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Endovascular treatment of Abdominal Aortic Aneurysm

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Case Presentation

- 53yr old male with an incidentally found AAA on routine MRI for chronic back pain.
- PMH-HTN, CAD s/p PCIX2
- PSH-Umbilical hernia repair
- High cardiac risk for surgery.

Case Presentation

- Medications- Diovan, Aspirin, Clonidine, Methadone, Lipitor, Tekturna
- Allergy-NKDA
- FSHx-non contributory

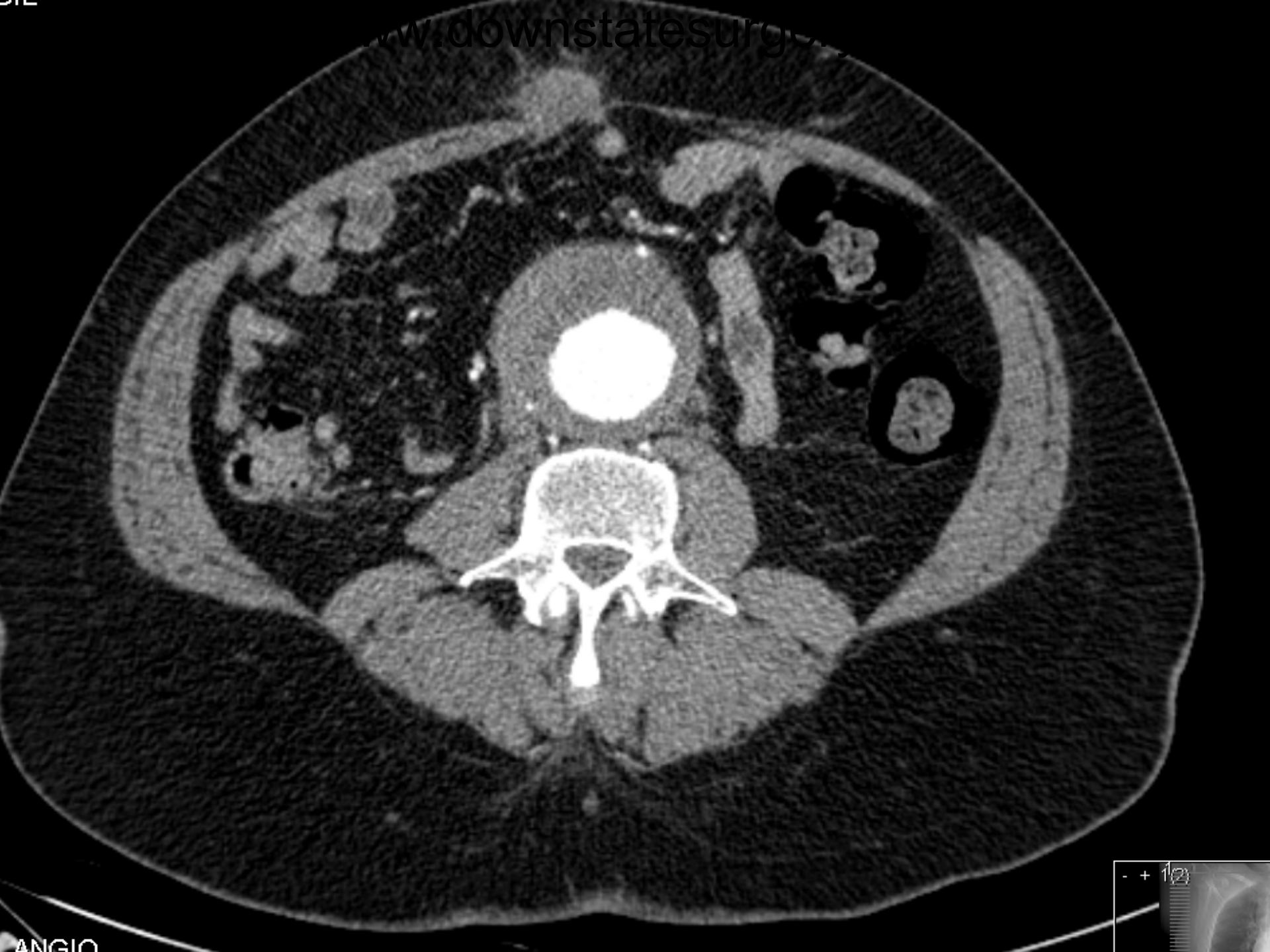
Case Presentation

- Gen examination- not pale, anicteric
- Abdominal exam-palpable pulsatile intrabdominal mass. NT/ND
- Vascular exam - palpable bilateral distal pulses
- Chest-CTA bilat
- CVS-S1S2 no murmur

