



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

JANUARY 25-27 2018 

MARRIOTT RIVE GAUCHE & CONFERENCE CENTER, PARIS, FRANCE

Est-ce que les artères iliaques
primitives dilatées compromettent les
résultats à long terme d'EVAR ?

Charline DELAY, Anne-Florence ROUBY, Anne LEJAY,
Yannick GEORG, Fabien THAVEAU, Nabil CHAKFE



Disclosure

Speaker name:

CHAKFE Nabil

I have the following potential conflicts of interest to report:

Consulting

Employment in industry

x Shareholder in a healthcare company

Owner of a healthcare company

x Other(s) Research grant and travel expense from Gore, Cook, Bard,

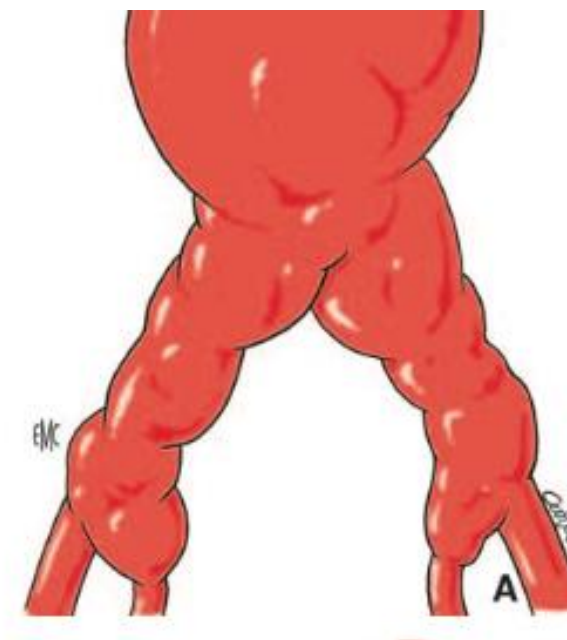
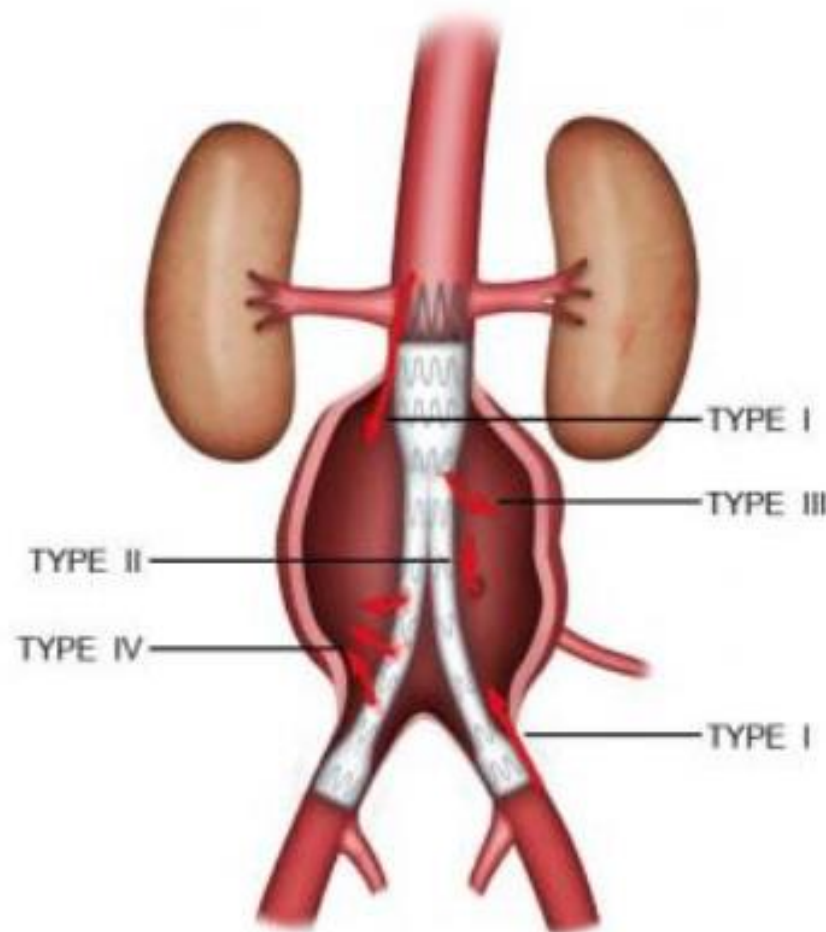
x I do not have any potential conflict of interest



We are obsessed by the proximal neck !

We a

zone !

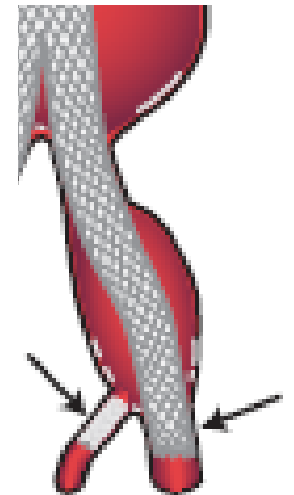
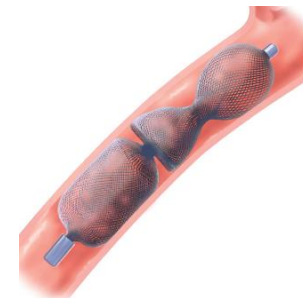
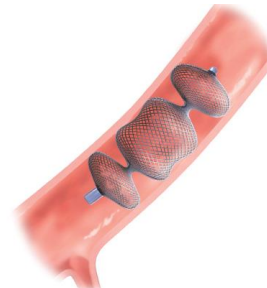
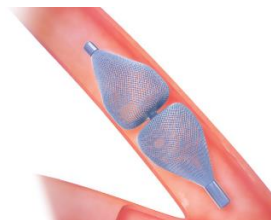
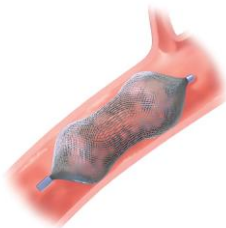


EMBOLIZATION ?

Specifics Materials:

COILS : Association of a metallic implant (stainless steel or platinum) with fibers. Different sizes, shapes and material

- **AMPLATZ VESSEL PLUG:** Implants made off Nitinol network creating a self-expandable cage. Different sizes and shapes





EMBOLIZATION ? BUT

Complications: **Pelvic ischemic**

- Buttock claudication

- Erectile

- Colon

- Other rare : spinal

nerve ischemia

→ If embolization

embolization

→ Try to prevent

Buttock claudication and erectile dysfunction after internal iliac artery embolization in patients prior to endovascular aortic aneurysm repair.
Rayt HS¹, Bown MJ, Lambert KV, Fishwick NG, McCarthy MJ, London NJ, Sayers RD.
Cardiovasc Intervent Radiol. 2008 Jul-Aug;31(4):728-34. doi: 10.1007/s00270-008-9319-3. Epub 2008 Mar 13.

Hypogastric artery preservation during endovascular aortic aneurysm repair: is it important?
Lin PH¹, Chen AY, Vij A.
Semin Vasc Surg. 2009 Sep;22(3):193-200. doi: 10.1053/j.semvascsurg.2009.07.012.

How safe is bilateral internal iliac artery embolization prior to EVAR?
Bratby MJ¹, Munneke GM, Belli AM, Loosemore TM, Loftus I, Thompson MM, Morgan RA.
Cardiovasc Intervent Radiol. 2008 Mar-Apr;31(2):246-53. Epub 2007 Oct 24.

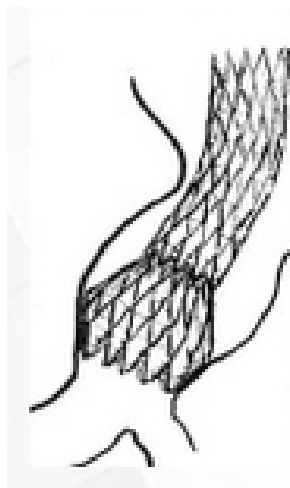
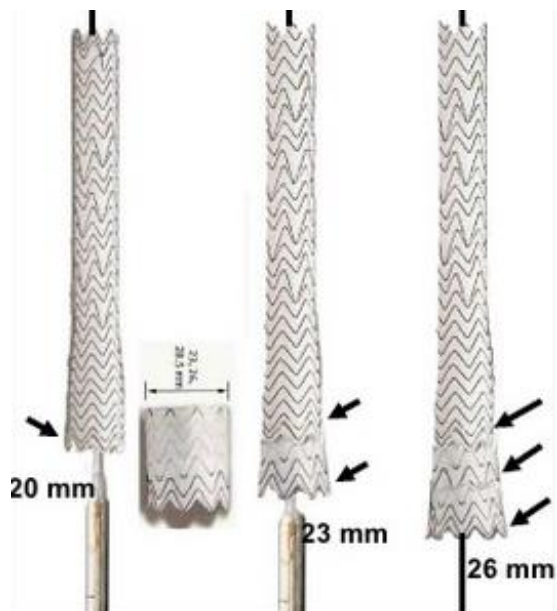
whenever possible

