

FORS is safe and effective, but does it reduce radiation time?

CVI 2026

Anna Prent, GW Schurink, Barend Mees

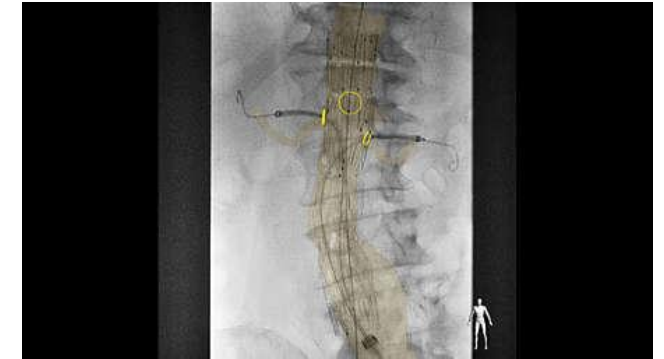
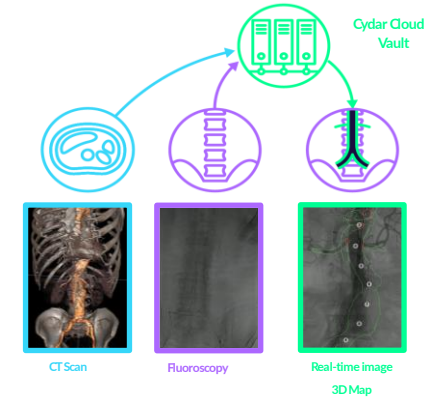
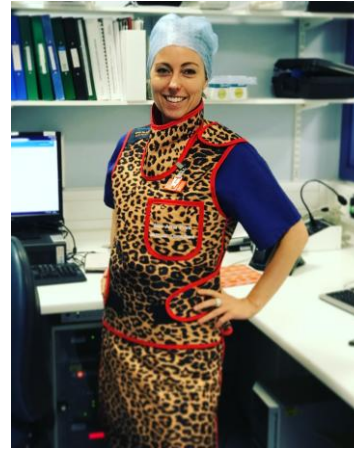
MUMC the Netherlands

Disclosures

I have no disclosure

I have the following disclosures

Introduction: Endovascular revolution



- Shielding: leads/ glasses/ shields/ distance
- Hybrid theatre
- Fusion imaging techniques

Radiation exposure vascular surgery

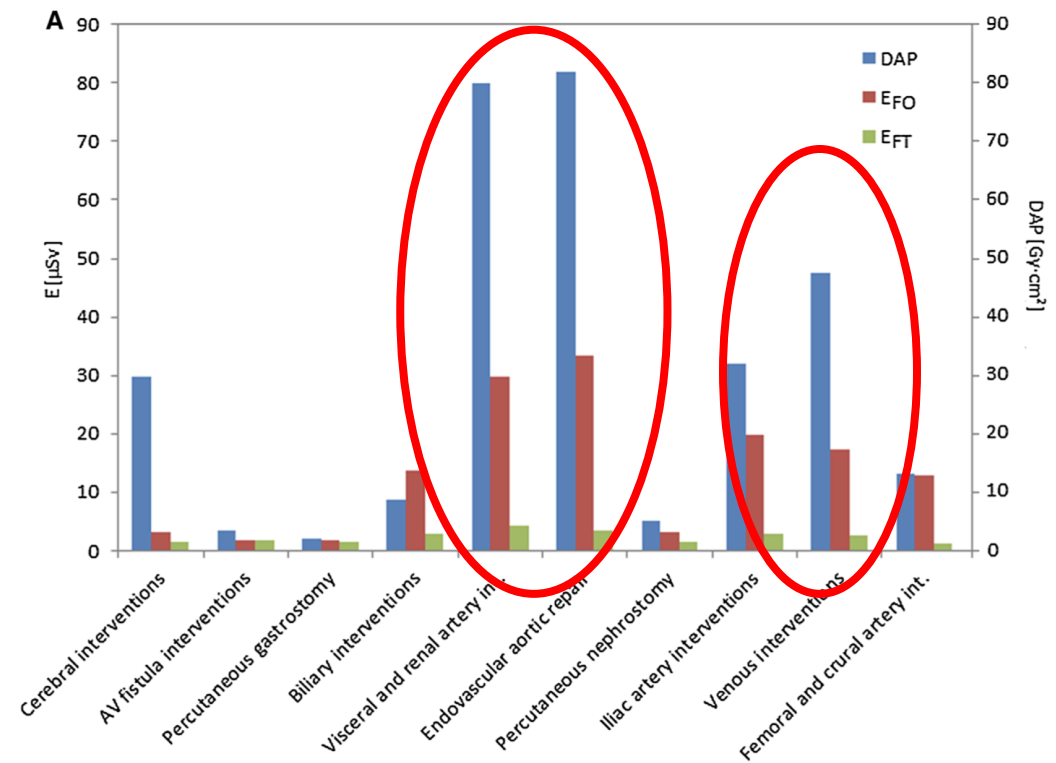
Cardiovasc Intervent Radiol (2017) 40:421–429
DOI 10.1007/s00270-016-1526-8

