

Optimal use of Cone Beam CT Lessons learned (Benefits and limitations)



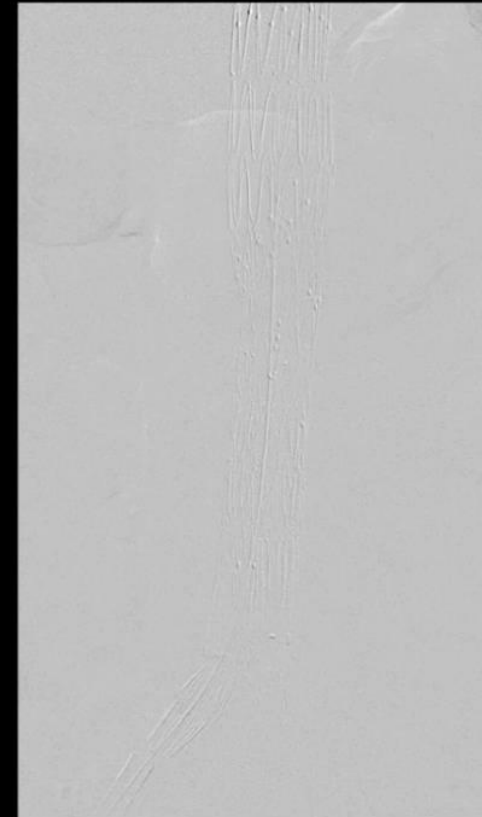
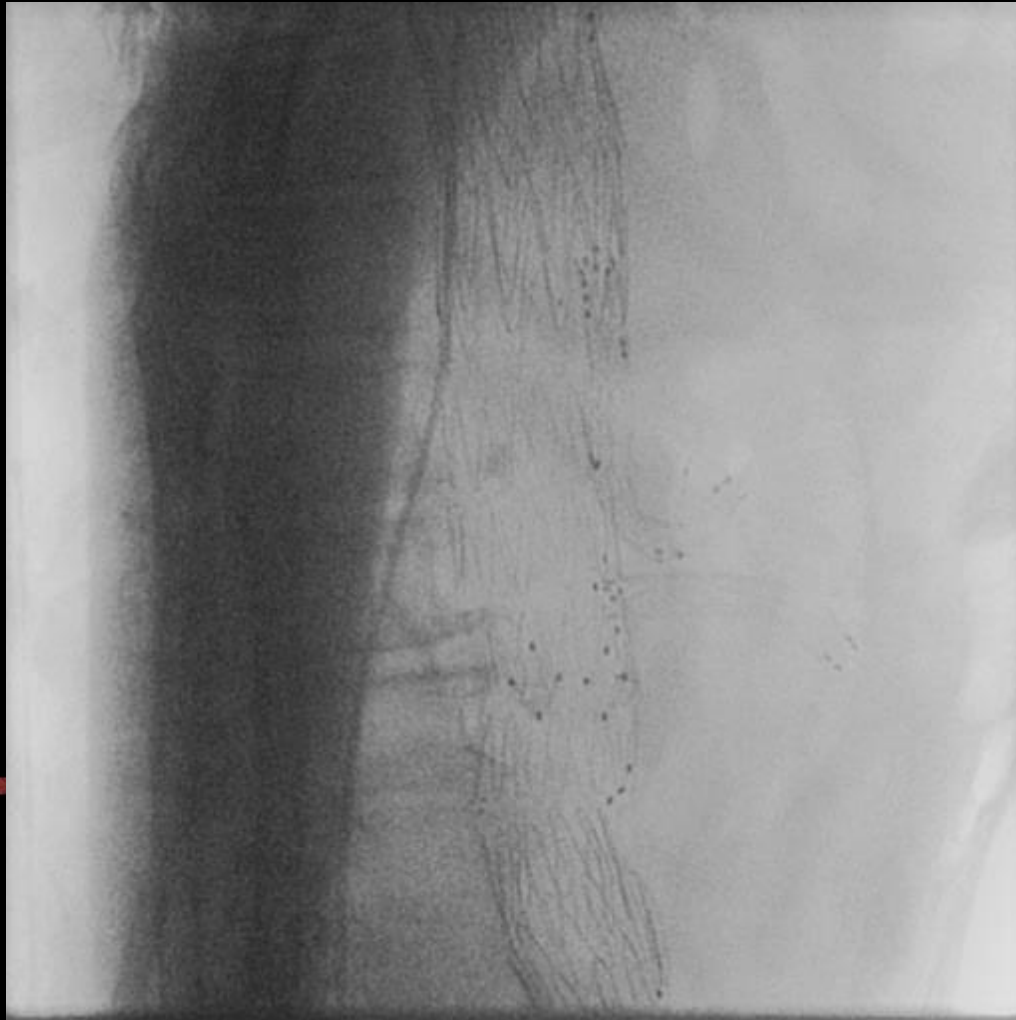
J.Mougin, A Hertault, G Tinelli, A Bianchini, E Lerisson, M Bonnet,
J Sobocinski, S Haulon