Case Presentation

-Laboratory tests

- CBC: 7.5/10.8/33/288
- BMP:143/4.2/109/25/14/0.9/80
- Coagulation: 11.5/28/1
- CT Scan Abdomen/Pelvis- 7.5cm X 7.3cm infrarenal AAA.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Operative procedure

- Endovascular repair of AAA with a bifurcated stent graft

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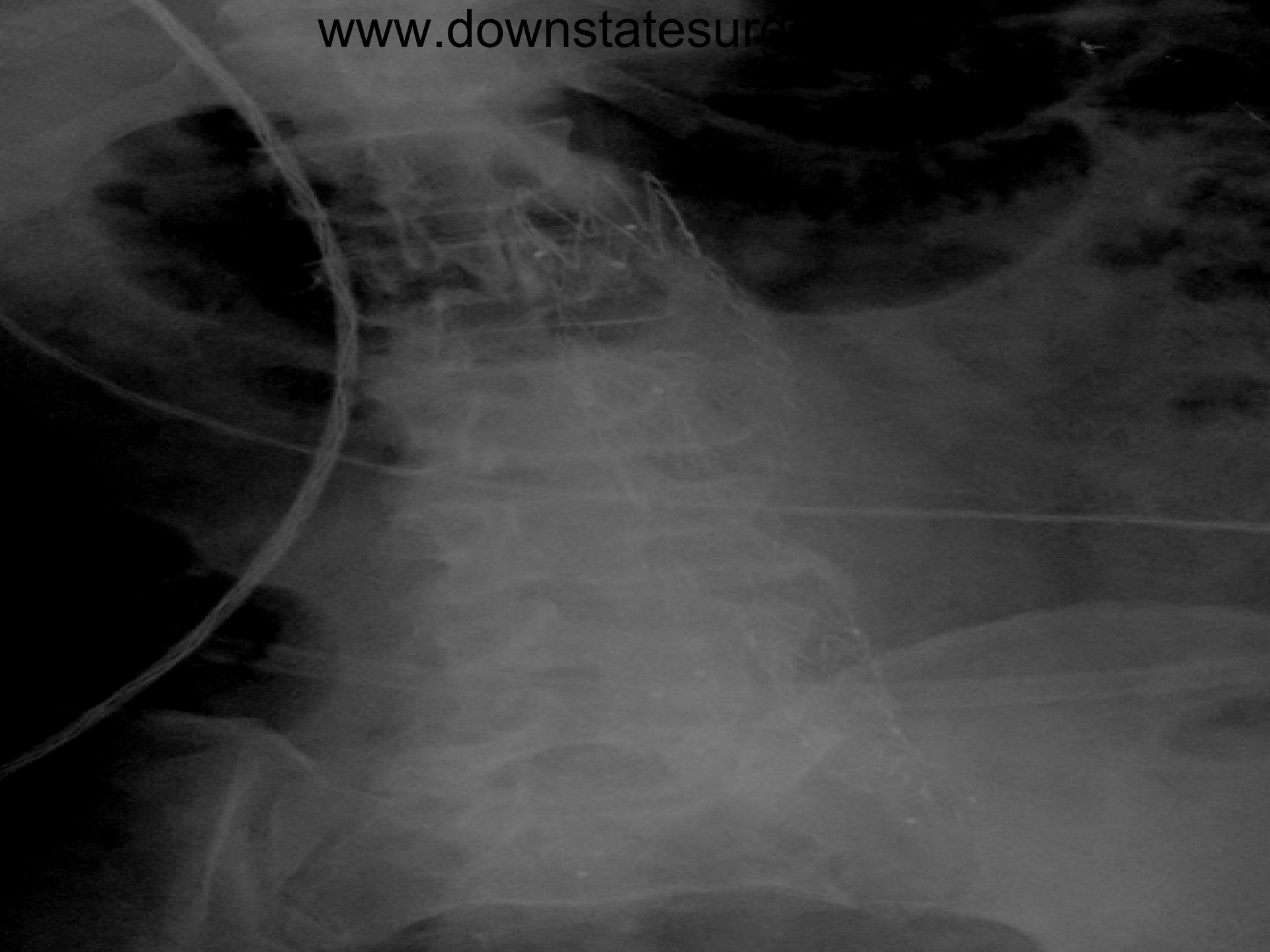