C RSE CrossMark

CLINICAL INVESTIGATION NON-VASCULAR INTERVENTIONS

Real-Time Patient and Staff Radiation Dose Monitoring in IR Practice

Anna M. Sailer^{1,2} · Leonie Paulis¹ · Laura Vergoossen¹ · Axel O. Kovac¹ · Geert Wijnhoven¹ · Geert Willem H. Schurink^{3,4} · Barend Mees³ · Marco Das^{1,4} · Joachim E. Wildberger^{1,4} · Michiel W. de Haan¹ · Cécile R. L. P. N. Jeukens¹



Radiation exposure complex aorta

Cardiovasc Intervent Radiol (2015) 38:827–832
DOI 10.1007/s00270-014-1025-8

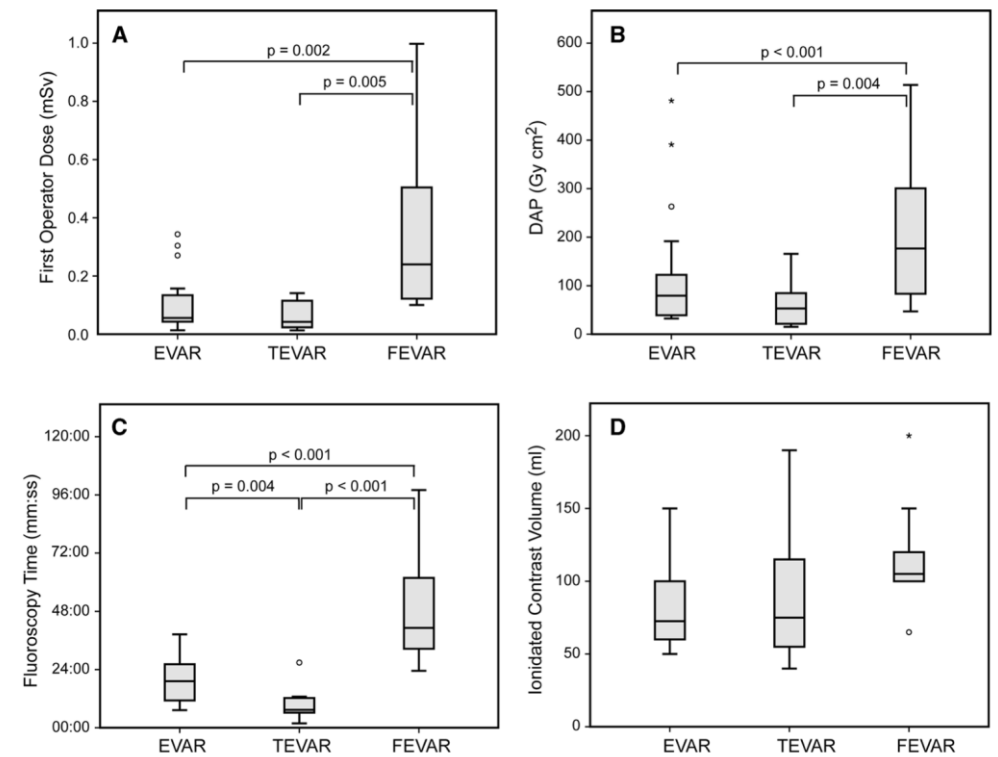


CLINICAL INVESTIGATION

ARTERIAL INTERVENTIONS

Occupational Radiation Exposure During Endovascular Aortic Repair

Anna M. Sailer · Geert Willem H. Schurink ·
Martine E. Bol · Michiel W. de Haan · Willem H. van Zwam ·
Joachim E. Wildberger · Cécile R. L. P. N. Jeukens