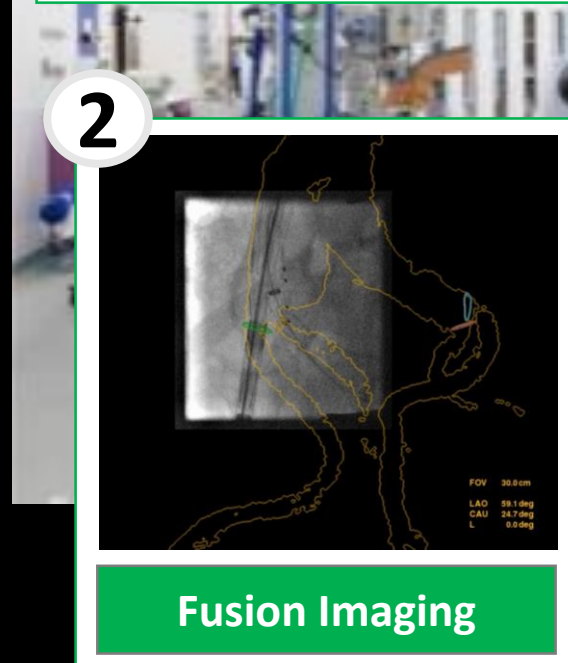
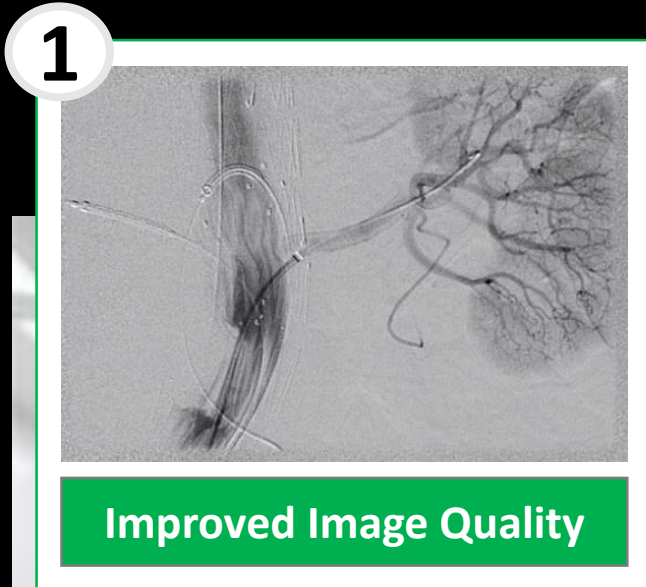
Disclosures

