

Distal Design
C - Closed Web

Total Covered Length

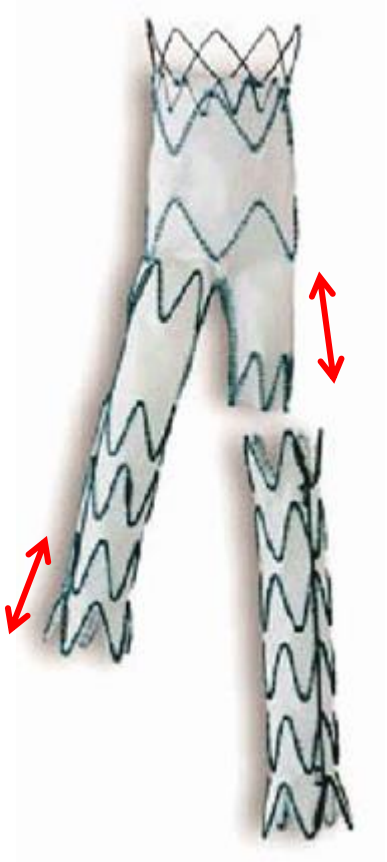
Delivery System
EE - Endurant™ II

Catheter Outer Diameter

Converting Patient AAA Lengths into Grafts – Main Body

- Important total length needs to account for IFU required 30mm overlap between any two stents.

30mm overlap required when ipsilateral iliac limb extension inserted into main body



30mm overlap required when contralateral iliac limb extension inserted into main body

Converting Patient AAA Lengths into Grafts – Main Body

- Important total length needs to account for IFU required 30mm overlap between any two stents.
- If total length required for the main body ipsilateral side equals 210mm:
  - Main Body Length = 166mm.
  - Account for 30mm loss for stent overlap.
  - Iliac Limb Extension Length = 82mm.
  - Therefore, 166+82-30=218mm.

Converting Patient AAA Lengths into Grafts – Contralateral

- Important total length needs to account for IFU required 30mm overlap between any two stents.

For contralateral side, the total length is the length of the iliac limb extension + 50mm of the main body

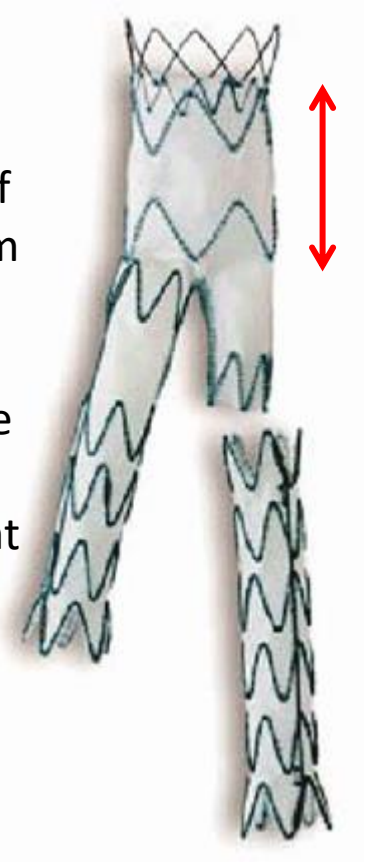
The 30mm portion distal to the gate in the main body is discounted as required for stent overlap

Converting Patient AAA Lengths into Grafts – Contralateral

- Important total length needs to account for IFU required 30mm overlap between any two stents.

For contralateral side, the total length is the length of the iliac limb extension + 50mm of the main body

The 30mm portion distal to the gate in the main body is discounted as required for stent overlap

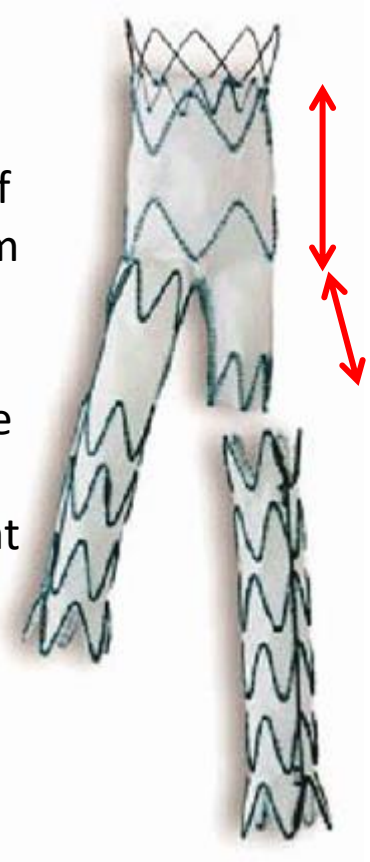


Converting Patient AAA Lengths into Grafts – Contralateral

- Important total length needs to account for IFU required 30mm overlap between any two stents.