Radiation-Induced DNA Damage in Operators Performing Endovascular Aortic Repair

Editorial, see p 2417

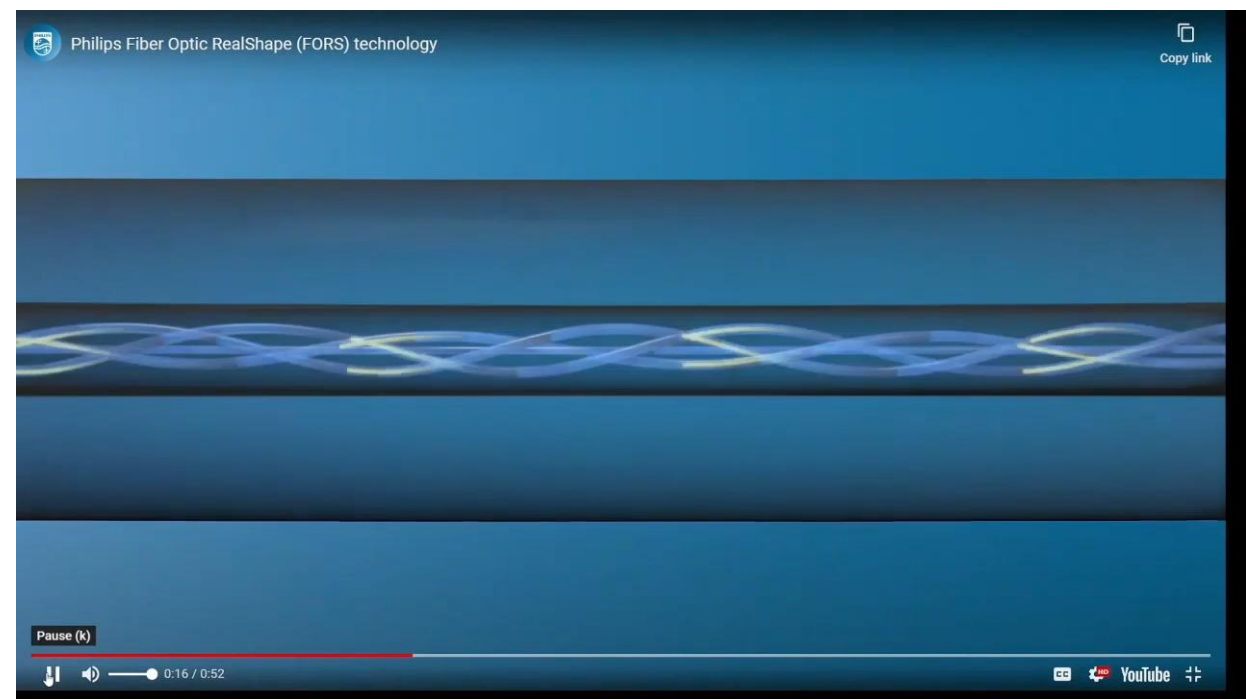
BACKGROUND: Radiation exposure during fluoroscopically guided interventions such as endovascular aortic repair (EVAR) is a growing concern for operators. This study aimed to measure DNA damage/repair markers in operators performing EVAR.

METHODS: Expression of the DNA damage/repair marker, γ -H2AX and DNA damage response marker, phosphorylated ataxia telangiectasia mutated (pATM), were quantified in circulating lymphocytes in operators during the peri-operative period of endovascular (infrarenal, branched, and fenestrated) and open aortic repair using flow cytometry. These markers were separately measured in the same

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Cardiovascular Research
Collaborative

LUMIGUIDE

Next level:
look into the
future



Fibre Optic RealShape: Key features

Radiation free navigation

- Realtime navigation with 3D device visualisation

Biplane viewing

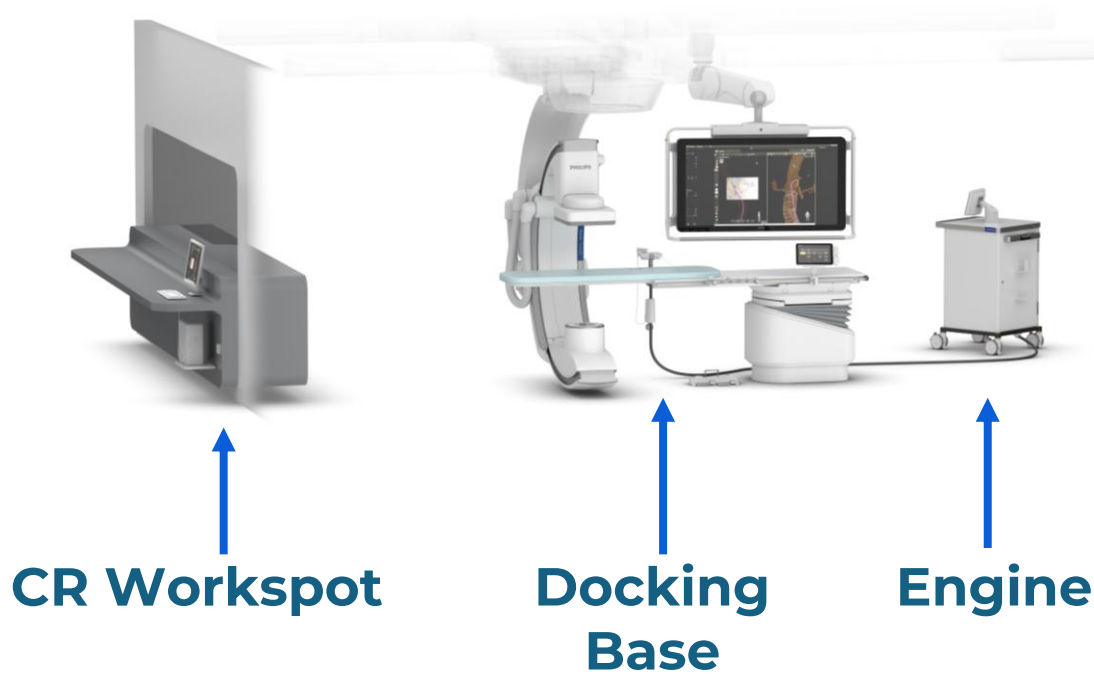
- Imaging can be rotated and tilted to allow viewing from any angle