Hospital Course

- POD#0- Admitted to CTICU
- POD#1- Transferred to surgical step down unit
- POD#3-Discharged home

Abdominal aortic aneurysms

- Widening or increased diameter to 50% of baseline
- Normal aorta: 2-2.5cm
- Aneurysm: 3-3.5cm
- 3%-10% of men over age 50years
- M:F=5:1
- At least 15,000 deaths/year
- 10th leading cause of death in men>55yrs

Risk factors

Risk factor	Odds ratio
Smoking	5.1
Family History AAA	1.9
Older age	1.7
Diabetes	0.5
Female gender	0.2

AAA rupture risk

AAA size (cm)	Annual rupture risk
<4	0%
4-5	0.5%-1.5%
5-6	3%-5%
6-7	10%-20%
7-8	20-40%
>8	50%

Diagnosis

- Usually asymptomatic
- Physical exam- poor sensitivity & accuracy
- Imaging : USS, CT scan
- CT Scan- defines anatomy, excludes rupture and evaluate other pathology
- Management- Open repair / Endovascular repair

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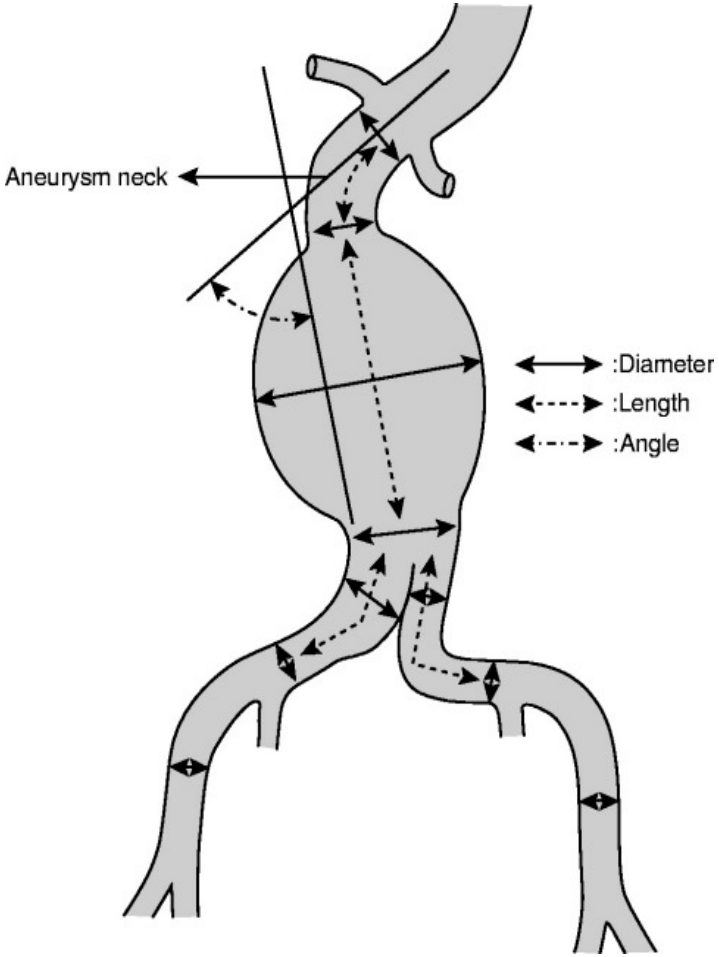
EVAR requirements