in ulceration – sciatic

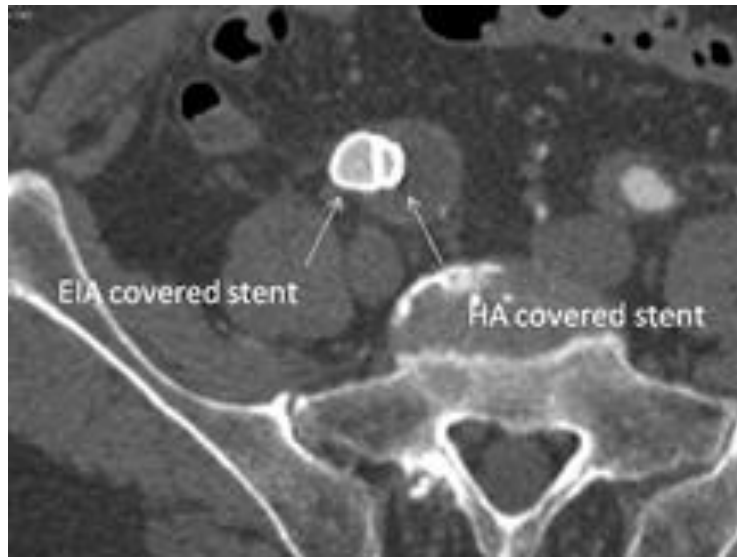
General IIA / Main trunk



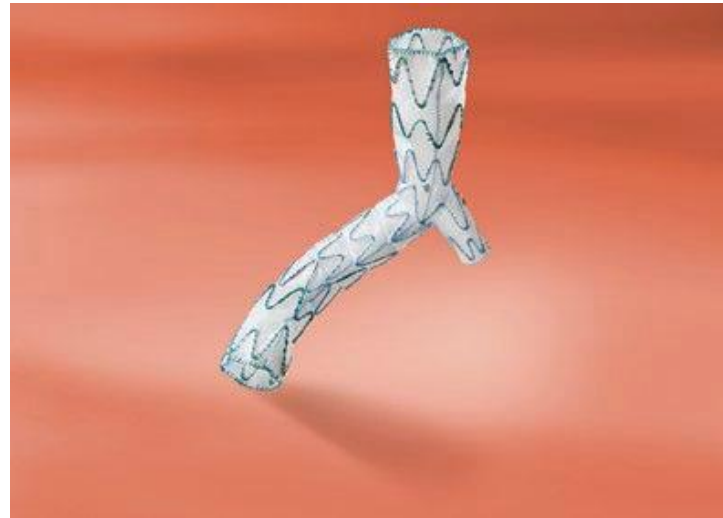
REVASCULARIZATION ? Bell Bottom ?



REVASCULARIZATION ? Exotic things



REVASCULARIZATION ? Iliac-branch devices



The questions we had from our experience

- **Which technique should we choose ?**
- **What are the long-term results of EVAR with dilated CIA?**
- **Study of the global evolution of CIA with a diameter > 20mm**
- **Risk factor study:**
 - CIA increasing volume
 - Endoleak 1B



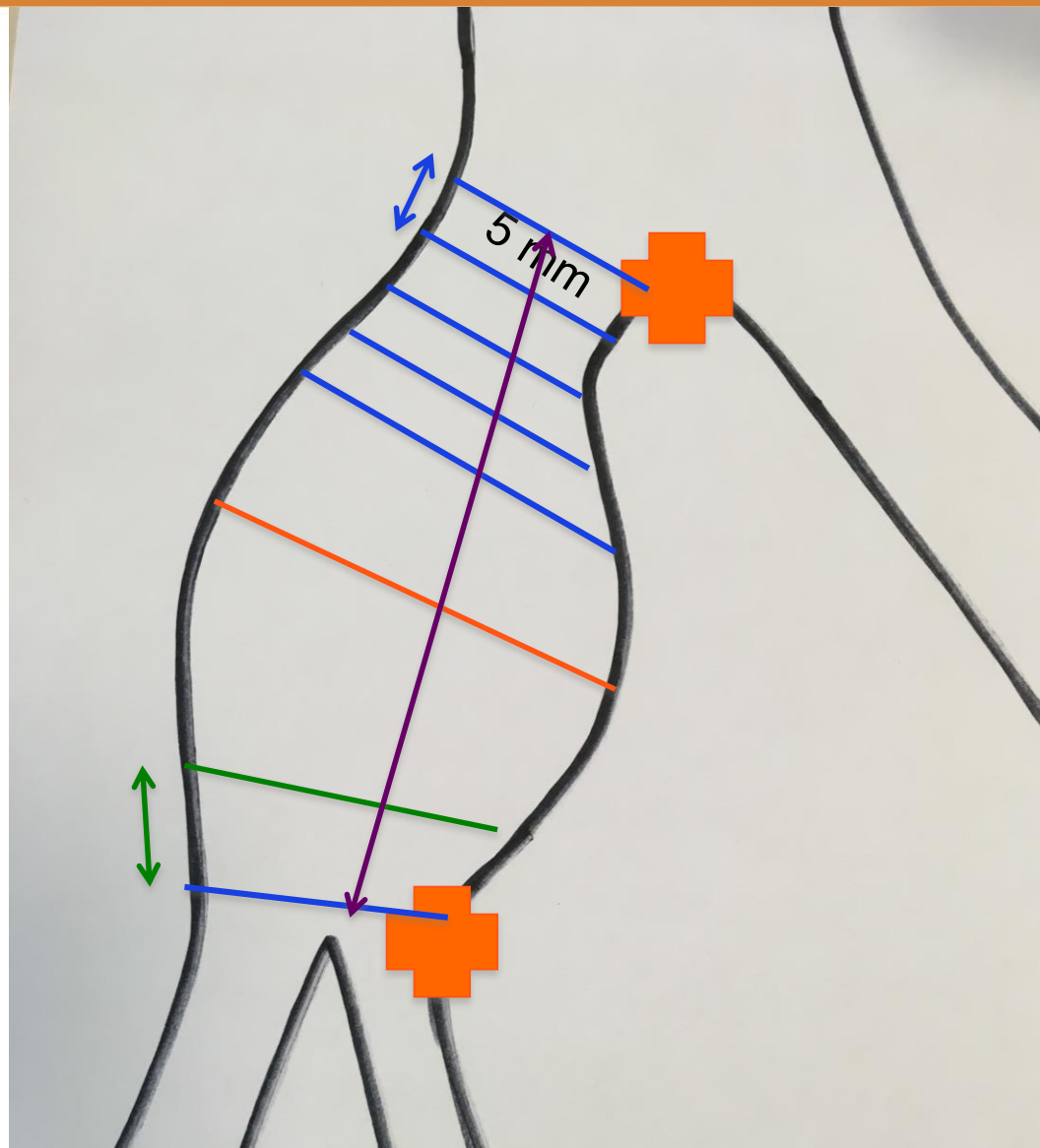
What did we do ?

- Monocentric
- Retrospective
- Aorto-iliac aneurysmal disease
- EVAR with dilated CIA > 20mm
- 2008 - 2016



Collected data

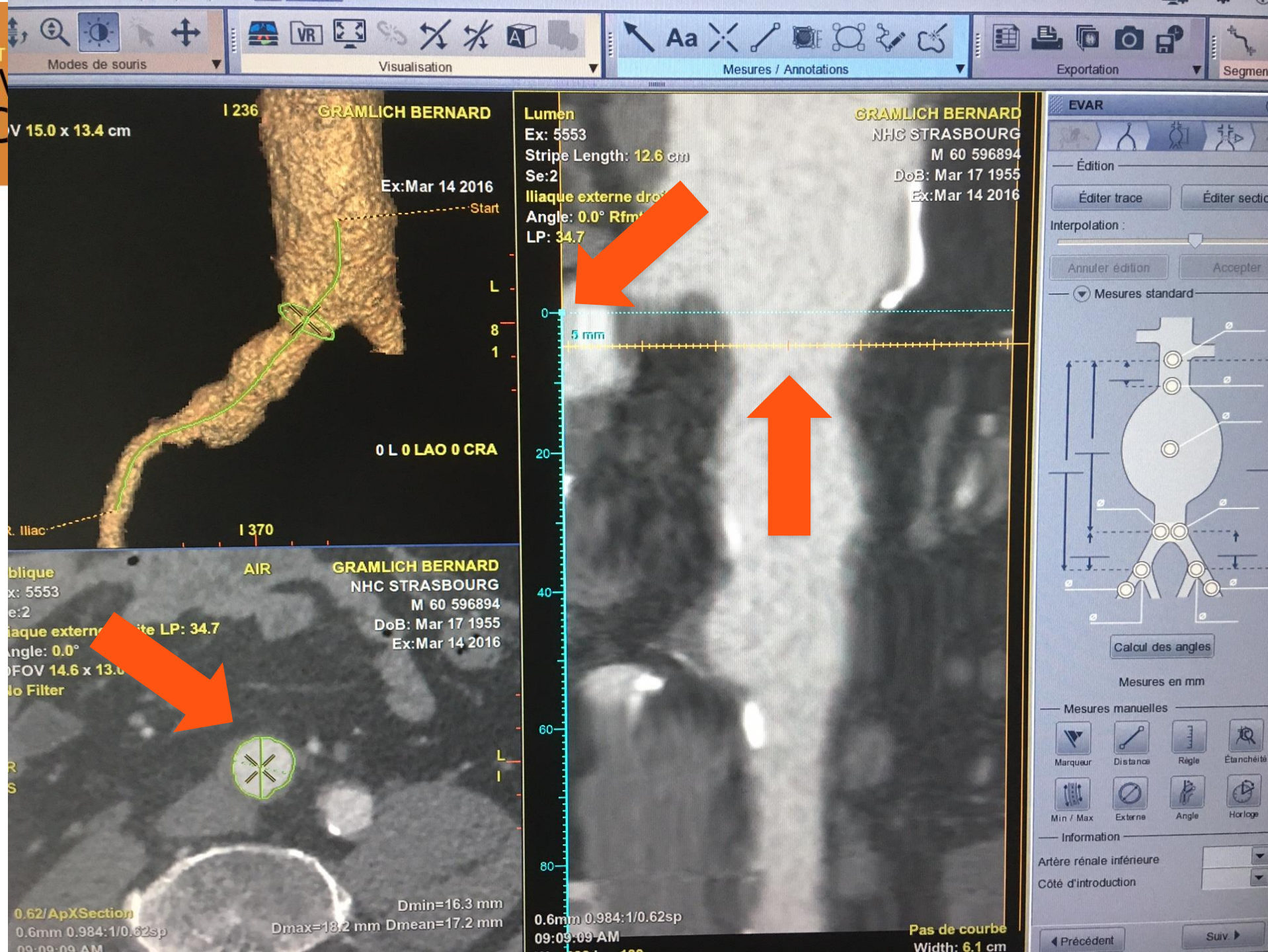
Data	
Pre-operative parameters	Clinical Radiological



