CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE

CONTROVERSIES & UPDATES IN VASCULAR SURGERY

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MARRIOTT RIVE GAUCHE & CONFERENCE CENTER, PARIS, FRANCE

Poor results of chimney technique in France: blame the technique or blame the surgeons?

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Disclosure

Speaker name:

Raphael COSCAS

- ■ I have the following potential conflicts of interest to report:
- ■ Consulting: Medtronic, Spectranetics, Terumo
- ☐ Employment in industry
- ☐ Shareholder in a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)
- ☐ I do not have any potential conflict of interest

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For the AURC

In the litterature, reported results of the chimney technique are

GREAT

Collected World Experience About the Performance of the Snorkel/Chimney Endovascular Technique in the Treatment of Complex Aortic Pathologies

The PERICLES Registry

Konstantinos P. Donas, MD, Jason T. Lee, MD,† Mario Lachat, MD,‡ Giovanni Torsello, MD, PhD,§ and Frank J. Veith, MD;¶ on behalf of the PERICLES investigators*

517 Patients / 898 Chimneys

Mortality 3.7% elective

17 m FU

-4.4 mm diameter

94% primary patency

Total patients	517
European centers (N = 9)	398
United States centers (N = 4)	119
Disease, n (%)	
Degenerating aneurysm	404 (78.1)
Penetrating ulcer	12 (2.3)
Type 1a endoleak from prior EVAR	45 (8.7)
Para-anastomotic aneurysm from prior open AAA repair	43 (8.3)
Intramural hematoma/type B dissection	13 (2.5%)
Classification, n (%)	
Juxtarenal AAA	360 (69.6)
Suprarenal AAA	129 (25.0)
Type IV TAAA	28 (5.4)
Clinical status, n (%)	
Asymptomatic	415 (80.3)
Symptomatic	52 (10.0)
Rapidly growing	21 (4.1)
Rupture	29 (5.6)

AAA indicates abdominal aortic aneurysm; EVAR, endovascular aneurysm repair; TAA, thoraco-abdominal aneurysm.

Journal of Vascular Surgery

The PROTAGORAS study to evaluate the performance of the Endurant stent graft for patients with pararenal pathologic processes treated by the chimney/snorkel endovascular technique

Konstantinos P. Donas, MD,[a,b] Giovanni B. Torsello, MD,[a,b] Gianluca Piccoli, MD,[c] Georgios A. Pitoulias, MD,[a,b,d] Giovanni Federico Torsello, MD,[c] Theodosios Bisdas, MD,[a,b] Martin Austermann, MD,[a,b] and Daniele Gasparini, MD,[c] *Münster, Germany; Udine, Italy; and Thessaloniki, Greece*

Objective: The chimney/snorkel endovascular aortic repair (ch-EVAR) is gaining ever-greater acceptance in the treatment of pararenal pathologic processes. However, the published experience includes mainly short-term clinical results with combinations of several abdominal devices and types of chimney grafts. The aim of this study was the midterm evaluation of the Endurant stent graft (Medtronic, Santa Rosa, Calif) as a standard abdominal device for ch-EVAR.

Methods: Between January 2009 and January 2013, prospectively collected data of high-risk patients with pararenal pathologic processes who underwent ch-EVAR with placement of the Endurant abdominal device were analyzed. The chimney graft intended for use was a balloon-expandable covered stent. Main outcome measures were aneurysm sac regression and chimney graft patency.

Results: A total of 187 snorkel/chimney grafts were successfully placed in 128 patients (mean age, 76.6 years). The technical success was 100%. The mean preoperative proximal neck length and aneurysm size were 4.7 mm and 64.8 mm (range, 48-135 mm), respectively. The postoperative new neck length after use of chimney grafts was 18.7 ± 6.3 mm. The mean aneurysm sac decreased significantly (60.8 mm; 95% confidence interval, 2.036-7.084; $P = .001$) after a mean radiologic follow up of 24.6 ± 17.4 months. Thirty-day mortality and midterm mortality were 0.8% and 17.2%, respectively. Two patients (1.6%) with single chimneys presented with late new onset of type Ia endoleak and underwent additional tube and multiple chimney placement. Primary chimney graft patency was 95.7%. Freedom from chimney graft-related reinterventions was 93.1%.

Conclusions: Standard use of the Endurant abdominal device for ch-EVAR in >120 patients is associated with high technical success, significant aneurysm sac regression, and low incidence of secondary procedures after 2-year radiologic follow-up. These results will give significant impetus to device selection, facilitating the standardization of technique. (J Vasc Surg 2016;63:1-7.)

French Multicenter Registry

Real Life – Voluntary participation

AURC (French University Association for Vascular Surgery)

