

Intraoperative imaging controversy

Do we really need these costly machines?

Conventional C-arm is a rationale option

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Vascular Surgery Departments

Lyon, Clermont-Ferrand and Saint-Etienne

University Hospitals

Conflicts of interest

Proctor Cook Medical

Hybrid room advantages

More powerful X-ray generators

Better quality imaging

Cooling system much more efficient (long fluoroscopy times in obese patients)

Decreased X-ray dose and contrast load

Fusion with pre-op CT

Cost hybrid room vs mobile C-arm

Material/setup

1500 k€ vs 150 k€

Maintenance

150 k€/an vs 1,5 k€

Global cost after 10 years

1 hybrid room = 20 mobile C-arms !!



Use of intraoperative imaging in the vascular operating room

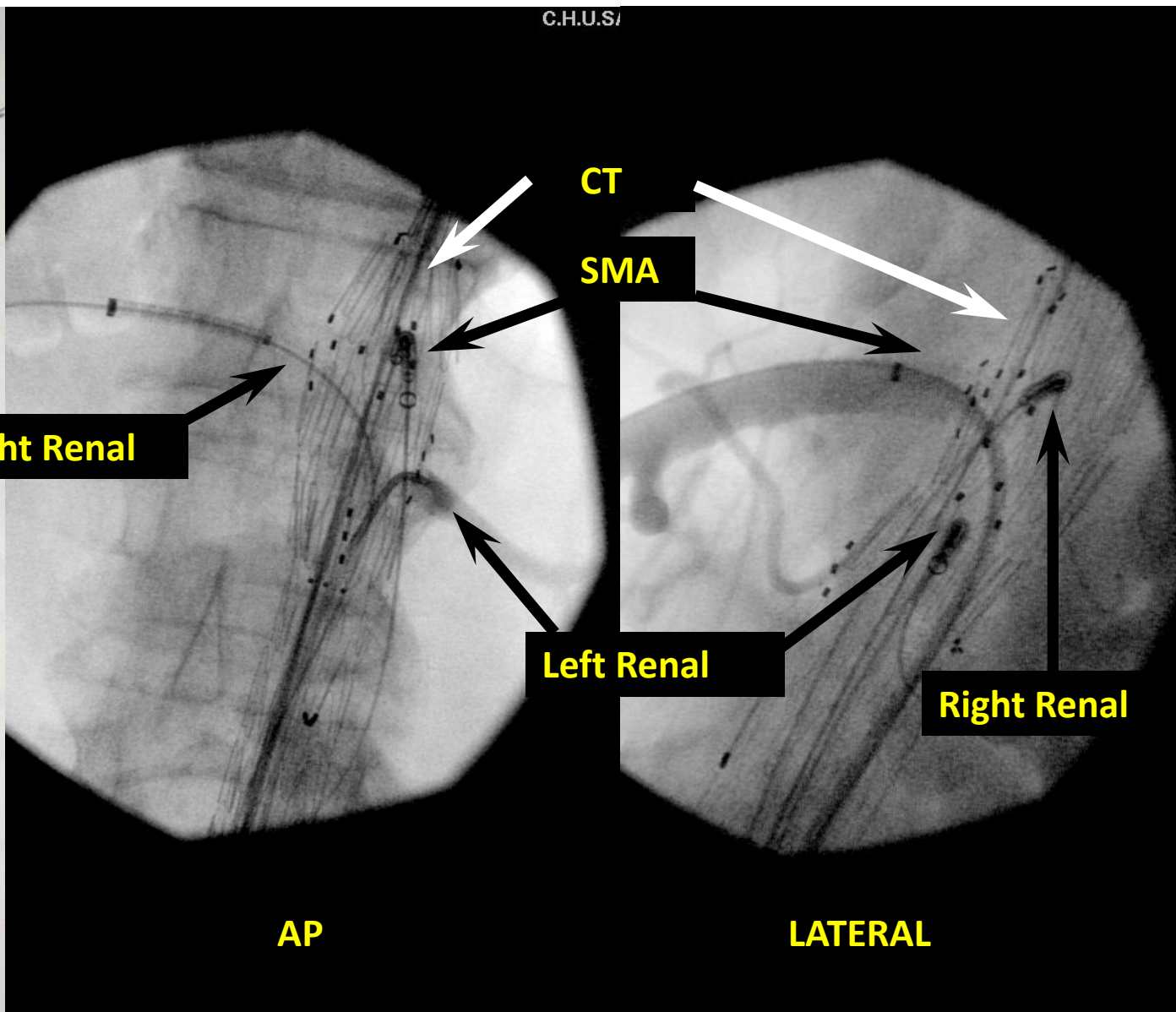
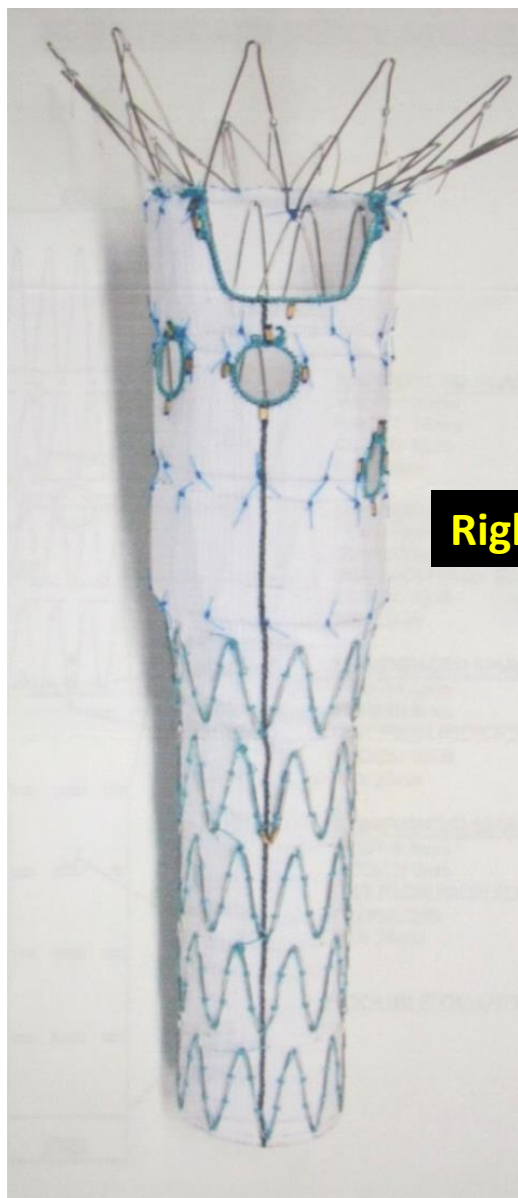
CHU Saint-Etienne vascular activity 2013