- Speaker name : Justine MOUGIN
- None

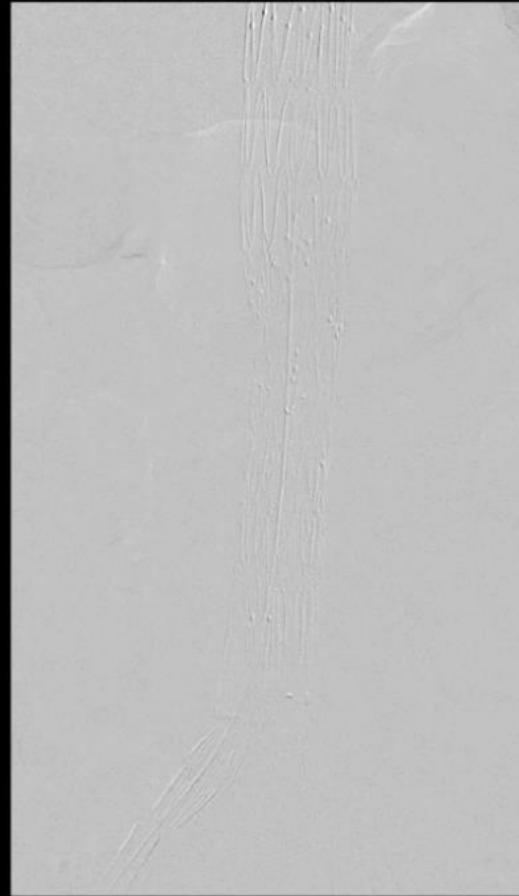
#Case1
Post endograft deployment CBCT



Benefits of HR

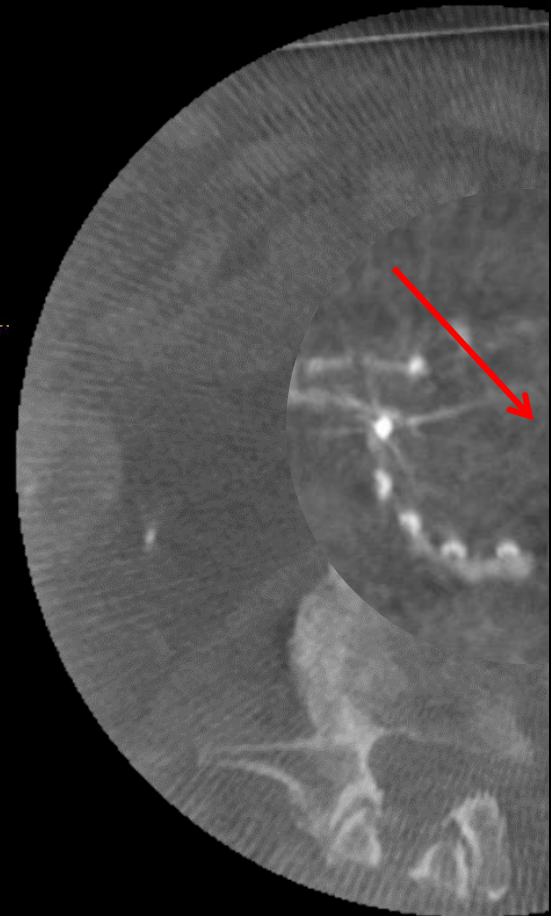
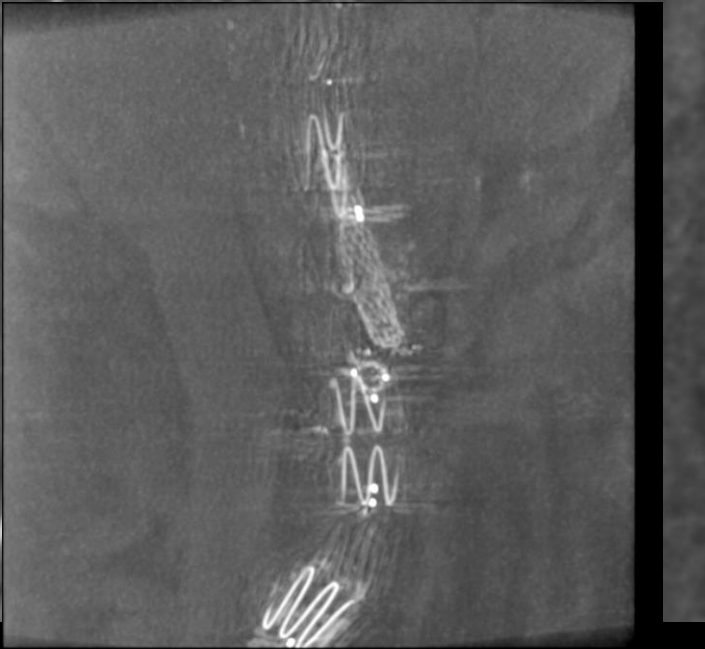
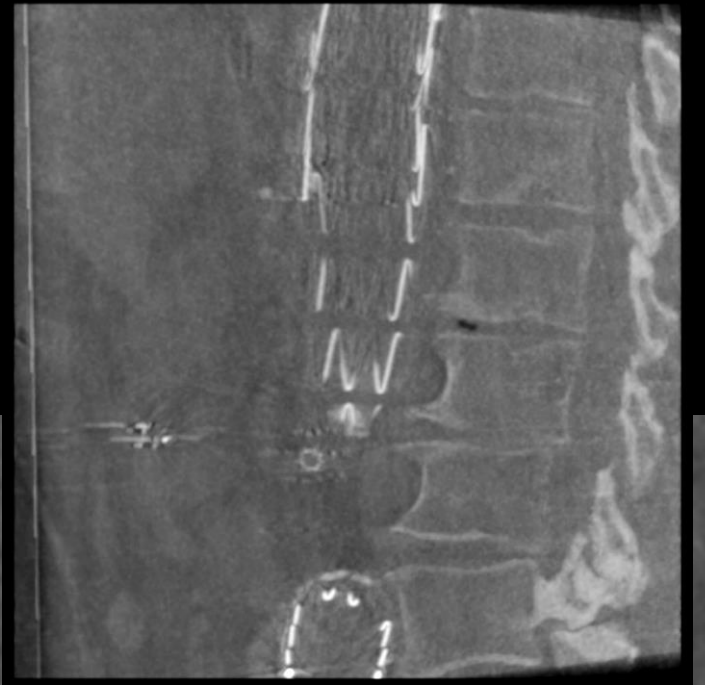


CBCT impact





#Case1
Post endograft deployment



CBCT to assess technical success


Intra-operative DynaCT improves technical success of endovascular repair of abdominal aortic aneurysms

Lukla Biasi, MD, Tahir A
Rob Morgan, MBBS, MR
Matt Thompson, MA, MF

Intraoperative contrast-enhanced cone beam

Main results

g endovascular an



Matthias Schmitt, Dittmar Böckler,

Benefits of Completion
Ultrasound to Assess


A. Hertault^a, B. Maurel^a, F. Pontal^a,
M. Rémy-Jardin^b, S. Haulon^{a,*}

^aService de Chirurgie Vasculaire, Hôpital cardiologique, CHRU Lille, France
^bService d'Imagerie Vasculaire, Hôpital cardiologique, CHRU Lille, France
^{*}Service des Explorations Fonctionnelles Cardio-Vasculaires, Hôpital cardiologique, CHRU Lille, France

...d with Contrast Enhanced
...R

...nski^a, I. Sediri^c, C. Gautier^c, R. Azaoui^a,

Few papers



CBCT : 7 to 70Gy/cm²
Contrast: 35 to 70mL
BUT
< to CTA

Impact of onlay fusion and cone beam computed

SUCCESS



LOADING...

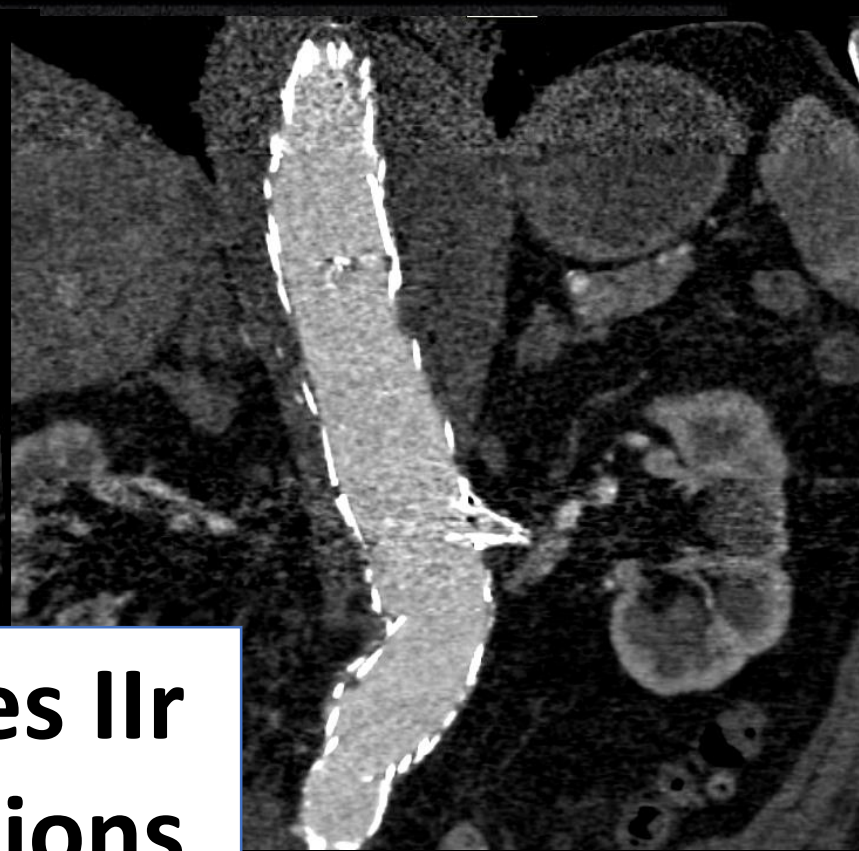
Is it worth it ?