For contralateral side, the total length is the length of the iliac limb extension + 50mm of the main body

The 30mm portion distal to the gate in the main body is discounted as required for stent overlap



50mm

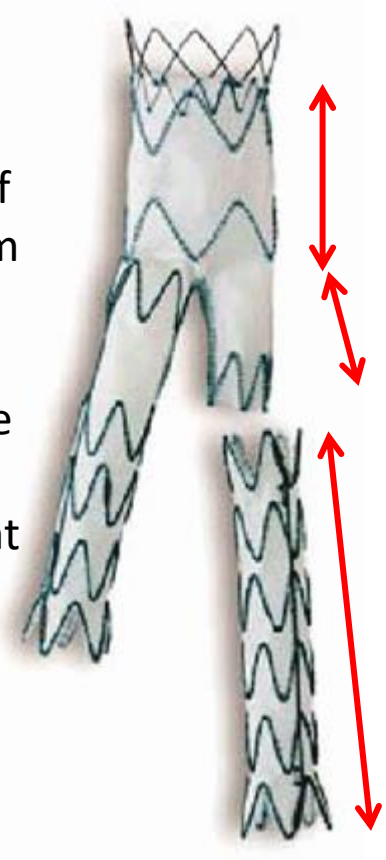
30mm portion distal to gate required for graft overlap

Converting Patient AAA Lengths into Grafts – Contralateral

- Important total length needs to account for IFU required 30mm overlap between any two stents.

For contralateral side, the total length is the length of the iliac limb extension + 50mm of the main body

The 30mm portion distal to the gate in the main body is discounted as required for stent overlap



50mm

30mm portion distal to gate required for graft overlap

Total iliac extension length used in calculation

Converting Patient AAA Lengths into Grafts – Contralateral

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discounted

REMEMBER THAT THE MAIN BODY CONTRALATERAL LIMB ALWAYS REQUIRES A 16MM DIAMETER GRAFT

:e

)

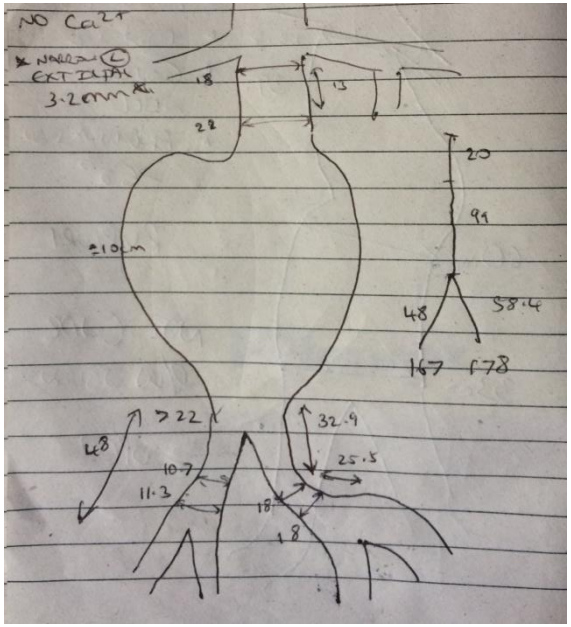
All ETLW grafts are 16mm at proximal aspect

used in

Converting Patient AAA Lengths into Grafts – Contralateral

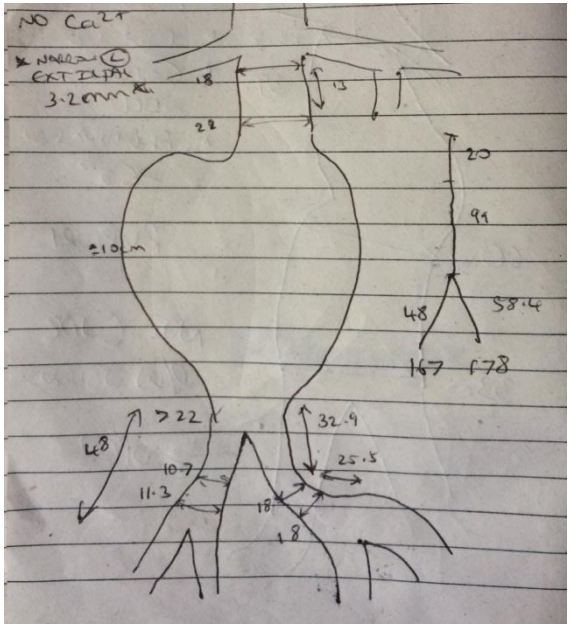
- If total length required for the contralateral side equals 170mm:
  - Main Body Length = 50mm.
  - Account for 30mm loss for stent overlap.
  - Iliac Limb Extension Length = 124mm.
  - Therefore, 50+124=174mm.

