From virtual to reality: simplification of a FEVAR procedure

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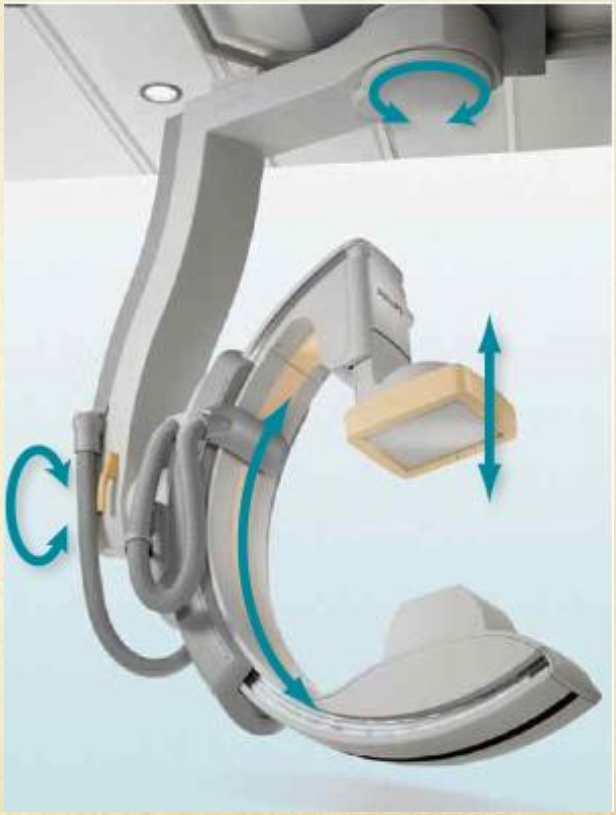
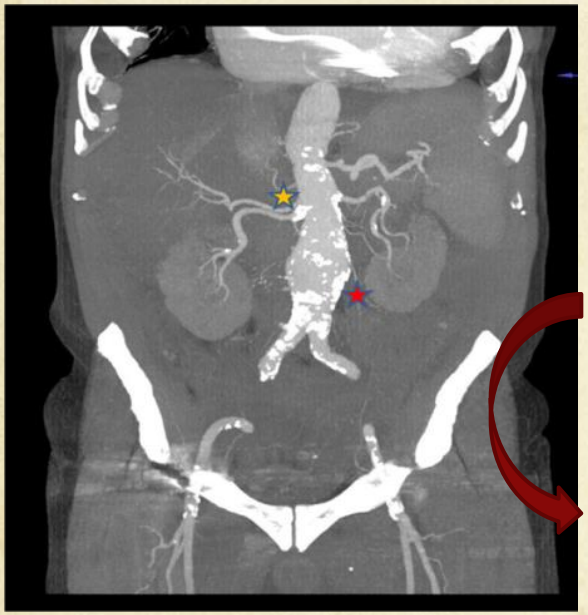
Technologie

- Capteur plan: Images avec haute résolution
- 3D Angiographie Rotationnel
- Cone-beam CT: TDM like
- Multi-modalités: fusion d'images
- Technologie avec Couplage cone-beam CT et intégration avec tracking et navigation
- Le co-enregistrement est intégré avec les mouvements du C-arm et le déplacement de table



Superposition des images Volume ?



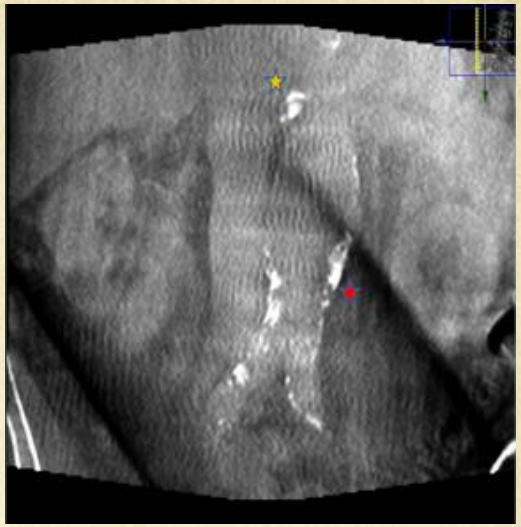
CBCT

Superimposed with CTA or MRA

Overlay to fluoroscopy

3D Road mapping without injection

Combined to table mouvements and to the C-arm



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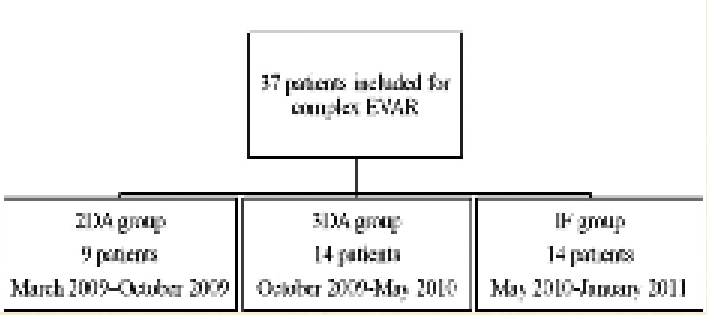
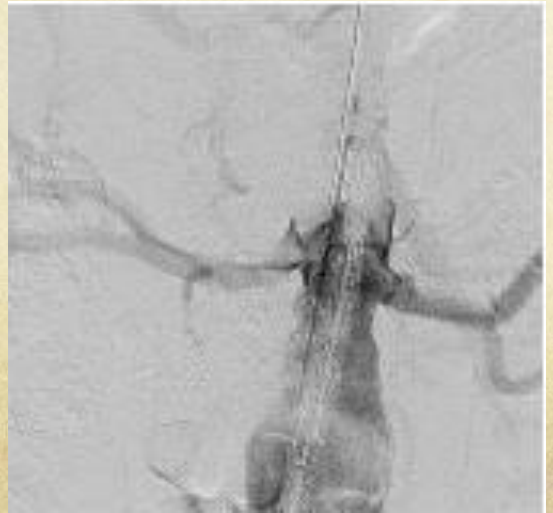
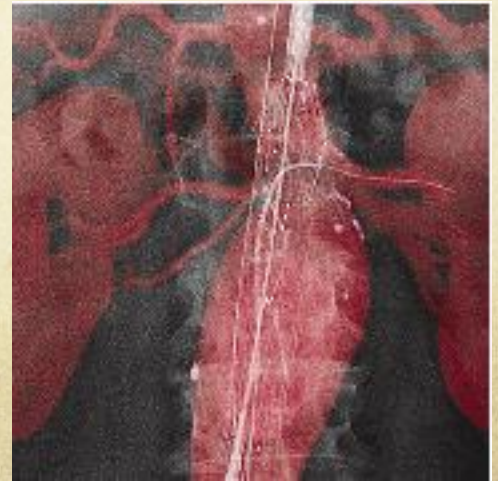
Comparison of Two-dimensional (2D) Angiography, Three-dimensional Rotational Angiography, and Preprocedural CT Image Fusion with 2D Fluoroscopy for Endovascular Repair of Thoracoabdominal Aortic Aneurysm