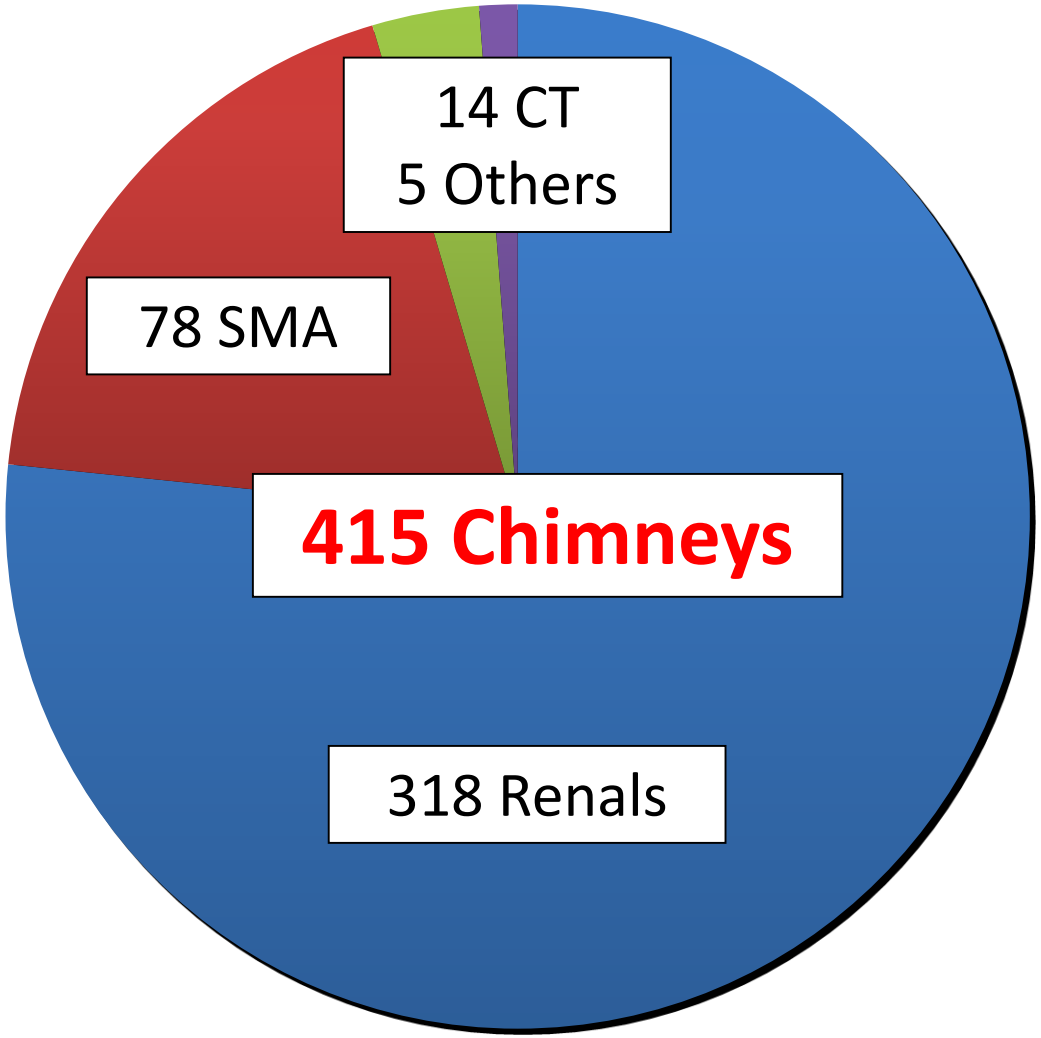
Emails to all university centers

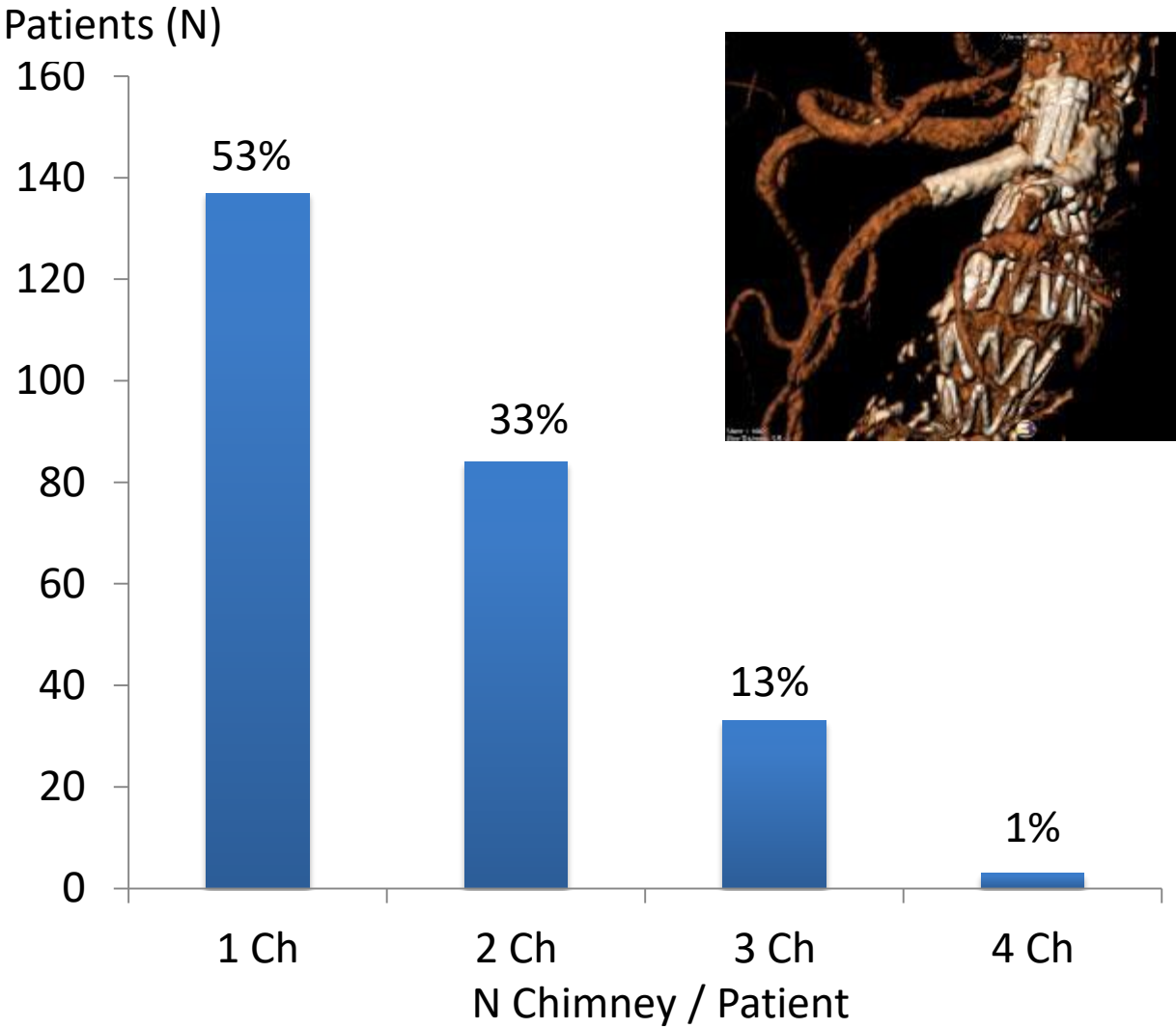
Retrospective 2008 - 2016

14 centers with a ChEVAR experience completed the database

Online anonymous

257 patients

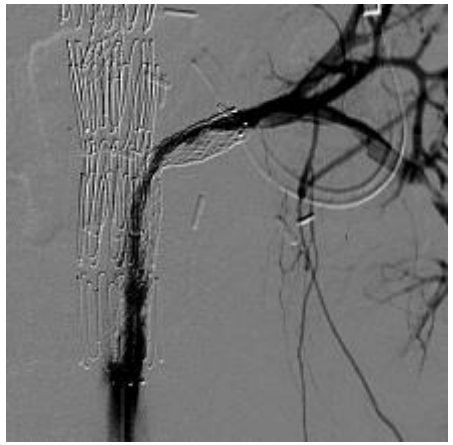




High rates of 30-d complications

	N (%)
Death	**28 (11.2)**
Stroke	10 (3.9)
Reintervention	37 (14.9)
Type Ia Endoleak	31 (12)

- Ch-Thrombolysis
- Ch-Bypasses
- Hematomas
- Intestinal infarct
- Endo-staples
- Nephrectomy
- Kidney embolization
- Distal extension



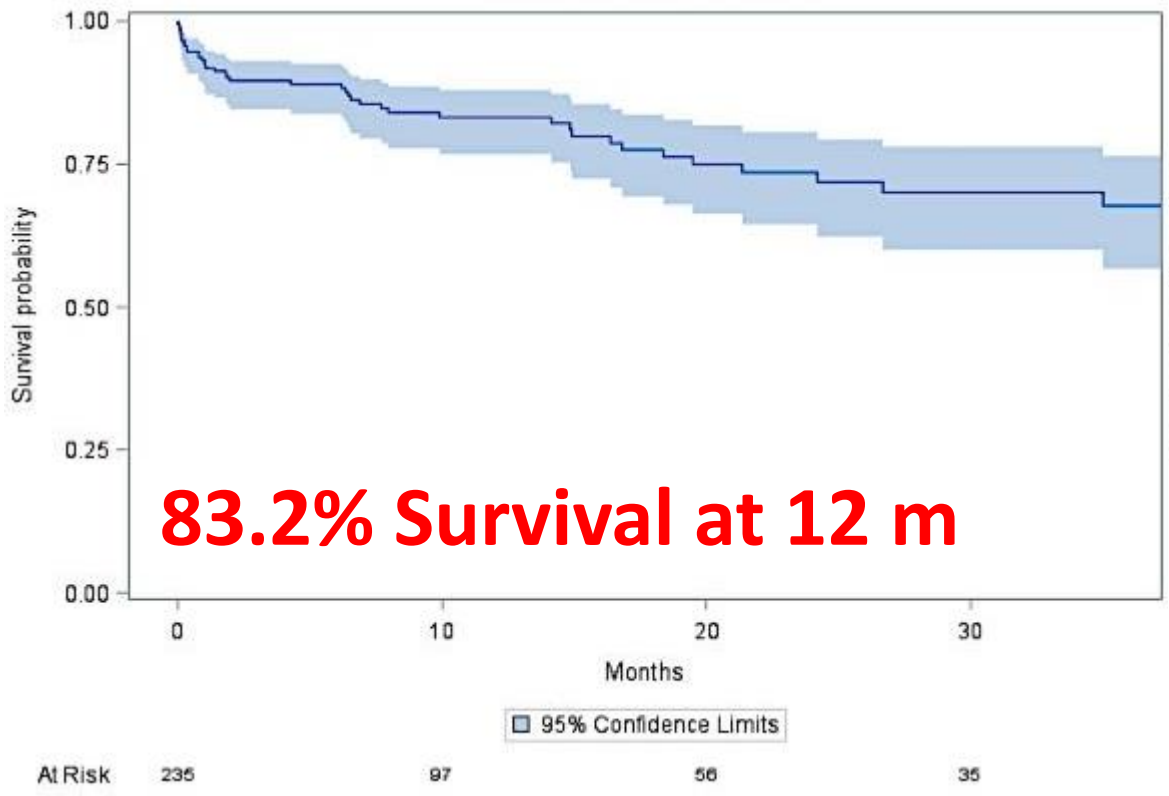
Factors associated with 30-d mortality

Variable
Gender
2 or more chimneys
Age > 80
CKD
Unplanned intraoperative surgery
Unplanned Chimney
AAA > 70 mm
COPD
Cardiac failure
OLD
Coronary artery disease
Emergency procedure
HTN
Prior aortic surgery
Type Ia endoleak
Juxtarenal vs. more extended AAA