S. Oderich, MD,^a C
A. Macedo, MD,^c T



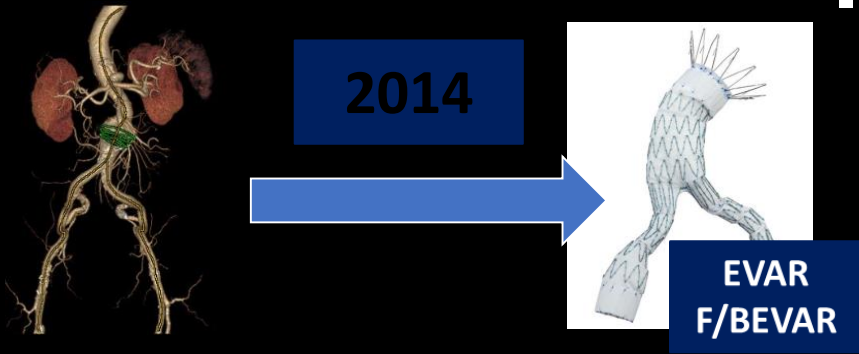
#Case1
Post endograft deployment CBCT

**Increases
technical succes**



**To reduces Ilr
interventions**

Initial findings



Benefits of Completion 3D Angiography Associated with Contrast Enhanced Ultrasound to Assess Technical Success after EVAR

A. Hertault^a, B. Maurel^b, F. Pontana^b, T. Martin-Gonzalez^b, R. Spear^b, J. Sobocinski^b, I. Sediri^c, C. Gautier^c, R. Azzouzi^a, M. Rémy-Jardin^b, S. Haulon^{a,*}

^aService de Chirurgie Vasculaire, Hôpital cardiologique, CHRU Lille, France
^bService d'Imagerie Cardio-Vasculaire et Thoracique, Hôpital Calmette, CHRU de Lille, France
^cService des Explorations Fonctionnelles Cardio-Vasculaires, Hôpital Cardiologique, CHRU de Lille, France

WHAT THIS PAPER ADDS

Use of a contrast enhanced CBCT based strategy to assess technical success after EVAR is feasible, and allows reduction of total in hospital radiation exposure and contrast medium volume injected.

Objectives: This study evaluated a new strategy to assess technical success after standard and complex endovascular aortic repair (EVAR), combining completion contrast enhanced cone beam computed tomography (ceCBCT) and post-operative contrast enhanced ultrasound (CEUS).

Methods: Patients treated with bifurcated or fenestrated and branched endografts in the hybrid room during the study period were included. From December 2012 to July 2013, a completion angiogram (CA) was performed at the end of the procedure, and computed tomography angiography (CTA) before discharge (group 1). From October 2013 to April 2014, a completion ceCBCT was performed, followed by CEUS during the 30 day post-operative period (group 2). The rate of peri-operative events (type I or III endoleaks, kinks, occlusion of target vessels), need for additional procedures or early secondary procedures, total radiation exposure (mSv), and total volume of contrast medium injected were compared.