Radiological parameters



CONTROVERSES ET CONTROL IN VASC



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Collected data

Data	
Pre-operative parameters	Clinical Radiological
Per-operative parameters	Type of procedure Type of EP Technical success
Post-operative parameters	Immediately In the long term -Survival curves -Radiological data



Risk factors

- Univariate analysis
- Multivariate analysis

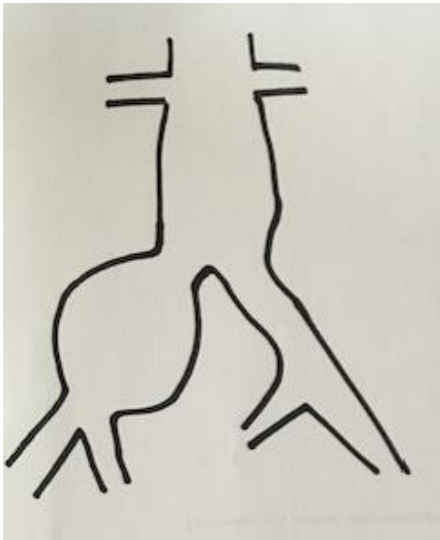
Statistical analysis

- Kaplan Meyer / Wilcoxon test / Fisher test / Logistic regression model

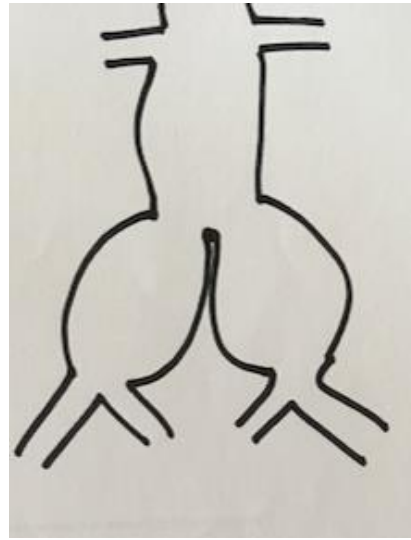


What did we find ?

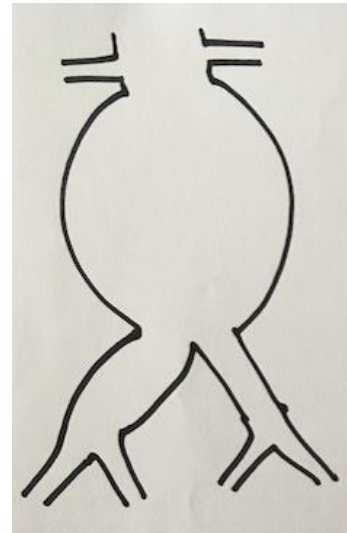
- 56 patients (15.5%) – 80 CIA > 20 mm (11.5%)



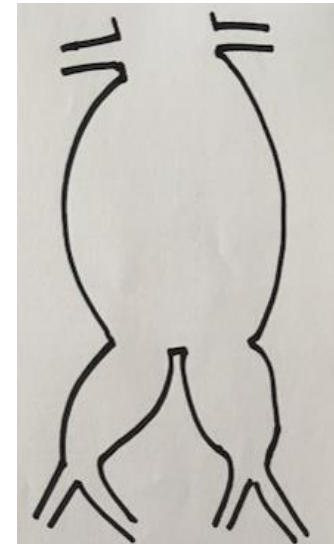
2



4



30

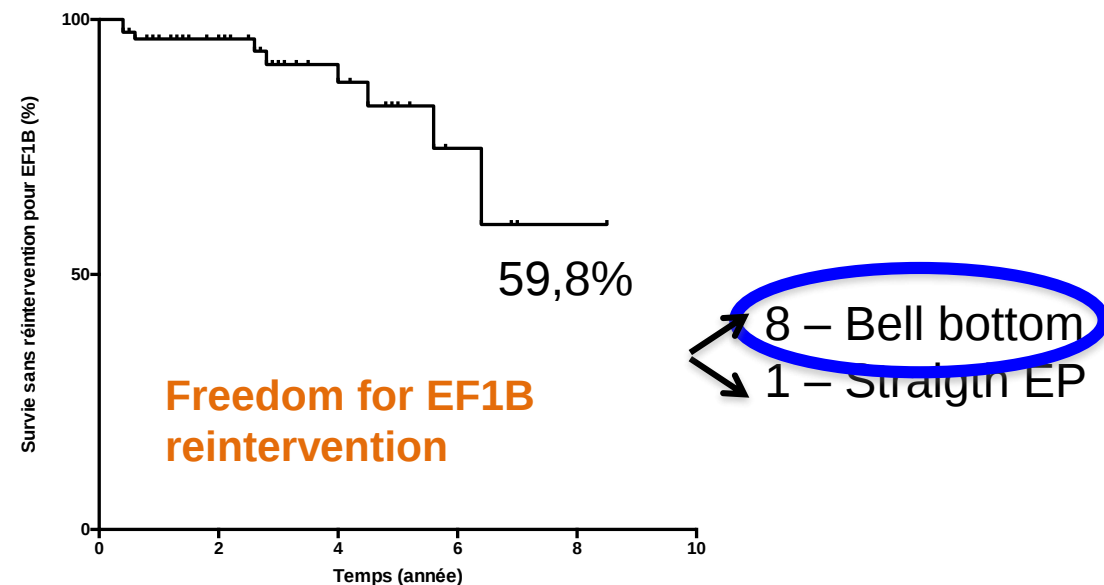
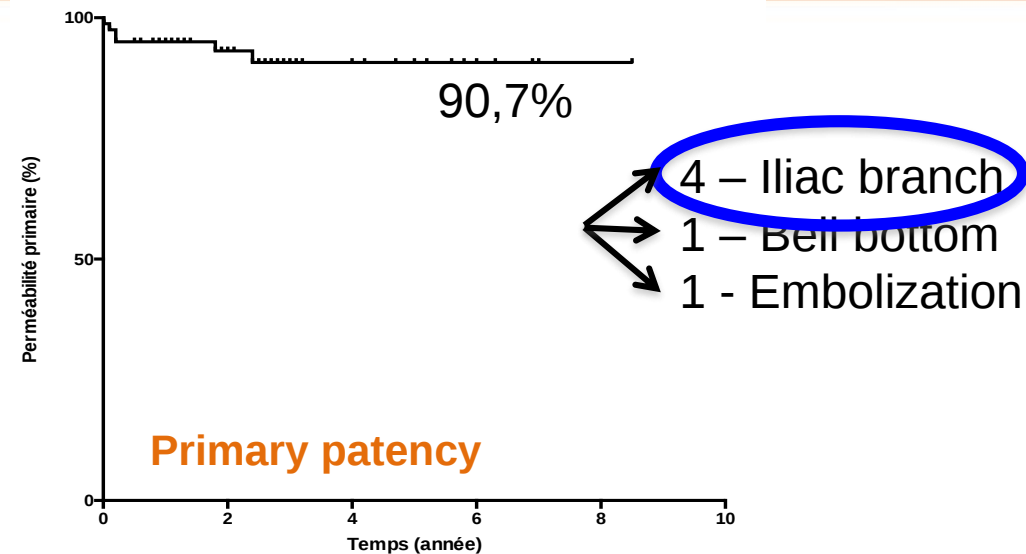
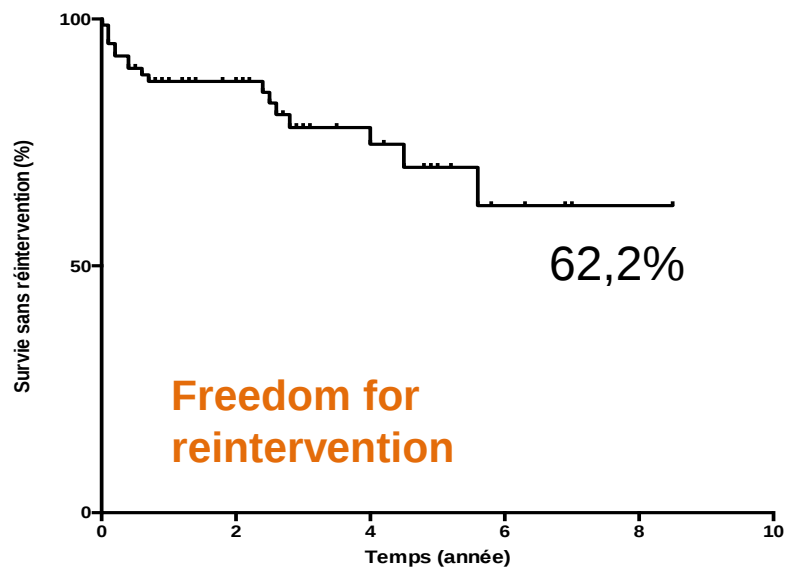
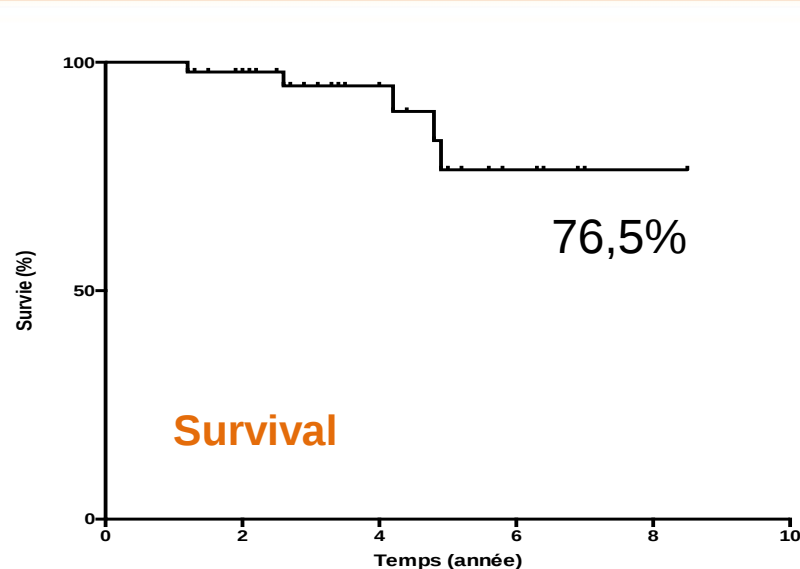


