

CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES IN VASCULAR SURGERY

JANUARY 19-21 2017

MARRIOTT RIVE GAUCHE & CONFERENCE CENTER
PARIS, FRANCE



*BENEFITS OF INTRAOPERATIVE
FUSION IMAGING FOR AORTIC
DISSECTION.*

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France

Disclosure

Speaker name: Rousseau

.....

I do not have any potential conflict of interest on this topic

Introduction

- CT scanner is the gold standard for a complete check of dissections, in identifying multiple entry tears, locating the true & false lumen and identifying perfusion of visceral vessels by the true and/or false lumen.
- Unfortunately all these anatomic data are are not readily available during the intervention, with conventional imaging systems (Angio, TEE, IVUS...).
- Fusion imaging, **on only one imaging system** (angio suite), can aid complex endovascular repair of aortic dissections.

Challenges

Therefore, in cases in which 2D imaging is used as a single modality, frequent control imaging in multiple planes is necessary, which leads to

- prolonged procedural times,
- more contrast media and
- increased radiation exposure for the patient and operator

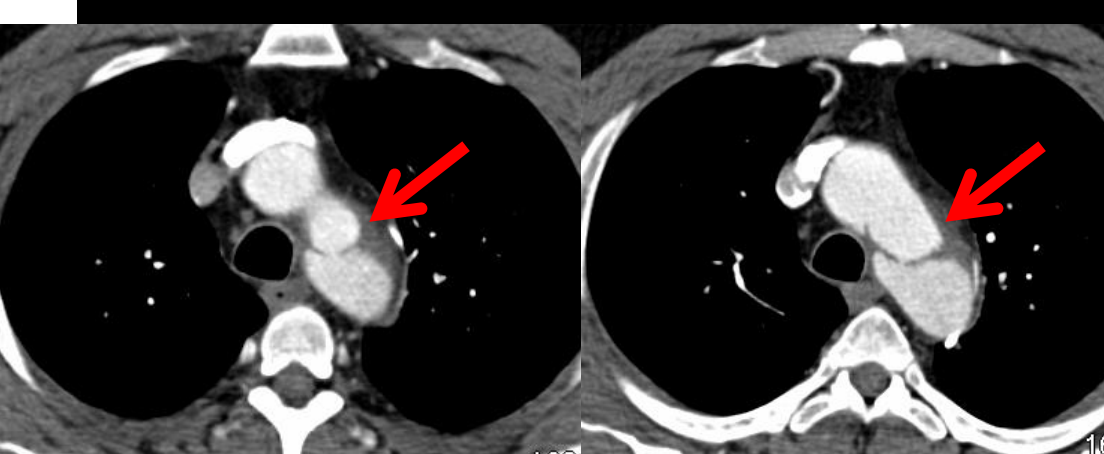
Principle of fusion imaging

1. **Segmentation / With the preoperative C T A**

With the preoperative C T A the different entry tears are marked, & true and the false color labeled.

2. **Fusion**

These data are then superimposed on the fluoroscopic images in order to facilitate deployment of endograft or other endovascular method.

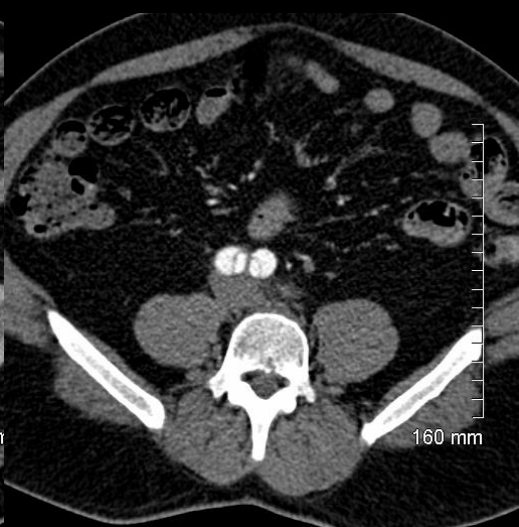
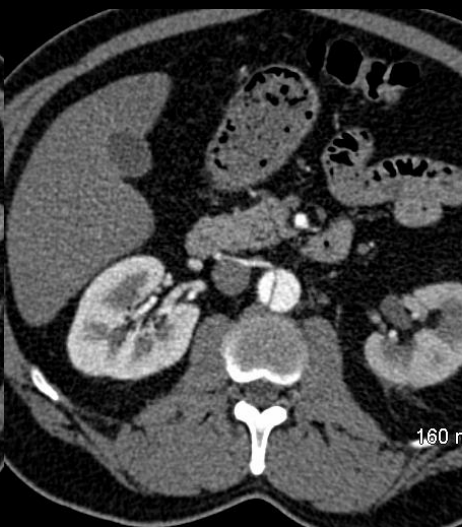
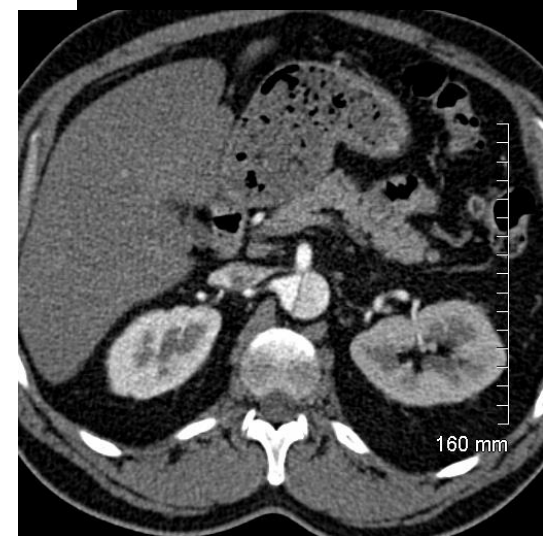


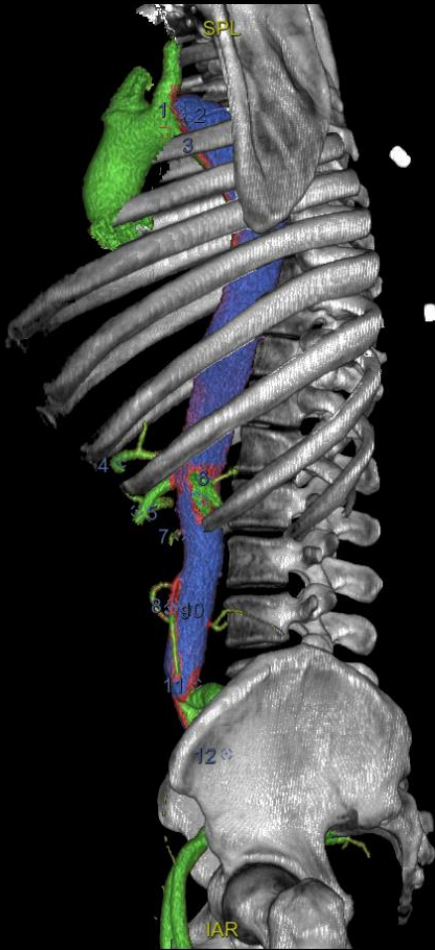
1



2

3





3D
Volume Rendering No cut
DFOV 27.1 x 24.5 cm
B20f No Filter

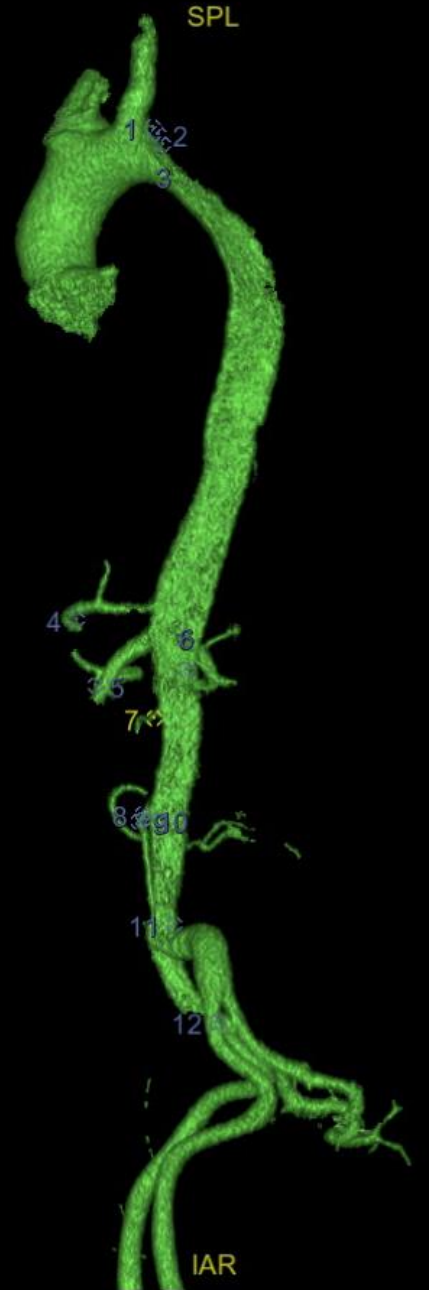
L
P
I

No VOI
kV 120
2.0mm /1.00sp
W = 533 L = 420



Wisniewski
Ex:Jun (

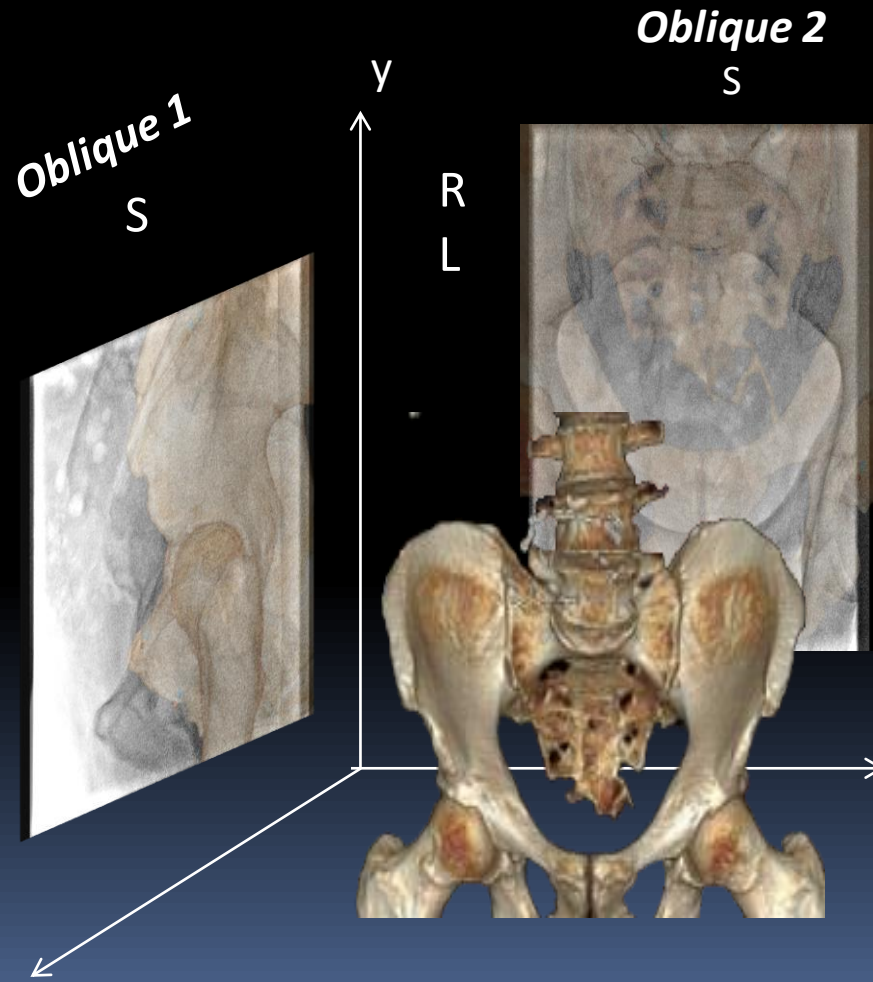
Statif de
0 L 135 RAC



Registration principle : Translation et rotation

Discovery solution (GE)