- **Neck Parameters**

-Length: 15-20mm

-Diameter: <30mm

-Angulation: <60º

-Minimal aortic thrombus

- **Common iliac parameters**

-Length: 20-25mm

-Diameter: 6-7mm

-Minimal thrombus

EVAR Requirements- Exceptions

-Short distal landing zone in CIA

1. Extend repair to external iliac artery

- Coil embolization of unilateral hypogastric
- Bilateral hypogastric occlusion- risk of pelvic ischemia

2. Use of “bell bottomed” or flared iliac limbs

- Capable of sealing ectatic or mild aneurysmal common iliac arteries

Contraindications

- High grade stenosis/occlusion SMA/celiac axis
- Neck angulation >60º, diameter greater than 32mm, or severe calcification or thrombus
- Iliac arteries-severe calcification or tortuosity
- Renal insufficiency- contraindication to IV contrast

Table 2 -- FDA-Approved Endografts: Description, Length and Diameter Availability

		Main Body	Iliac Leg	Delivery System Profile	Fixed Location	Stent Material	Graft Material
Company	Device	Length (cm)	Diam. (mm)	Length (cm)			
Cook	Zenith	7.4, 8.8, 10.3, 11.7, 13.2	22, 24, 26, 28, 30, 32, 36	3.7, 5.4, 7.1, 8.8, 10.5, 12.2	8, 10, 12, 14, 16, 18, 20, 22, 24	20, 22, 24 F	18, 20, 22 F
Edologix	Powerlink	8,10	25, 28, 34	4,55	16	21 F	
Gore	Excluder	14, 16, 18	23, 26, 285, 31+	10, 12, 14	12, 145, 16, 18, 20	20 F	18 F
Medtronic	AneuRx	13.5, 16.5	20, 22, 24, 26, 28	85, 115	12, 13, 14, 15, 16	21 F	

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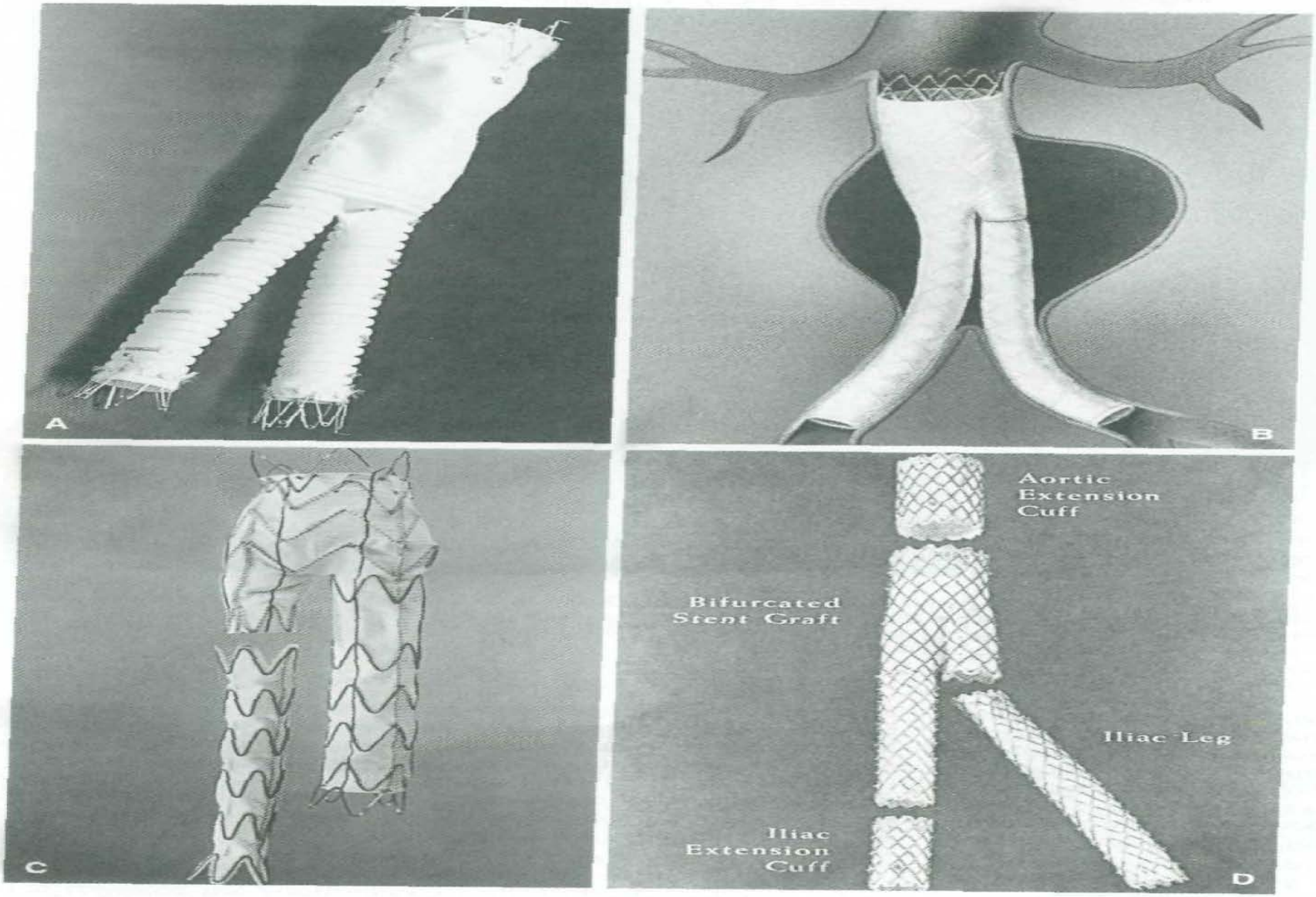
Endovascular stent grafts