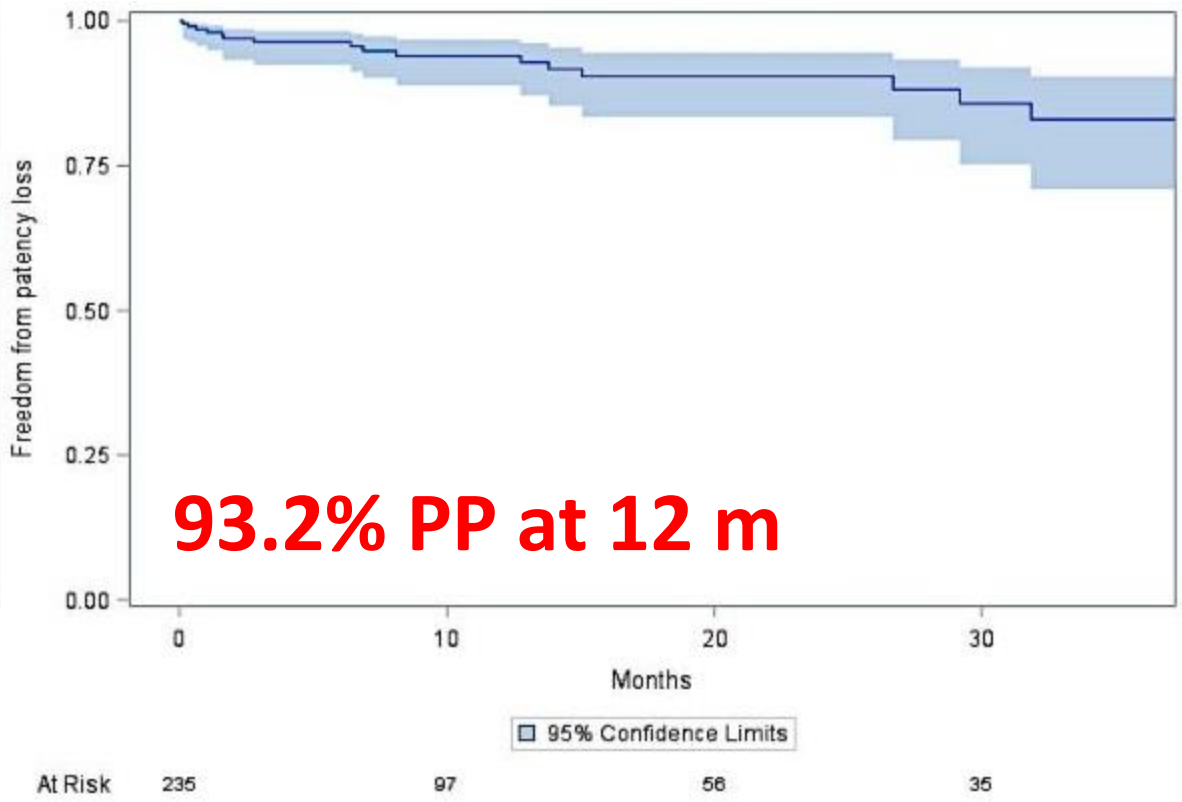
→ Multivariable analysis

Variable	OR (95% CI)	*p*
CKD	**3.7 [1.4-9.8]**	**0.01**
Unplanned intraoperative surgery	**4.4 [1.6-12.2]**	**0.01**

FU 13.7 ± 16.8 m



83.2% Survival at 12 m



93.2% PP at 12 m

Why these poor results ?

1 - Patients at very high surgical risk (comorbidities)

2 - Patients with very unfavorable anatomy

3 - Bad endovascular surgeons

4 - Beginning of the technique (learning curve)

5 - The Chimney technique itself

1 - Patients at very high surgical risk ?

Variable	PERAGLES	PROTAGORAS
Coronary disease	107 (41.6)	
COPD	58 (22.6)	
Diabetes	37 (14.4)	
Preoperative CKD	**173 (39.6)**	**30 (41.1)**
Hyperlipidemiae	133 (51.2)	
Current smoking	**84 (31.5)**	**35 (47.9)**
Past smoking	93 (38.3)	
Hypertension	198 (77)	
ASA Score 1	2 (0.8)	
2	69 (27.8)	
3	**134 (51.1)**	**42 (57.5)**
4	**93 (35.3)**	**31 (42.5)**

2 - Very unfavorable anatomies ?

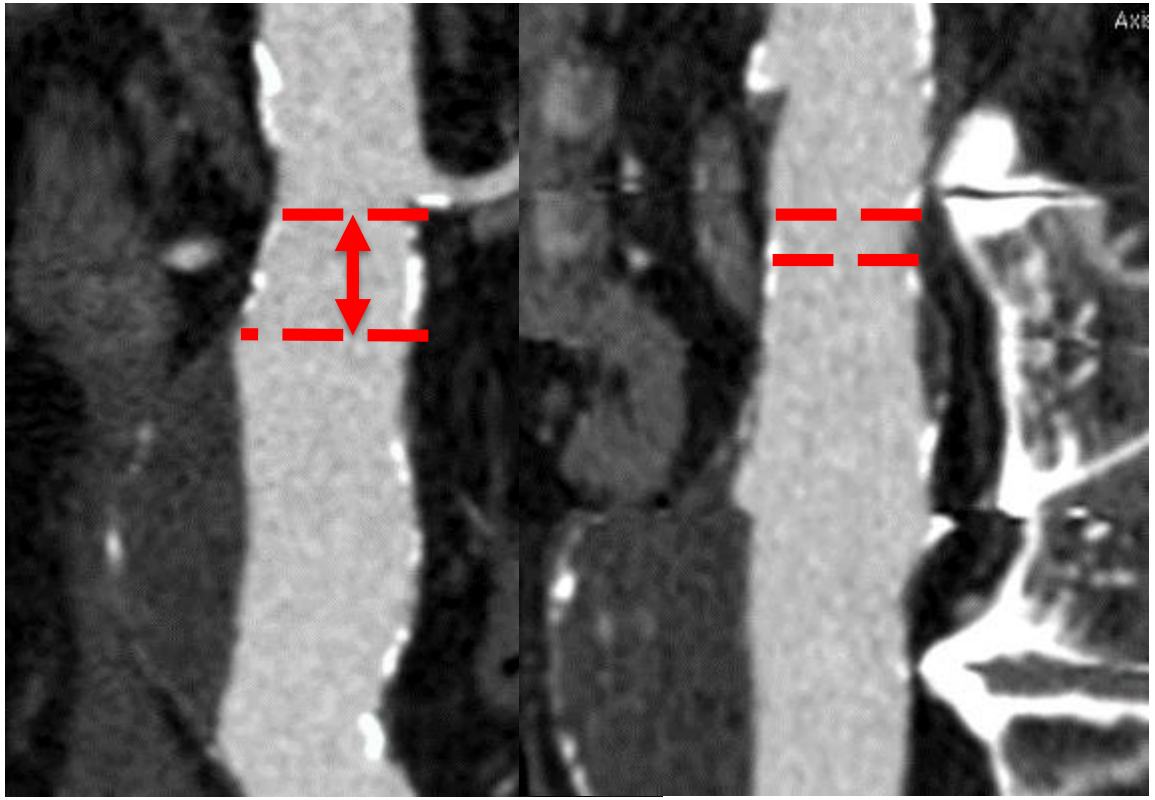
But...

Interpretation of ChEVAR studies must be made with caution

No **Core lab**

No **Clinical event Committee**

No **Independent monitoring**



3 - Bad endovascular surgeons ?

French Endovascular Surgeons can be sometimes disappointing

French Study	Procedure	30-d Results
EVA 3S (NEJM 2006)	Carotid stenting	9.6% stroke or death
WINDOWS (Ann Surg 2015)	F/B EVAR	6.7% mortality juxtarenal 10.1% mortality suprarenal / TAA 4
AURC (EJVES 2014)	Hybrid repairs	34.2% mortality + 12.8% paraplegia

3 - Bad endovascular surgeons ?