Bi view method requiring 2 fluoroscopic images separated by at least 45°



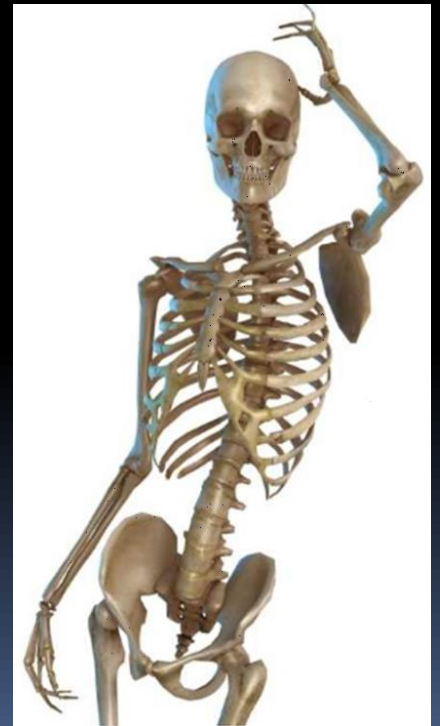
1. Lateral Fluoro
2. Manual Registration
3. Frontal Fluoro
4. Manual Registration
5. Display Vessels

^X Simultaneous display of the 2 view are crucial to see the effect of the registration of one view on the other view and allows optimal iterative registration without back or forth gantry position

Pitfalls

more challenging for thoracic aorta

- **CTA arms positioning difference** versus angiography introduces higher discrepancy on the thoracic than on the abdomen (impact on thoracic is higher than on the abdomen)



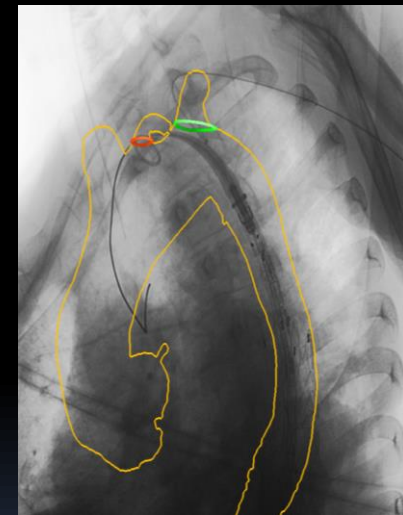
Pitfalls

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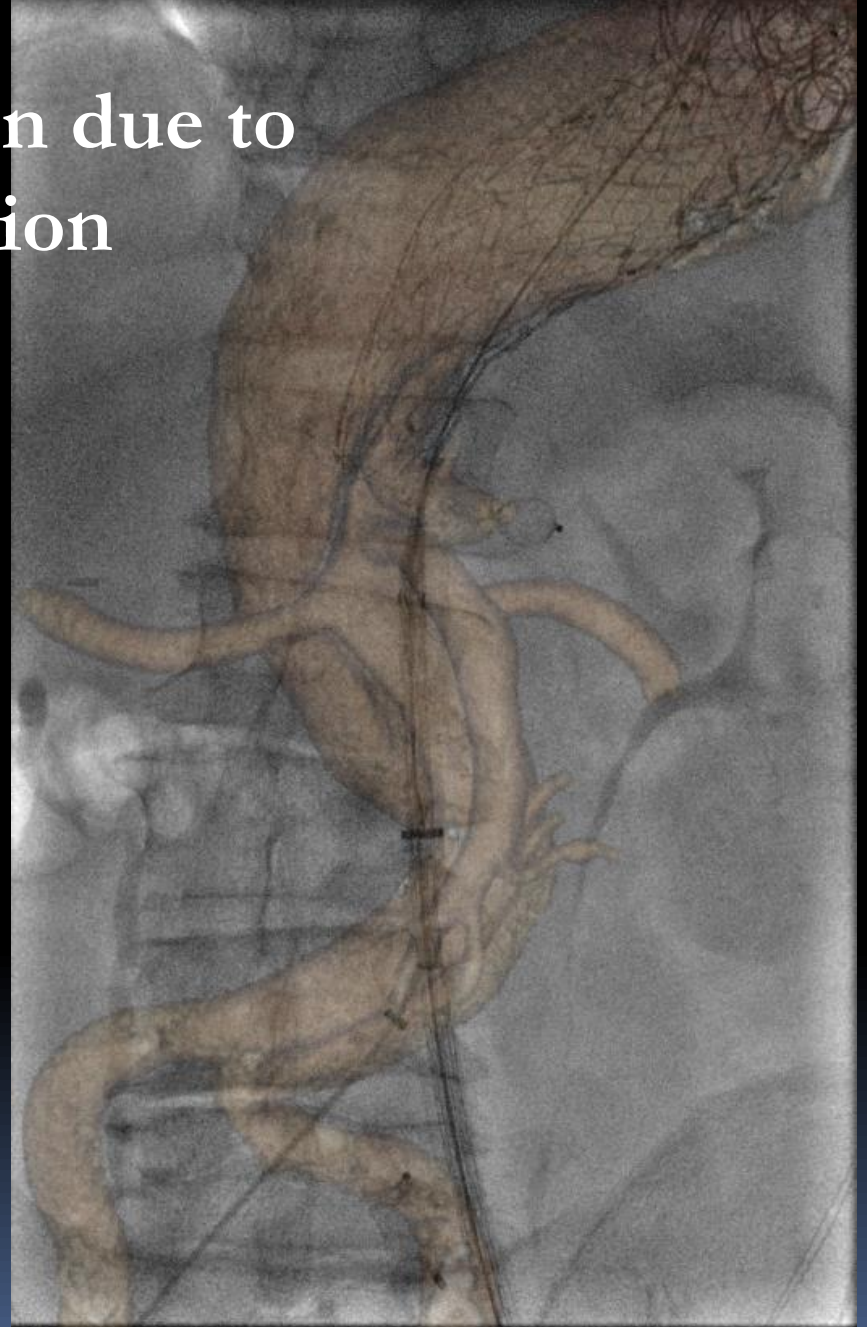
→ Use multiple landmarks as close as possible from your ROI such as stent or calcification

→ fine tune with a small injection (fine tuning ideally directly performed by the operator at table side)



- **Anatomical deformation due to sheath or device insertion**

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Main benefit will be in complex endovascular interventions.

- Stent graft Insertion (branch or fenestrated SG)
- False lumen embolisation
- Visceral branches from the false lumen