20



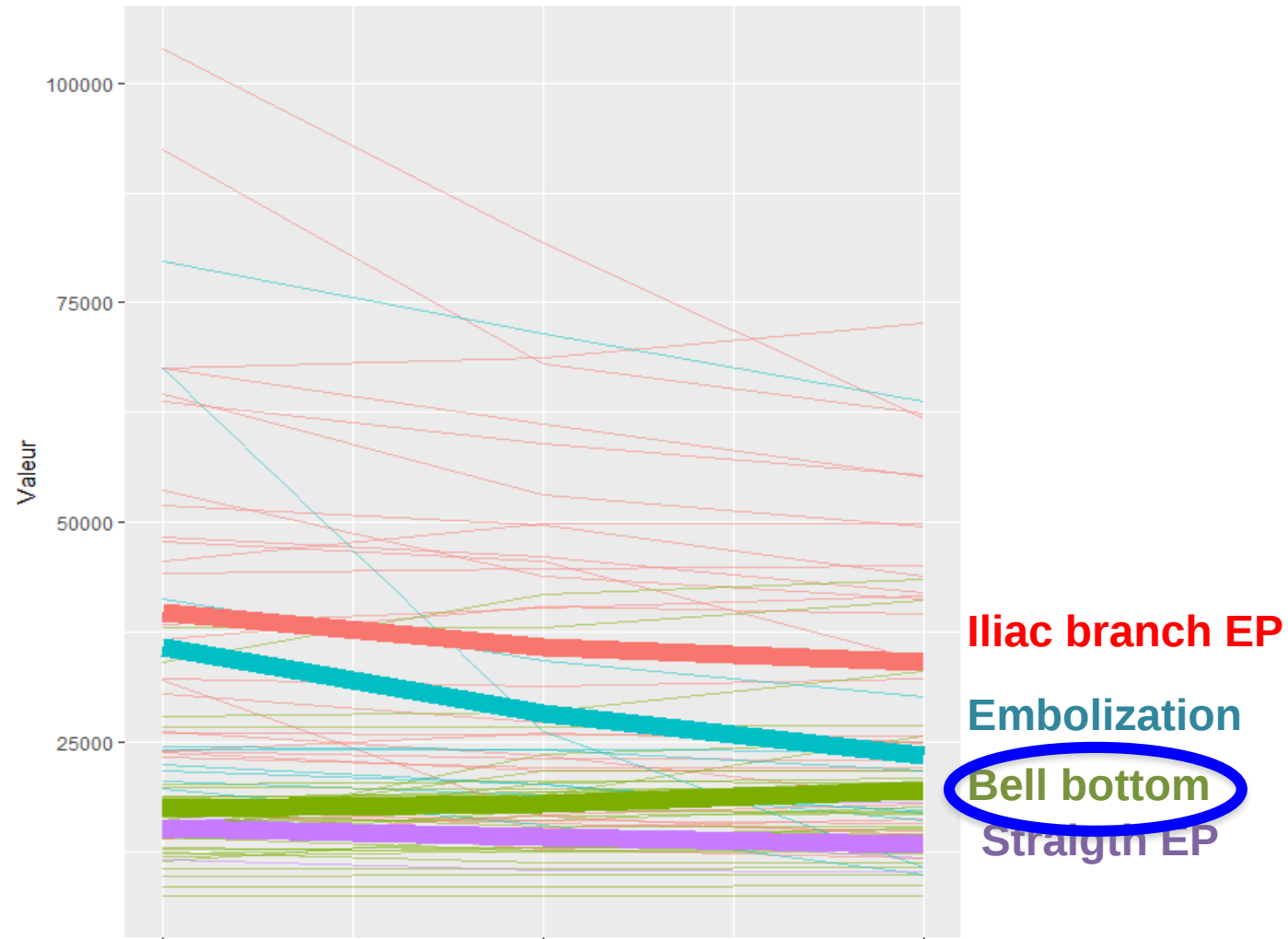
How did we treat them ?

- Embolizations : 9 (18%)
- Bell bottom : 36 (45%)
- Iliac branch endoprotheses: 32 (40%)
- Straigth endoprotheses: 3 (3,75%)
- Technical success: 100%





Volume analysis





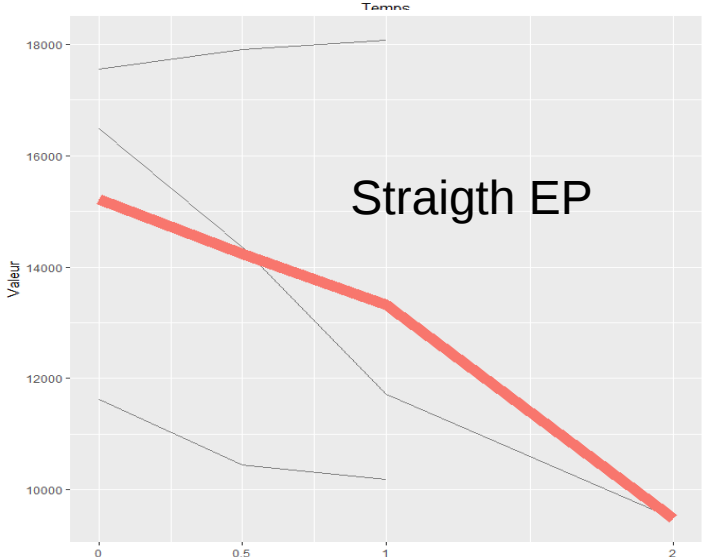
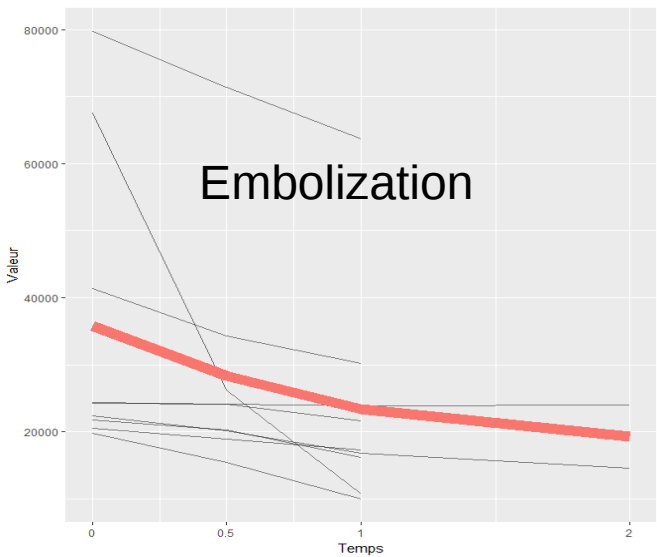
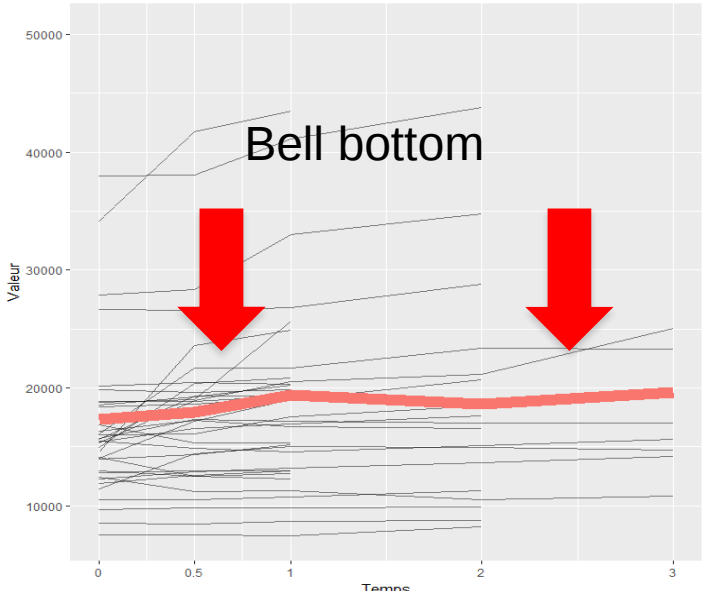
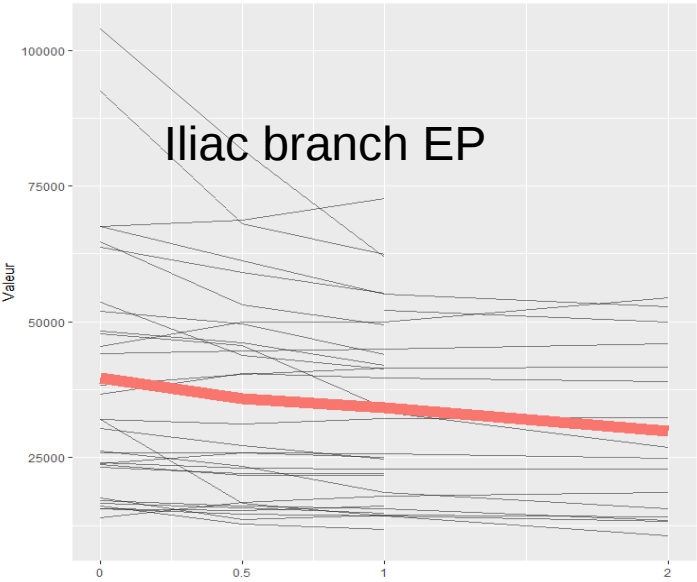
Volume analysis