Vania Tacher, MD, MingDe Lin, PhD, Pascal Desgranges, MD, PhD, Jean-Francois Deux, MD, PhD, Thijs Grünhagen, PhD, Jean-Pierre Becquemin, MD, Alain Luciani, MD, PhD, Alain Rahmouni, MD, and Hicham Kobeiter, MD





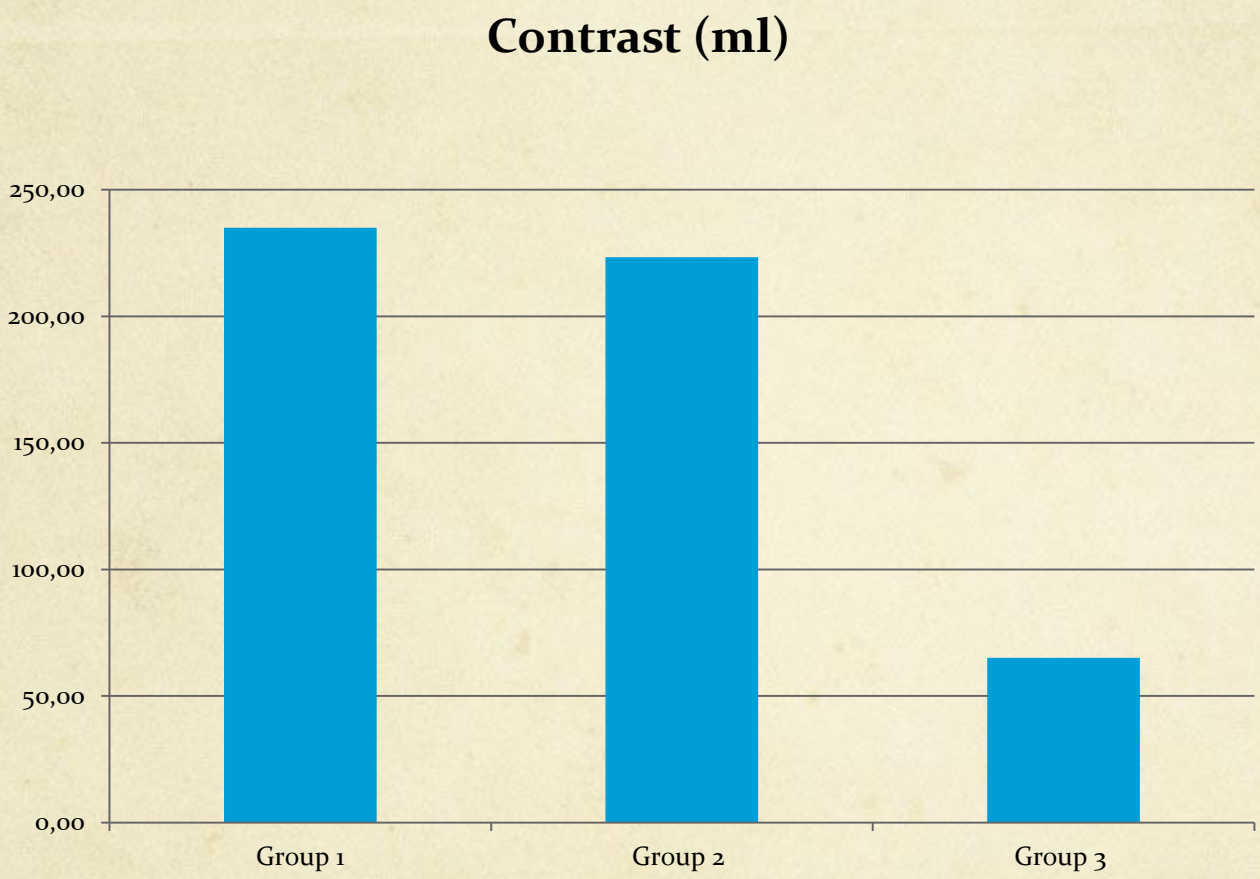


Results :

- Feasability and safety of fusion :
  - None failure of intervention
  - None failure of catheterism of target vessels, after control by contrast injection.