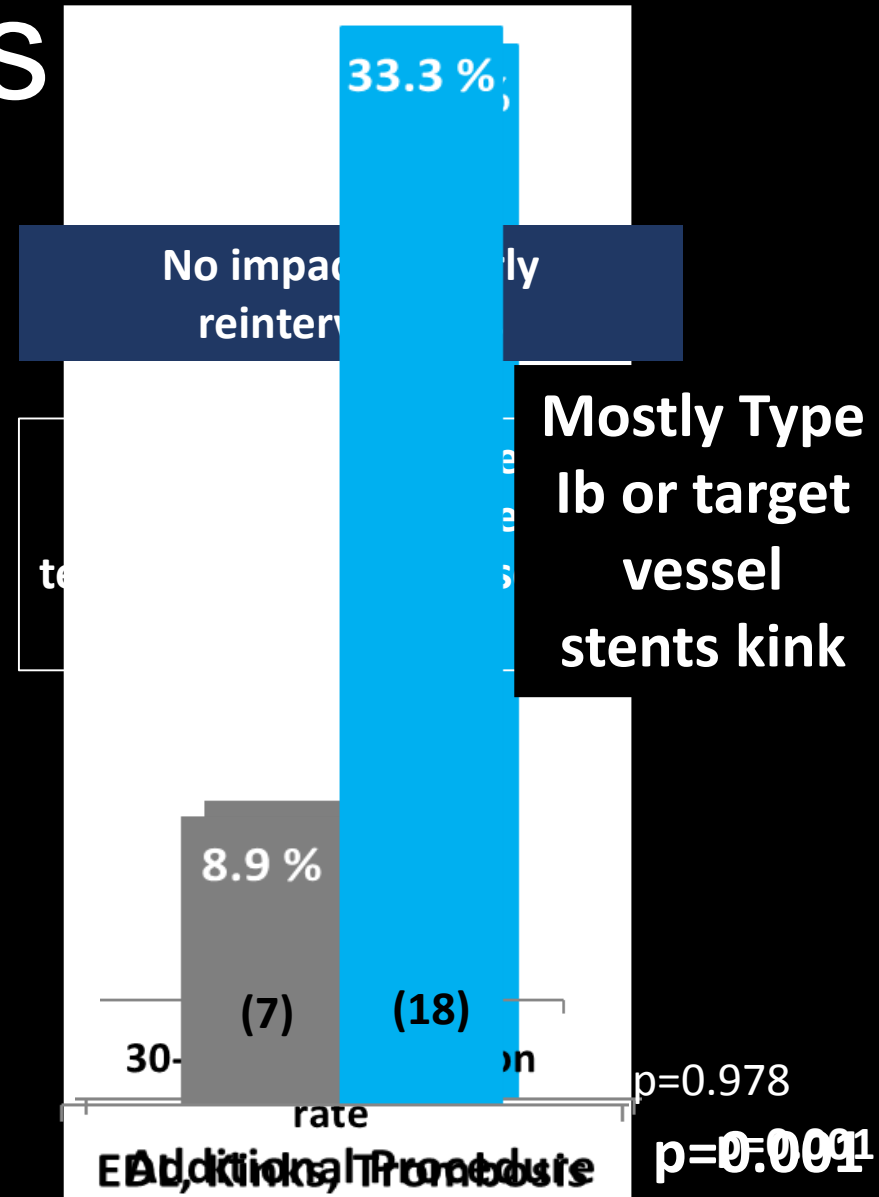
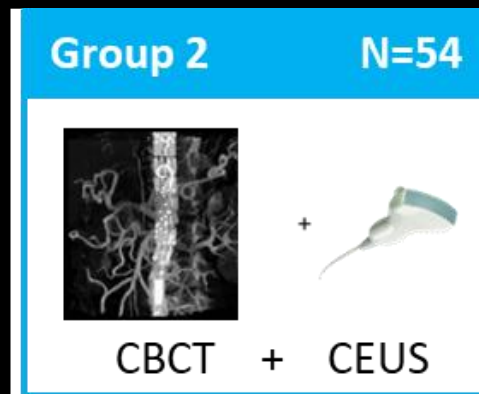
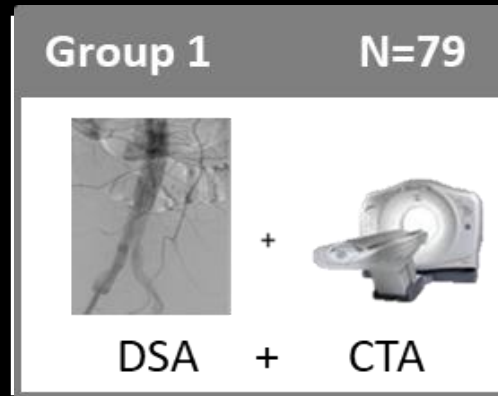
Results: Seventy-nine patients were included in group 1 and 54 in group 2. Peri-operative event rates were respectively 8.9% ($n = 7$) and 33.3% ($n = 18$) ($p = .001$). Additional procedures were performed in seven patients (8.9%) in group 1 versus 17 (31.5%) in group 2 ($p = .001$). Two early secondary procedures were performed in group 2 (3.7%), and three (3.8%) in group 1 ($p = .978$). Median radiation exposure due to CBCT was 7 Gy cm² (5.25–8) (36%, 27%, and 9% of the total procedure exposure, respectively for bifurcated, fenestrated, and branched endografts). CEUS did not diagnose endoleaks or any adverse events not diagnosed by ceCBCT. Overall radiation and volume of contrast injected during the patient hospital stay in groups 1 and 2 were 34 (25.8–47.3) and 11 (5–20.5) mSv, and 184 (150–240) and 91 (70–132.8) mL respectively (reduction of 68% and 50%, $p < .001$).

Conclusions: Completion ceCBCT is achievable in routine practice to assess technical success after EVAR. Strategies to evaluate technical success combining ceCBCT and CEUS can reduce total in hospital radiation exposure and contrast medium volume injection.

© 2015 European Society for Vascular Surgery. Published by Elsevier Ltd. All rights reserved.

Article history: Received 4 September 2014, Accepted 19 January 2015, Available online 7 March 2015

Keywords: Cone beam computed tomography, Hybrid room, Radiation, Iodinated contrast medium, EVAR, Technical success



Study Design

Benefits of Completion 3D Angiography Associated with Contrast Enhanced Ultrasound to Assess Technical Success after EVAR

A. Hertault ^a, B. Maurel ^a, F. Pontana ^b, T. Martin-Gonzalez ^a, R. Spear ^a, J. Sobocinski ^a, I. Sediri ^c, C. Gautier ^c, R. Azzaoui ^a, M. Rémy-Jardin ^b, S. Haulon ^{a,*}

^aService de Chirurgie Vasculaire, Hôpital cardiologique, CHRU Lille, France

^bService d'Imagerie Cardio-Vasculaire et Thoracique, Hôpital Calmette, CHRU de Lille, France

^cService des Explorations Fonctionnelles Cardio-Vasculaires, Hôpital Cardiologique, CHRU de Lille, France

WHAT THIS PAPER ADDS

Use of a contrast enhanced CBCT based strategy to assess technical success after EVAR is feasible, and allows reduction of total in hospital radiation exposure and contrast medium volume injected.