Traitement	Coef	IC	p	6 mois	1an
Branchée iliaque	0,988	0,979-0,997	<0,05	-6,8%	-13,2%
EP évasée	1,008	0,999-1,017	0,2	+4,8%	+9,8%
Embolisation et couverture	0,965	0,948-0,982	<0,01	-19,3%	-35%
EP couverte droite	0,988	0,959-1,019	0,9	-7%	-13%



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Risk factors

Risk factor of CIA volume increasing:

Protection factor : **Embolization**

Bell bottom

Risk factor of EF1B:

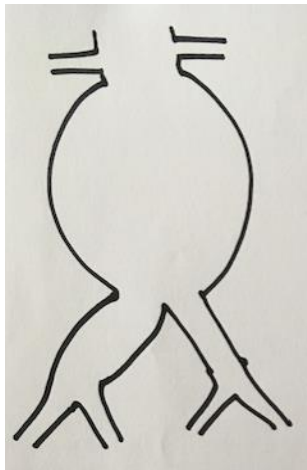
Bell bottom

CIA length < 50mm

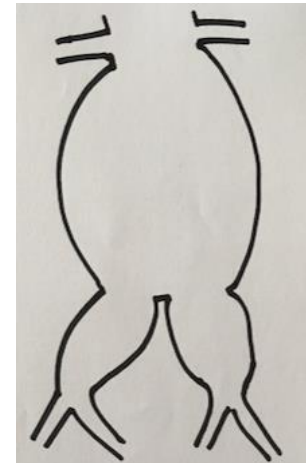


Bell bottom ?

- 28 patients – 36 dilated CIA treated with bell bottom

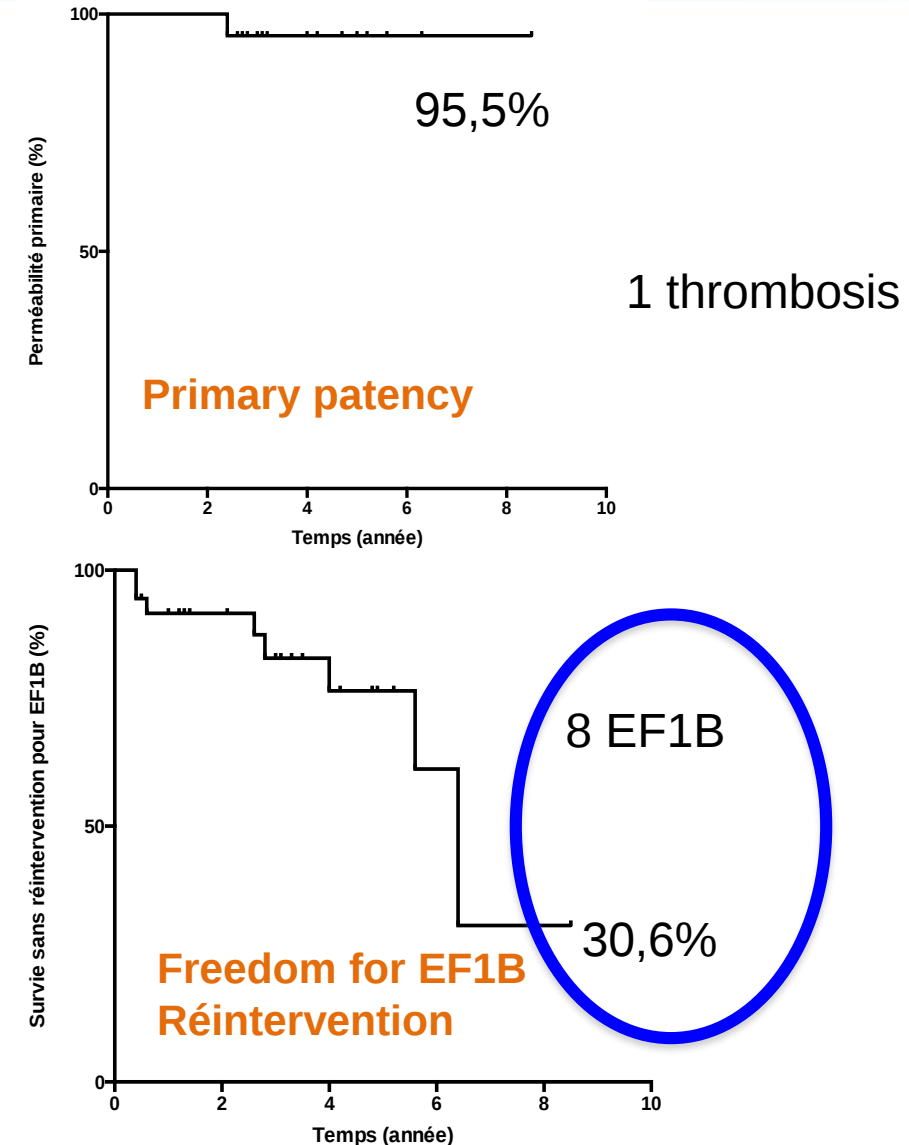
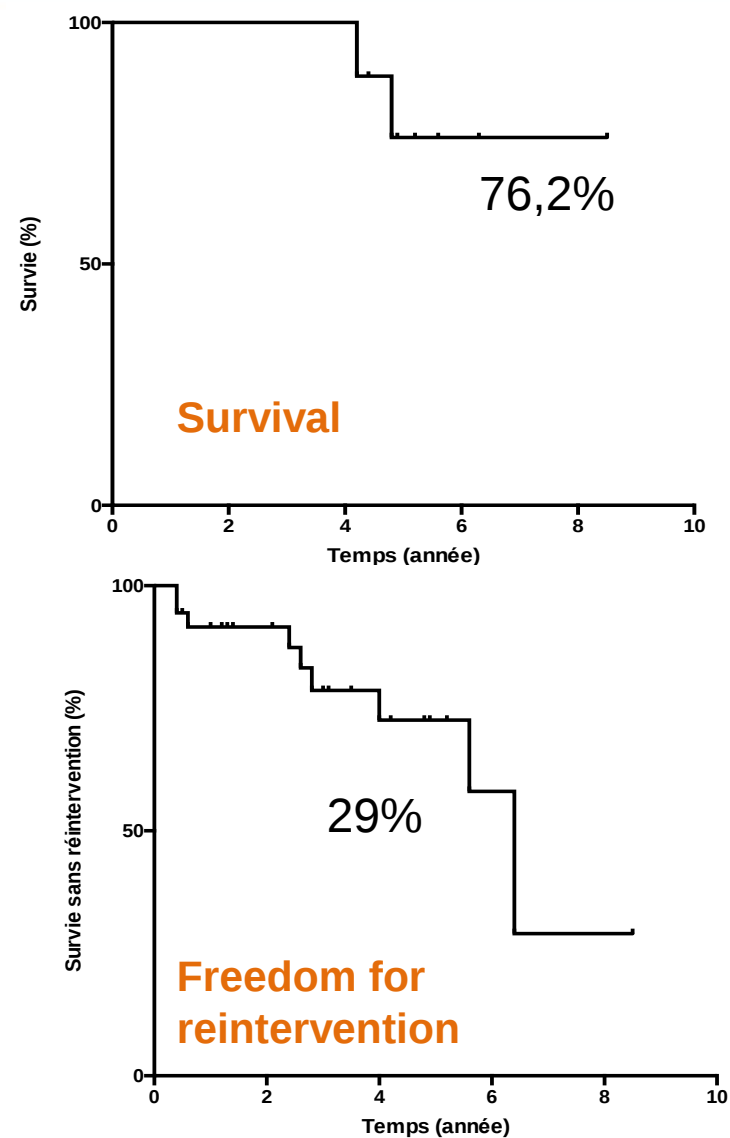