Basic AAA Measurements



Anatomical Characteristics		Size
Proximal Aortic Neck Diameter	D1	22mm
Proximal Aortic Neck Length	L1	20mm (not 13mm)
Main Aortic Length	L2	99mm
Common Iliac Diameter	D4 D5	Right 11mm Left 18mm
Common Iliac Length	L3 L4	Right 48mm Left 58mm
External Iliac Diameter	D6 & D7	>10mm

Basic AAA Measurements



Anatomical Characteristics		Size
Proximal Aortic Neck Diameter	D1	22mm
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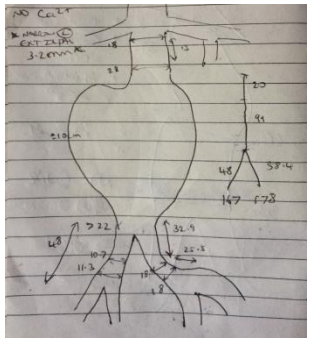
Main Aortic Length	L2	99mm
Common Iliac Diameter	D4 D5	Right 11.3mm Left 18mm
Common Iliac Length	L3 L4	Right 48mm Left 58mm
External Iliac Diameter	D6 & D7	>10mm

Decide on Ipsilateral side for Main Body
Usually Right Side

EVAR Stent



Anatomical Characteristics		Size
Main Body – Right - Ipsi Proximal Aortic Neck Diameter Right Iliac Diameter Right Limb Length (= Lowest Renal to Right Iliac Bifurcation)	 D1 D4 L1 + L2 + L3	 22mm 11.3mm 167mm
Iliac Limb Extension – Left - Contra Left Iliac Diameter Left Limb Length (= Lowest Renal to Left Iliac Bifurcation)	 D5 L1 + L2 + L4	 18mm 178mm

Main Body

PRODUCT CODES

ENDURANT II BIFURCATIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETBF	23	13	C	124	E	18
ETBF	23	13	C	145	E	18
ETBF	23	13	C	166	E	18
ETBF	23	16	C	124	E	18
ETBF	23	16	C	145	E	18
ETBF	23	16	C	166	E	18
ETBF	25	13	C	124	E	18
ETBF	25	13	C	145	E	18
ETBF	25	13	C	166	E	18
ETBF	25	16	C	124	E	18
ETBF	25	16	C	145	E	18
ETBF	25	16	C	166	E	18
ETBF	28	13	C	124	E	18
ETBF	28	13	C	145	E	18
ETBF	28	13	C	166	E	18
ETBF	28	16	C	124	E	18
ETBF	28	16	C	145	E	18
ETBF	28	16	C	166	E	18
ETBF	28	20	C	124	E	18
ETBF	28	20	C	145	E	18
ETBF	28	20	C	166	E	18
ETBF	32	16	C	124	E	20
ETBF	32	16	C	145	E	20
ETBF	32	16	C	166	E	20
ETBF	32	20	C	124	E	20
ETBF	32	20	C	145	E	20
ETBF	32	20	C	166	E	20
ETBF	36	16	C	145	E	20
ETBF	36	16	C	166	E	20
ETBF	36	20	C	145	E	20
ETBF	36	20	C	166	E	20

ENDURANT IIs BIFURCATIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ESBF	23	14	C	103	E	18
ESBF	25	14	C	103	E	18
ESBF	28	14	C	103	E	18
ESBF	32	14	C	103	E	20
ESBF	36	14	C	103	E	20

LIMBS*

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)	Total Contralateral Covered Length with ENDURANT Bifurcated†	Total Ipsilateral Covered Length with ENDURANT Bifurcated‡
ETLW	16	10	C	82	E	14	136	155
ETLW	16	10	C	93	E	14	147	166
ETLW	16	10	C	124	E	14	178	177–197
ETLW	16	10	C	156	E	16	210	209–229
ETLW	16	10	C	199	E	16	253	252–272
ETLW	16	13	C	82	E	14	136	155
ETLW	16	13	C	93	E	14	147	166
ETLW	16	13	C	124	E	14	178	177–197
ETLW	16	13	C	156	E	16	210	209–229
ETLW	16	13	C	199	E	16	253	252–272
ETLW	16	16	C	82	E	14	136	135–155
ETLW	16	16	C	93	E	14	147	146–166
ETLW	16	16	C	124	E	14	178	177–197
ETLW	16	16	C	156	E	16	210	209–229
ETLW	16	16	C	199	E	16	253	252–272
ETLW	16	20	C	82	E	16	136	155
ETLW	16	20	C	93	E	16	147	166
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ETLW	16	20	C	199	E	16	253	252–272
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ETLW	16	28	C	156	E	16	210	209–229
ETLW	16	28	C	199	E	16	253	252–272

*The limb mates with the AUI stent graft on the ipsilateral side.

†These calculations assume the minimum 30 mm overlap between the bifurcated stent graft and the contralateral iliac limb per the Endurant II Stent Graft System Instructions For Use. When using the 124 mm length bifurcated stent graft, subtract 10 mm from Total Contralateral Covered Length with Bifurcated.