3D

S 665

No cut
Volume Rendering

Ex: Mar 17 2015

Non GE image
DFOV 66.4cm
B30f



R
3
1
3

L
3
5
1

Gantry OFF

No VOI
KV 120

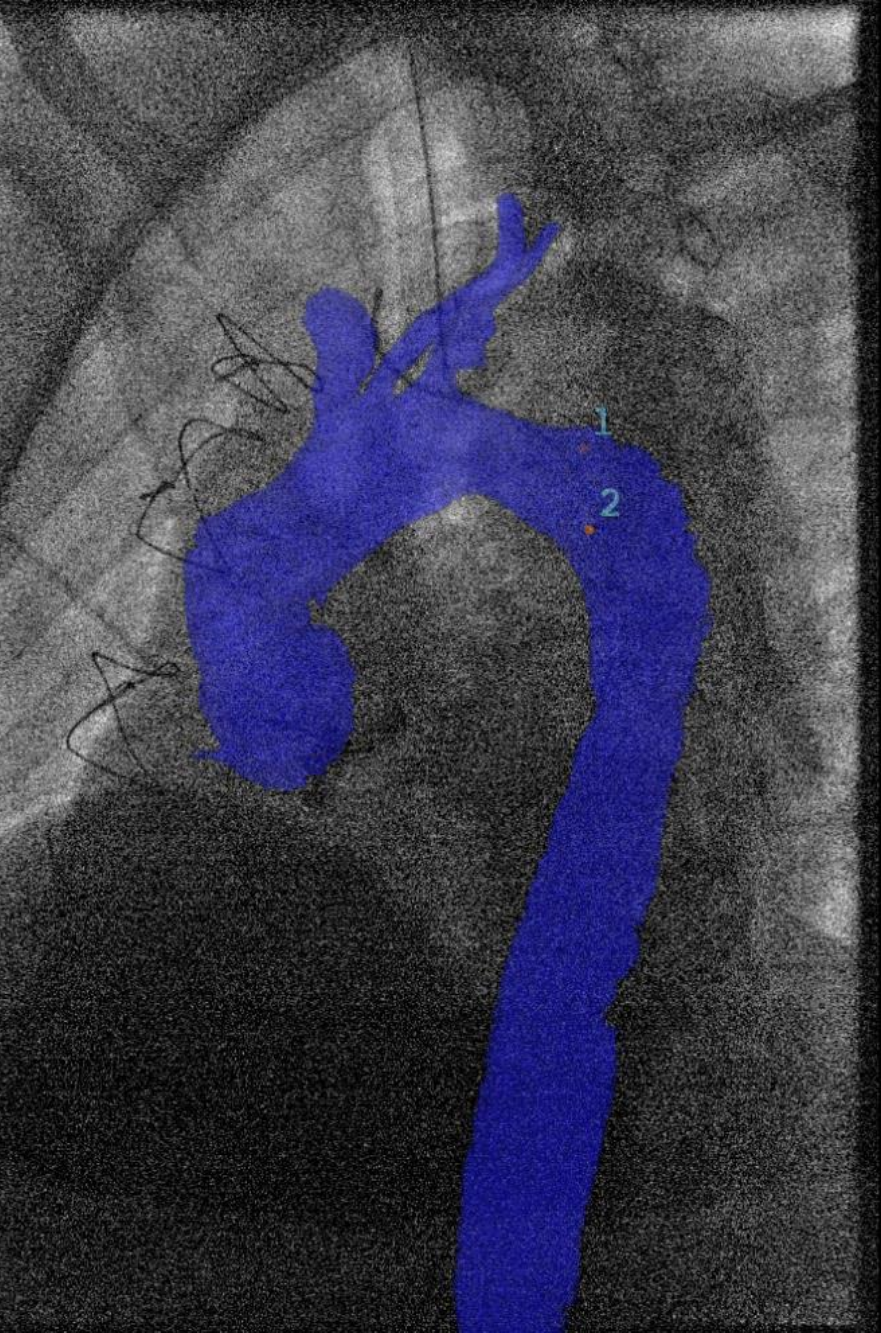
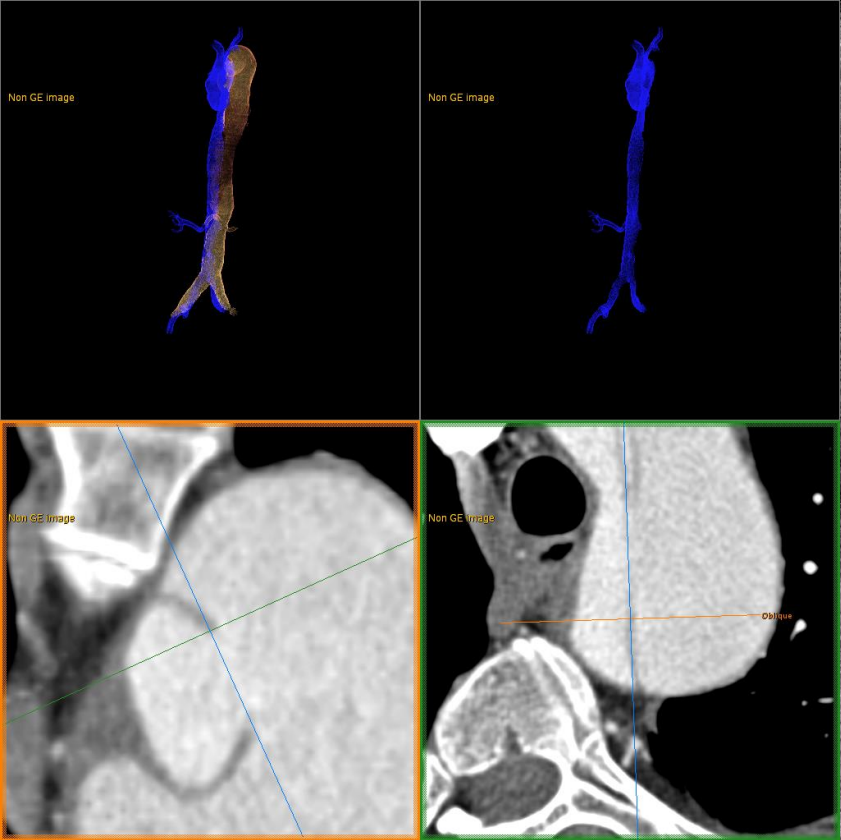
0 L 0 LAO 0 CRA

1.5mm / 1.00sp

W = 594 L = 41

Mun

S 1



Main benefit will be in complex endovascular interventions.

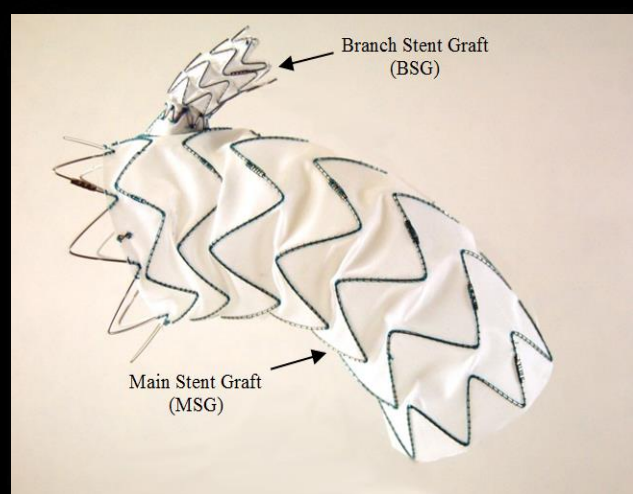
- Stent graft Insertion (branch or fenestrated SG)
- False lumen embolisation
- Visceral branches from the false lumen



Alain

211606

H

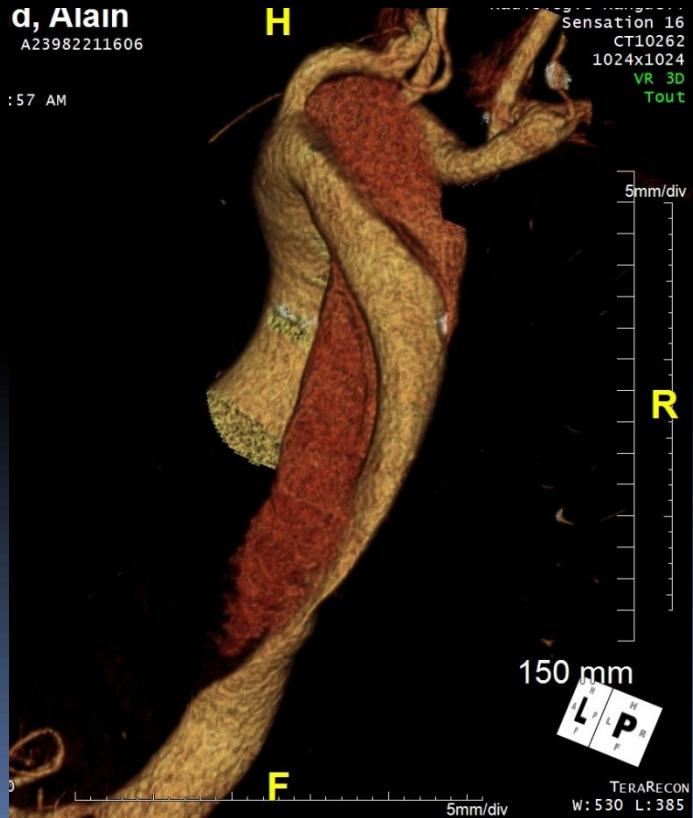


d, Alain

A23982211606

:57 AM

H



Alain

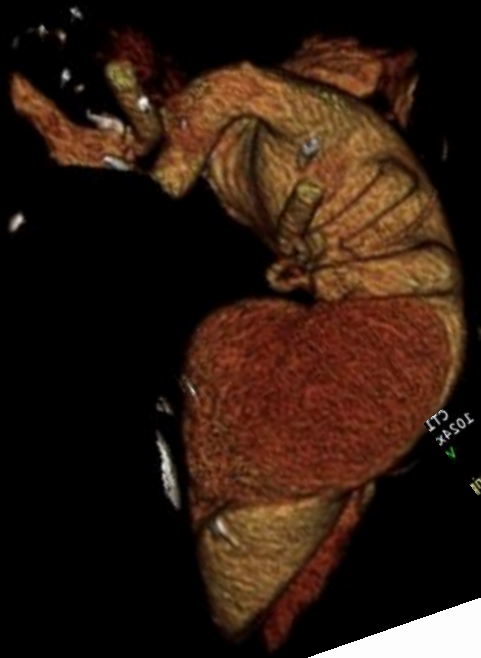
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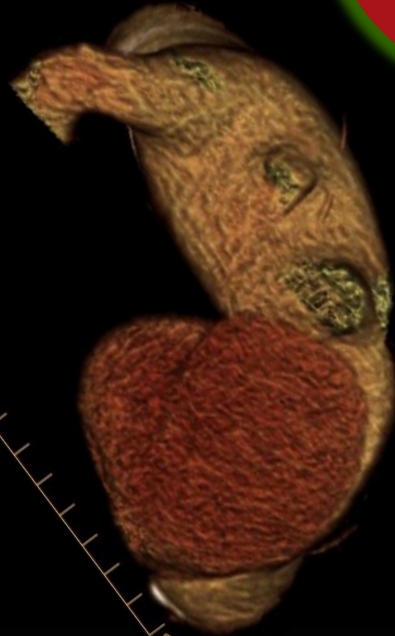