20



8

- Technical success: 100%

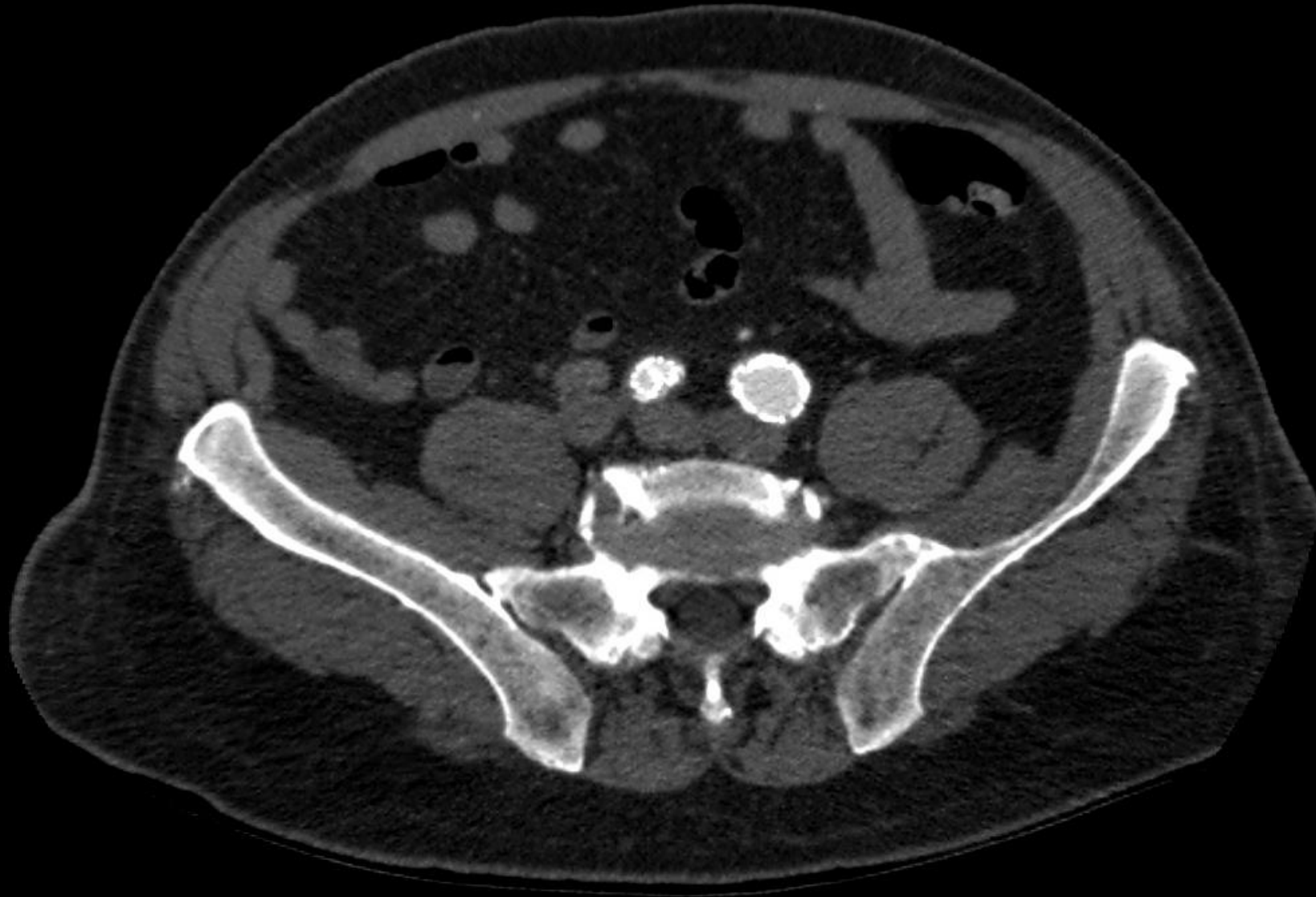


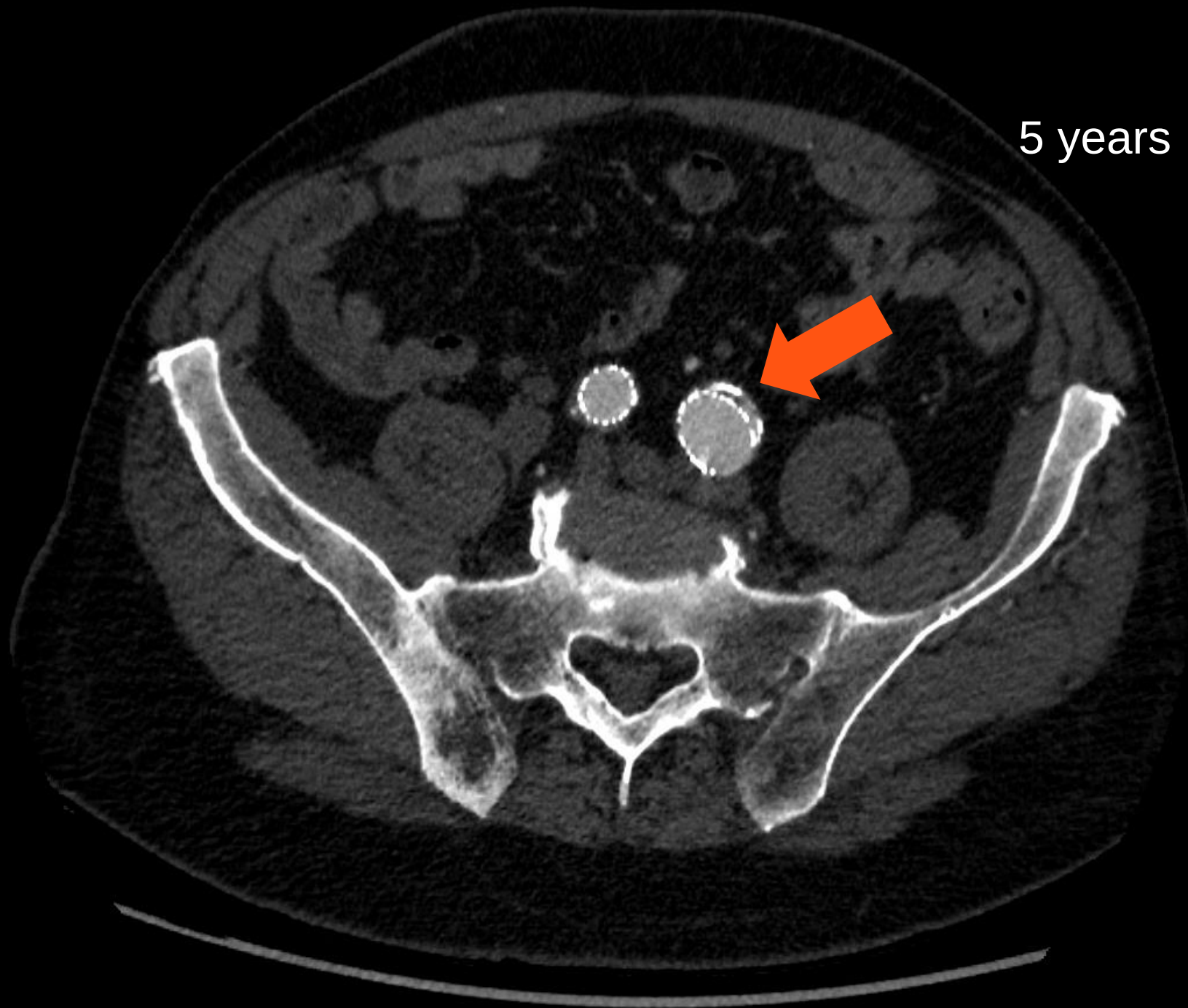


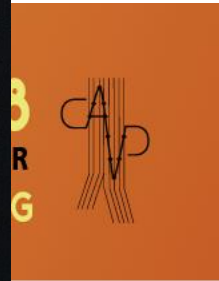
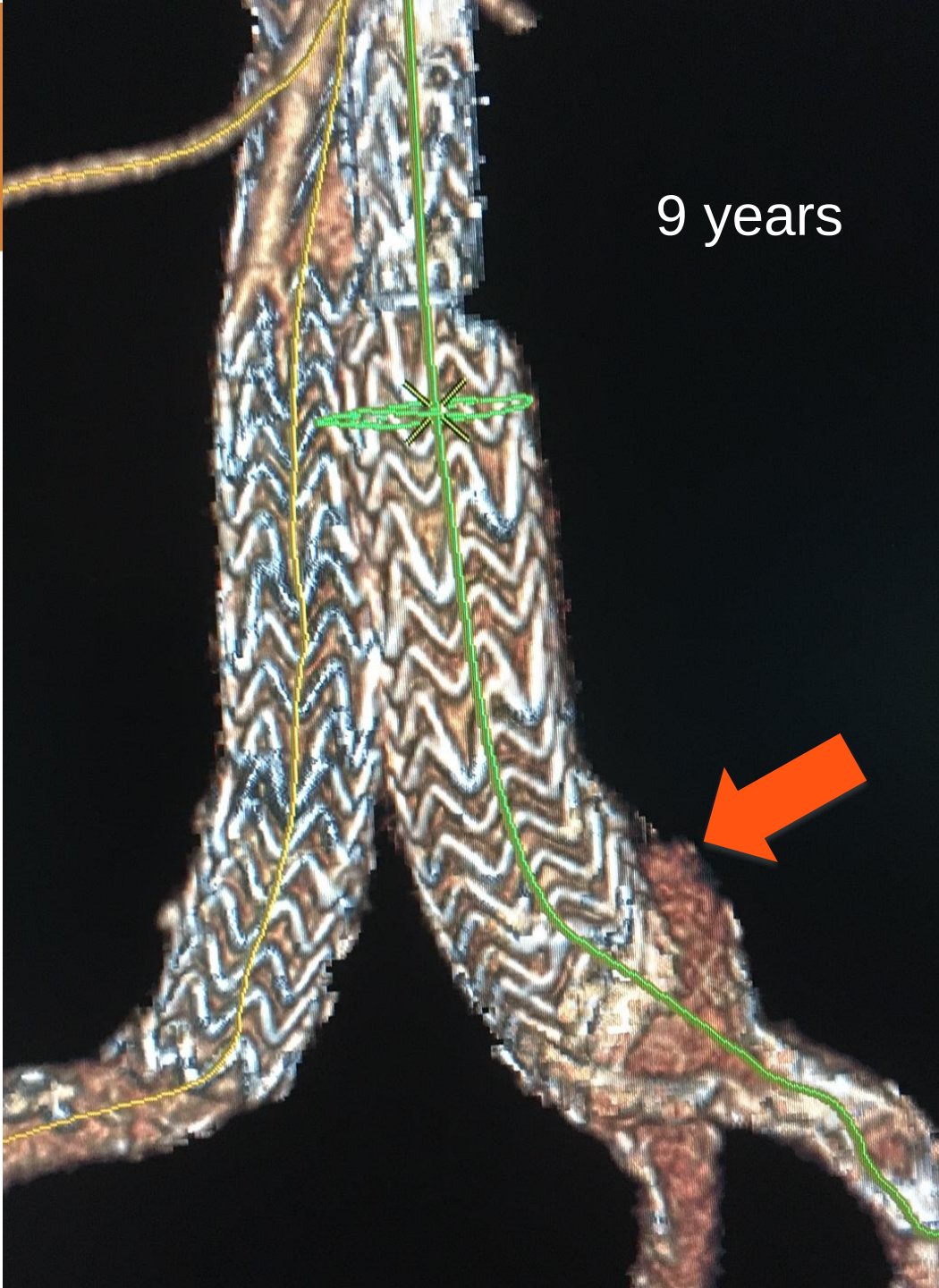
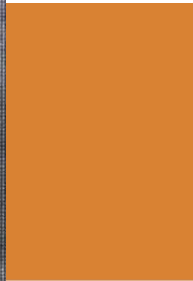
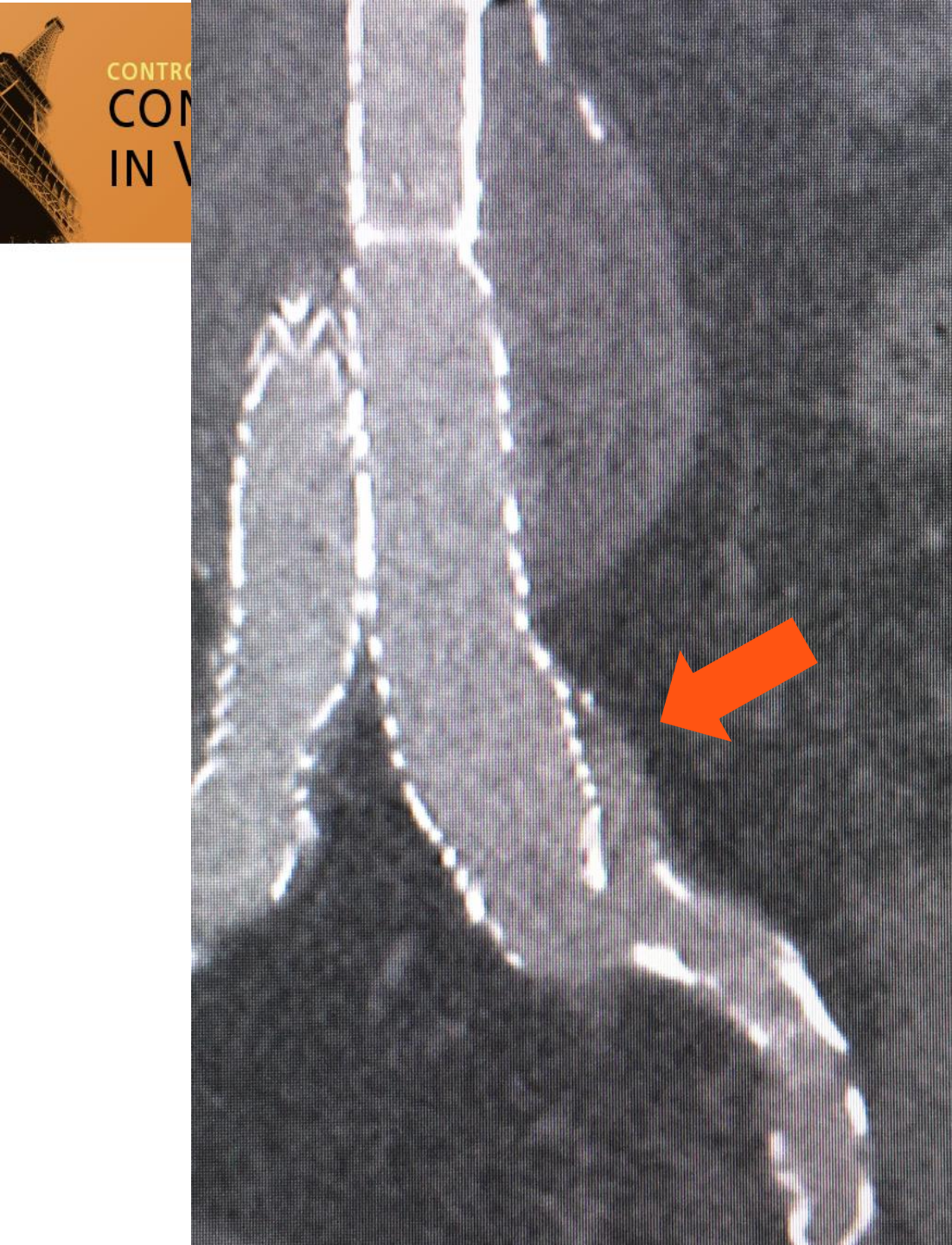
Which area dilated ?

	zone proximale	zone moyenne	zone distale
Rapport du volume du TDM à 1an sur le volume du TDM pré-op (%)	<u>+3,8%</u>	<u>+20,1%</u>	<u>+12,9%</u>
- augmentation (n)	15 (41,7%)	23 (63,9%)	21 (58,3%)
- diminution (n)	12 (33,3%)	5 (13,9%)	4 (11,1%)
- stable (n)	9 (25,0%)	8 (22,2%)	11 (30,6%)
Rapport du volume du dernier TDM sur le volume du TDM à 1an	<u>+ 8,6%</u>	<u>+10,9%</u>	<u>+10,3%</u>
- augmentation (n)	18 (50,0%)	18 (50,0%)	18 (50,0%)
- diminution (n)	8 (22,2%)	3 (8,3%)	2 (5,6%)
- stable (n)	10 (27,8%)	15 (41,7%)	16 (44,4%)

1 month









Iliac branch endoprotheses

Literature review:

Effective procedure, few complications and low reintervention rate on medium-term

J Cardiovasc Surg (Torino). 2014 Oct;55(5):679-83. Epub 2014 Jul 10.

Early experience with the Excluder® iliac branch endoprosthesis.

Ferrer C¹, De Crescenzo F, Coscarella C, Cao P.

Eur J Vasc Endovasc Surg. 2013 Jun;45(6):607-9. doi: 10.1016/j.ejvs.2013.02.017. Epub 2013 Mar 27.

Endovascular treatment of aorto-iliac aneurysms: four-year results of iliac branch endograft.

Pratesi G¹, Fargion A, Pulli R, Barbante M, Dorigo W, Ippoliti A, Pratesi C.