	Group 1 2D		Group 2 3D		Group 3 Fusion	
Target vessel :	**23**		**38**		**33**	
Sacrified arteries	**1**	**4,35%**	**0**	**0,00%**	**0**	**0,00%**
Lost arteries	**0**	**0%**	**0**	**0,00%**	**1**	**3,03%**

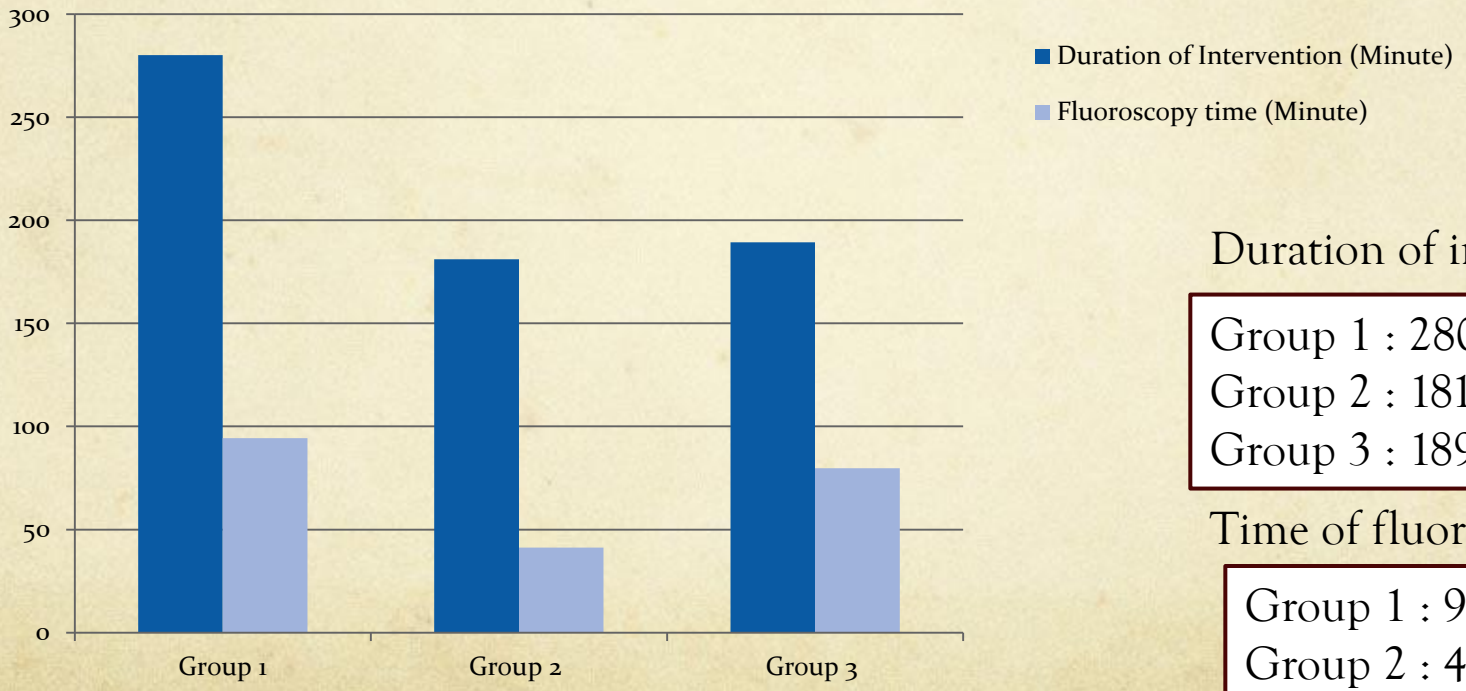
Volume of Contraste



Group 1 : 235 ml
Group 2 : 223 ml
Group 3 : 65 ml
p(g1/g3) and p(g2/g3) : S

Duration of intervention and fluoroscopy

Duration of intervention and of fluoroscopy (Minute)



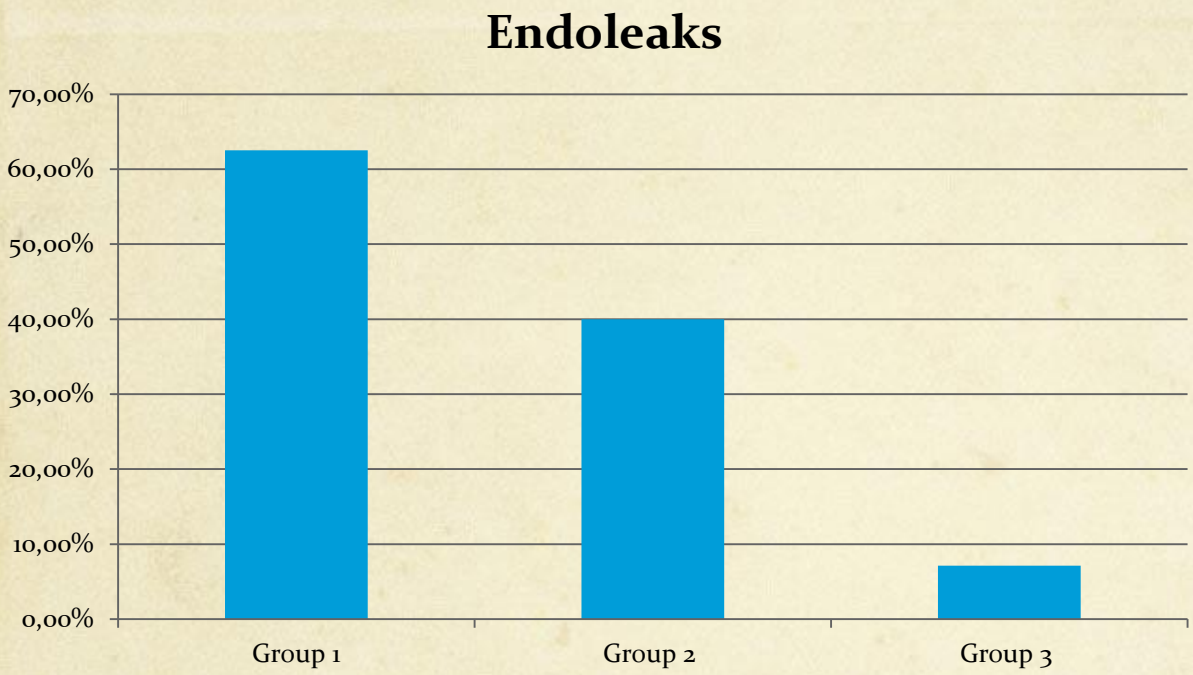
Duration of intervention

Group 1 : 280 min[195]
Group 2 : 181 min [51]
Group 3 : 189 min[60]