Radiologie Sens

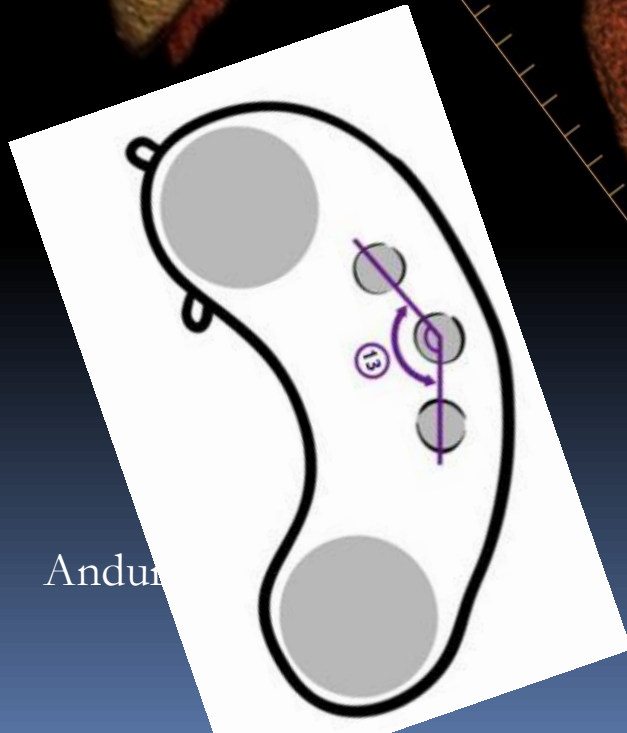
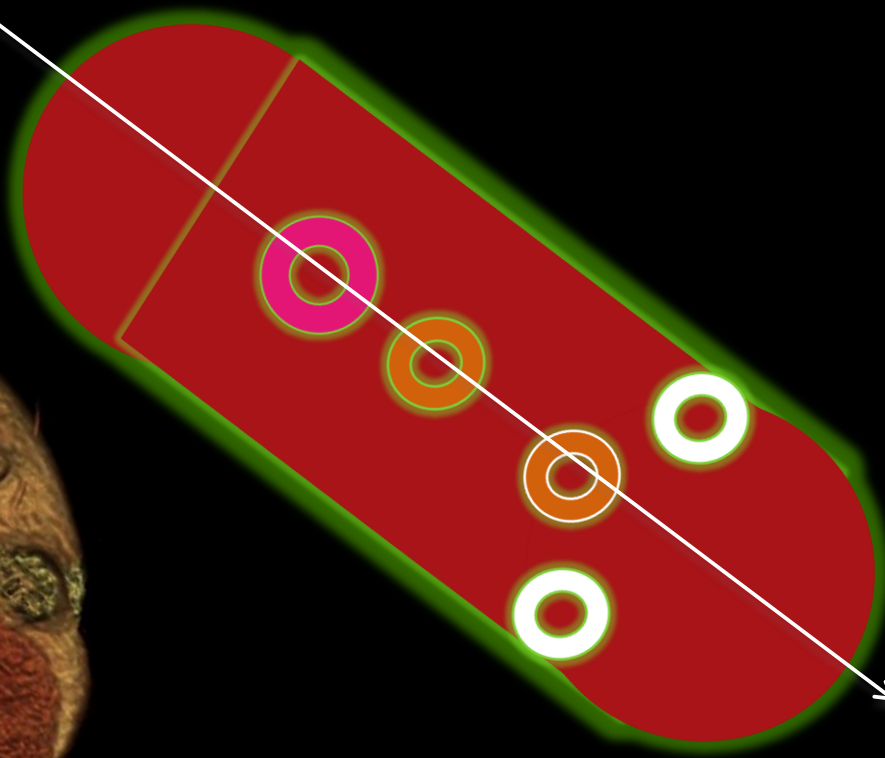
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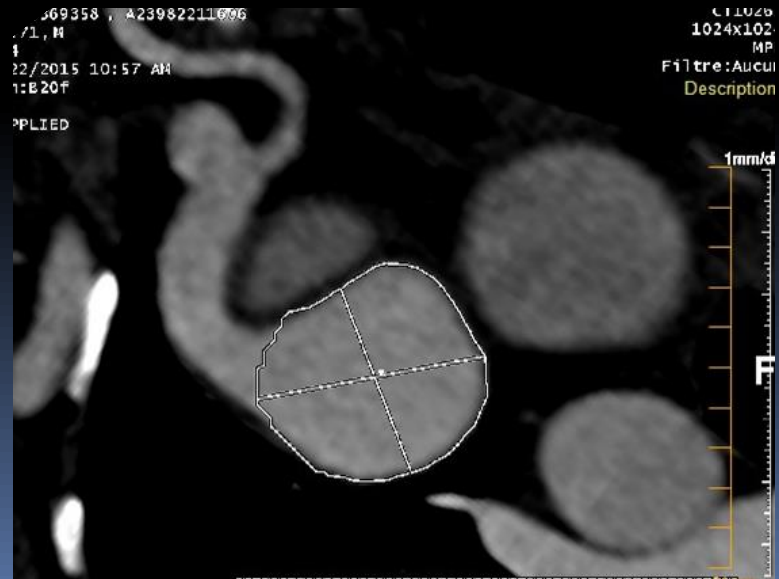
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10:21 AM
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Andu

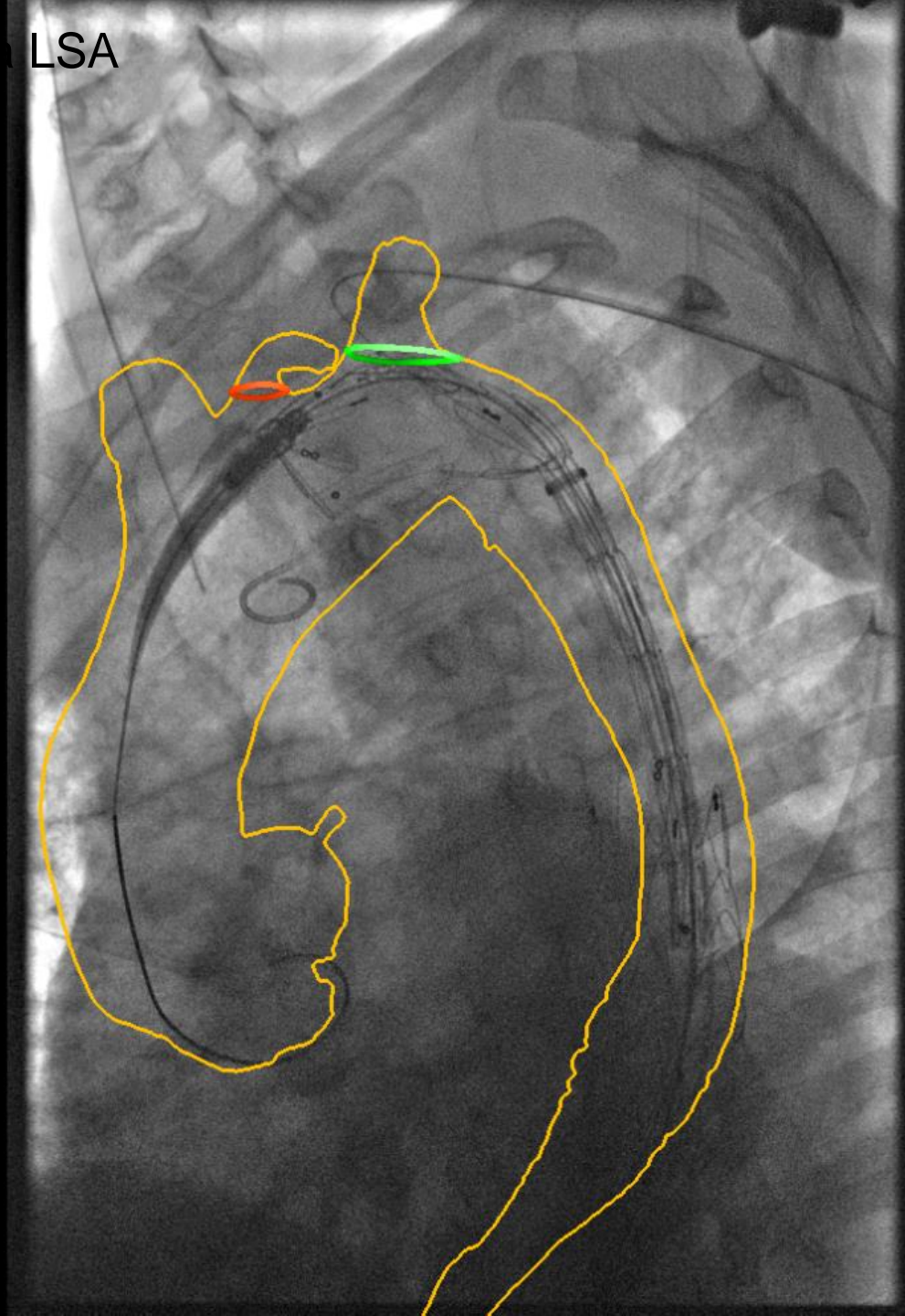


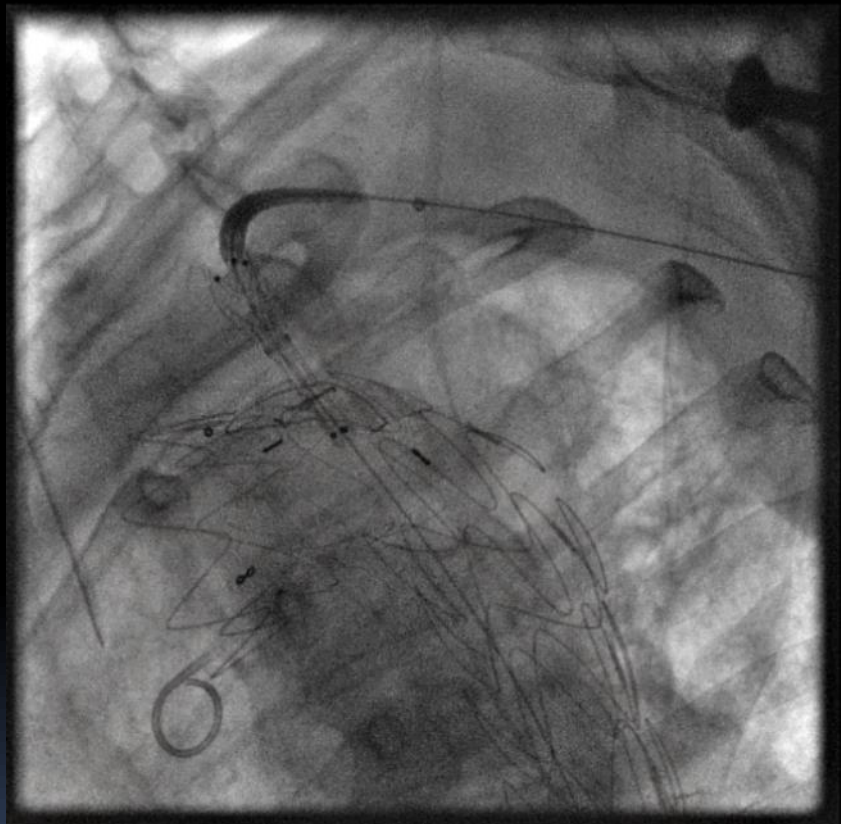
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10:57 AM
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APPLIED