Agnostic to catheters

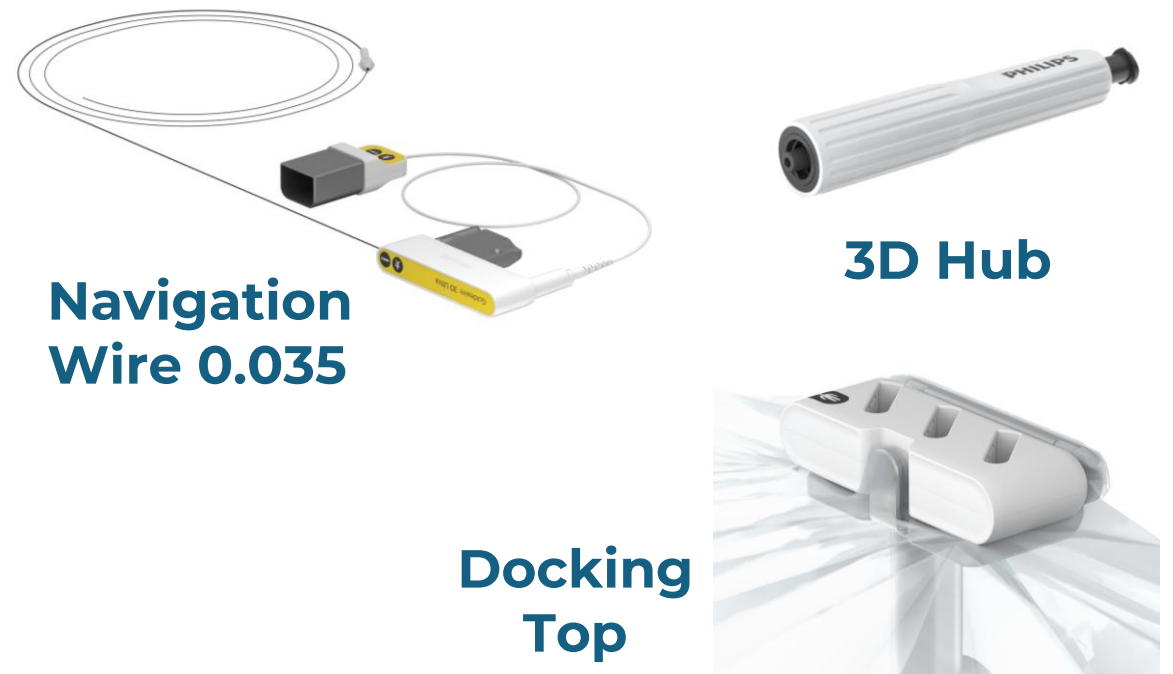
- 3D Hub and fors guidewire allows work with a wide range of catheters

Lumiguide equipment

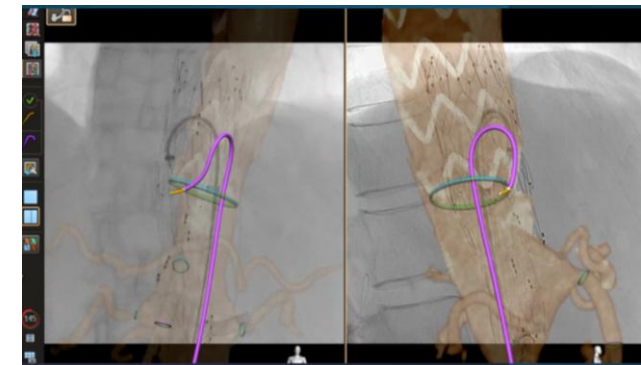
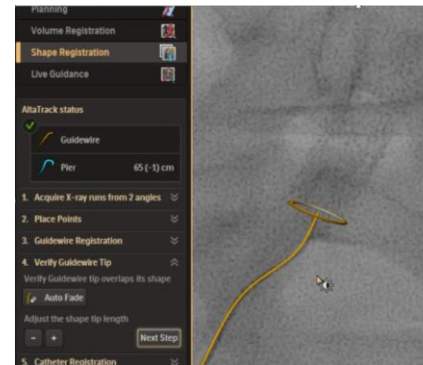
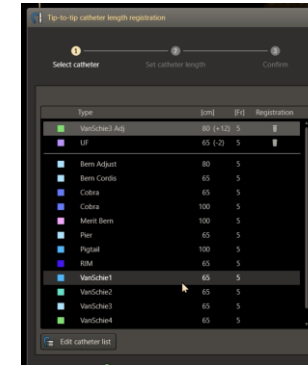
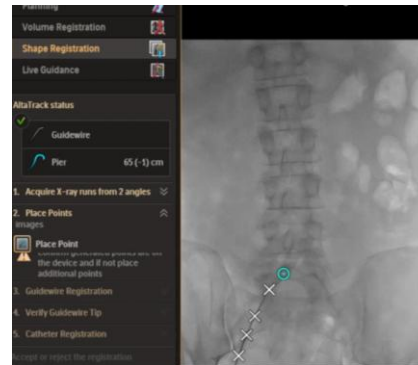
Lumiguide Equipment