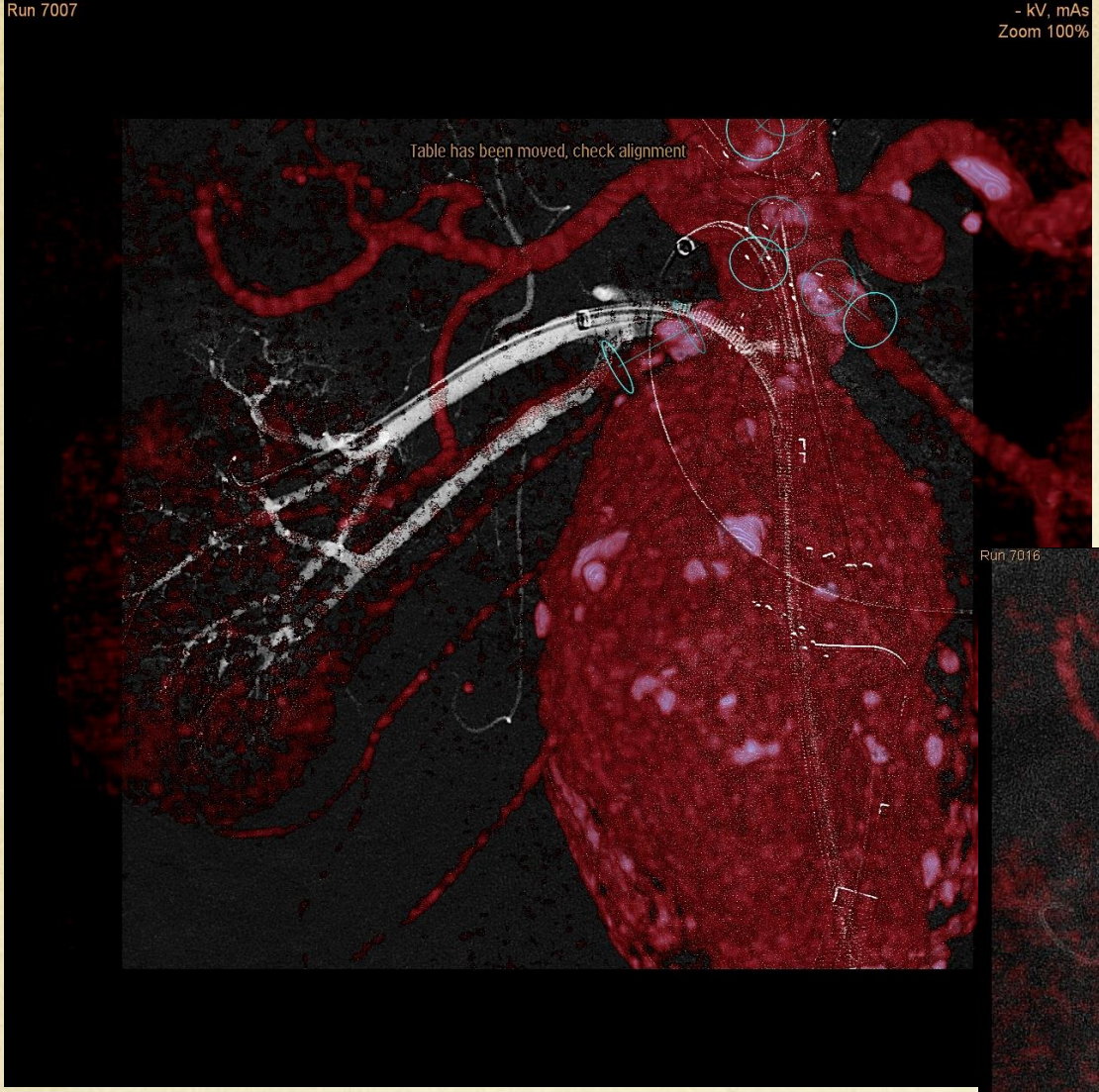
Time of fluoroscopy

Group 1 : 94 min
Group 2 : 41 min
Group 3 : 80 min
p(g1/g2) : S

Endoleaks

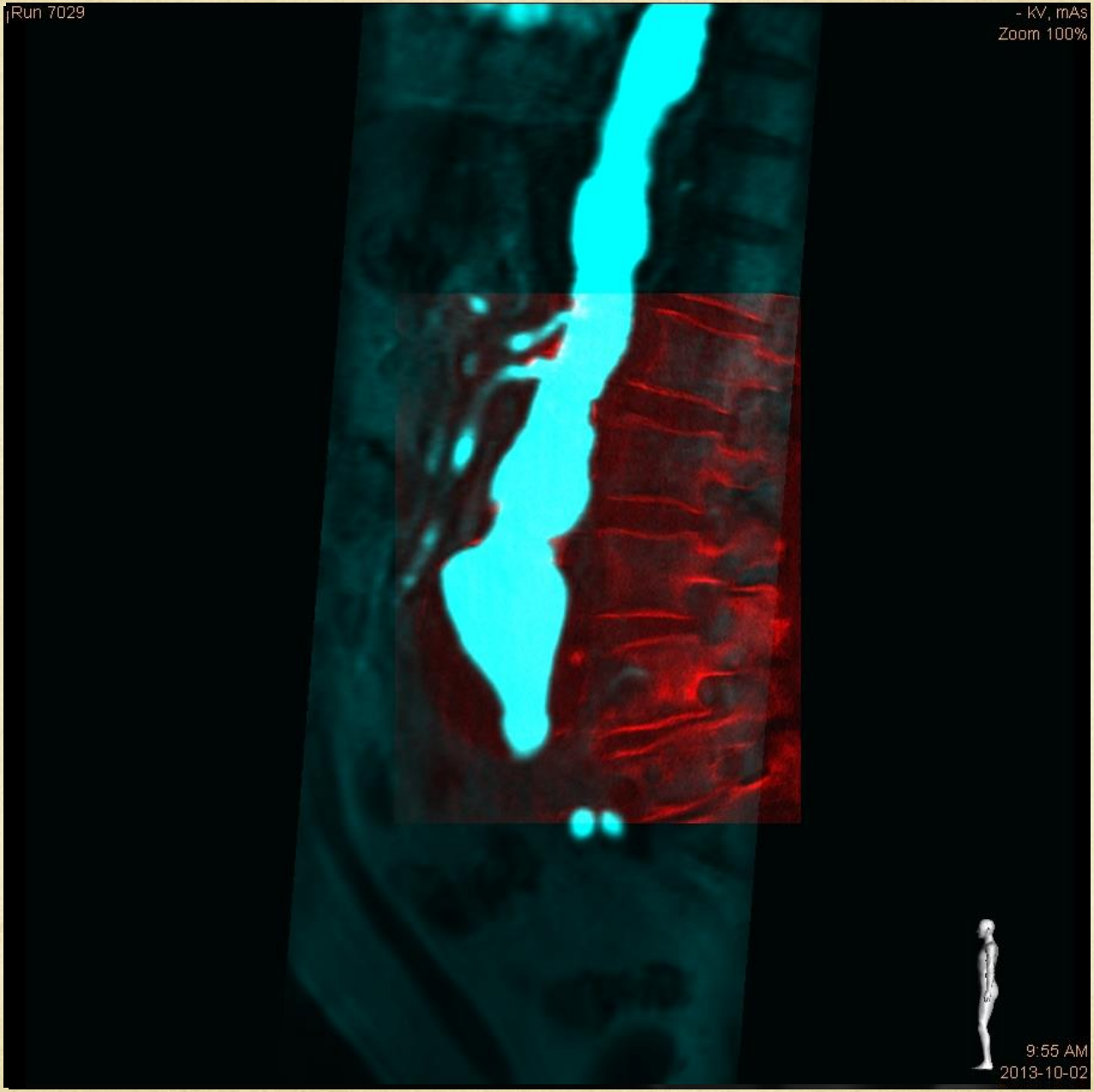


Endoleak on the first CT control	Group 1		Group 2		Group 3	
Endoleak	5	62,50%	6	40,00%	1	7,14%
Type 1	3	37,50%	2	13,33%	0	0,00%
Type 2	2	25,00%	4	26,67%	1	7,14%
Type 3	0	0,00%	0	0,00%	0	0,00%