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Description

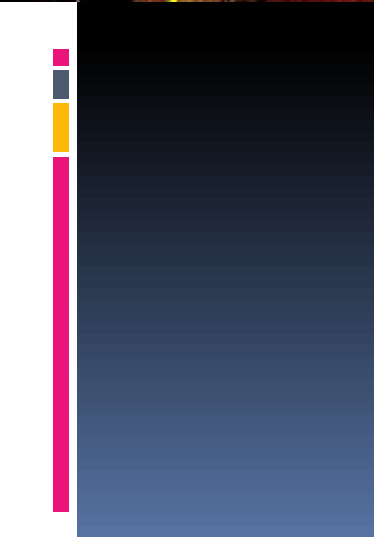
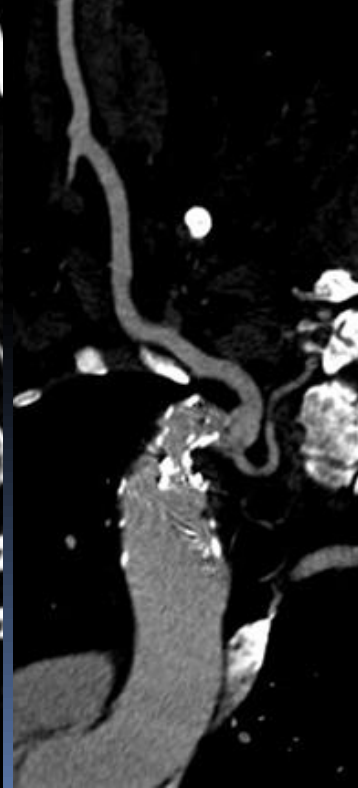
1mm/d

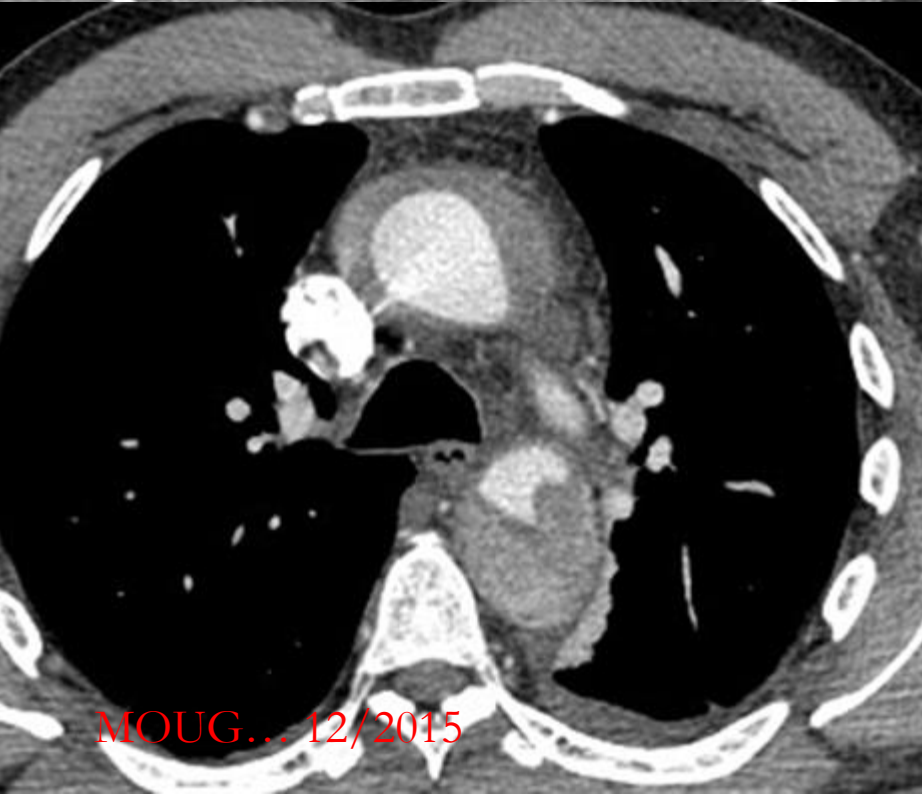
LSA





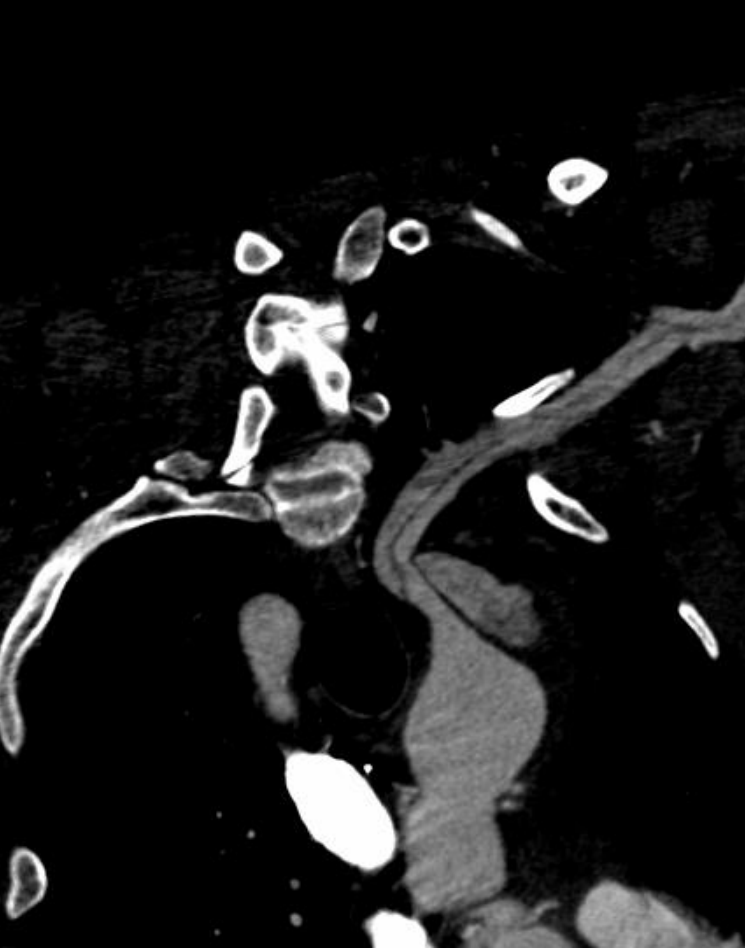






MOUG... 12/2015



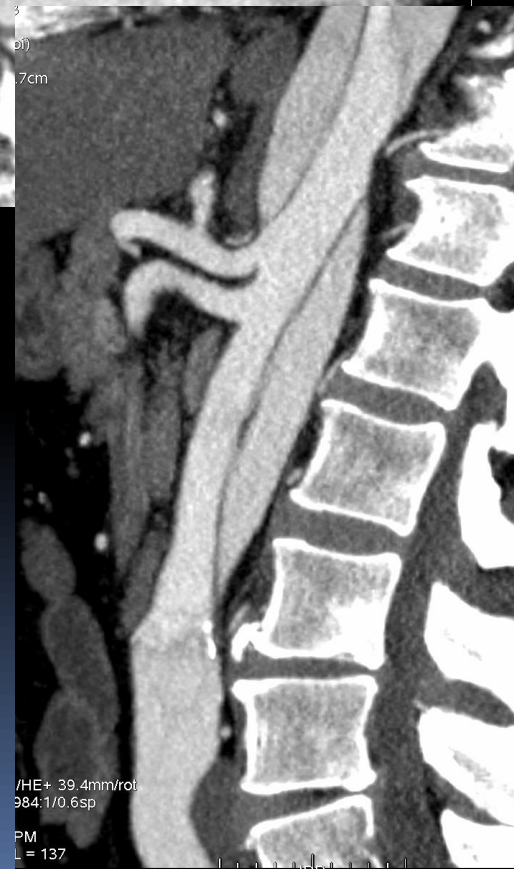


Ex: 40198
S# 2
R: 0.1 (coi)
DFOV 18.3cm
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DoB: Jul 27
Ex: Jan 13:



M 54
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Ex

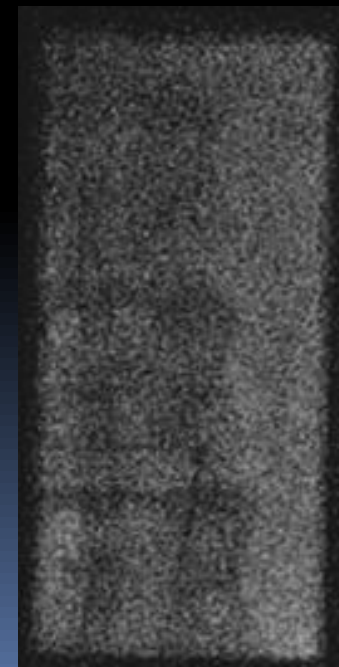
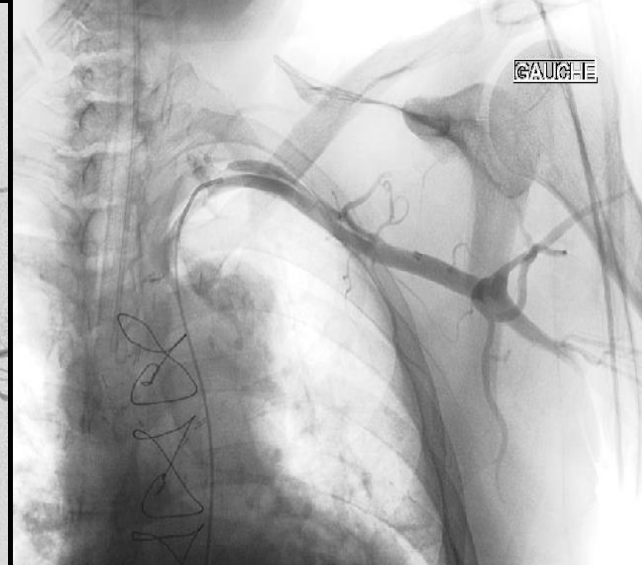
/HE+ 39.4mm/rot
984:1/0.6sp
PM
L = 137