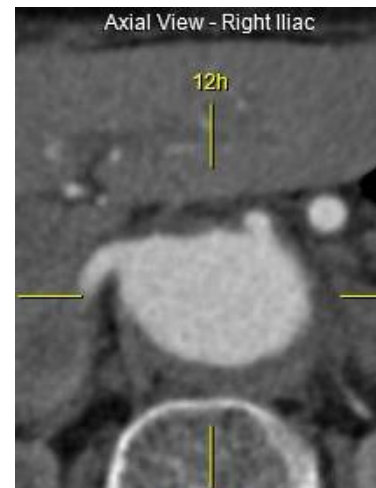
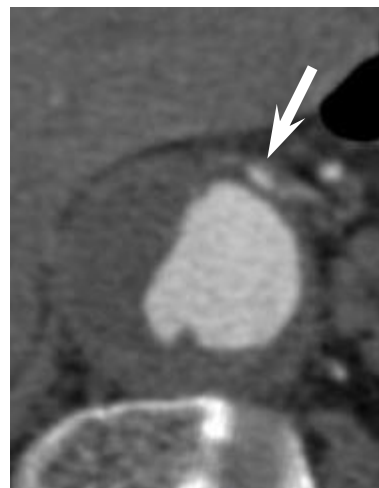
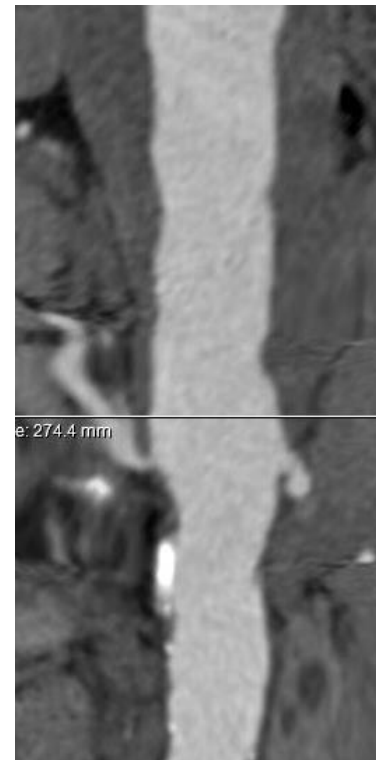
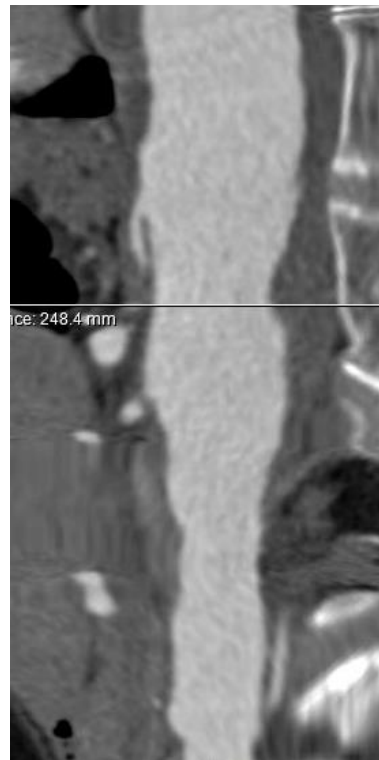
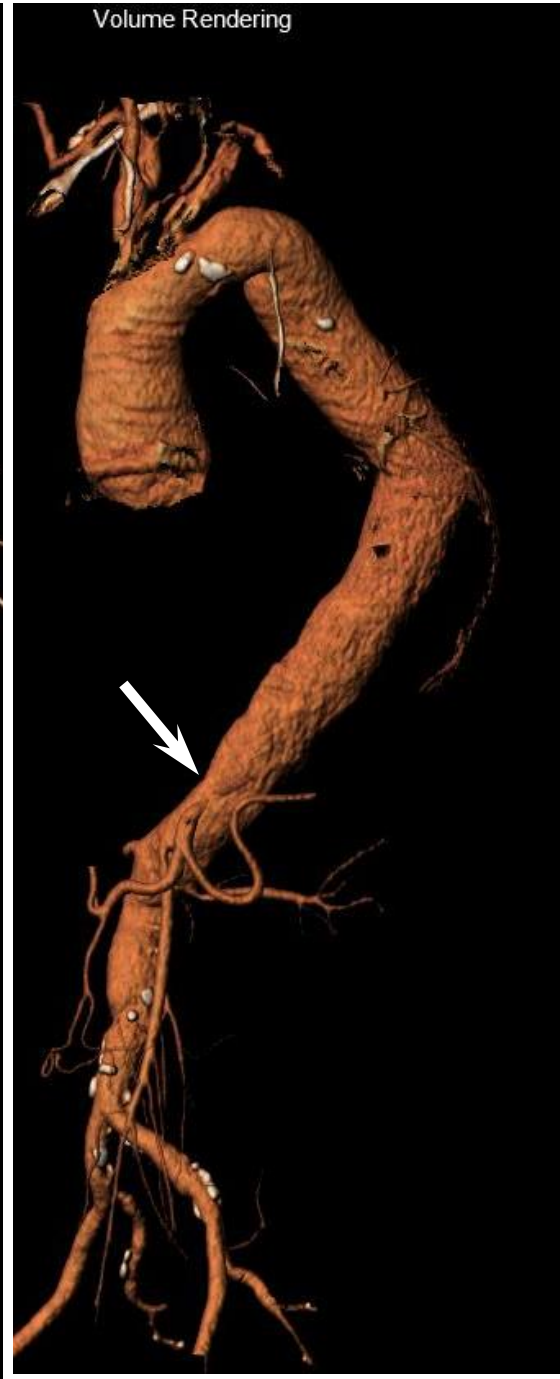
N arterial procedures	988
N endovascular procedures	464 (47%)
Infringuinal	200
Iliac	130
Infrarenal + thoracic stent-grafts	60
AV fistulae	15
Fenestrated SG	14 (3 %)
Renal and visceral	20
Carotids/ supra aortic trunks	25
	13 %