Lumiguide Single Use Devices



Fibre Optic RealShape

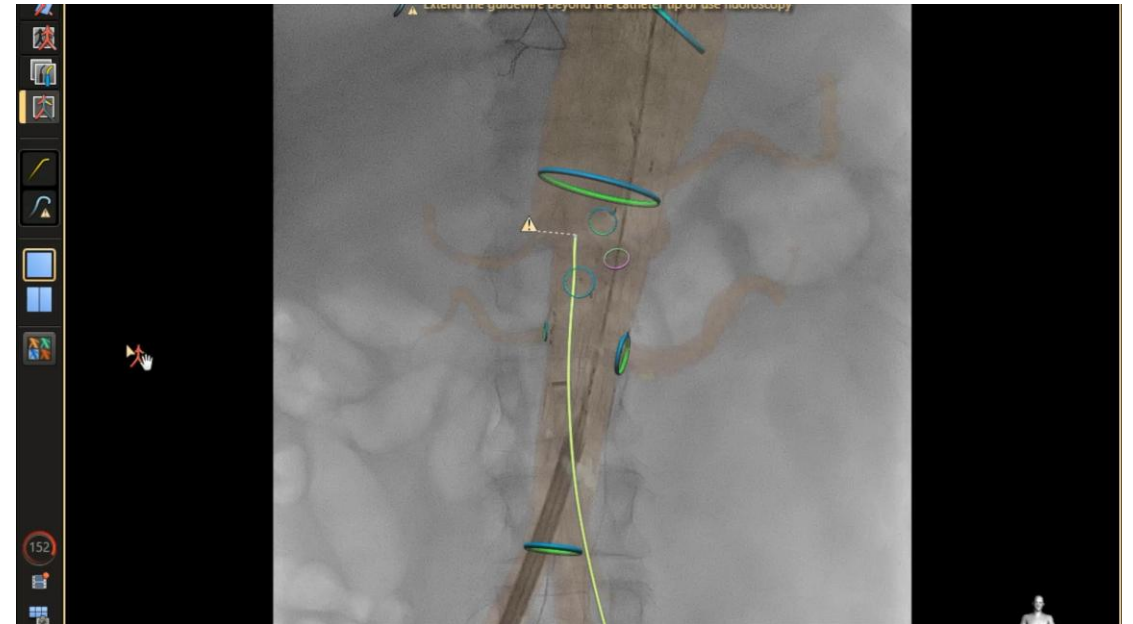


- Shape registration
- Zoom in and adjust

- Catheter selection
- Catheter registration
 - Tip-to-tip
 - In the patient

A fenestrated case

- Cannulating SMA in FEVAR
- Shaping steerable sheath using FORS
- Use biplane for orientation
- Avoiding lateral C arm position
- Lumiguide guidewire and Merit Berenstein catheter



Chimney EVAR

- Brachial access
- Navigating through aortic arch
- Using Lumiguide guidewire and UF catheter
- Dual imaging of 2 different areas



Other
endovascular
procedures

CLL (EVAR)