	Low ChEVAR volume (N<20)	High ChEVAR volume (N>20)	*p*
30-d mortality	8.5% (6/71)	11.8% (22/187)	0.44

➔ **No improvement with chimney volume**

4 - Beginning of the technique (learning curve)

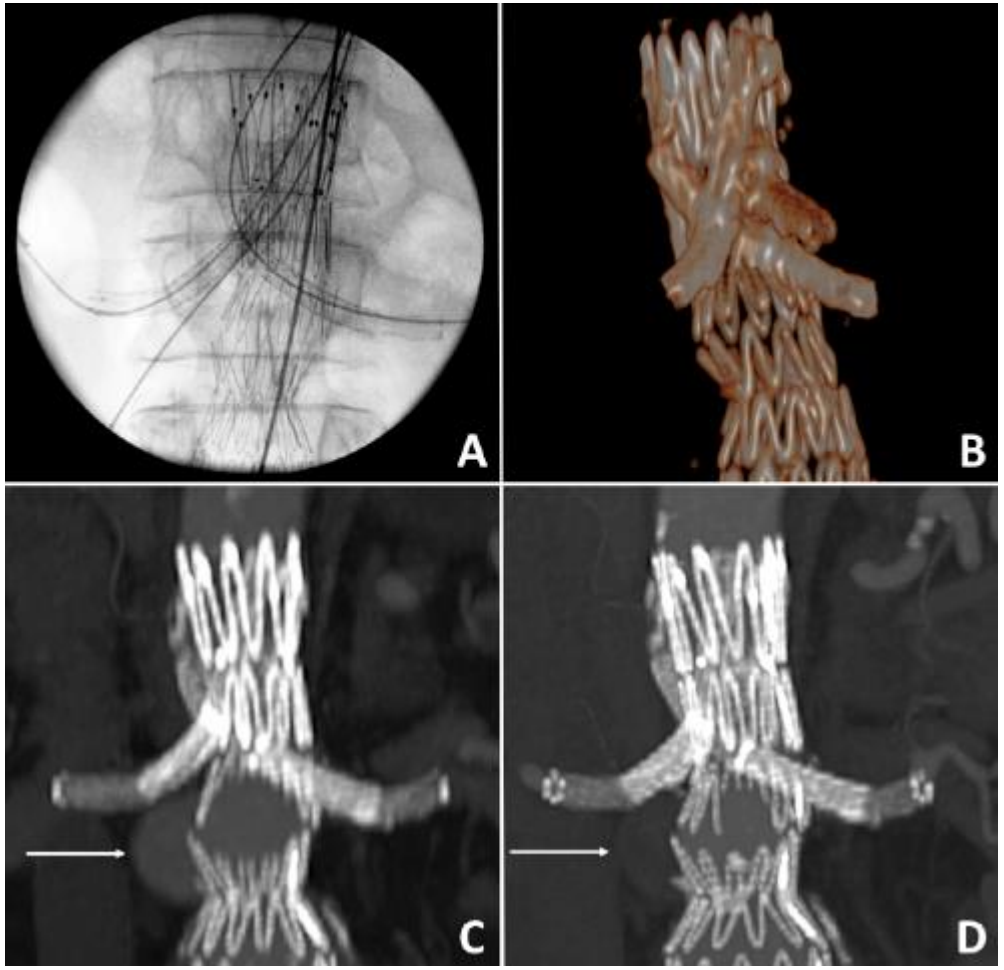
	First 20 patients	After 20 patients	*p*
30-d mortality	15%	13%	0.8
Early type 1a EL	12.5%	14.4%	0.8

➔ **No improvement with experience**

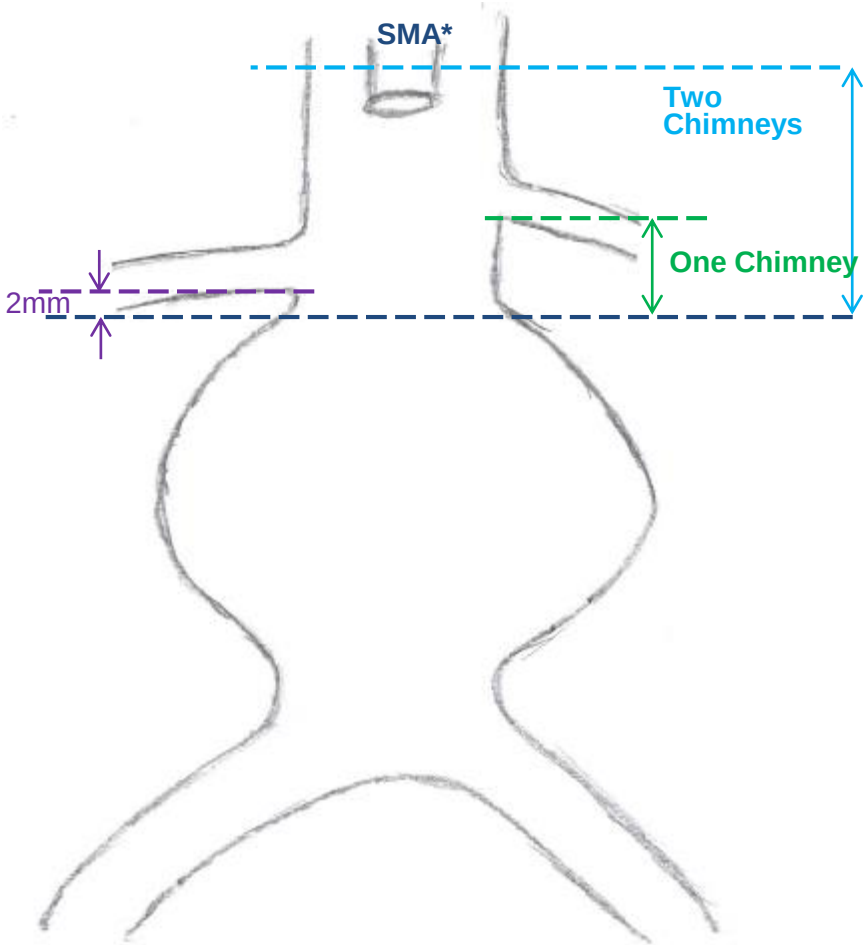
5 - The Chimney technique itself ?

Stent-Graft	N (%)
Endurant	43 (17)
Zenith	**148 (58)**
Excluder	35 (14)
Nellix	14 (5.5)
AFX	5 (2)
Anaconda	0
Other	9 (3.5)

24% Oversizing
Different strategies regarding stents



Less than 15% of patients treated according to recent IFUs



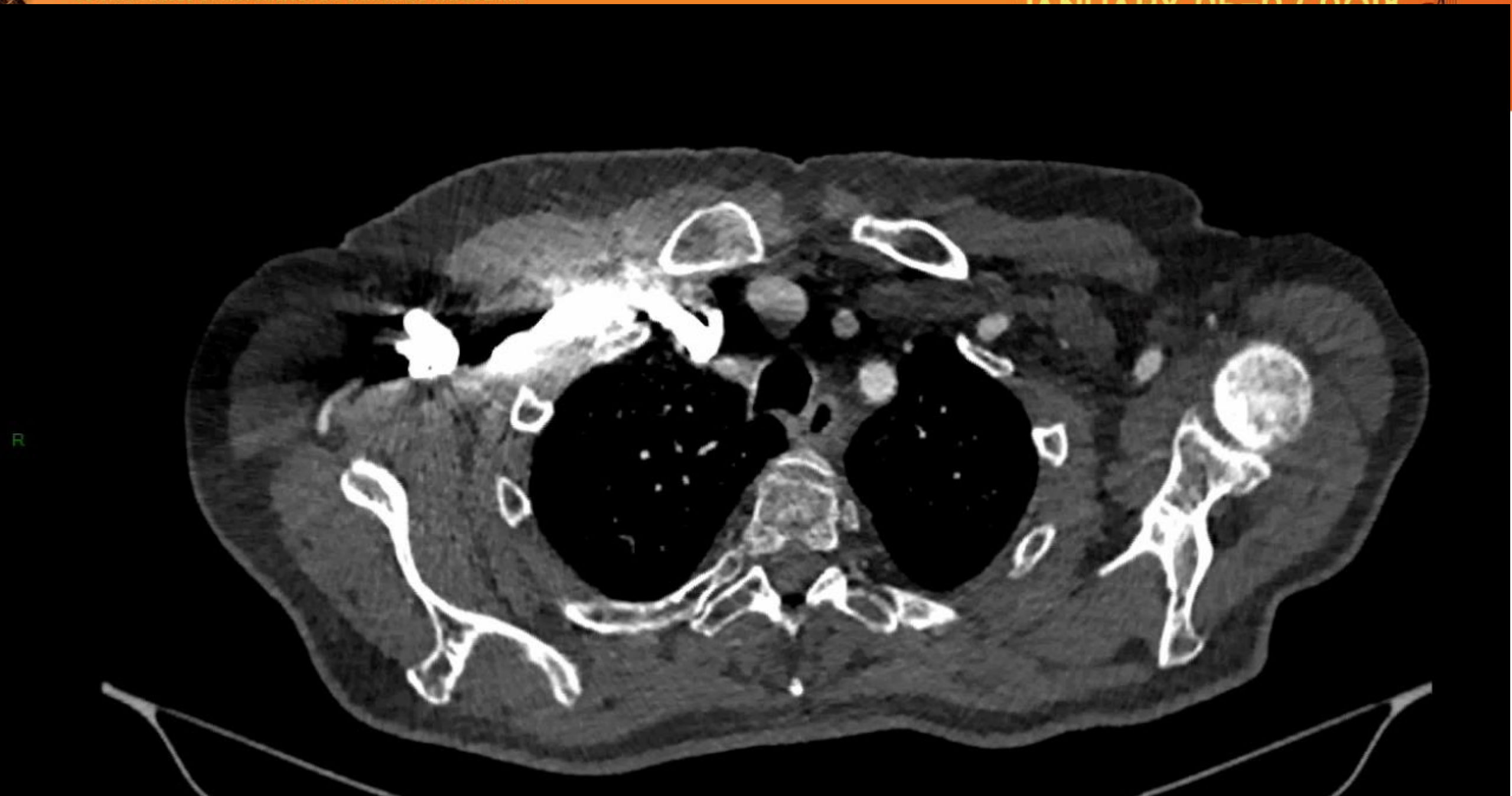
Combination Endurant + balloon-expandable stents