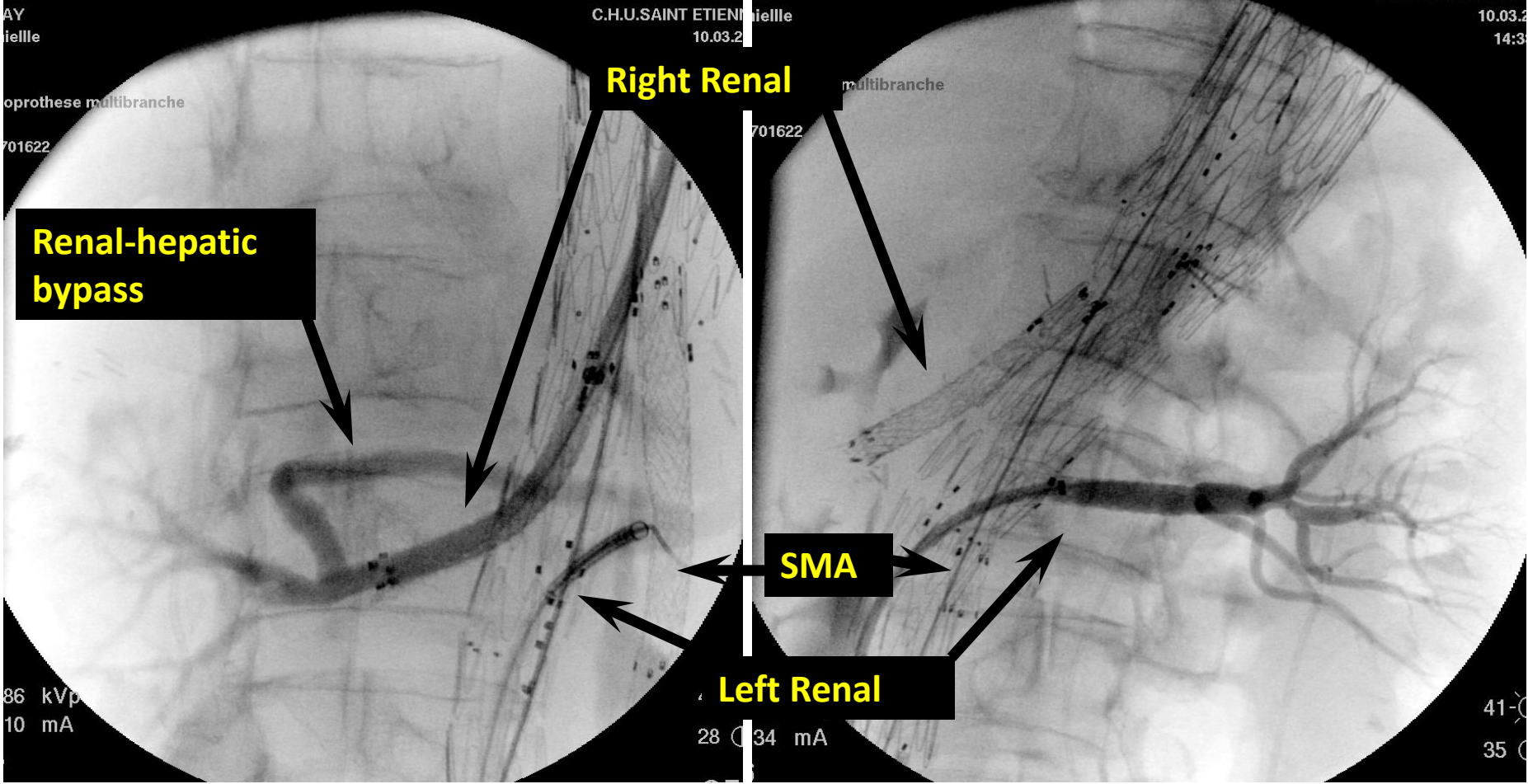
Fenestrated/ branched SG experience

Collaboration Lyon/Clermont-Ferrand/Saint-Etienne











Patients N=91

Nov 2005 - Janv 2015

Age 72 y (53-85)

Juxta and supra-renal	65
Thoraco-abdominal	26
High surgical risk	100%

Stent-grafts

Fenestrated

68

Fenestrations

1

1

2

18

3

32

4

17

Fenestrated + branch

14

Branch

9

Total

91

Procedures

Duration (min)	224 (150-617)
Fluoroscopy time (min)	75 (11-250)
Contrast load (ml)	148 (52-300)
Technical success	89 pts (98%)