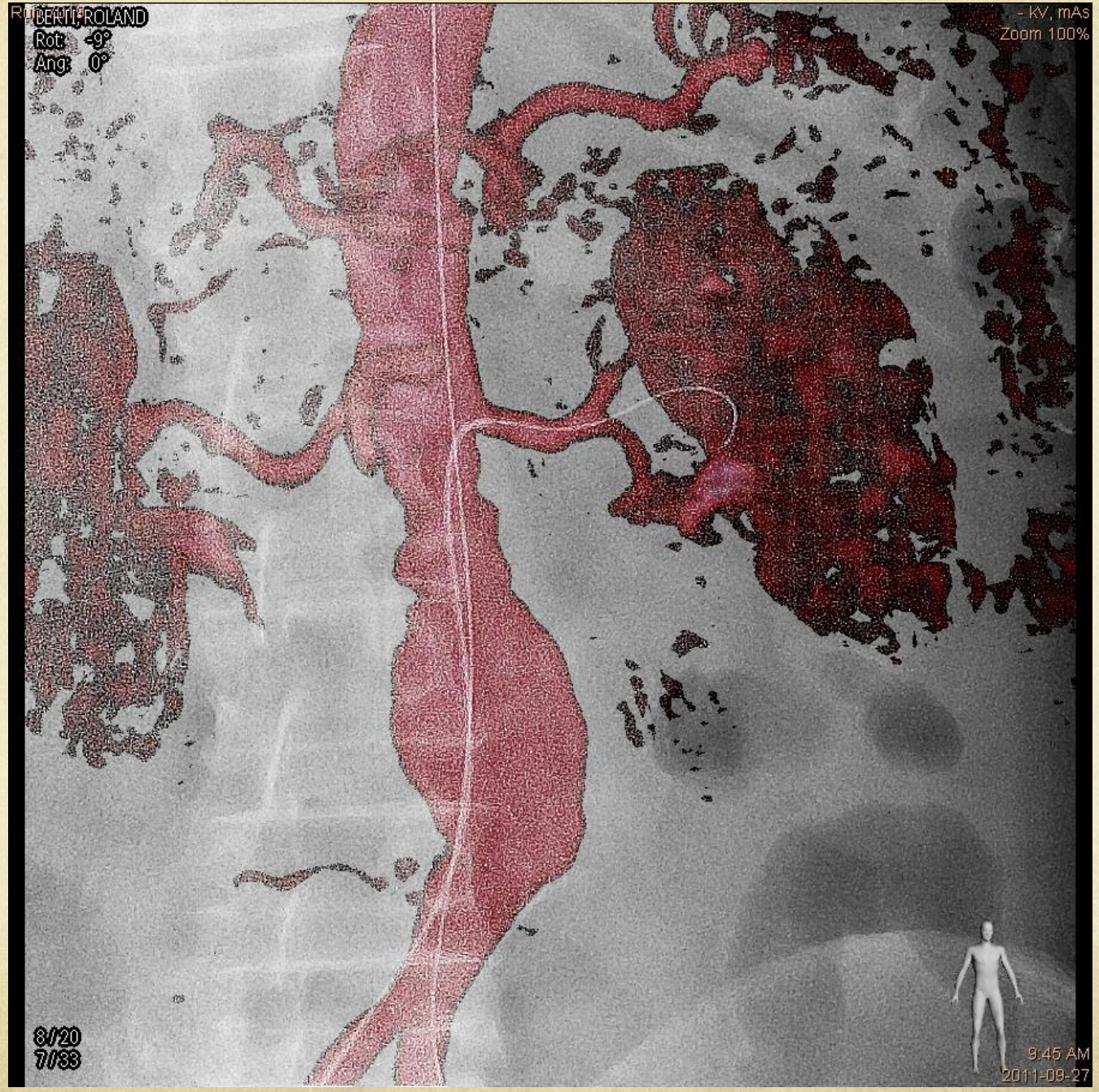


KT Right Renal
Fenestrated anaconda
4 Fenestrations

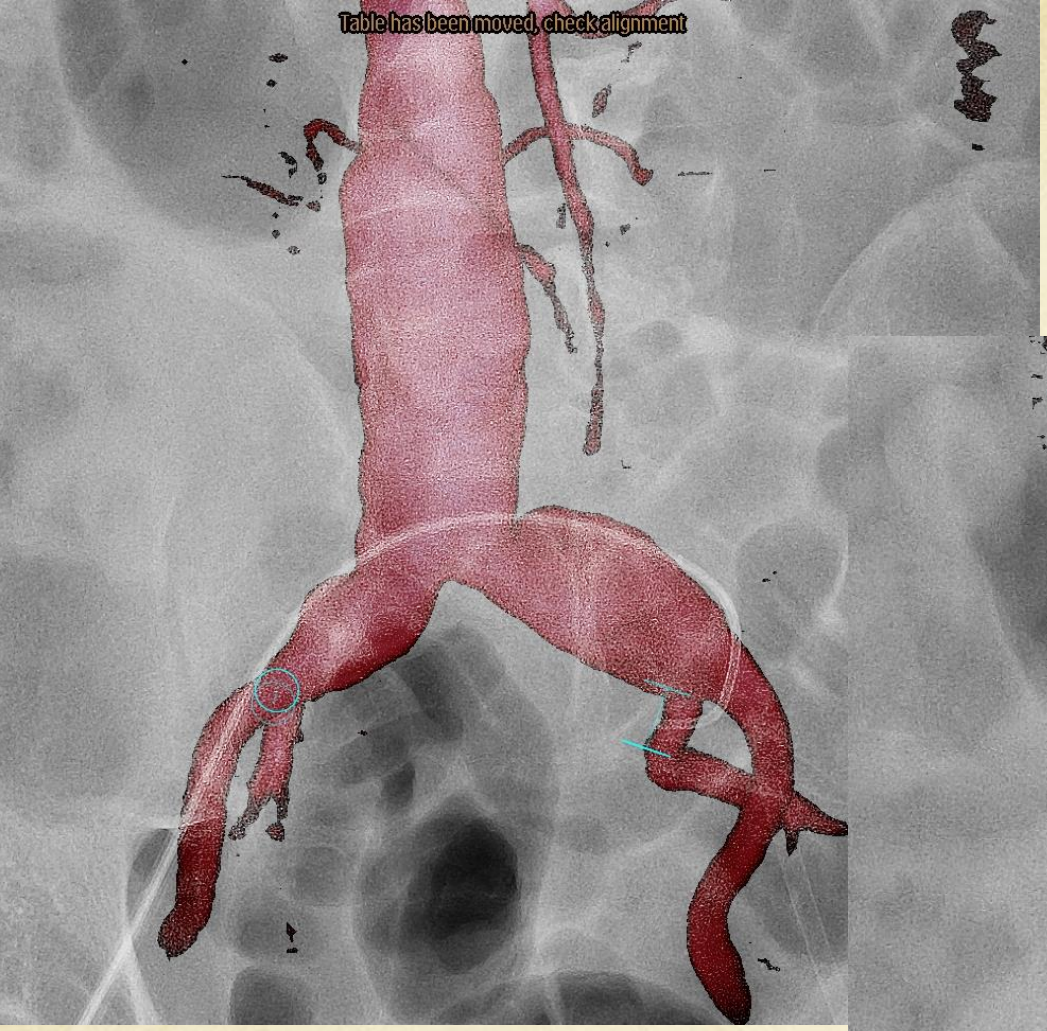
Final control