Objectives: This study evaluated a new strategy to assess technical success after standard and complex endovascular aortic repair (EVAR), combining completion contrast enhanced cone beam computed tomography (ceCBCT) and post-operative contrast enhanced ultrasound (CEUS).

Methods: Patients treated with bifurcated or fenestrated and branched endografts in the hybrid room during the study period were included. From December 2012 to July 2013, a completion angiogram (CA) was performed at the end of the procedure, and computed tomography angiography (CTA) before discharge (group 1). From October 2013 to April 2014, a completion ceCBCT was performed, followed by CEUS during the 30 day post-operative period (group 2). The rate of peri-operative events (type I or III endoleaks, kinks, occlusion of target vessels), need for additional procedures or early secondary procedures, total radiation exposure (mSv), and total volume of contrast medium injected were compared.

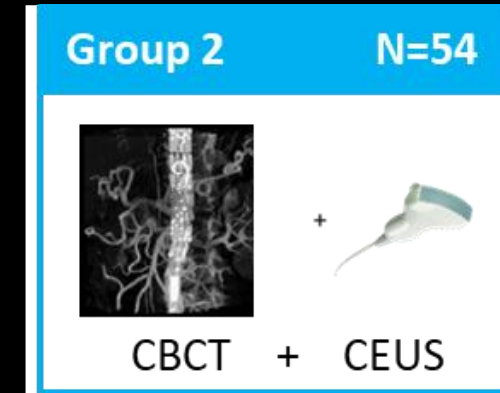
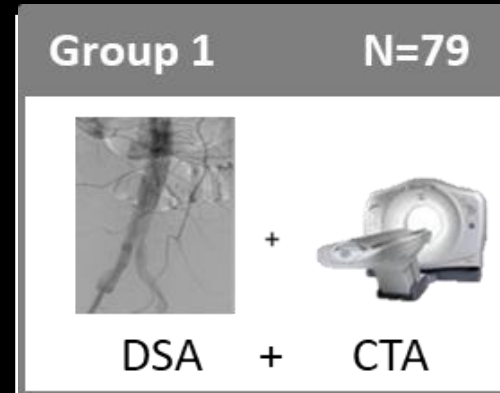
Results: Seventy-nine patients were included in group 1 and 54 in group 2. Peri-operative event rates were respectively 8.9% ($n = 7$) and 33.3% ($n = 18$) ($p = .001$). Additional procedures were performed in seven patients (8.9%) in group 1 versus 17 (31.5%) in group 2 ($p = .001$). Two early secondary procedures were performed in group 2 (3.7%), and three (3.8%) in group 1 ($p = .978$). Median radiation exposure due to CBCT was 7 Gy cm² (5.25–8) (36%, 27%, and 9% of the total procedure exposure, respectively for bifurcated, fenestrated, and branched endografts). CEUS did not diagnose endoleaks or any adverse events not diagnosed by ceCBCT. Overall radiation and volume of contrast injected during the patient hospital stay in groups 1 and 2 were 34 (25.8–47.3) and 11 (5–20.5) mSv, and 184 (150–240) and 91 (70–132.8) mL respectively (reduction of 68% and 50%, $p < .001$).

Conclusions: Completion ceCBCT is achievable in routine practice to assess technical success after EVAR. Strategies to evaluate technical success combining ceCBCT and CEUS can reduce total in hospital radiation exposure and contrast medium volume injection.

© 2015 European Society for Vascular Surgery. Published by Elsevier Ltd. All rights reserved.

Article history: Received 4 September 2014, Accepted 19 January 2015, Available online 7 March 2015

Keywords: Cone beam computed tomography, Hybrid room, Radiation, Iodinated contrast medium, EVAR, Technical success



April
2014

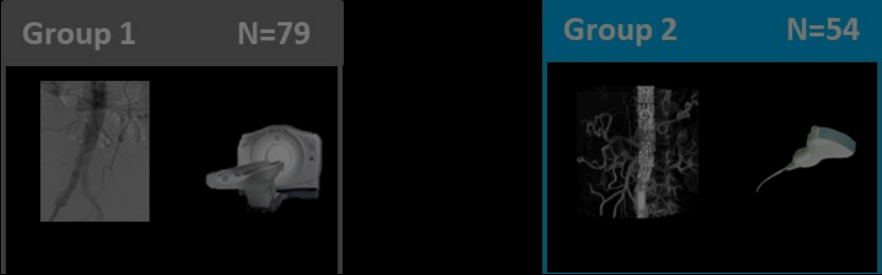
November
2018

Secondary intervention rate?

EL rate?

Graft instability?

Study Findings



AND...