EVAR + IBD

CERAB

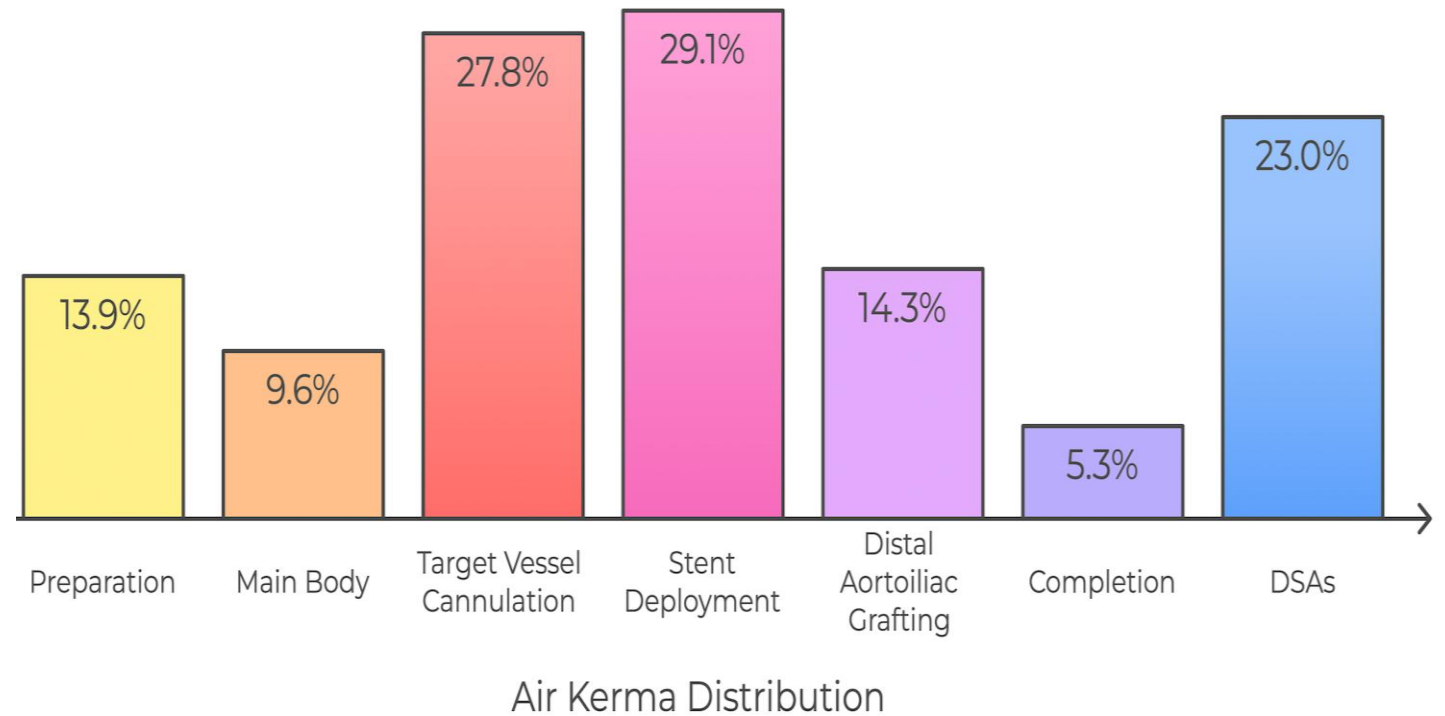
Venous recanalisation

Radiation reduction?

A procedural step analysis of radiation exposure in fenestrated endovascular aortic repair

Mark Rockley, MD,^{a,b} Petroula Nana, MD, PhD,^a Aya Rebet, MSc,^c Dominique Fabre, MD, PhD,^a and Stéphan Haulon, MD, PhD,^a Paris, France; Ottawa, Ontario, Canada; and Buc, France

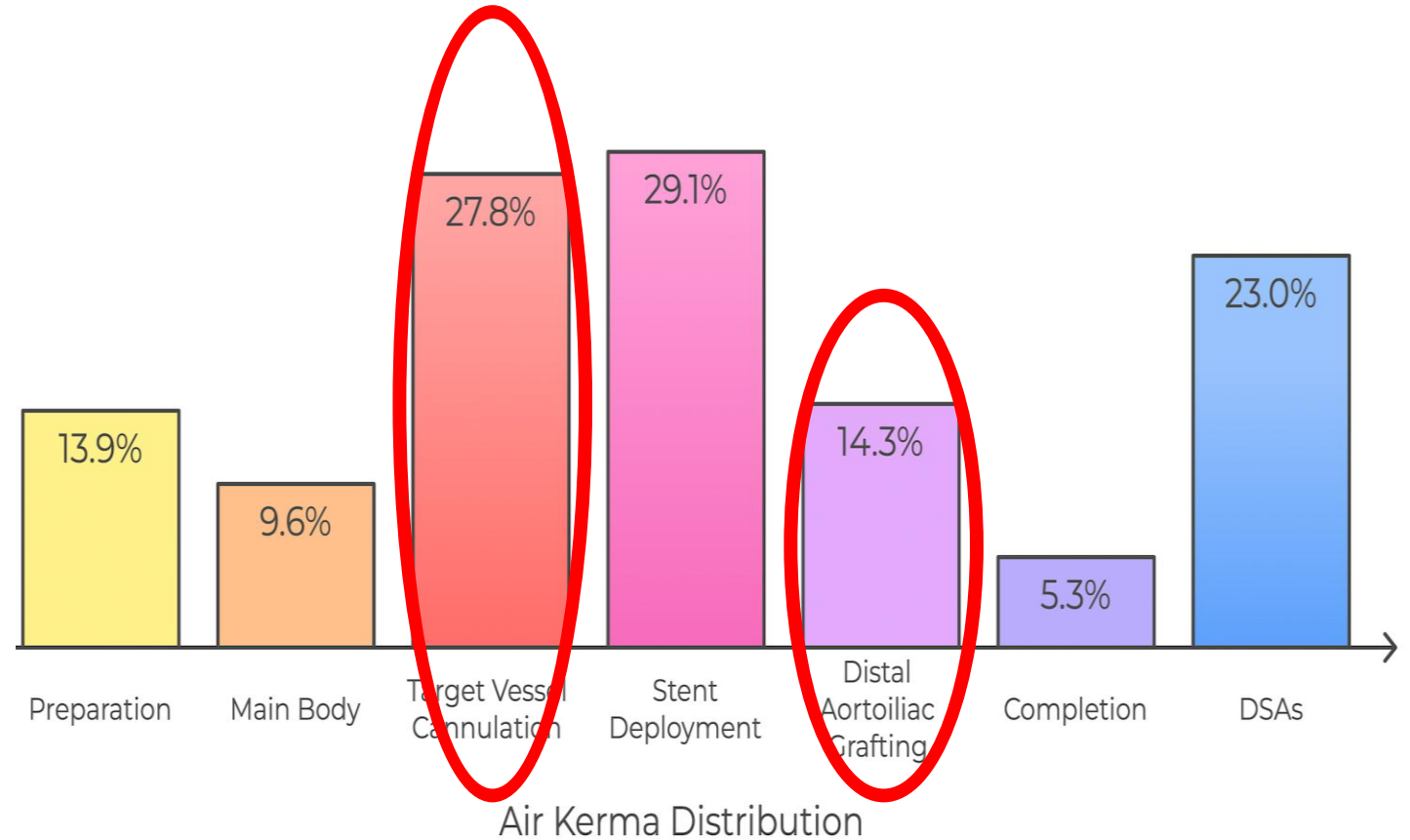
- LumiGuide powered by FORS (Philips)
- TV cannulation
- Distal aorto-iliac grafting