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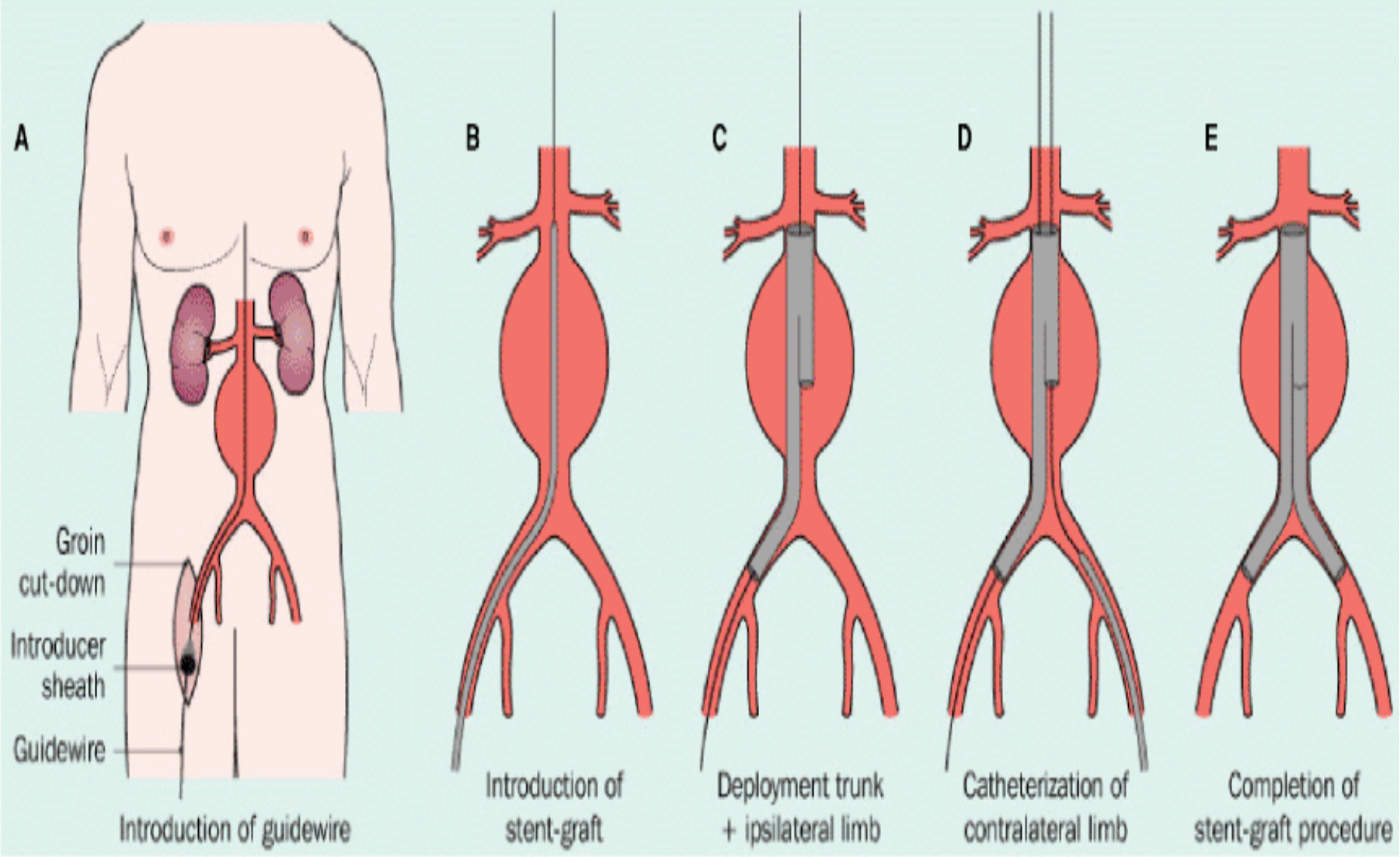
Surgical technique