‡The 3-5 stent overlap is available only with select limbs. Please refer to the Instructions For Use for more information.

AORTIC EXTENSIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETCF	23	23	C	49	E	18
ETCF	25	25	C	49	E	18
ETCF	28	28	C	49	E	18
ETCF	32	32	C	49	E	20
ETCF	36	36	C	49	E	20
ETTF	23	23	C	70	E	18
ETTF	25	25	C	70	E	18
ETTF	28	28	C	70	E	18
ETTF	32	32	C	70	E	20
ETTF	36	36	C	70	E	20

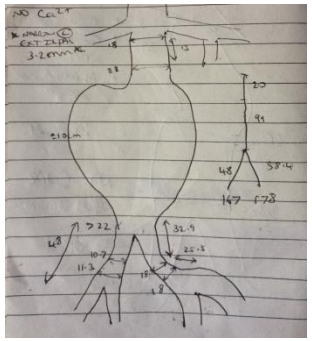
ILIAC EXTENSIONS

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETEW	10	10	C	82	E	14
ETEW	13	13	C	82	E	14
ETEW	20	20	C	82	E	16
ETEW	24	24	C	82	E	16
ETEW	28	28	C	82	E	18

AUI

Product Code	Proximal Graft Diameter (mm)	Distal Graft Diameter (mm)	Distal Design	Total Covered Length (mm)	Delivery System	Catheter Outer Diameter (F)
ETUF	23	14	C	102	E	18
ETUF	25	14	C	102	E	18
ETUF	28	14	C	102	E	18
ETUF	32	14	C	102	E	20
ETUF	36	14	C	102	E	20

EVAR Stent

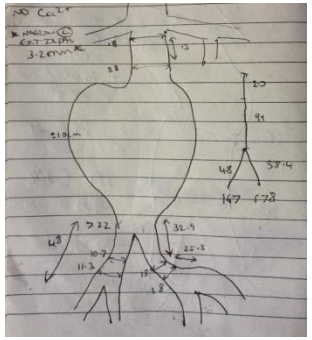


Anatomical Characteristics		Size
Main Body – Right - Ipsi Proximal Aortic Neck Diameter Right Iliac Diameter Right Limb Length (= Lowest Renal to Right Iliac Bifurcation)	 D1 D4 L1 + L2 + L3	 22mm 11mm 167mm
ETBF-25-16-166 *(ETLW-16-16-82)*		
Iliac Limb Extension – Left - Contra Left Iliac Diameter Left Limb Length (= Lowest Renal to Left Iliac Bifurcation)	 D5 L1 + L2 + L4	 18mm 178mm
ETLW-16-16-93 ETLW-16-20-82		

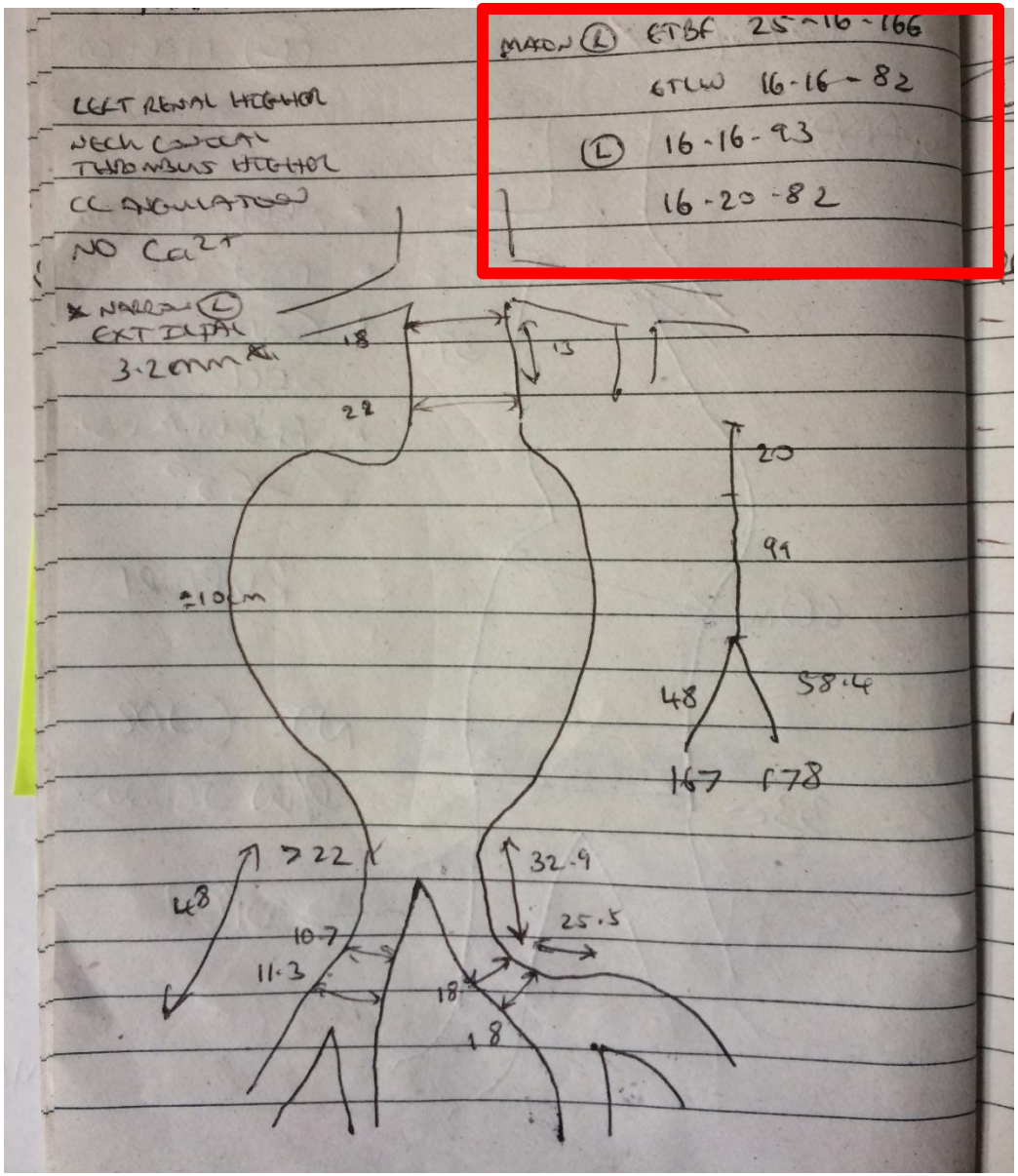
Belfast Health and Social Care Trust
caring supporting improving together