Eur J Vasc Endovasc Surg. 2012 Mar;43(3):287-92. doi: 10.1016/j.ejvs.2011.12.011. Epub 2012 Jan 10.

Long-term results of iliac aneurysm repair with iliac branched endograft: a 5-year experience on 100 consecutive cases.

Parlani G¹, Verzini F, De Rango P, Brambilla D, Coscarella C, Ferrer C, Cao P.

J Endovasc Ther. 2014 Aug;21(4):579-86. doi: 10.1583/14-4712R.1.

Use of iliac branch devices for endovascular repair of aneurysmal distal seal zones after EVAR

Bisdas T¹, Weiss K, Donas KP, Schwindt A, Torsello G, Austermann M.



Iliac branch endoprotheses



Zenith Bifurcated Iliac Side Branch Device: Mid-term Results and Assessment of Risk Factors for Intraoperative Thrombosis

Charline Delay,¹ Sébastien Deglise,² Anne Lejay,¹ Yannick Georg,¹ Mathieu Roussin,¹
Mickaël Schaeffer,¹ François Saucy,² Fabien Thaveau,¹ Jean-Marc Corpataux,²
and Nabil Chakfe,¹ Strasbourg, France, and Lausanne, Switzerland

Background: The aim of this study is to evaluate the short- and mid-term results of the Zenith bifurcated iliac side branch device (ZBIS) in the treatment of common iliac artery (CIA) aneurysms, and to assess risk factors for intraoperative internal iliac artery (IIA) thrombosis.

Methods: All patients who underwent endovascular treatment of either an isolated CIA aneurysm or an aortoiliac aneurysm using the ZBIS device in the departments of vascular surgery of Strasbourg (France) and Lausanne (Switzerland) between January 2010 and December 2014 were retrospectively collected.