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Two-Year Outcomes after Conventional or Endovascular Repair of Abdominal Aortic Aneurysms

Jan D. Blankensteijn, M.D., Sjors E.C.A. de Jong, M.D., Monique Prinssen, M.D., Arie C. van der Ham, M.D., Jaap Buth, M.D., Steven M.M. van Sterkenburg, M.D., Hence J.M. Verhagen, M.D., Erik Buskens, M.D., and Diederick E. Grobbee, M.D., for the Dutch Randomized Endovascular Aneurysm Management (DREAM) Trial Group*

Endovascular aneurysm repair versus open repair in patients with abdominal aortic aneurysm (EVAR trial 1): randomised controlled trial

EVAR trial participants*

Lancet 2005; 365: 2179–86
Published online June 17, 2005
DOI:10.1016/S0140-6736(05)66627-5

See Comment page 2156
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*Trial participants listed at end of paper

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	EVAR 1	DREAM
Trial design	Multicentre RCT	Multicentre RCT
Trial time span	1999–2003	2000–3
No of centres	34	30
No of patients registered	4799*	351
No of patients randomised	1082	339
No of patients randomised to open repair	539	178
No of patients randomised to EVAR	543	173
Minimum follow-up (months)	12	1
Maximum follow-up (months)	48	42
Mean age (years)	74	69.6 (open) 70.7 (EVAR)
Male:female	9:1	9:1
Aneurysm size criteria (cm)	≥5.5	≥5
Median aneurysm size (cm)	6.2	6.0 and 6.06

EVAR results recorded on an intention-to-treat basis.
*457 unfit offered EVAR 2.
DREAM, Dutch Randomised Endovascular Management Trial Group; EVAR, endovascular aneurysm repair; RCT, randomised controlled trial.

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EVAR vs. Open: Trials	DREAM		EVAR 1	
	Endo	Open	Endo	Open
Peri-op mortality	1.1%	4.5%	1.7%	4.7%
2 year survival	89%	89%		
4 year survival			72%	72%
AAA death (>30 days)	2.1%	5.7%	4%	7%
Complications 2 years	16%	8%		
Complications 4 years			41%	9%
Re-interventions (4 yr)	3x more		20%	6%
Quality of life (12 mos)	64	70	0.75	0.74

Source: Blankensteijn JD et al *N Engl J Med* 2005;352:2398-05; EVAR Trial Part *Lancet* 2005;365:2179-86

Open AAA vs. EVAR

	Open AAA	EVAR
Blood loss	More	Less
Mortality	3%-5%	Lower
Aneurysm	Gone	Remains
Recovery	Longer	Shorter
Follow up	Minimal	Persistent
Anatomic exclusions	None	Exclusions
ICU stay	Longer	Shorter