FU (r

Median time to Ilr intervention

22.5 (13.5-36.6)

39.5 (25.3-49)

EL T

Median time to reintervention is almost doubled in the CBCT group

Graft instability

21.5% (17)

12.9% (7)

0.21

Sac enlargement

18.9% (15)

5.6% (3)

0.03

Ilr Interventions

17.7% (16)

12.9% (8)

0.46

Post deployment CBCT

What we know

CBCT detects more events

CBCT increases additional procedures

Patients treated in HR tends to have less IIR interventions

Seems to increase
Primary-assisted
Technical Success

Biased by different FU

The "feeling"

HR & CBCT probably improve F/B/EVAR early & late outcomes, but the impact is difficult to distinguish from other factors

#Case 2

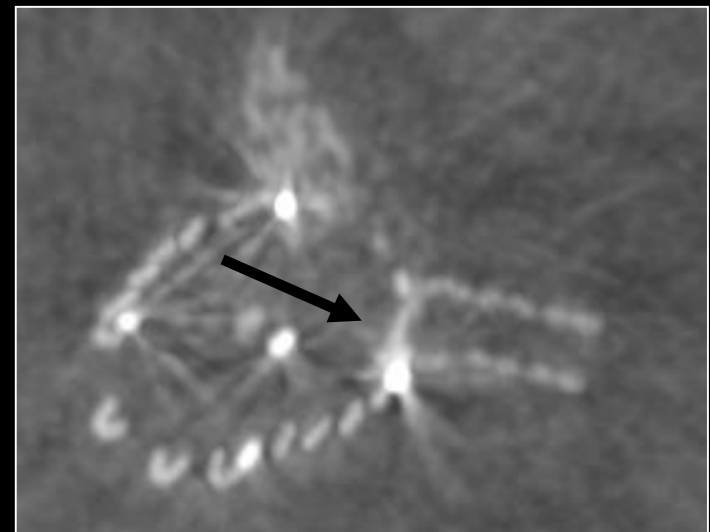
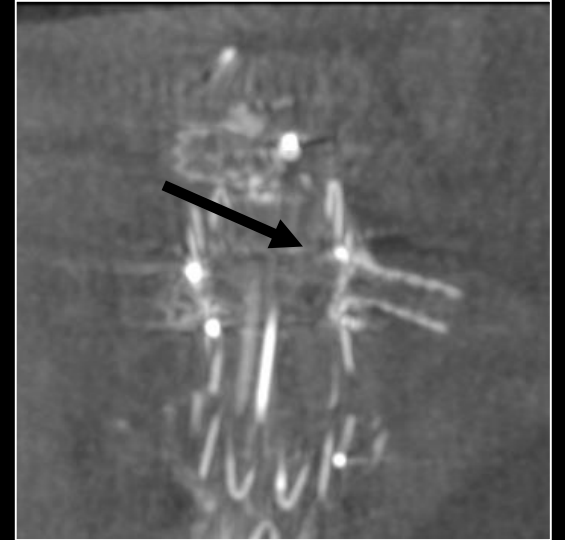
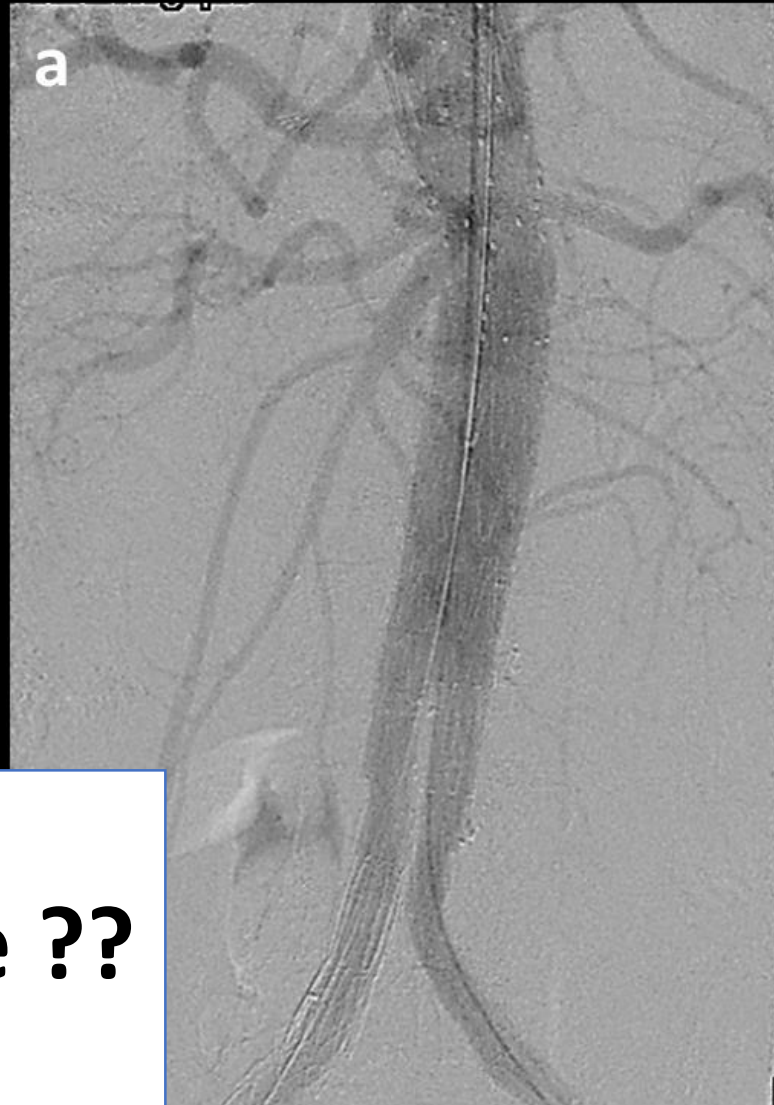
Male, 69 yo