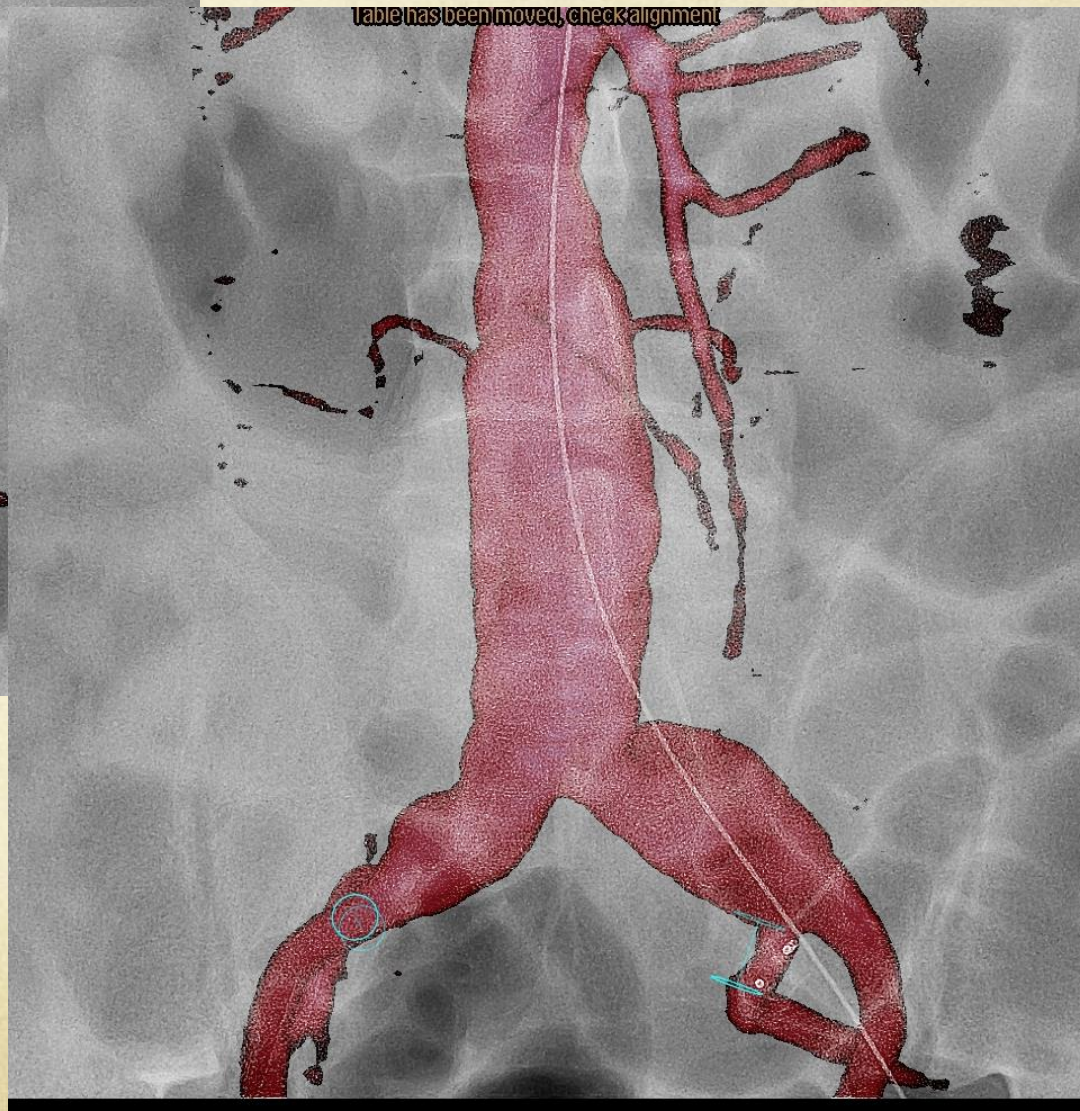


Fusion with MRA
Technique


BERTI, ROLAND
Rot: -9°
Ang: 0°
- kV, mAs
Zoom 100%
8/20
7/33
9:45 AM
2011-09-27

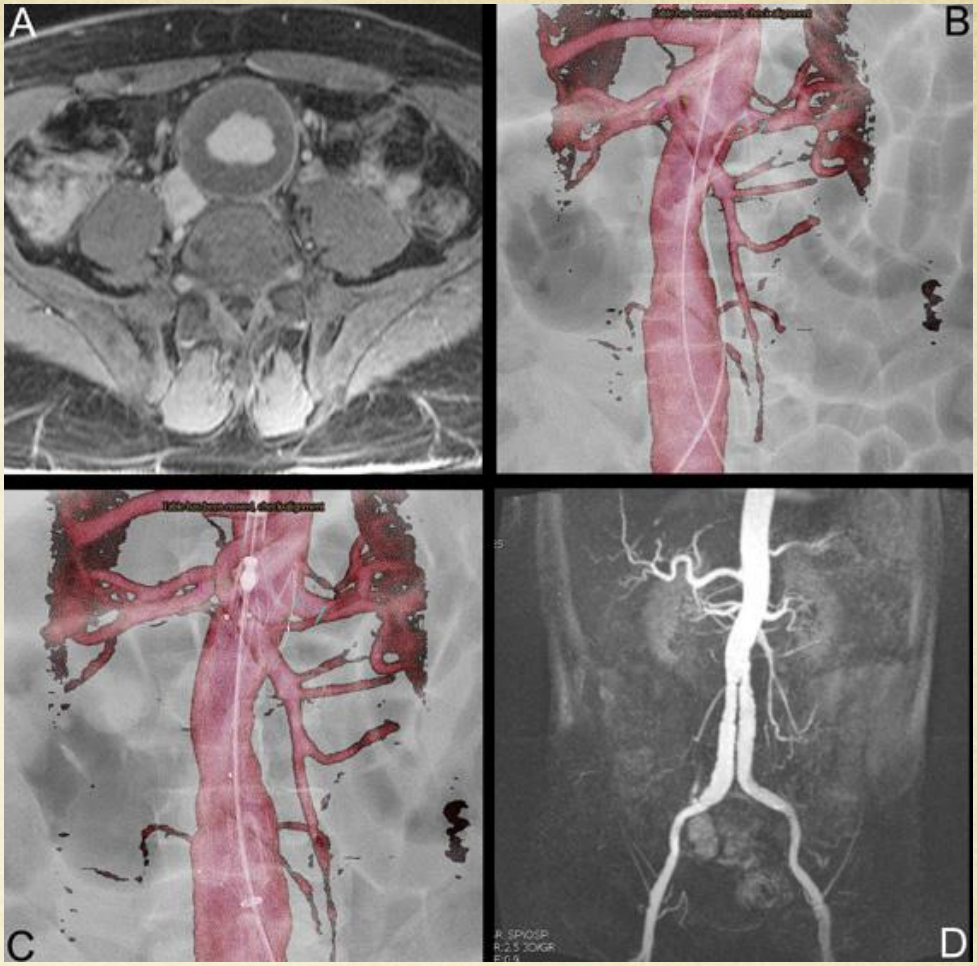
Application:
AAA douloureux de 56 mm
ARM pas de rupture mais prise de contraste «inflamatoire?»
Choc anaphylactique après coronarography «15stents »