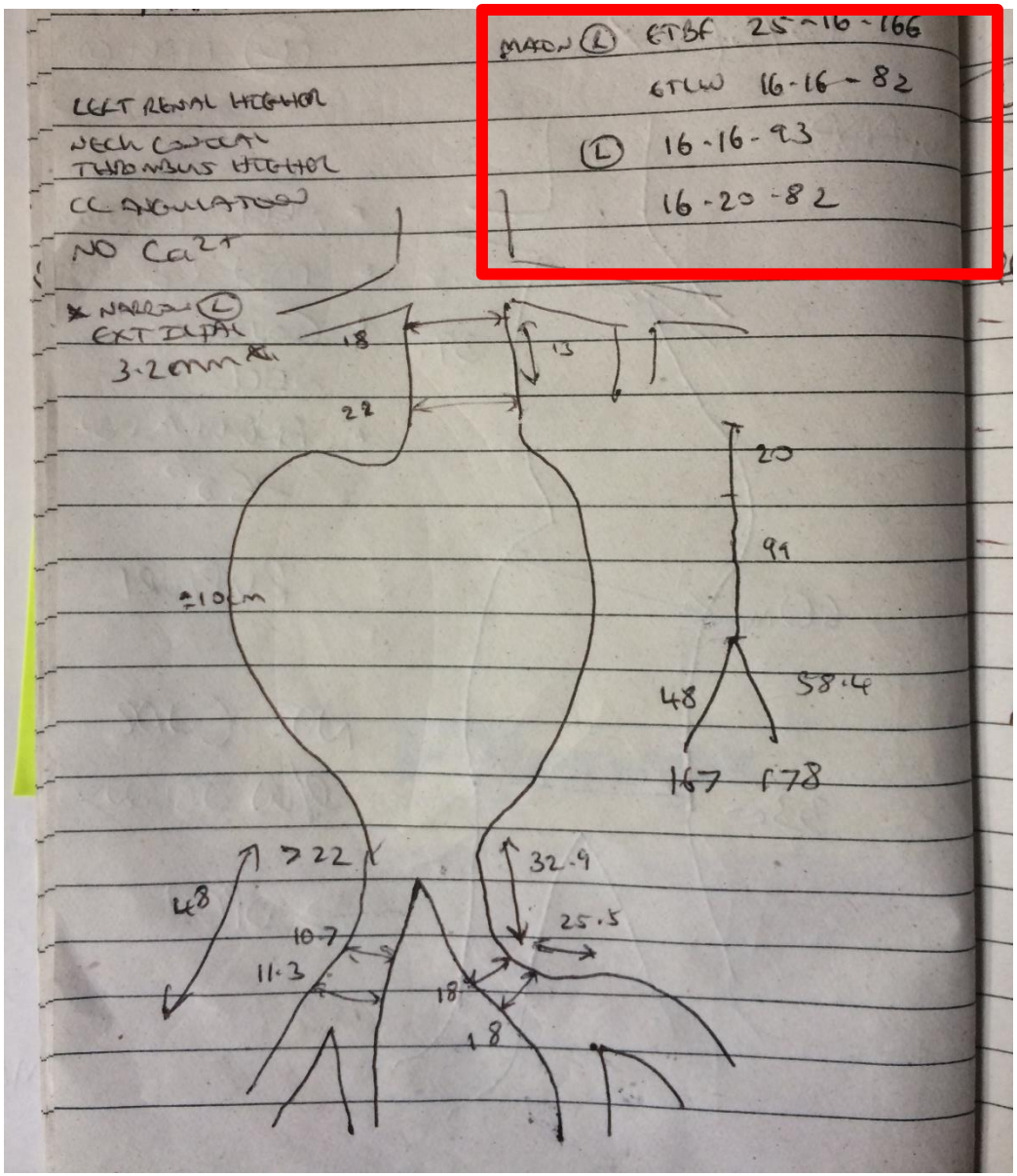
Ulster University

EVAR Stent

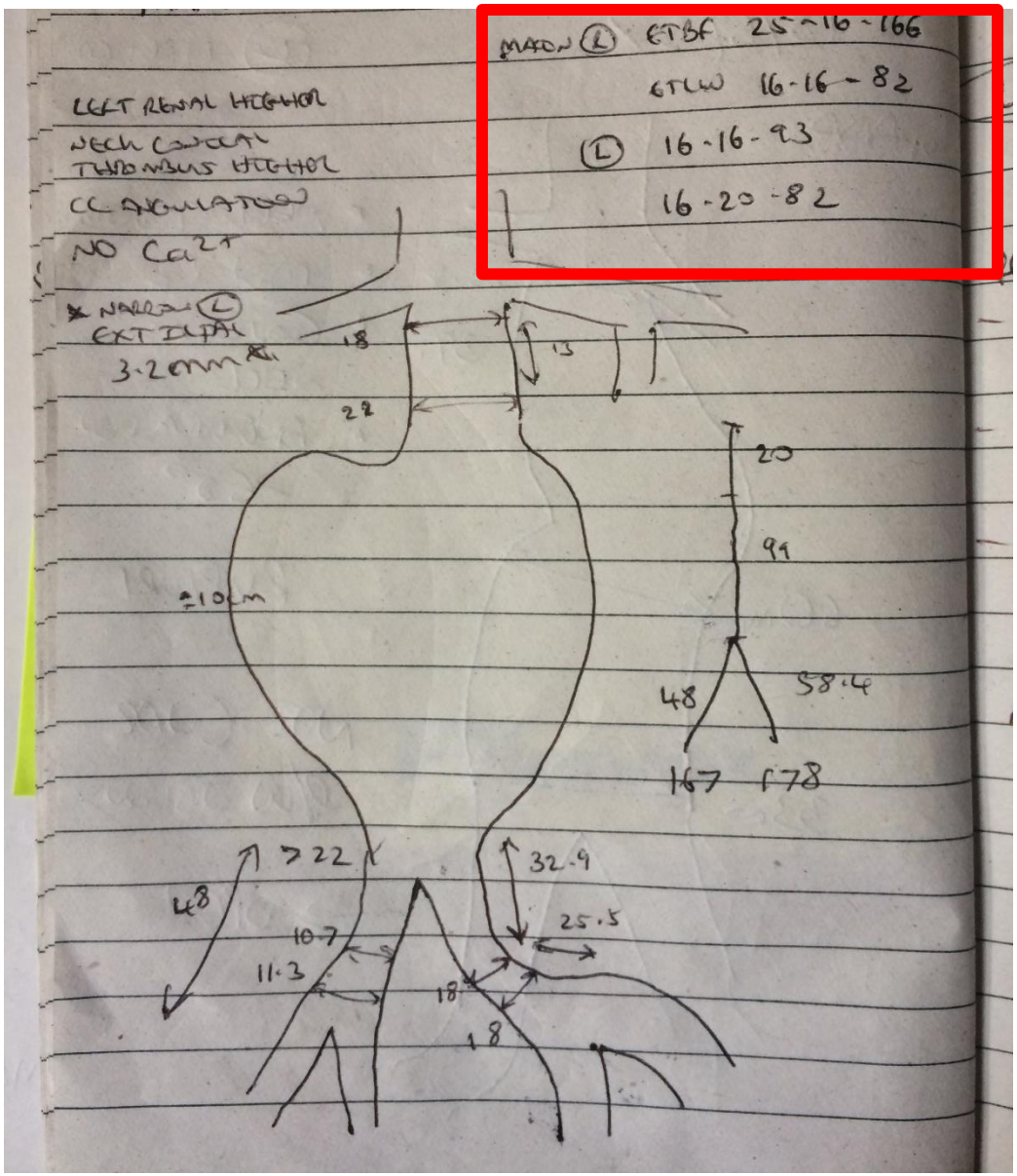


Anatomical Characteristics		Size
Main Body – Right - Ipsi		
Proximal Aortic Neck Diameter	D1	22mm
Right Iliac Diameter	D4	11.3mm
Right Limb Length	L1 + L2 + L3	167mm
(= Lowest Renal to Right Iliac Bifurcation)		
ETBF-25-16-166 *(ETLW-16-16-82)* *Required 167mm vs. Stent 166mm +/- 52mm extension (remember lose 30mm overlap)*		