Previous FEVAR

CBCT after endovascular aortic arch repair

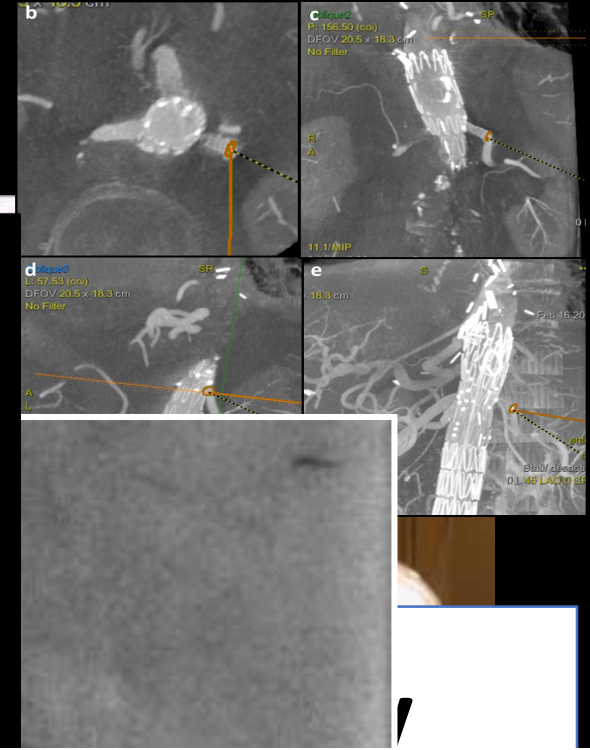
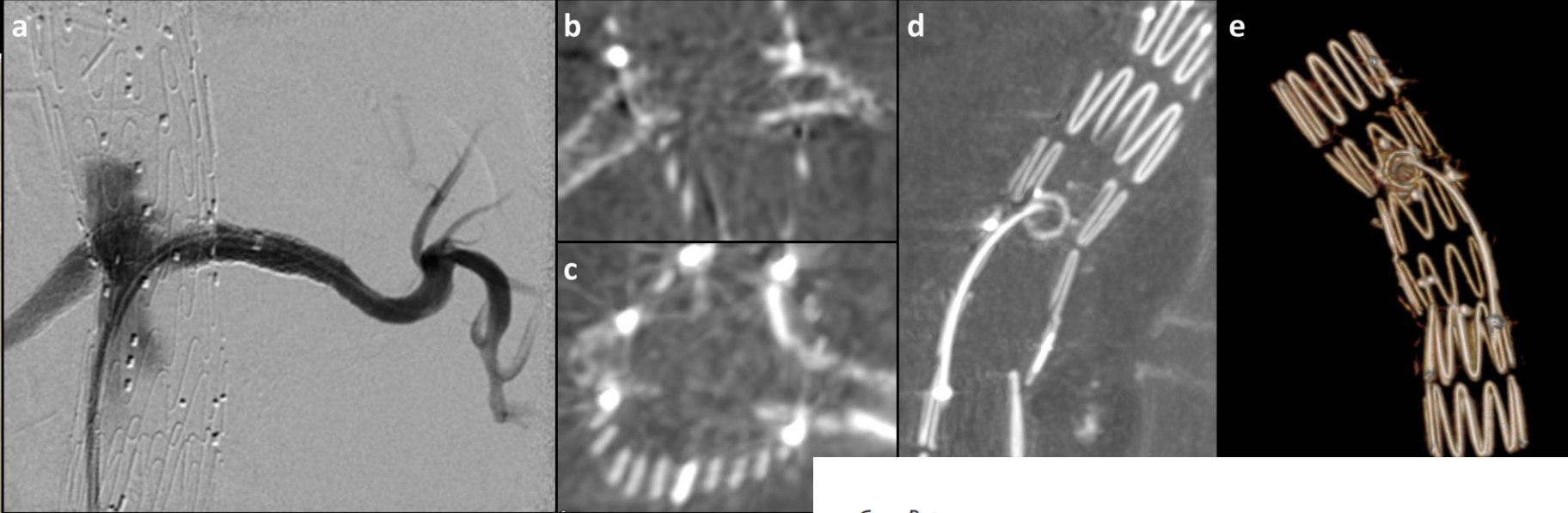
Left renal stent kink

Failure to catheterize ??



#Case 2

Trackvision needle trajectory planning



Case Report

Translumbar Puncture for Retrograde Catheterization of a Kinked Left Renal Stent After Fenestrated Endograft Repair

Adrien Hertault, MD¹, Rachel E. Clough, MD, PhD¹,
Teresa Martin-Gonzalez, MD, PhD¹, Raffaella Spear, MD, PhD¹,
Richard Azzaoui, MD¹, Jonathan Sobocinski, MD, PhD¹,
and Stéphan Haulon, MD, PhD¹

JOURNAL OF
ENDOVASCULAR
THERAPY.
A SAGE PUBLICATION
INTERNATIONAL SOCIETY OF
ENDOVASCULAR SPECIALISTS

Journal of Endovascular Therapy
1-6
© The Author(s) 2016
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1526602816664769
www.jevt.org
SAGE

To conclude

- Promising tool for EVAR
- But still need to be evaluate
- New applications ... ?

[Int J Comput Assist Radiol Surg.](#) 2017 Jan;12(1):51-57. doi: 10.1007/s11548-016-1466-4. Epub 2016 Aug 4.

Electromagnetic navigation versus fluoroscopy in aortic endovascular procedures: a phantom study.

[Tystad Lund K](#)¹, [Tangen GA](#)^{2,3,4,5}, [Manstad-Hulaas F](#)^{2,3,4,6}.

Optimal use of Cone Beam CT Lessons learned (Benefits and limitations)



J.Mougin, A Hertault, G Tinelli, A Bianchini, E Lerisson, M Bonnet,
J Sobocinski, S Haulon