Primary EVAR
Maximum 2 Chimneys
Neo neck 15mm
Proximal neck 2 mm minimum
Aortic diameter 19 mm- 30 mm
Oversizing 20 - 30%
Low angulation
Renal angulation < 90°

5 - The Chimney technique itself ?

Sometimes, the chimney has

a surprise for you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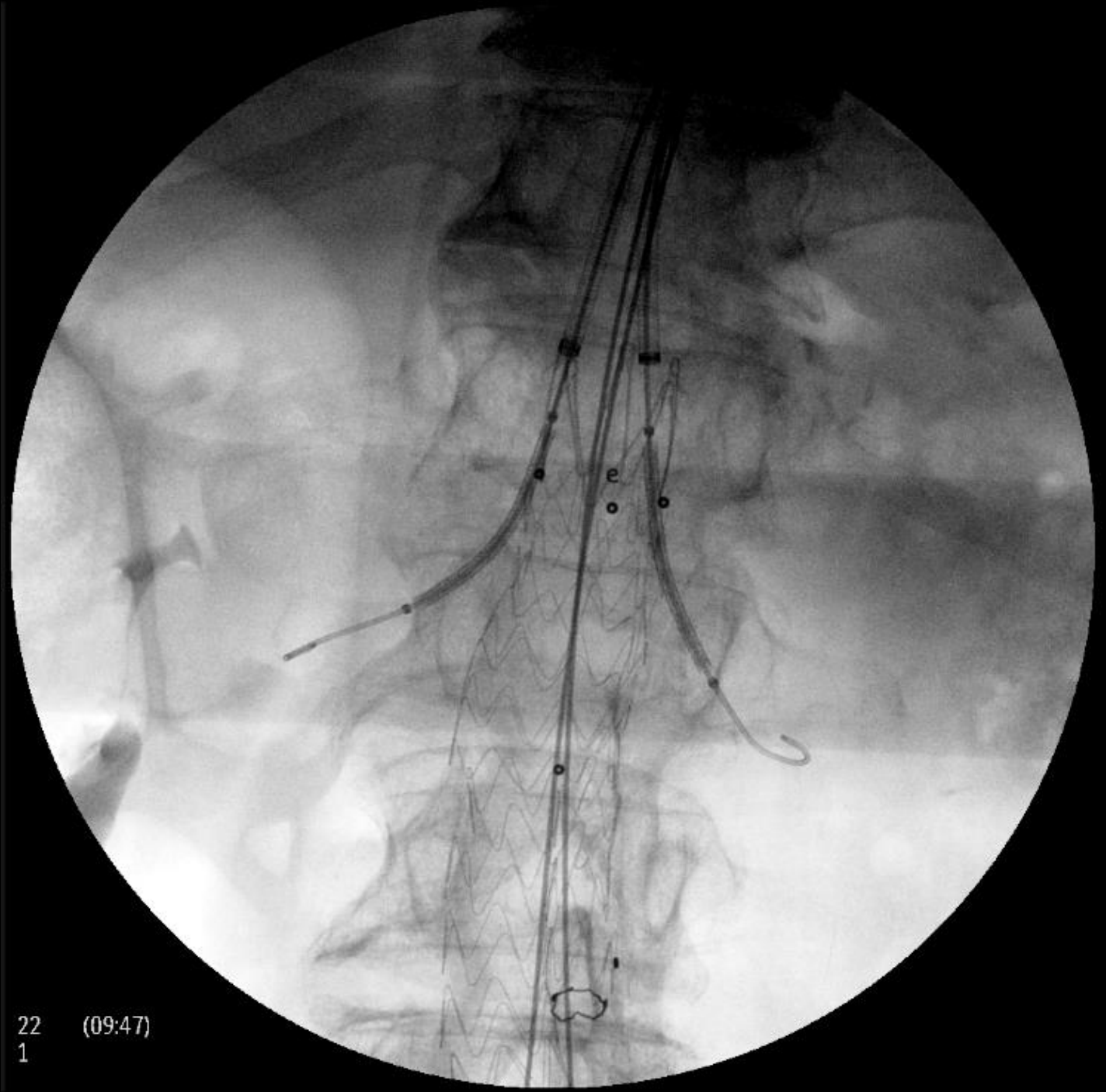
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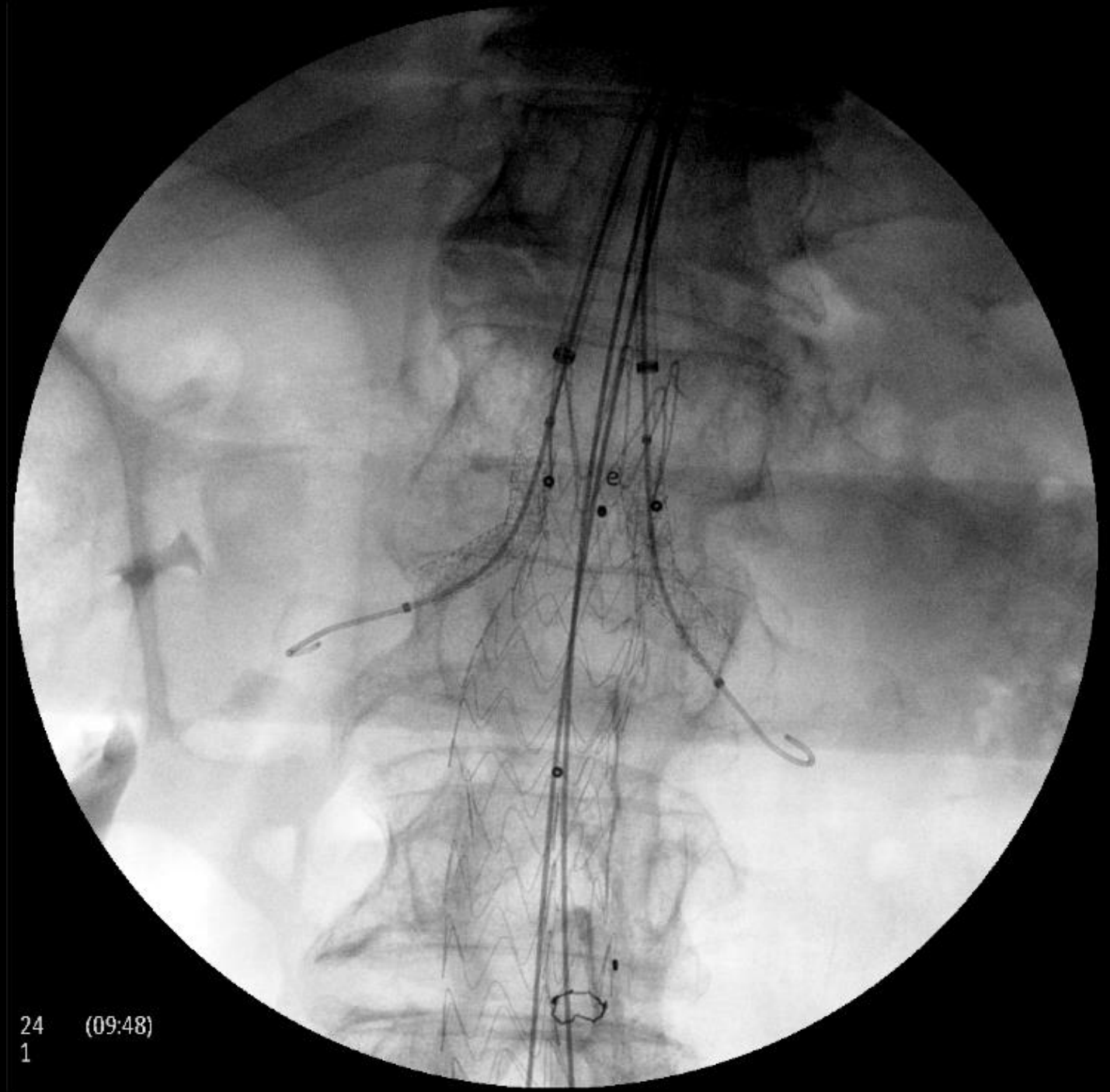
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