A procedural step analysis of radiation exposure in fenestrated endovascular aortic repair

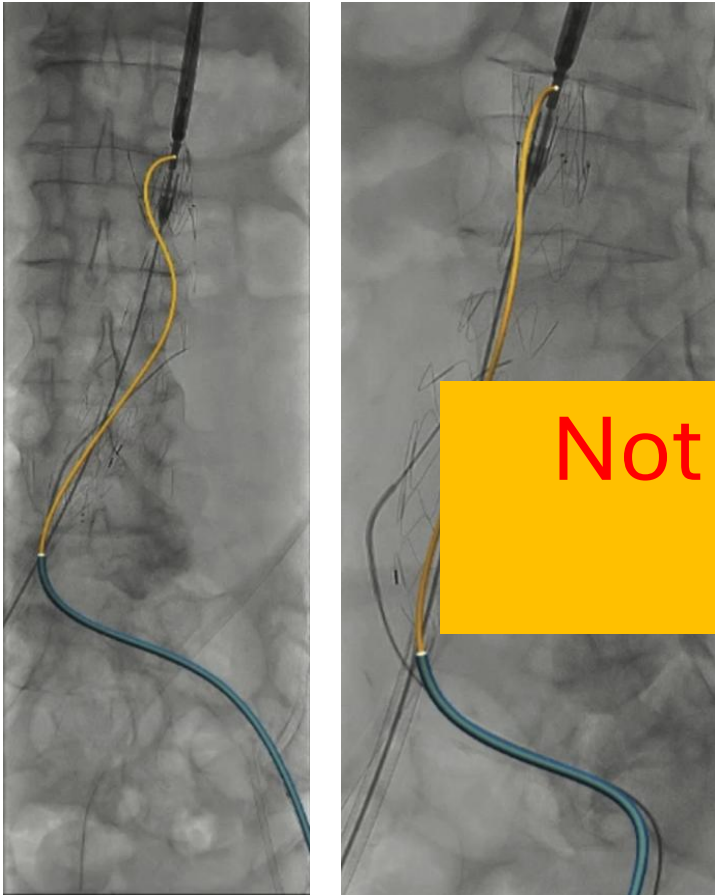
Mark Rockley, MD,^{a,b} Petroula Nana, MD, PhD,^a Aya Rebet, MSc,^c Dominique Fabre, MD, PhD,^a and Stéphan Haulon, MD, PhD,^a Paris, France; Ottawa, Ontario, Canada; and Buc, France

- LumiGuide powered by FORS (Philips)
- TV cannulation
- Distal aorto-iliac grafting



Editor's Choice – Radiation Dose Reduction During Contralateral Limb Cannulation Using Fiber Optic RealShape Technology in Endovascular Aneurysm Repair

Jurre Klaassen ^{a,*}, Constantijn E.V.B. Hazenberg ^a, Trijntje Bloemert-Tuin ^a, Suzan C.A. Wulms ^{a,b}, Martin Teraa ^a, Joost A. van Herwaarden ^a



Not reflected in overall procedure radiation dose reduction

	Lumiguide	Regular Fluoroscopy
Fluoroscopy time (secs) *	37	176
Navigation Time (mins)	8	7

*P<0.05

- 27 EVAR cases in each group
- Lumiguide vs standard fluoroscopy
- Matched for BMI, age and gender

Single centre historical cohort data



- FORS (21) vs non-FORS (61)
- BMI, extent, components matched
- **81/95 (85%)** successful cannulation
- **37%** Procedure time reduction
- **41%** Fluoro time reduction
- **56%** DAP reduction

E. Finnesgard, A. Schanzer et al. , J Vasc Surg 2023



- FORS (49) vs non-FORS (69)
- Matched cohorts
- **32%** Fluoro time reduction
- **35%** Air Kerma reduction
- Similar TV cannulation rate
- Similar complication rate

J. Darling, M. Schermerhorn et al. , J Vasc Surg 2025

Target vessel cannulation

50 subjects – 201 navigation tasks
FORS used in 93% cases
60% successful vessel cannulation
No FORS complications

Predictors of converting to fluoroscopy

- Challenging Target Vessel Angle
- Ostial stenosis
- Branch vs fenestration
- Coeliac / SMA compared with renals

Panuccio, Kolbel, et al. J Vasc Surg 2023

FORS
perfect?