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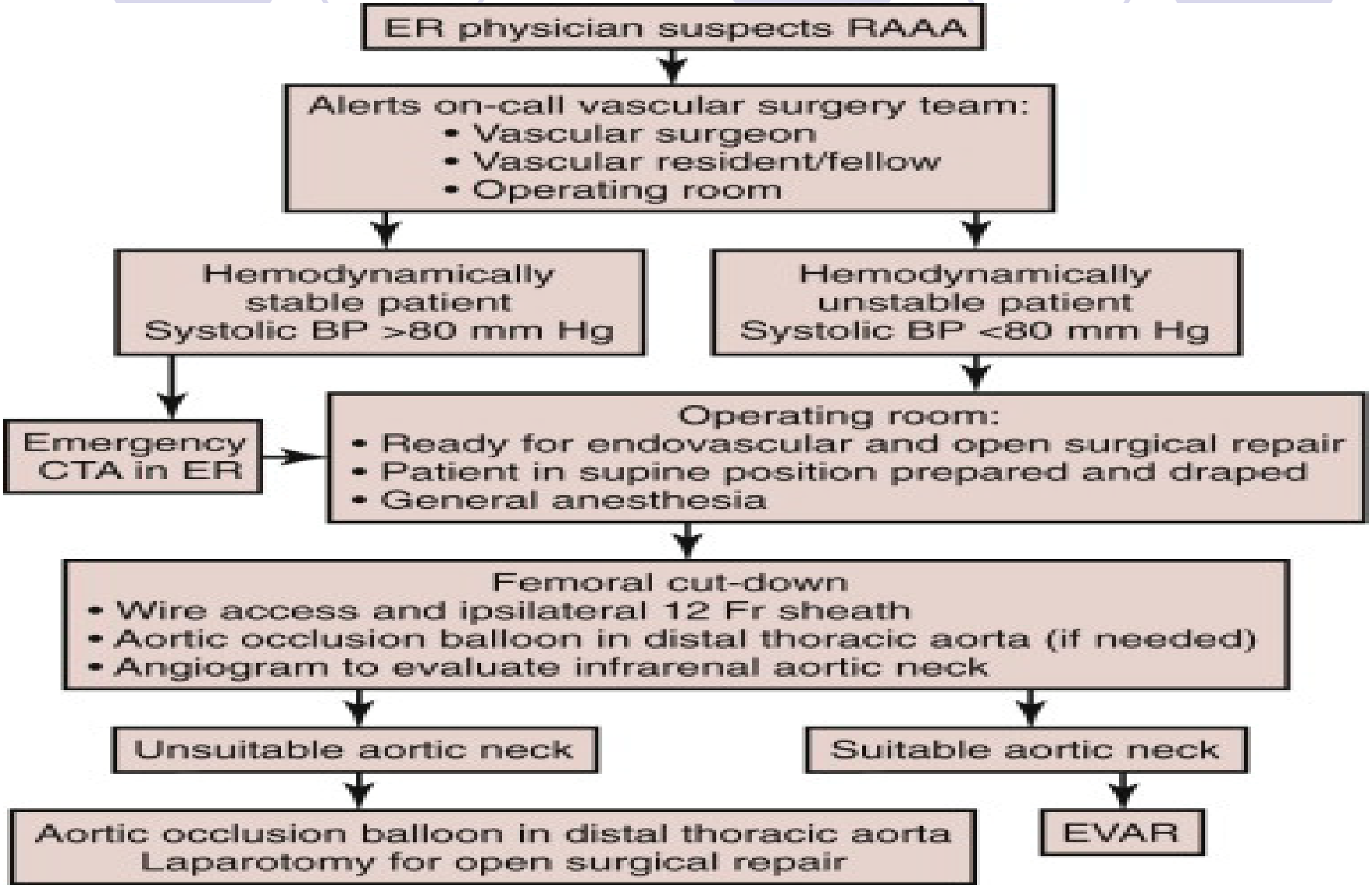
Endovascular repair of ruptured AAA