Iliac Limb Extension – Left - Contra		
Left Iliac Diameter	D5	18mm
Left Limb Length	L1 + L2 + L4	178mm
(= Lowest Renal to Left Iliac Bifurcation)		
ETLW-16-16-93 + ETLW-16-20-82 OR ETLW-16-20-124 *Required 178mm vs. Stent 50mm + 93mm + 52mm(remember lose 30mm overlap 2nd iliac graft) = 195mm* *Or Required 178mm vs. Stent 50mm + 124mm = 174mm*		


LEFT RENAL HIGHER
NECK CONCAT
THROMBUS HIGHER
CC ANGULATION
NO Ca2+
EXTRAL
3.2mm
MAYO L ETBF 25-16-166
GTLW 16-16-82
L 16-16-93
16-20-82
18
22
13
20
99
±10cm
48
58.4
167
178
>22
48
10.7
11.3
32.9
25.5
18
18



Right distal common iliac was dilated so I went for 16mm distally instead of 13mm

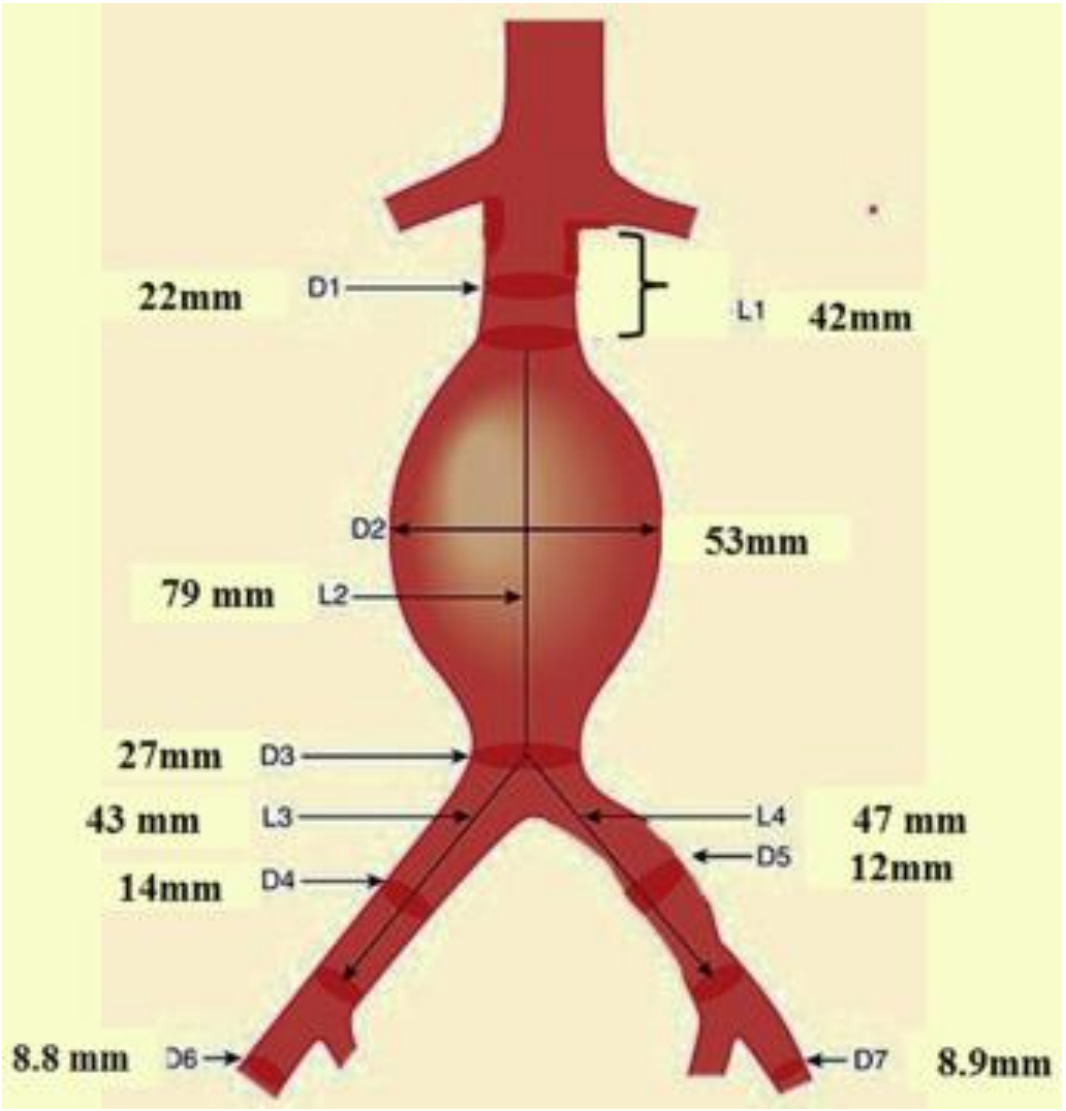


Right distal common iliac was dilated so I went for 16mm distally instead of 13mm