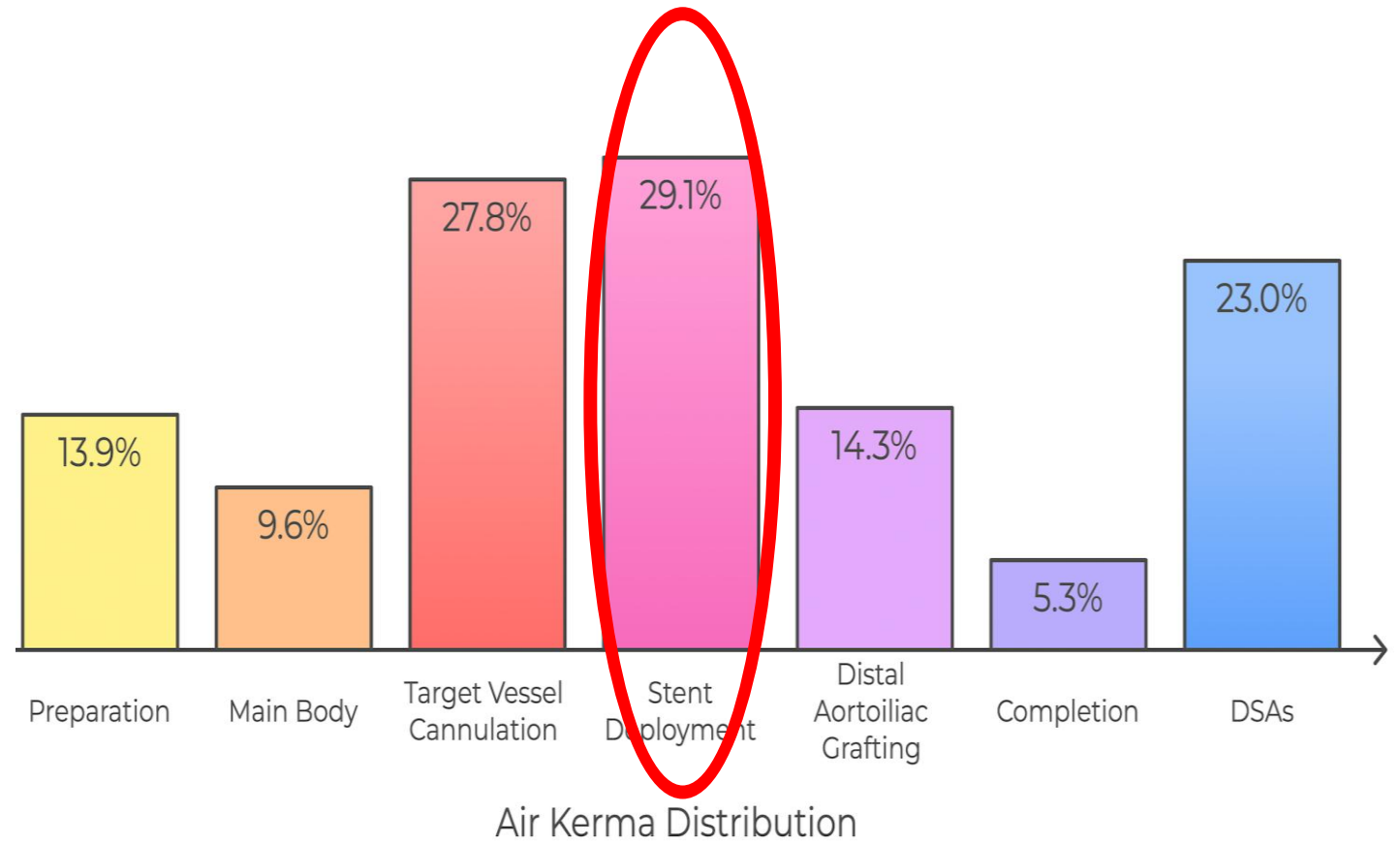
Guidewire

- Short 120cm → 160cm
- Stiff and less responsive
- Poor torque ability
- Back loadable

Shaking view

Rest of the procedure?

- Main device
- Bridging stent placement
- Bridging stent ballooning
- Check angiography



In conclusion

Exciting new technique



Intuitive workflow



Safe and effective



Moonshot: future compatible devices



High potential in radiation reducing complex aortic repair

RadFree Study

Study design

- Prospective randomised controlled
- Multi-centre study

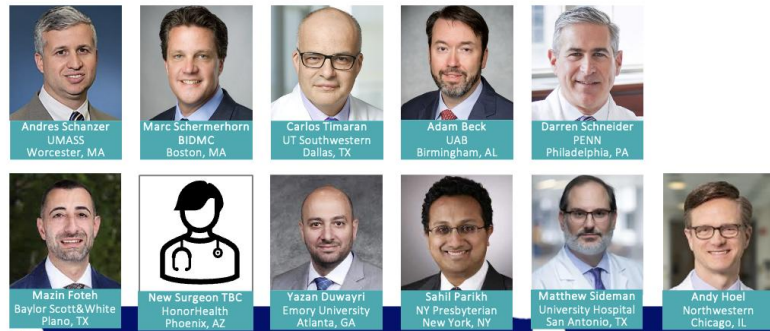
Inclusion

- 182 primary FEVAR procedures (1:1 randomisation)

Primary Objective

- Fluoroscopy time with/without LuimiGuide in FEVAR

Questions?



LumiGuide: Key numbers to date



FORS/LumiGuide installs

>1850

Procedures performed with FORS

236

Active patents

16

Papers published



Mentions in guidelines



Conference presentations

-37%*
Procedure time during complex aortic aneurysm procedures

~40%**
Fluoro time reduction in complex aortic aneurysm procedures

35-56%**
DAP reduction in complex aortic aneurysm procedures

* Single-center historic cohort comparison: E. Finnesgard et al., JVS, Nov. 2022

** From two single-center historic cohort comparisons: A. Sanders, M. Schermerhorn, JVS, Nov. 2023 and E. Finnesgard et al., JVS, Nov. 2022