Embolisation I Int G

- 70 min d'intervention
- 15 minutes de scopie
- 0 minute de graphie
- 0 cc de contraste



- Contrôle par ARM: AAA exclue
- Pas de fuite
- AR et AII Dt perméable

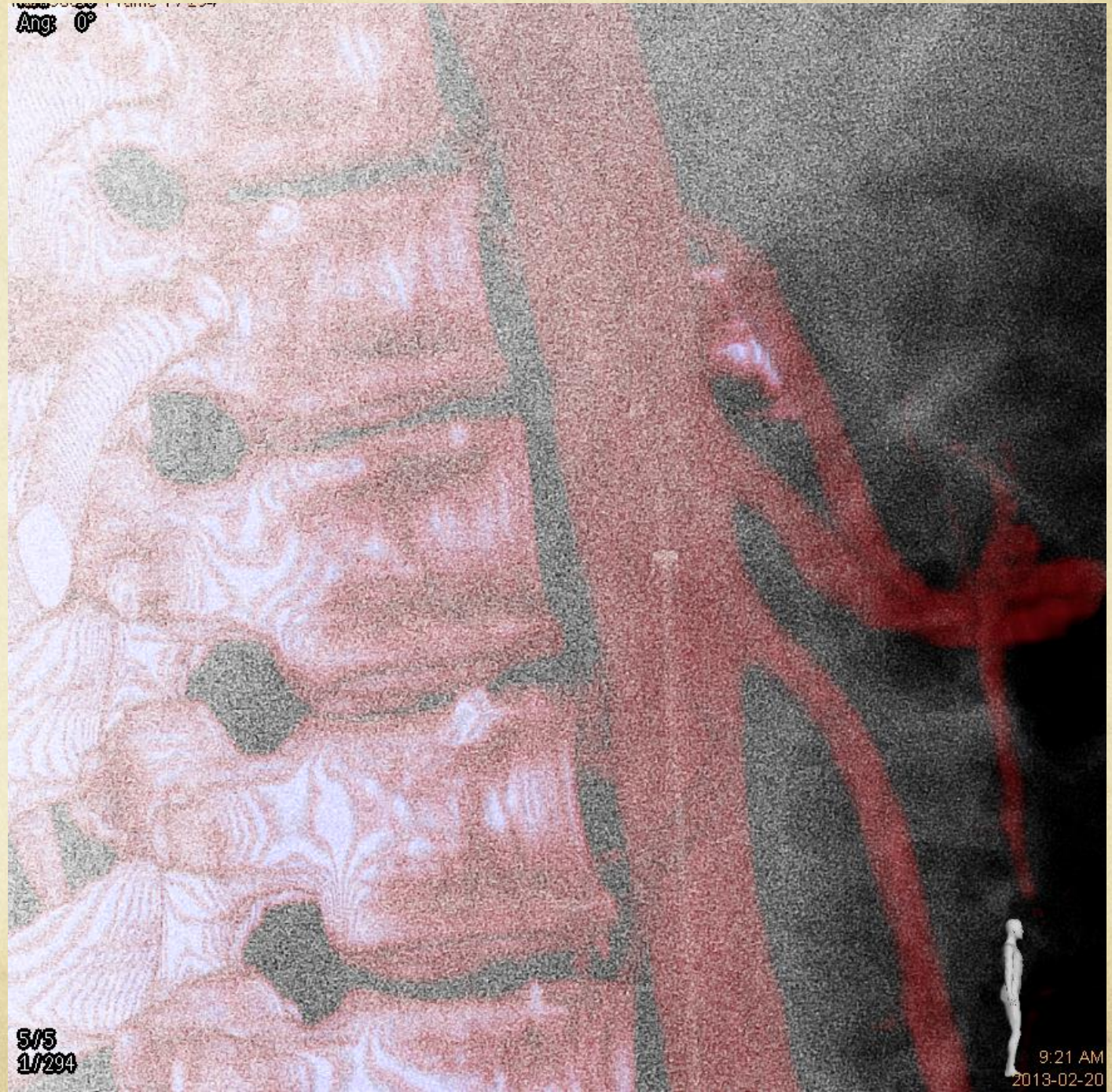
Our experience

- 5 patients
- 3 EVAR (severe allergy): 0 contrast
- 2 CEVAR: (1RA and SMA) (1 SMA) “renal failure”: 35 and 40 cc of contrast
- Success: all patient “zero targeted vessel coverage”
- One type I endoleak: CEVAR treated by embolization

Magellan system:

KT in the CT

Splenic aneurysm embolization



Conclusion

- Fusion ou superposition avec la meilleur imagerie diagnostique
- Imagerie 3D roadmap synchronisée avec le C-Arm et la table
- Réduction de la fluoroscopie et surtout de la graphie
- Réduction des volumes de produit de contraste
- Evolution future : correction des déformations vasculaire, tissue, (de l'ordre des mm, impact clinique???)
- Robotiques

Conclusions

Old technology

New technology