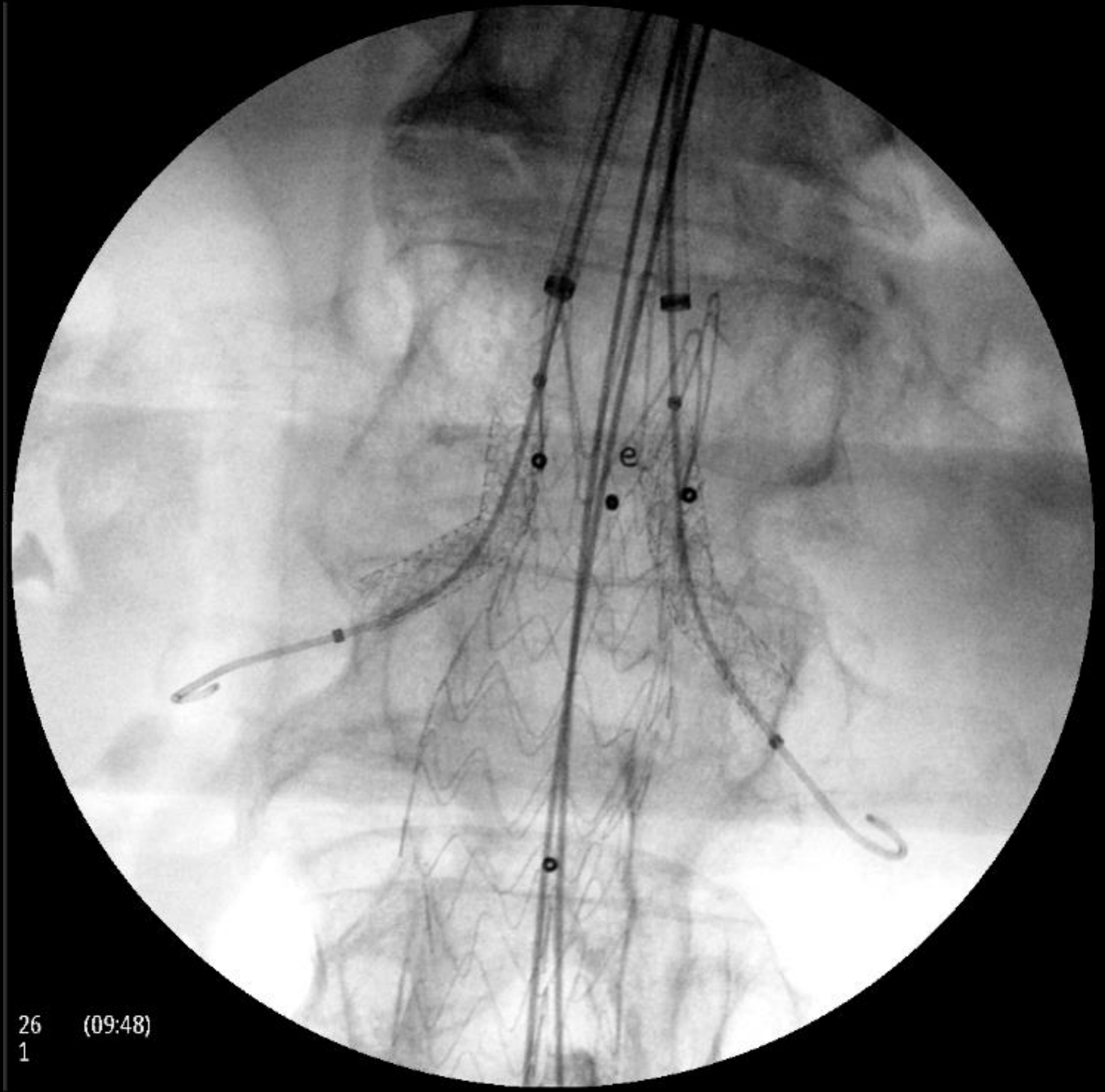
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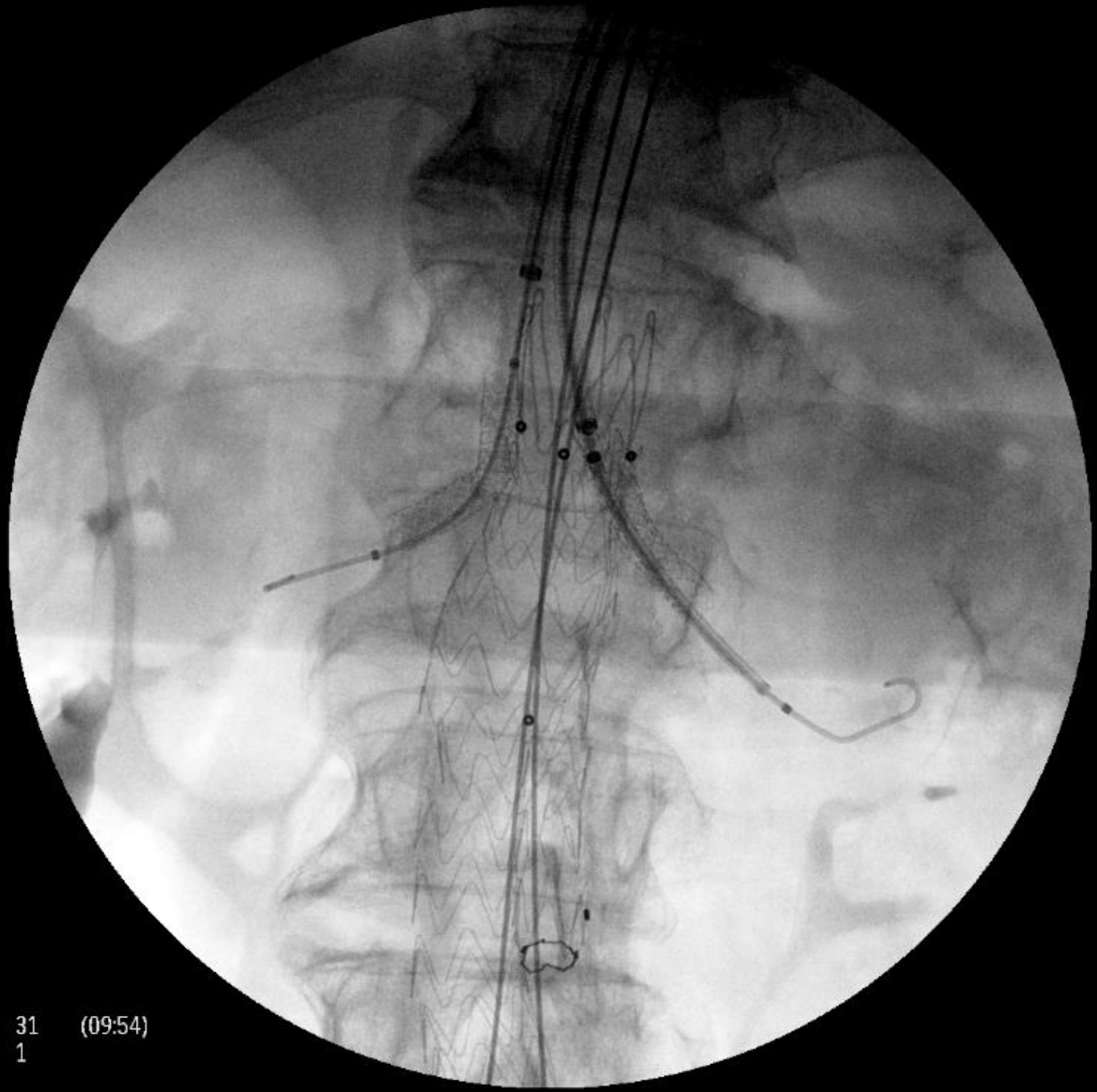
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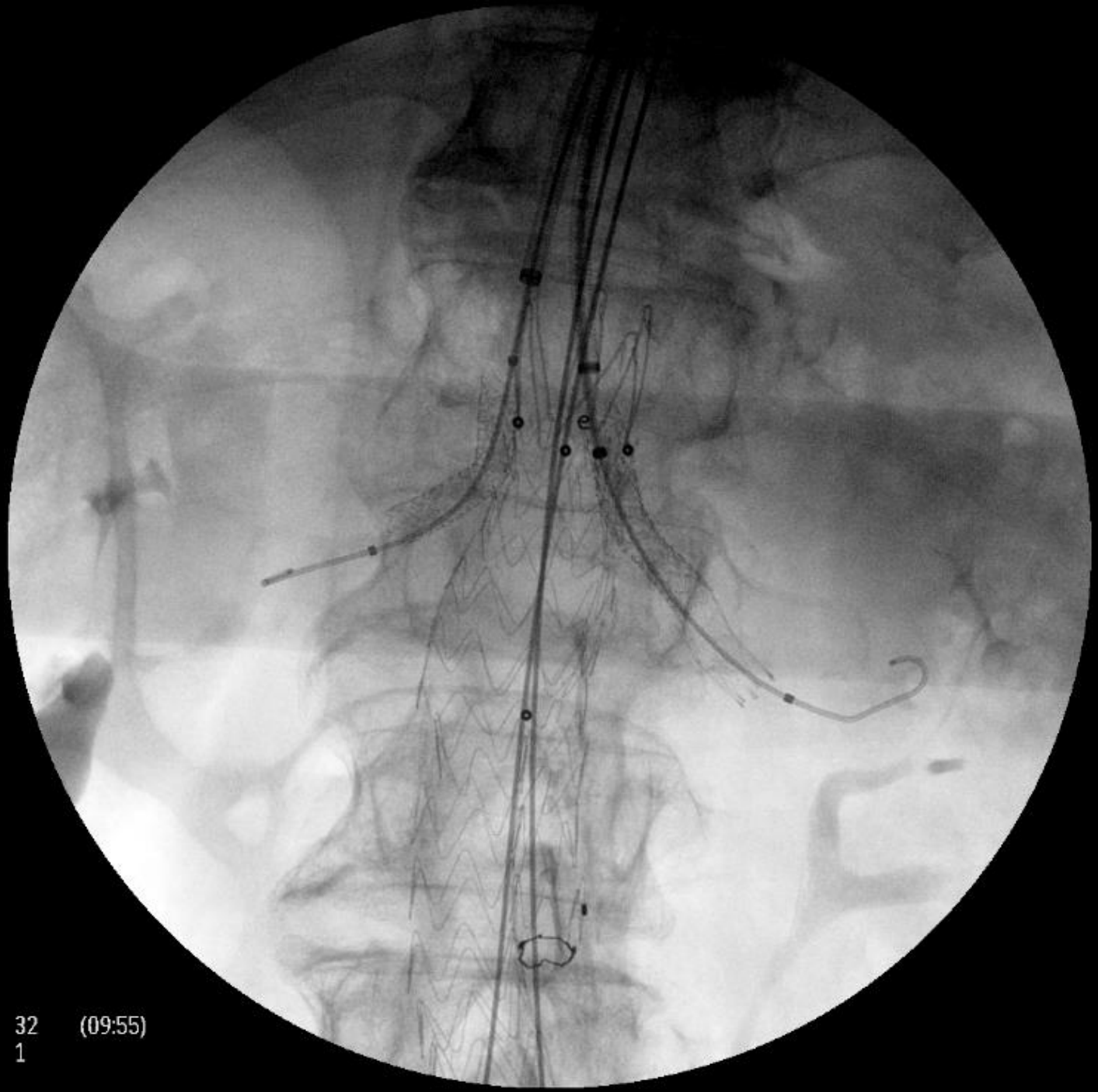