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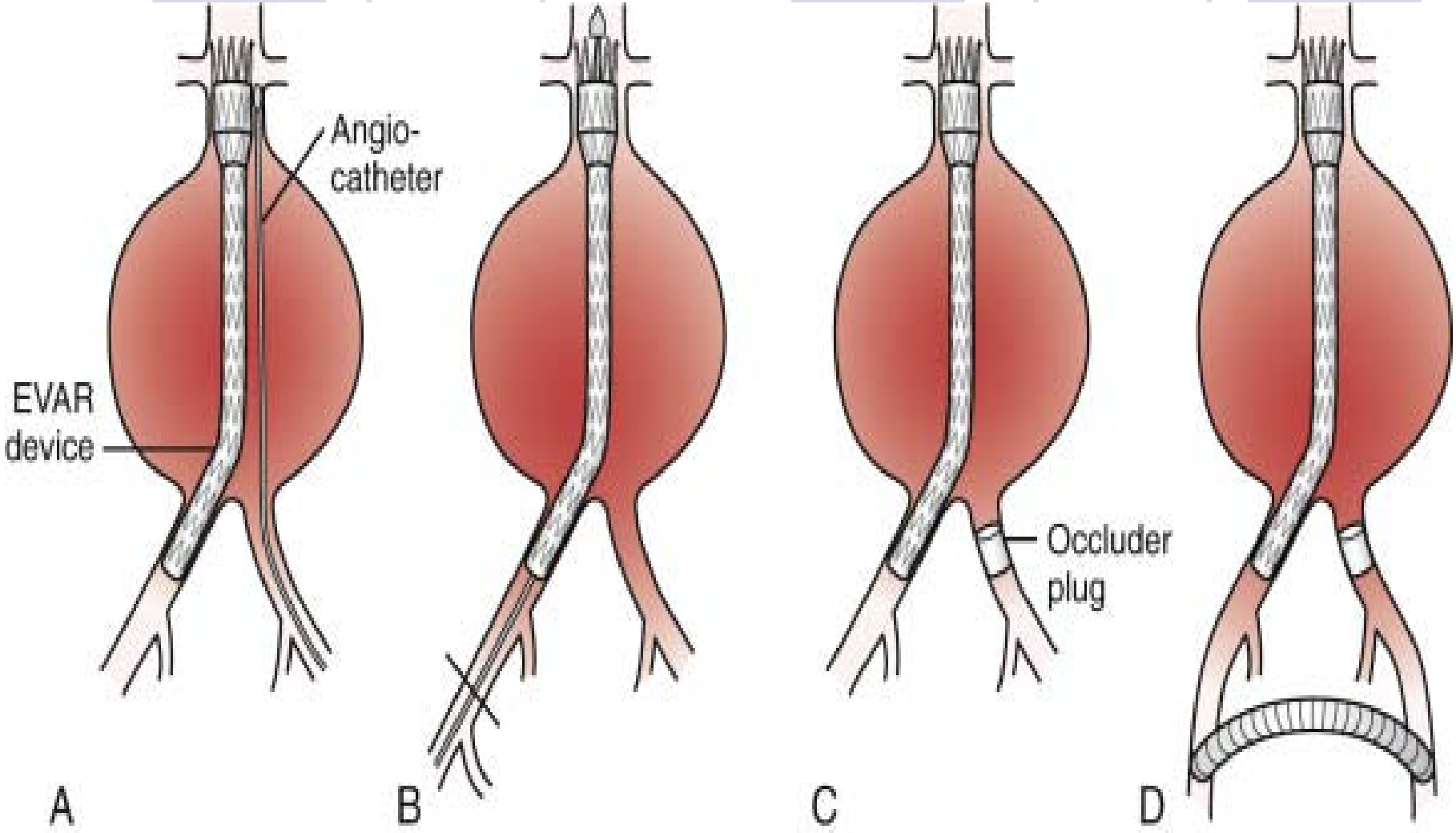
Surgical procedure



Surveillance after EVAR

	Interval	Imaging
Initial routine	1 month	CT w/contrast
	12 months	
No leak; sac smaller	12 months	Duplex USS
Type II endoleak	6 months	CT w/contrast

References

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2. Hollier *et al* ***Haimovici's Vascular Surgery 5th Edition***. Pgs744-751.
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5. EVAR Trial Part ***Lancet*** 2005;365:2179-86
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