Postoperative mortality

	N patients	N deaths	%
Global	91	5	5.5
AAA JR/SR	65	2	3
ATA	26	3	11.5

C-arm management during fenestrated/branch SG procedures

« Easy » steps

Guidewire placement and exchange

Stent-graft delivery system introduction/retrieval

Renal/visceral sheath, covered stent insertion

Balloon dilatation

Low dose setting (30-50 %)

Fluoro with

Pulse 4 to 8 frames / sec

No roadmapping

Minimal use of zoom and oblique views

C-arm management during fenestrated/branch SG procedures

« Tricky » steps

SG orientation, visualisation of fen/branch markers

Fen/branch, target artery catheterism

Covered stent positioning

Low dose setting (30-50 %)

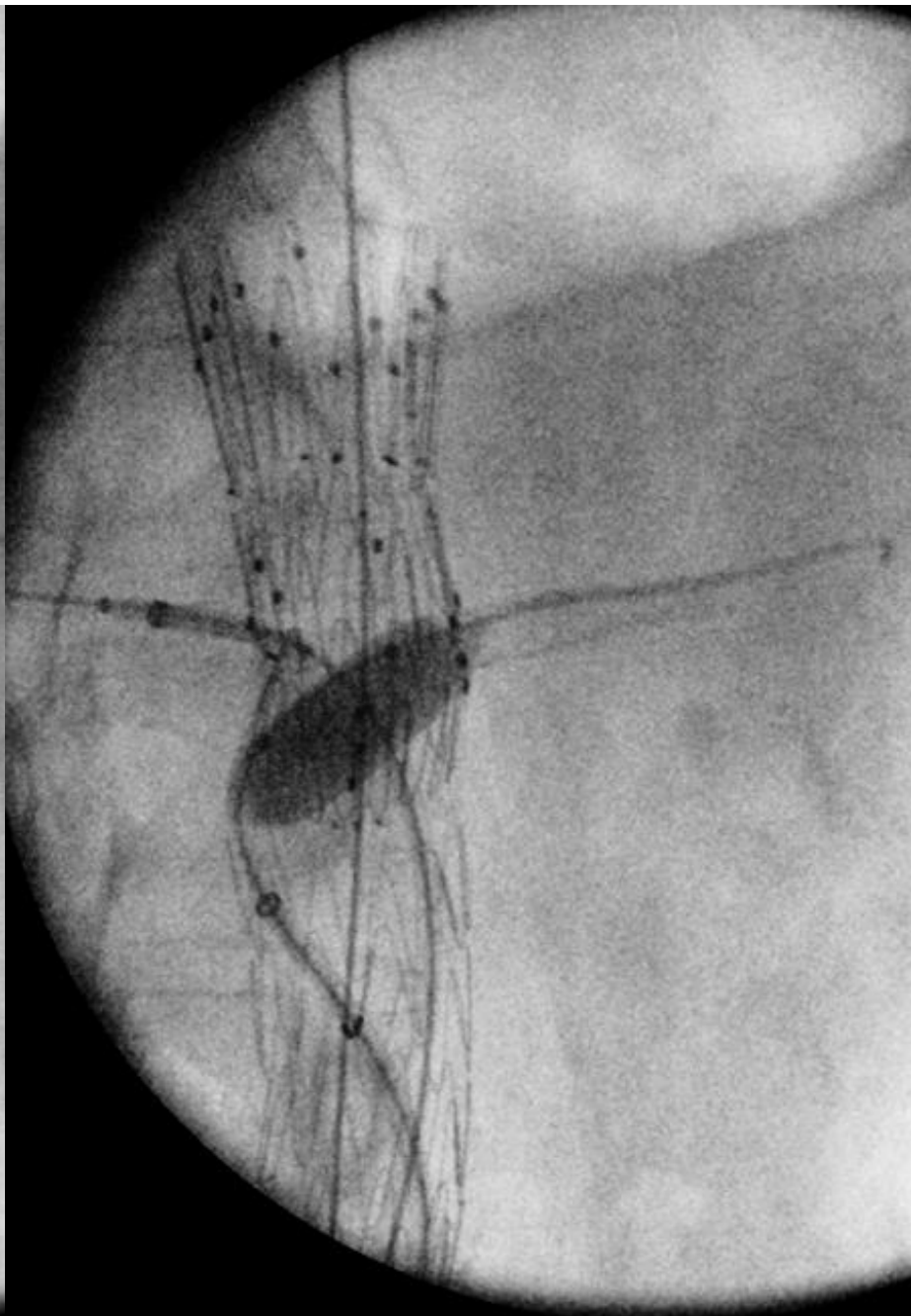
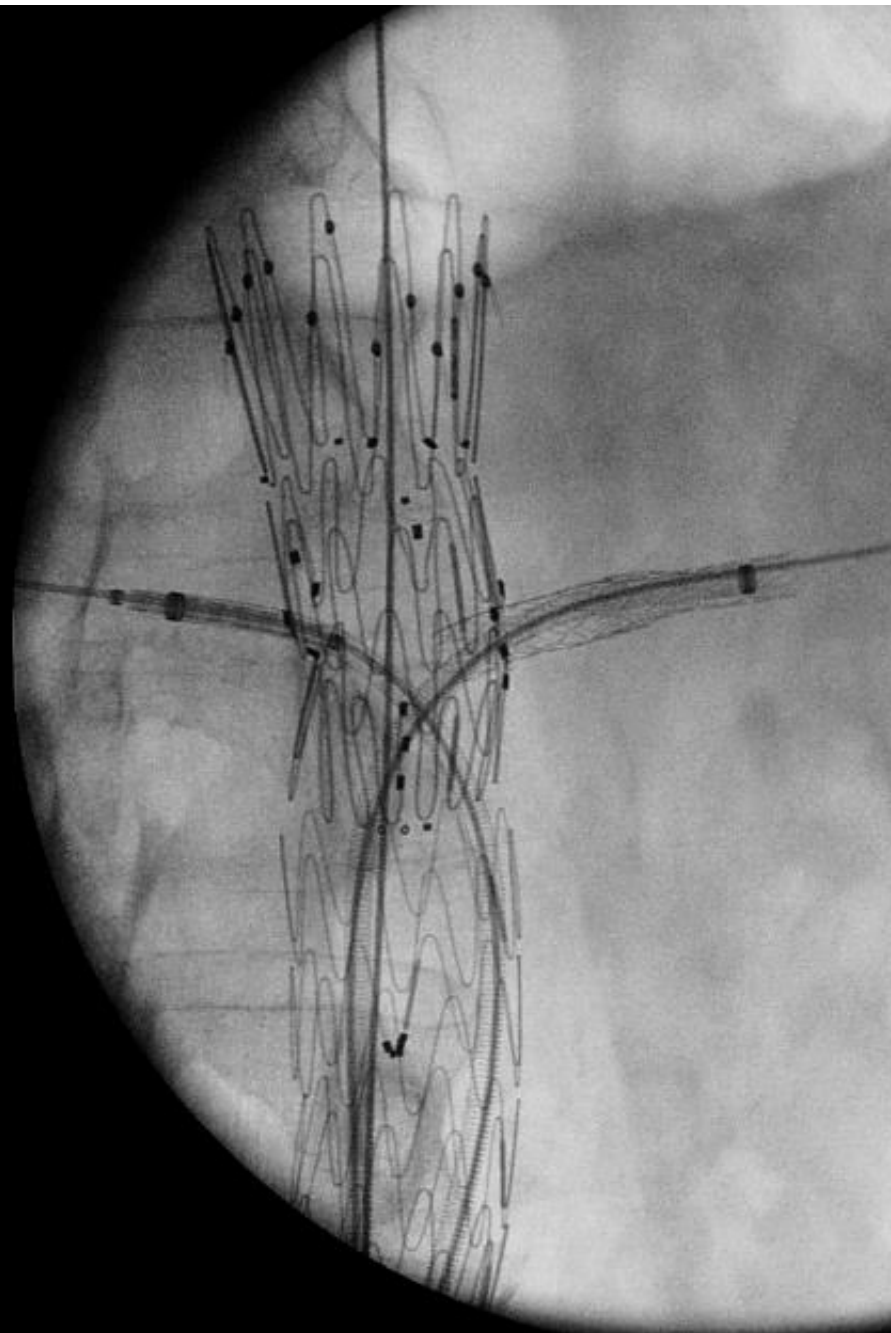
Fluoro with