M 54
DoB
Ex

/HE+ 39.4mm/rot
984:1/0.6sp
PM
L = 137







1 ER CONTROLE AOR

1 ER CONTROLE AORTIQ AV

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A244
JU

32x32 cm
1.9 deg
14.4 deg

32x32 cm
1.9 deg
14.4 deg

32x32 cm
1.9 deg
14.4 deg

SUSSEAU

1 ER CONTROLE

MS

S

CONTROLE AC

1.9 deg
14.4 deg
1.00
096WL-2048
8x800

FRAME
MA

ILA

32 cm
9 deg
4 deg

MOUG;;; 7/06/2016

GAU

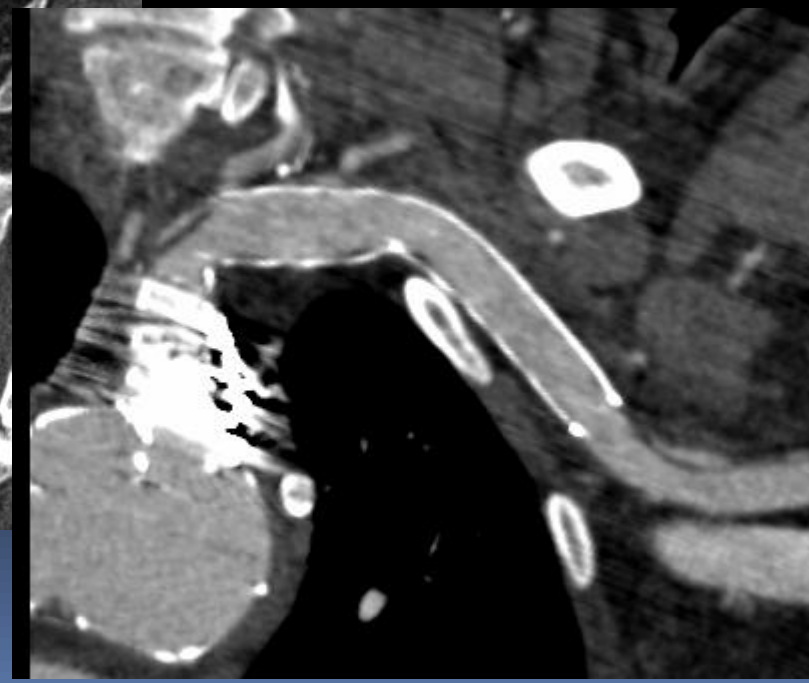
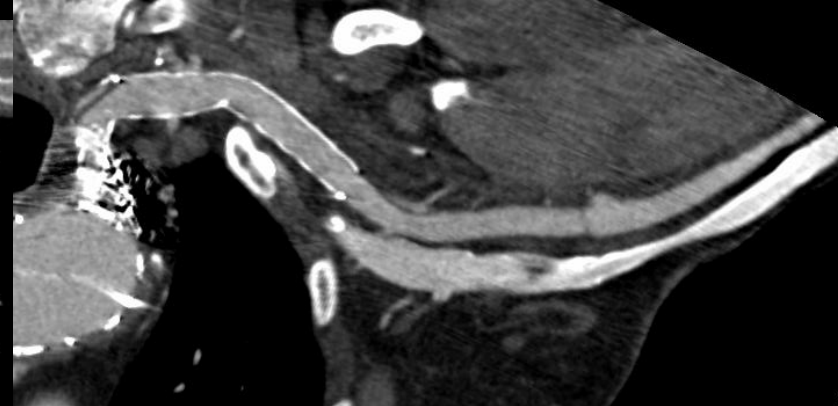
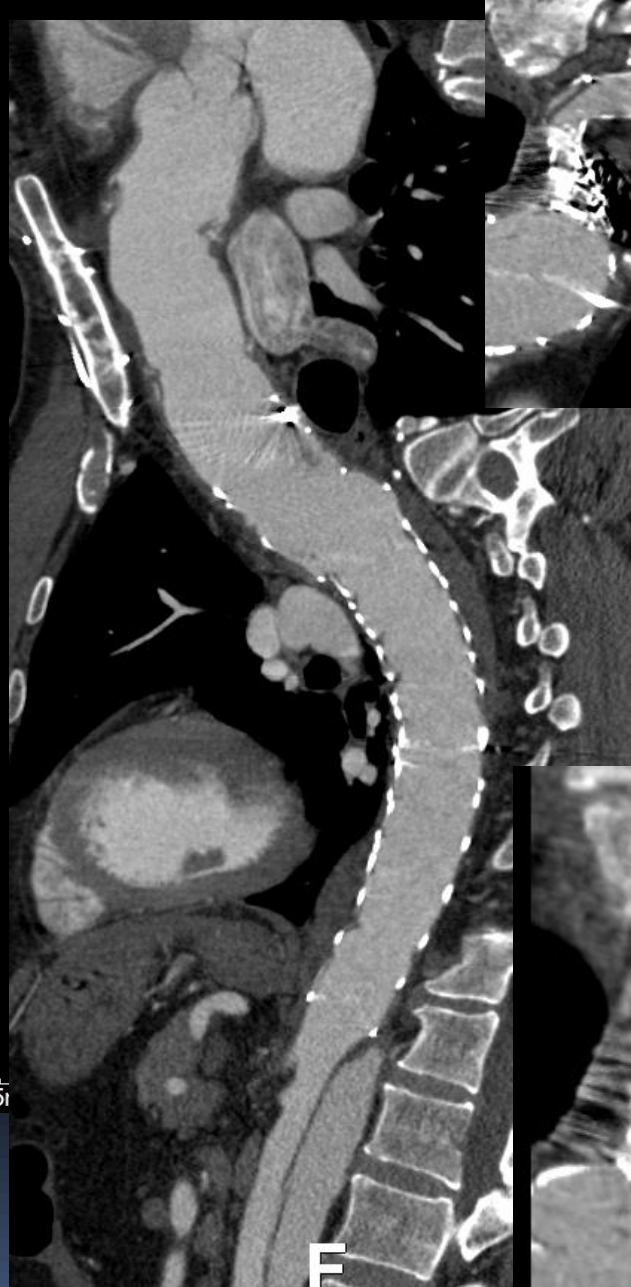
SOUS CLAVI

800

ILA

FR





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- **False lumen embolisation**
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#C
M
Visio
A2

TEMS ADW_IGS740

2

He
M5

AL SYSTEMS\ADW_IGS740

1393032

FRAI

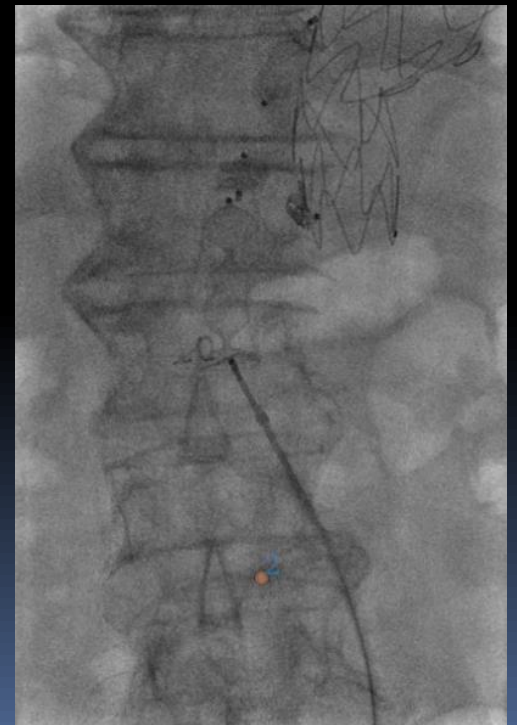
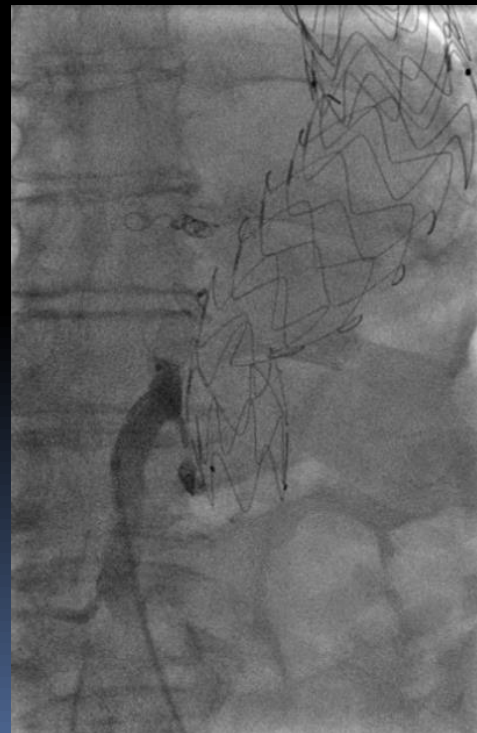
TEMS

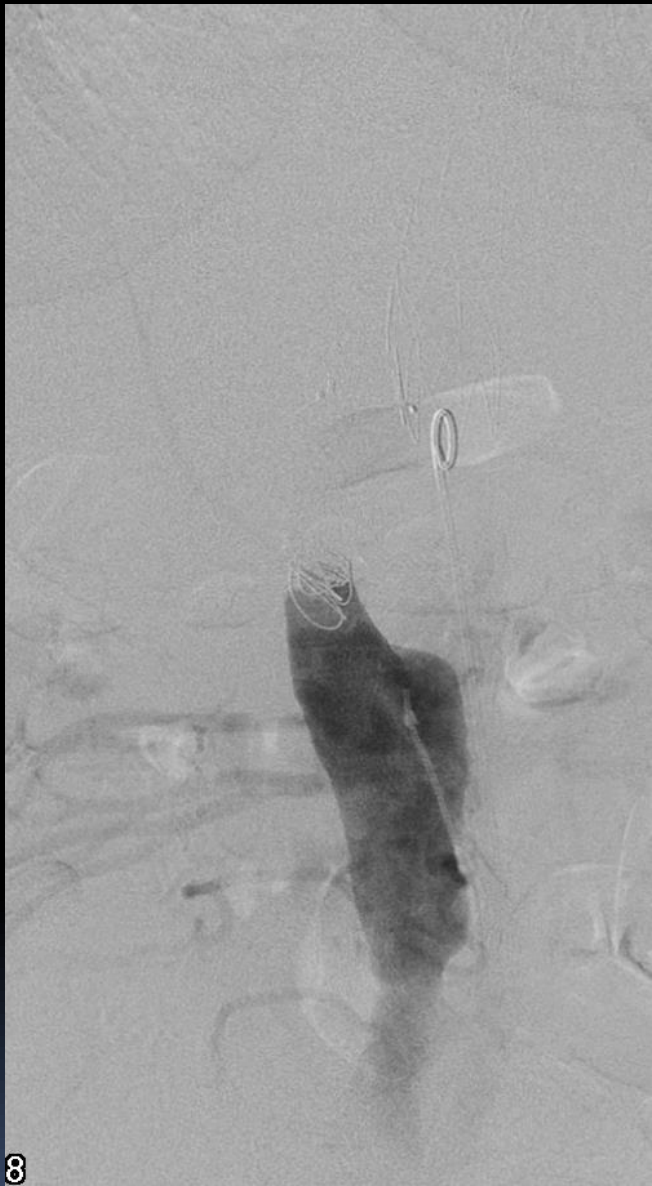
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Visio
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Heppn....r