Results: Thirty-one implantations were performed: 30 patients underwent 31 endovascular CIA aneurysm treatments with the ZBIS device. Mean operative time was 188 min. Technical success was obtained in 26 implantations (84%). In 5 implantations (16%), the final angiogram revealed an IIA thrombosis. Thirty-day mortality was 3.2%. Thirty-day morbidity was 13.3%. Mean follow-up was 15 months. Overall survival was 96% at 1 year and 89% at 2 years. In intention-to-treat analysis, primary patency of the internal iliac side branch was 84% at 1 year and 76% at 2 years (5 peroperative IIA occlusions and 1 late occlusion). Freedom from reintervention was 89% at 1 and 2 years. One case of type III endoleak and 2 cases of type II endoleaks were identified. Only type III endoleak required an additional intervention with a covered stent. Aneurysm diameter decreased in 15 implantations (48%) and remained stable in 16 implantations (52%). Clinical, radiological, and peroperative parameters were analyzed to identify risk factor for intraoperative thrombosis of the internal iliac side branch. Notion of intraoperative difficulties (any additional procedure that was not initially planned and increasing the operating time) appeared as a risk factor in multivariate analysis ($P < 0.01$, standard deviation 1.27, odds ratio 30.6).

Conclusions: The main findings of our study is that the procedure can be difficult to perform in particular conditions and can lead to peroperative failure in these cases, highlighting the need for adequate patients screening. When technical success is obtained, outcomes can be considered as satisfactory.

Eur J Vasc Endovasc Surg. 2012 Mar;43(3):287-92. doi: 10.1016/j.ejvs.2011.12.011. Epub 2012 Jan 10.

Long-term results of iliac aneurysm repair with iliac branched endograft: a 5-year experience on 100 consecutive cases.

Parlani G¹, Verzini F, De Rango P, Brambilla D, Coscarella C, Ferrer C, Cao P.

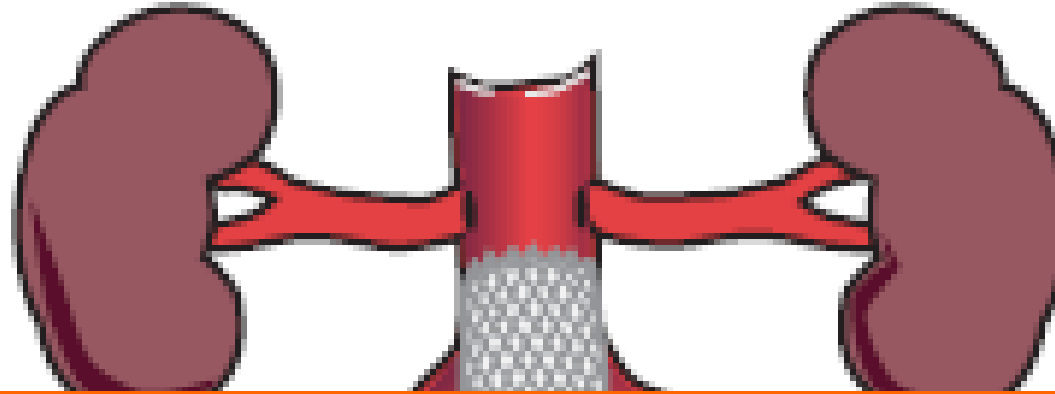
Vascular Surgery
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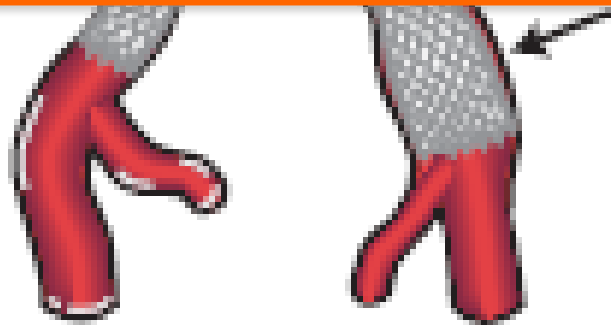


DISCUSSION

- Low morbi-mortality
- Primary patency: **Iliac branch EP**
- Freedom for EF1B reintervention:
 - **Bell bottom**
- Volumetric analysis
 - **Bell bottom**
- Risk factor: **Bell bottom**



**What are the mechanisms of
CIA diameter increase in
patients treated with bell
bottom limbs ?**





CIA volume increase

— Post-EVAR remodeling

Kouvelos GN, Oikonomou K, Antoniou GA, Verhoeven EL, Katsargyris A. A systematic review of proximal neck dilatation after endovascular repair for abdominal aortic aneurysm. J Endovasc Ther 2016;20:59-67.

Litwinski RA, Donayre CE, Chow SL, Song TK, Kopchok G, et al. The role of aortic neck dilatation and elongation in the etiology of stent graft migration after endovascular abdominal aortic aneurysm repair with a passive fixation device. J Vasc Surg 2006;44:1176-81.

Monahan TS, Chuter TA, Reilly LM, Rapp JH, Hiramoto JS. Long-term follow-up of neck expansion after endovascular aortic aneurysm repair. J Vasc Surg 2010;52:303-07.

Cao P, Verzini F, Parlani G, Rango PD, Parente B, et al. Predictive factors and clinical consequences of proximal aortic neck dilatation in 230 patients undergoing abdominal aorta aneurysm repair with self-expandable stent-grafts. J Vasc Surg 2003;37:1200-5.



CIA volume increase

— Post-EVAR remodeling

Kaladji A, Cardon A, Laviolle B, Heautot JF, Pinel G, et al. Evolution of the upper and lower landing site after endovascular aortic aneurysm repair. J Vasc Surg 2012;55:24-32.

Gonçalves FB, Oliveira NF, Josee van Rijn M, Ultee KHJ, Hoeks SE, et al. Iliac seal zone dynamics and clinical consequences after endovascular aneurysm repair. Eur J Vasc Endovasc Surg 2017;58:185-92.

Tsilimparis N, Dayama A, Ricotta JJ. Remodeling of aortic aneurysm and aortic neck on follow-up after endovascular repair with suprarenal fixation. J Vasc Surg 2015;61:28-34.

-> Areas in contact with the arterial wall :
continuous stress / tendency to enlarge



CIA volume increase

- Post-EVAR remodeling
- Initially dilated: is it actually remodeling?

Richards T, Dharmadasa A, Davies R, Murphy M, Perera R, et al. Natural history of the common iliac artery in the presence of an abdominal aortic aneurysm. J Vasc Surg 2009;49:881-5.

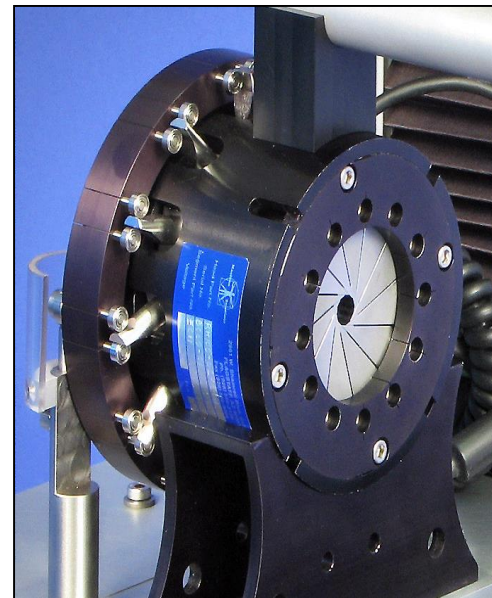
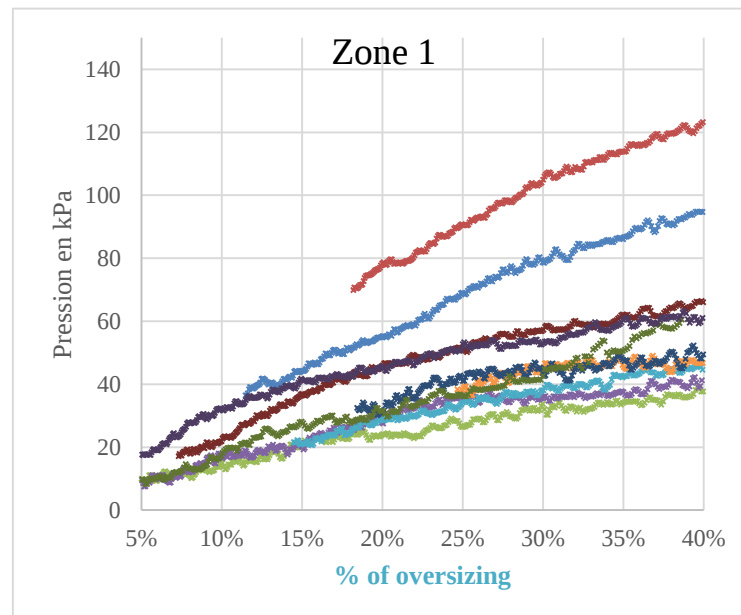
Falkensammer J, Hakaim AG, Oldenburg A, Neuhauser B, Paz-Fumagalli R, et al. Natural history of the iliac arteries after endovascular abdominal aortic aneurysm repair and suitability of ectatic iliac arteries as a distal sealing zone. J Endovasc Ther 2007;14:619-24.

- **Evolution of aneurysmal disease**



CIA volume increase

- Post-EVAR remodeling
- Arterial wall pathology
- Do all bell bottom have the same mechanical properties ?





CONCLUSION

- Dilated CIA are pathologic
- Long-term follow up is mandatory +++
- Don't forget distal landing zones +++
- Favor iliac branch devices +++



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THANK YOU