NO Pulse

No roadmapping

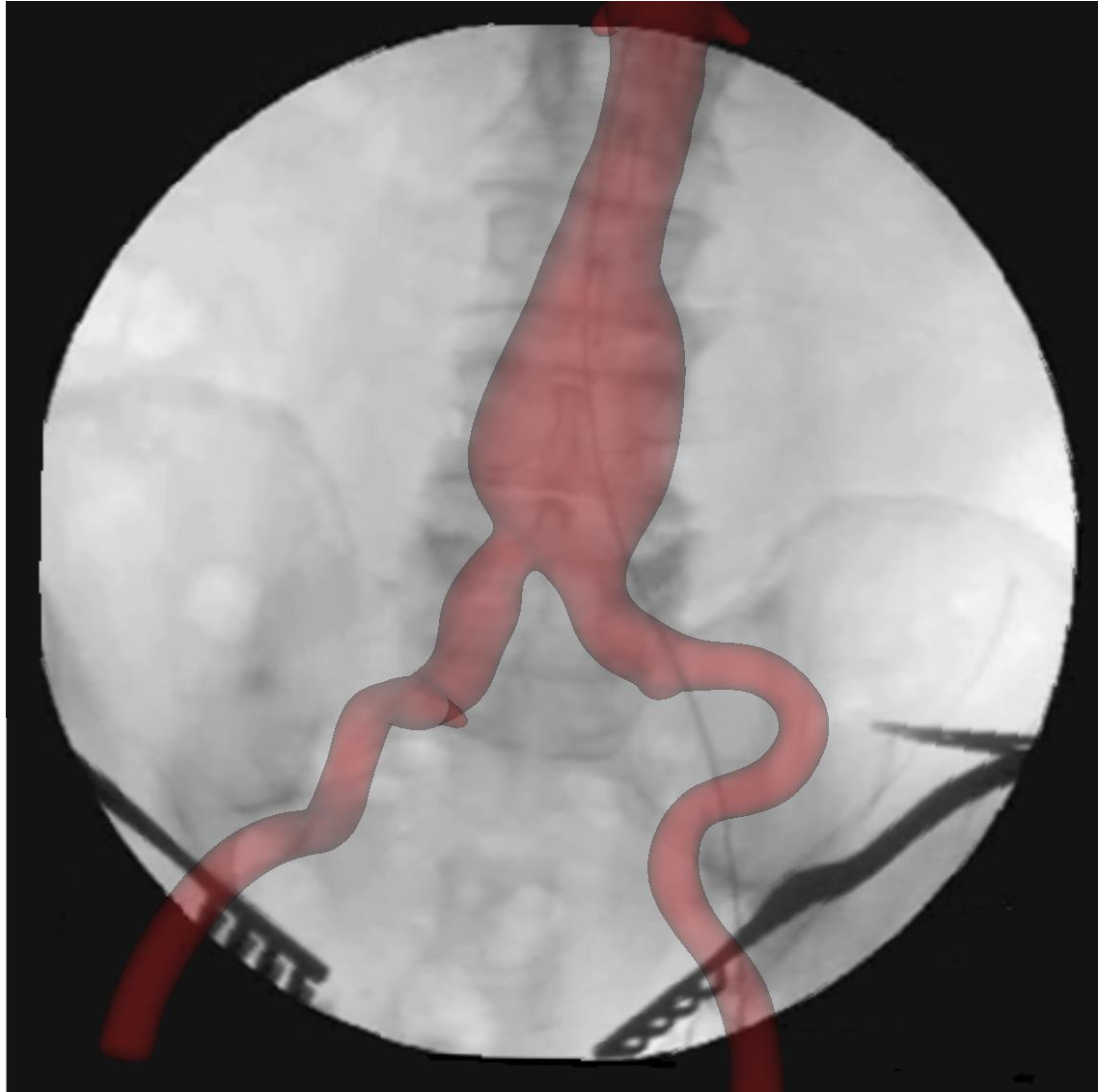
Zoom and oblique views if needed

High definition « snapshots »



Integration of fusion in mobile C-arms

Therenva Endonaut project



The ideal cardiovascular mobile C-arm

Flat detectors (Phillips)

High powered X-ray generators and cooling systems (Siemens CIOS alpha)

Motorisation (OEC 9900)

Fusion

Affordable cost

The future?



Projet de salle hybride en chirurgie cardio-vasculaire

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