0x40 cm
0 deg
0 deg
eg
leg

FRAM

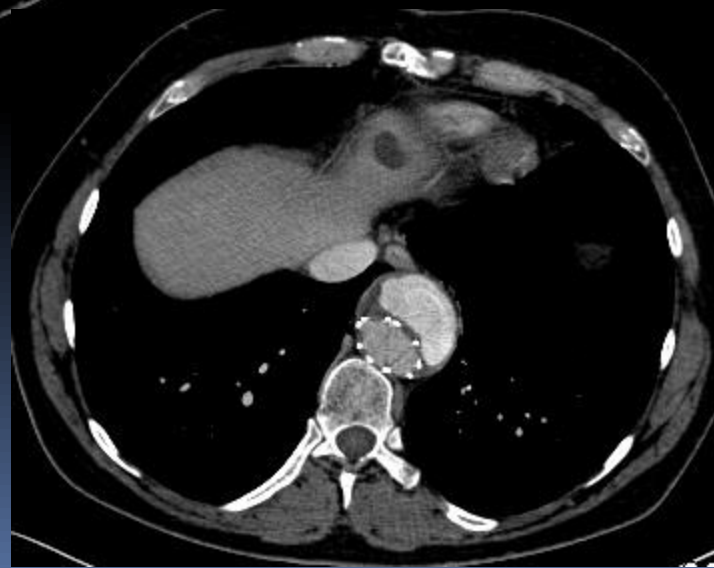
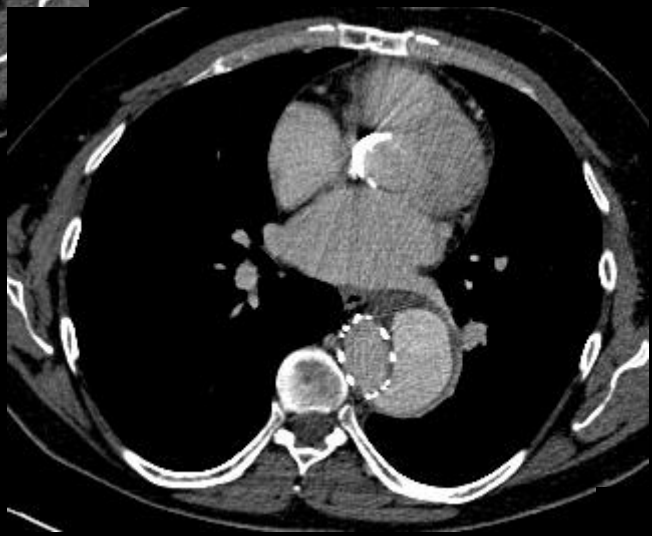




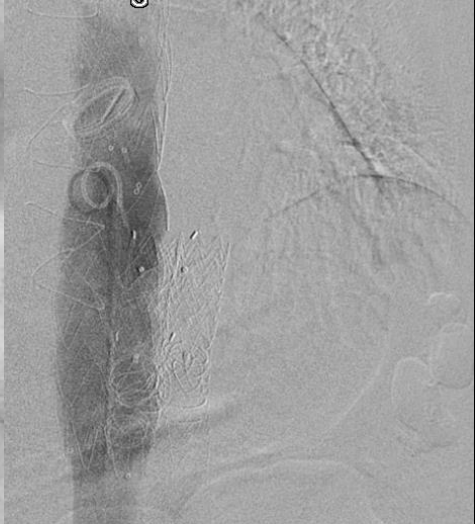
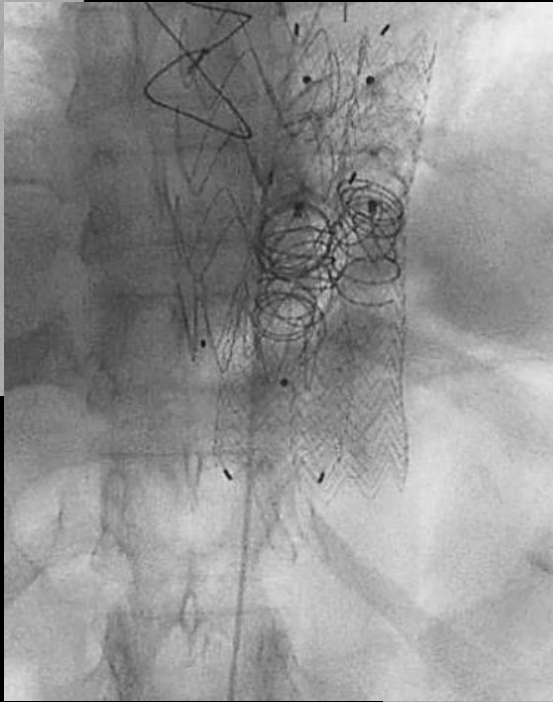
8



Heppn....r



Munoz.. 02/2016



Munoz.. 24/02/2016

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- Stent graft Insertion (branch or fenestrated SG)
- False lumen embolisation
- **Visceral branches from the false lumen**

EX: A23/32335200
Se:5
Volume Rendering No cut
Image non GE
DFOV 39.9 cm
No Filter

R
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No VOI

2.0mm /1.00sp

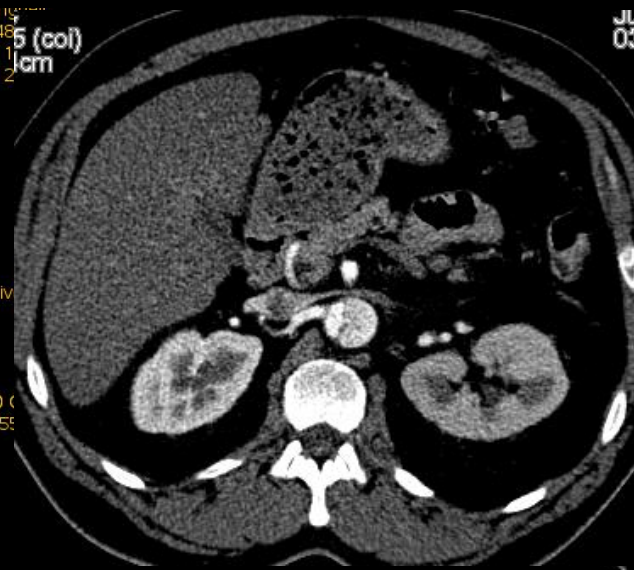
03:14:33 PM
W = 300 L = 40

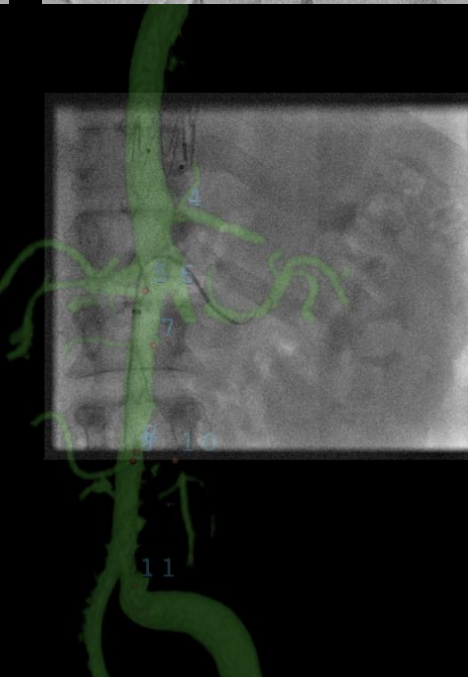


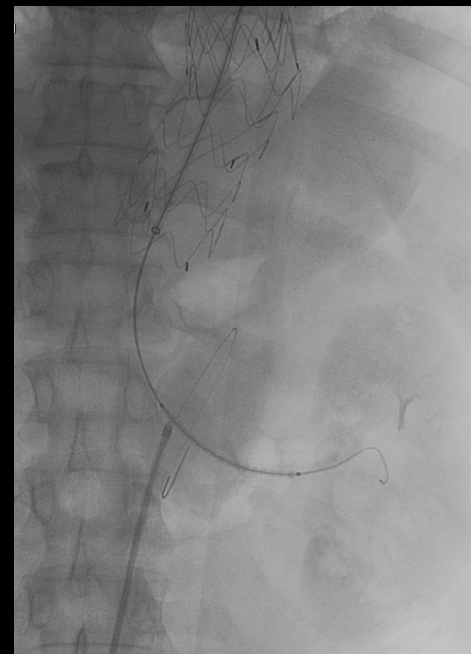
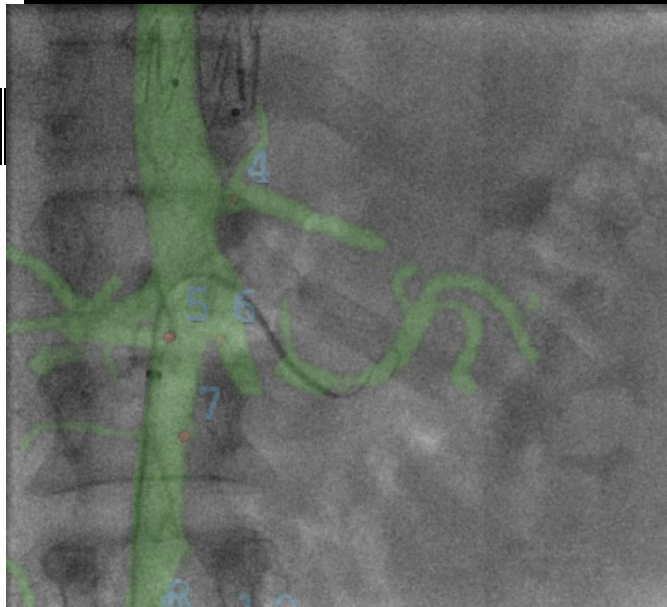
Radiologie Rang: ""
M 40 A23782248
DoB: Nov 11 1955
Ex: Jun 08 2015 (col) 1cm