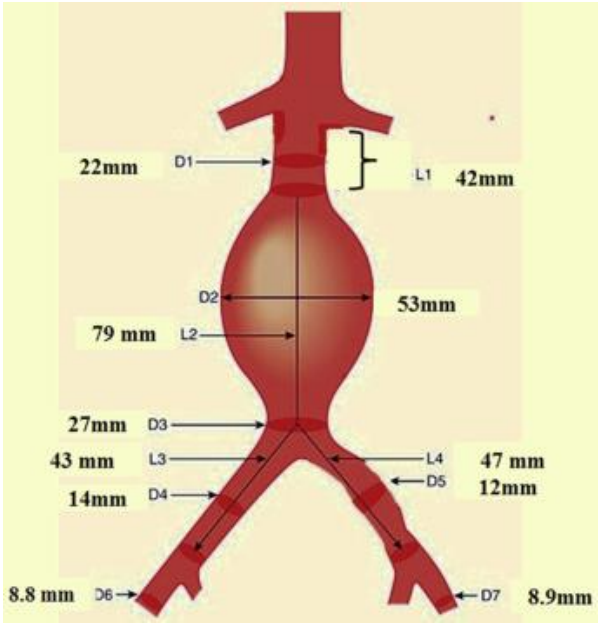
Balloon angioplasty to left external iliac at start using 5mm balloon and used 2 shorties due to mid-common iliac bend

Cases

Case 1

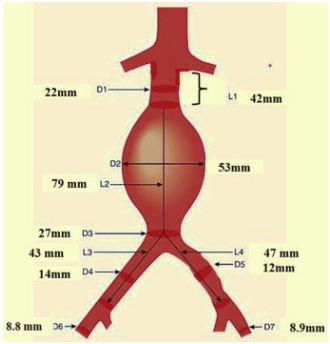

22mm
D1
L1
42mm
D2
53mm
79 mm
L2
27mm
D3
43 mm
L3
L4
47 mm
D5
12mm
14mm
D4
8.8 mm
D6
D7
8.9mm

Basic AAA Measurements



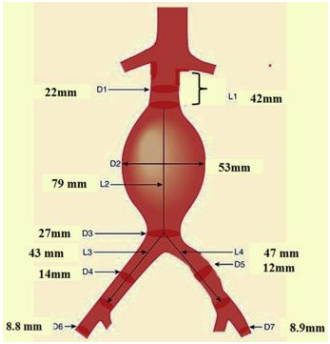
Anatomical Characteristics		Size
Proximal Aortic Neck Diameter	D1	22mm
Proximal Aortic Neck Length	L1	42mm
Main Aortic Length	L2	79mm
Common Iliac Diameter	D4 D5	Right 14mm Left 12mm
Common Iliac Length	L3 L4	Right 43mm Left 47mm
External Iliac Diameter	D6 & D7	>8mm

EVAR Stent



Anatomical Characteristics		Size
Main Body – Right - Ipsi		
Proximal Aortic Neck Diameter	D1	22mm
Right Iliac Diameter	D4	14mm
Right Limb Length (= Lowest Renal to Right Iliac Bifurcation)	L1 + L2 + L3	164mm
Iliac Limb Extension – Left - Contra		
Left Iliac Diameter	D5	12mm
Left Limb Length (= Lowest Renal to Left Iliac Bifurcation)	L1 + L2 + L4	168mm

EVAR Stent



Anatomical Characteristics		Size
Main Body – Right - Ipsi		
Proximal Aortic Neck Diameter	D1	22mm
Right Iliac Diameter	D4	14mm
Right Limb Length	L1 + L2 + L3	164mm
(= Lowest Renal to Right Iliac Bifurcation)		
ETBF-25-16-166 Required 164mm vs. Stent 166mm		
Iliac Limb Extension – Left - Contra		
Left Iliac Diameter	D5	12mm
Left Limb Length	L1 + L2 + L4	168mm
(= Lowest Renal to Left Iliac Bifurcation)		
ETLW-16-13-124 Required 168mm vs. Stent 50mm + 124mm extension = 174mm		

Caution

- Be aware of maximal and minimal stent sizes.
- Oversizing stents utilised for very diseased vessels.
- Utilise “shorties” rather than long iliac extension stents to afford more flexibility round corners.
- Remember you can reduce overall stent length by concertinaing the graft during deployment or increasing consumption of graft length through use of multiple “shorties” and increasing overlap lengths above 30mm.

Questions ?