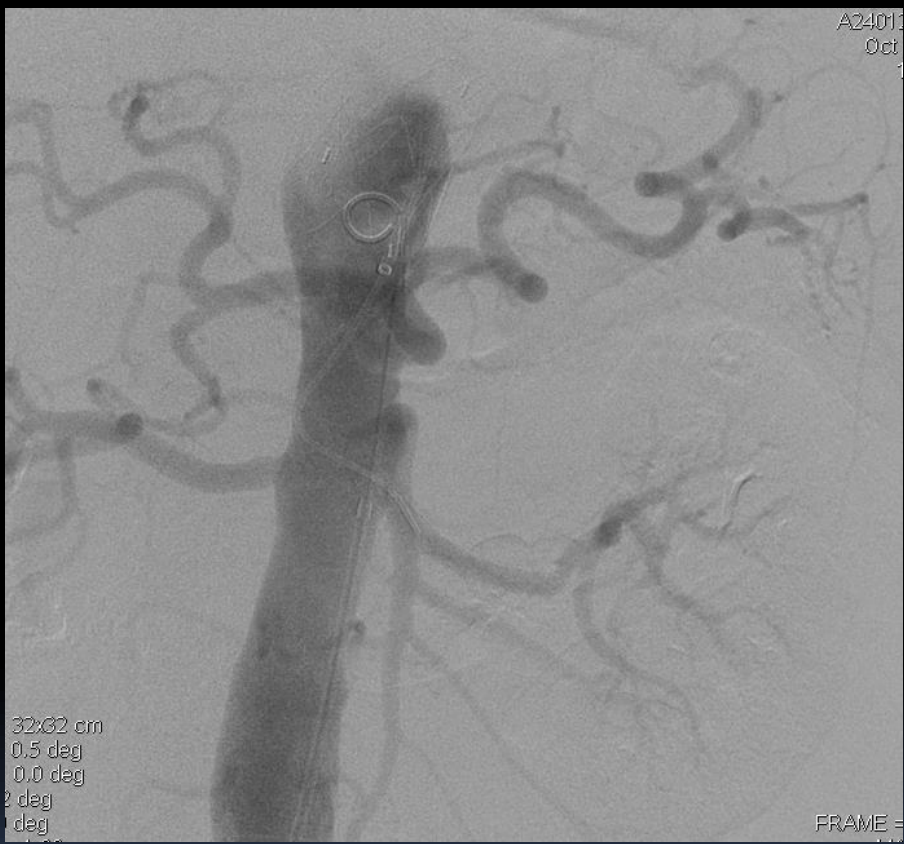
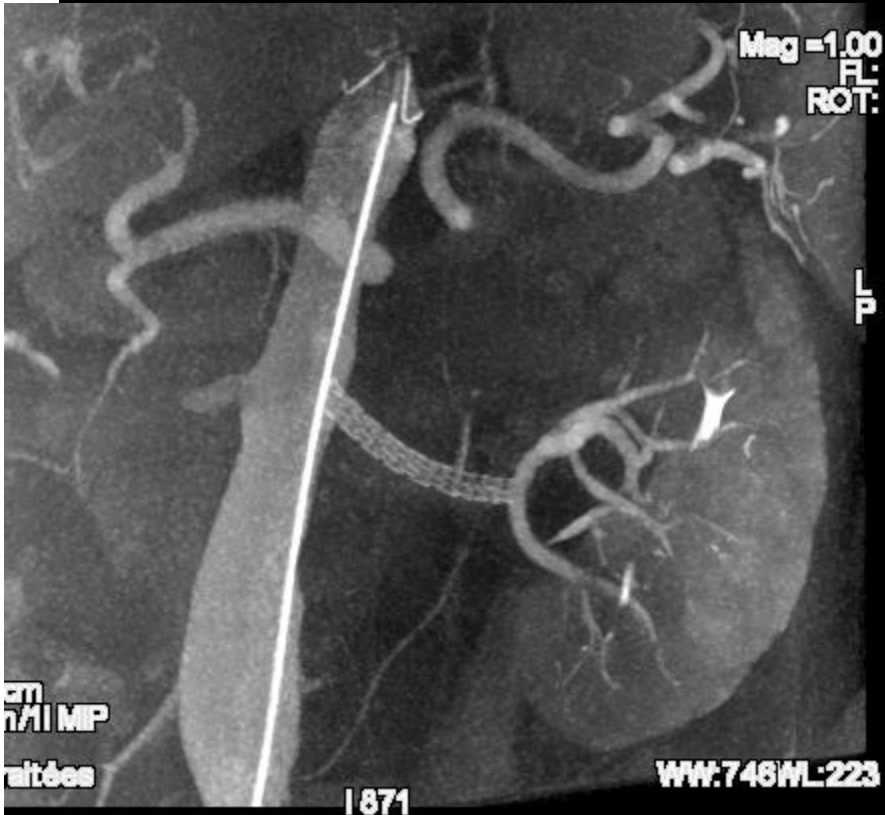
Statif désactiv

0 L 25 LAO 0 c
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Janusw,p 2015





GE MEDICAL SYSTEMS
CH RANGUEIL
Pr.H.ROUSSEAU

S

Cantau Marc
A24114075589
M Dec 12 1935
3D CT, 20kV, 1295mm
A24323399113
Dec 07 2018
12:44:13

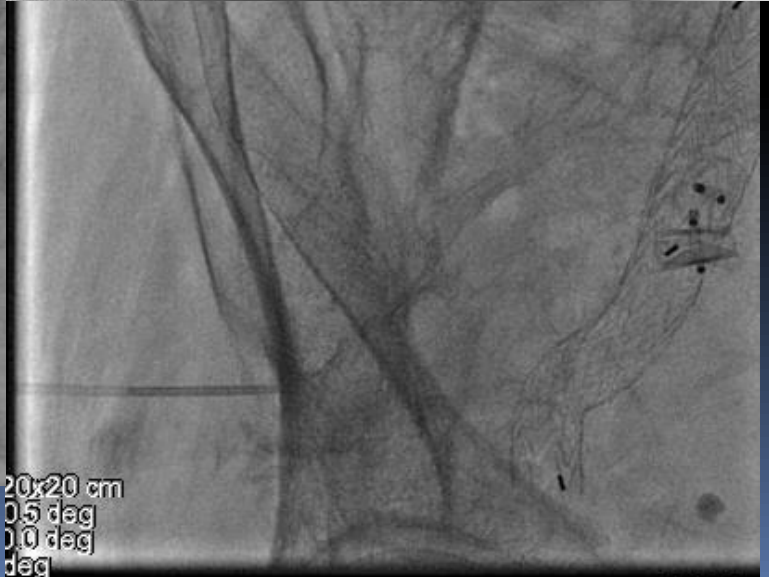
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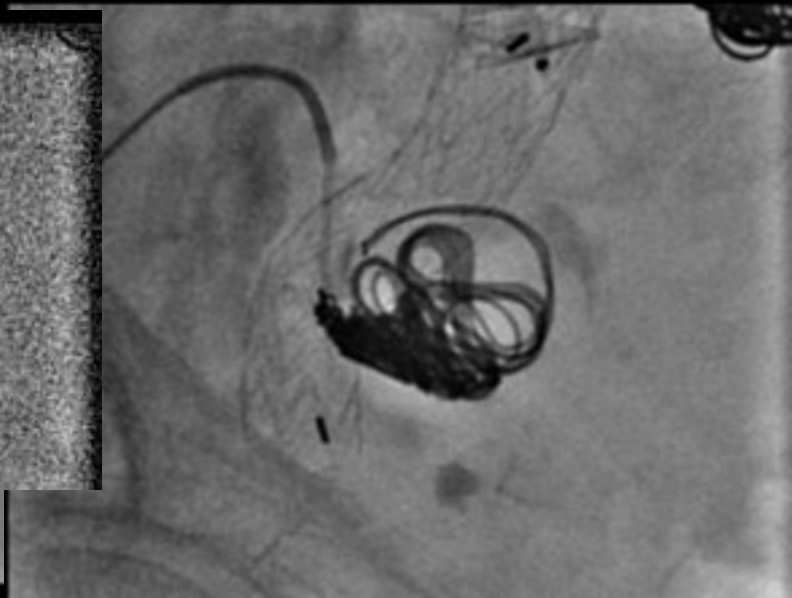
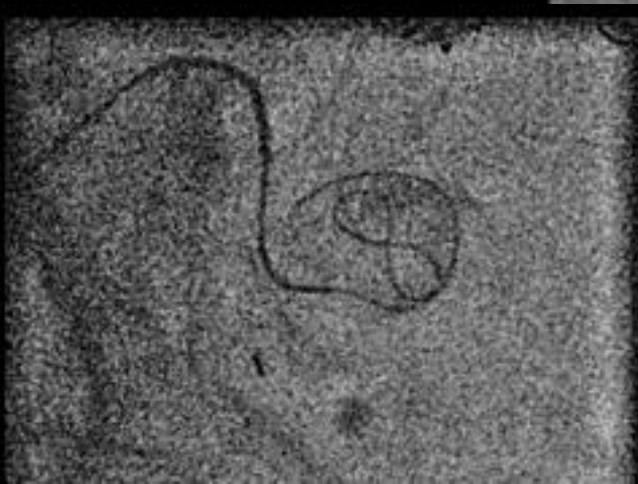
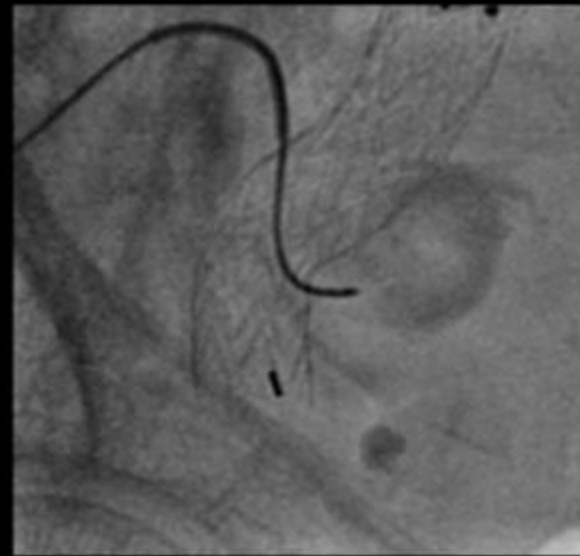
(Filt. 3)

FOV: 40x40 cm
PAO: 88.3 deg
CPA: 0.5 deg
L: 0.1 deg
Tilt: 0 deg
Mag = 1.00
FL:ROT
WW:4095WL:2048
XA:500:500

Seq: 1
FRAME = 25 / 291



20x20 cm
0.5 deg
0.0 deg
deg



GE MEDICAL SYSTEMS
CH RANGUEIL
Pr.H.ROUSSEAU

S

Cantau Marc
A24114075589
M Dec 12 1933

A24823899113
Dec 07 2016
14:01:46

R

L

(Filt. 5)

FOV: 20x20 cm
RAO: 0.5 deg
CRA: 0.0 deg
L: 0.1 deg
Tilt: 0 deg
Mag = 1.00
FL:ROT:
WV:4096WL:2048
XA 1000x1000

Seq: 19
FRAME = 2 / 31
MASK = 1

1



Conclusions

- Merging of CT angiography and fluoroscopic images is feasible, and preliminary results look promising.
- Fusion will allow us to further reduce radiation exposure, contrast dose, and procedural time, and its main use and benefit will be in complex endovascular interventions.