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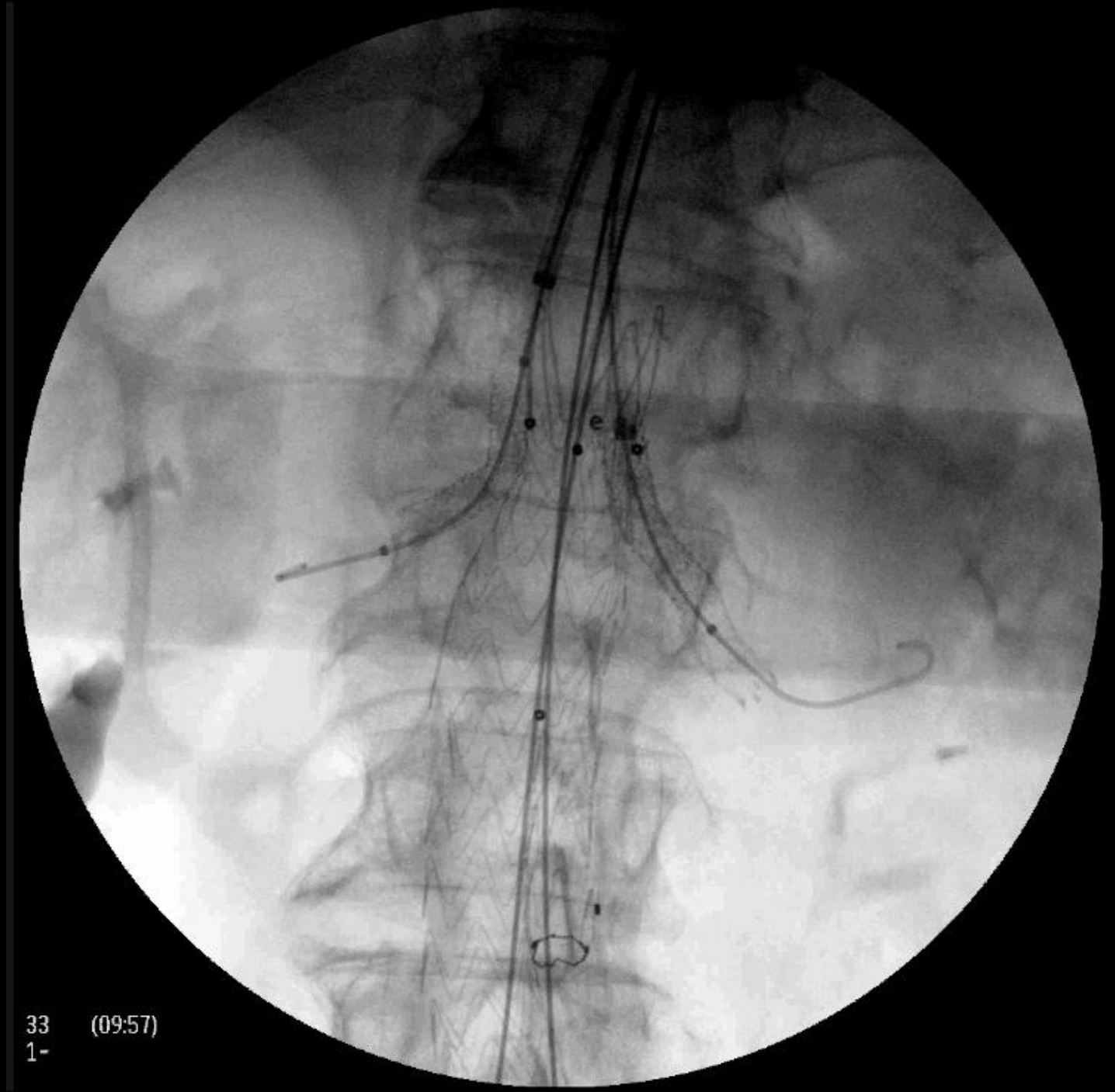
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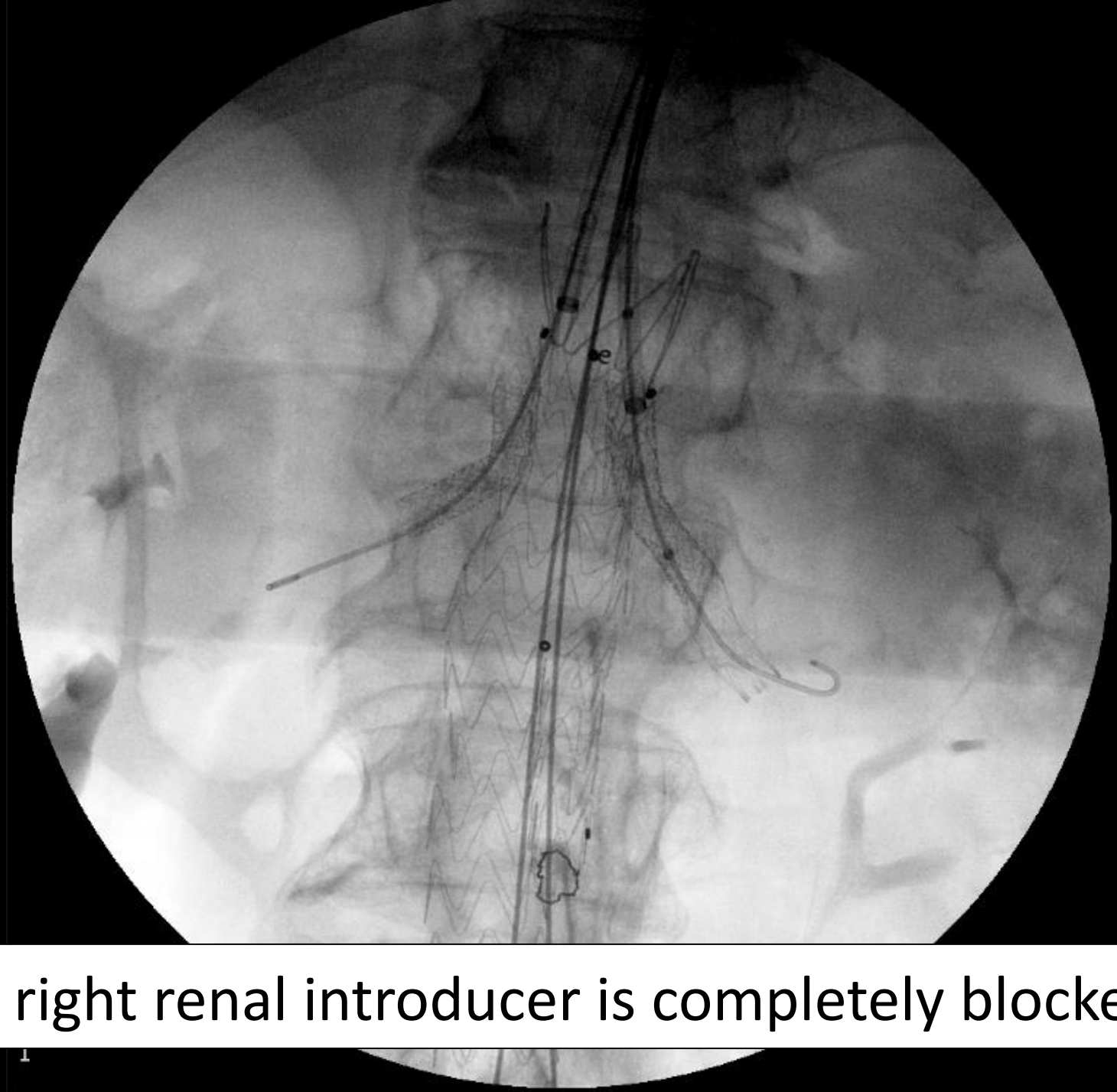
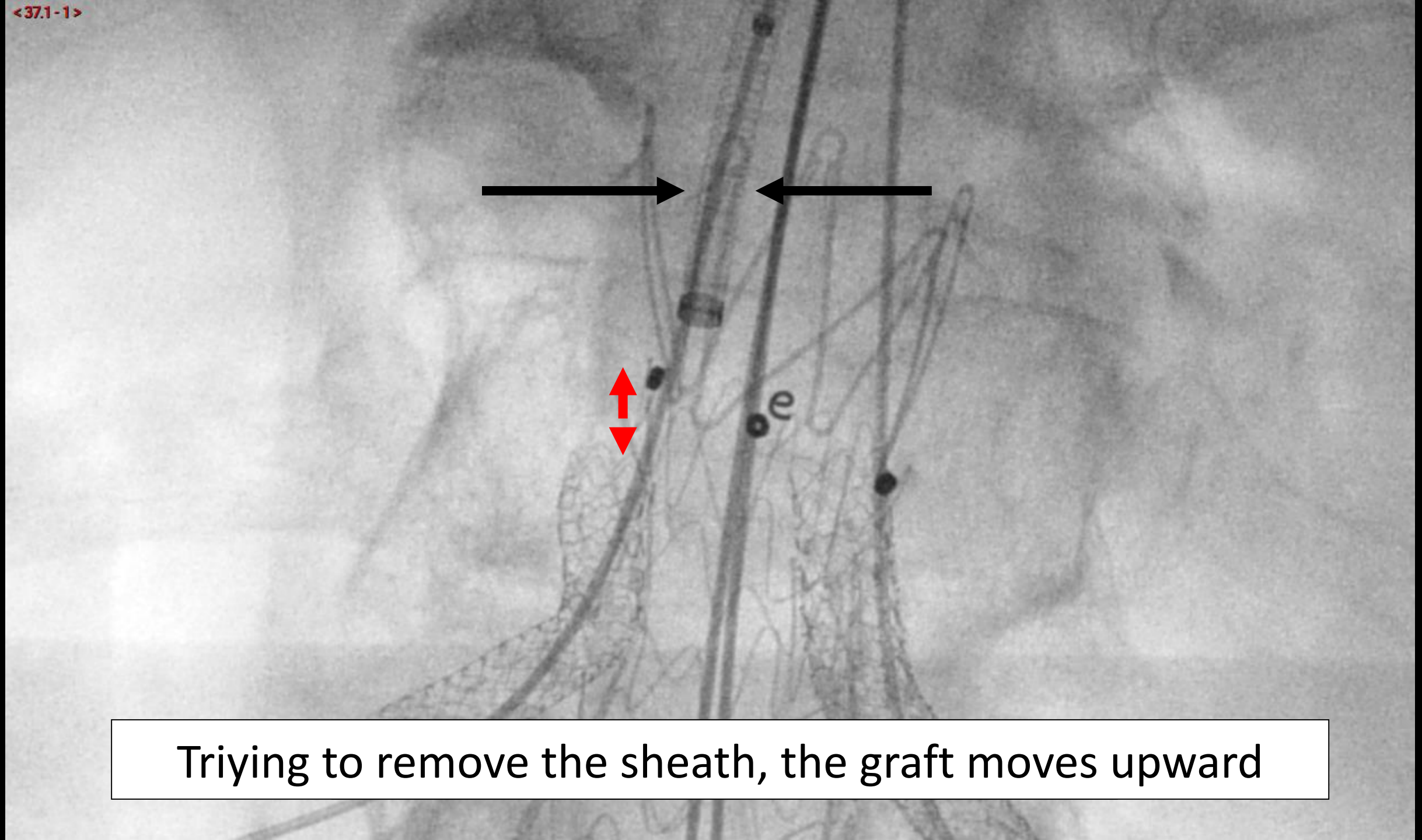
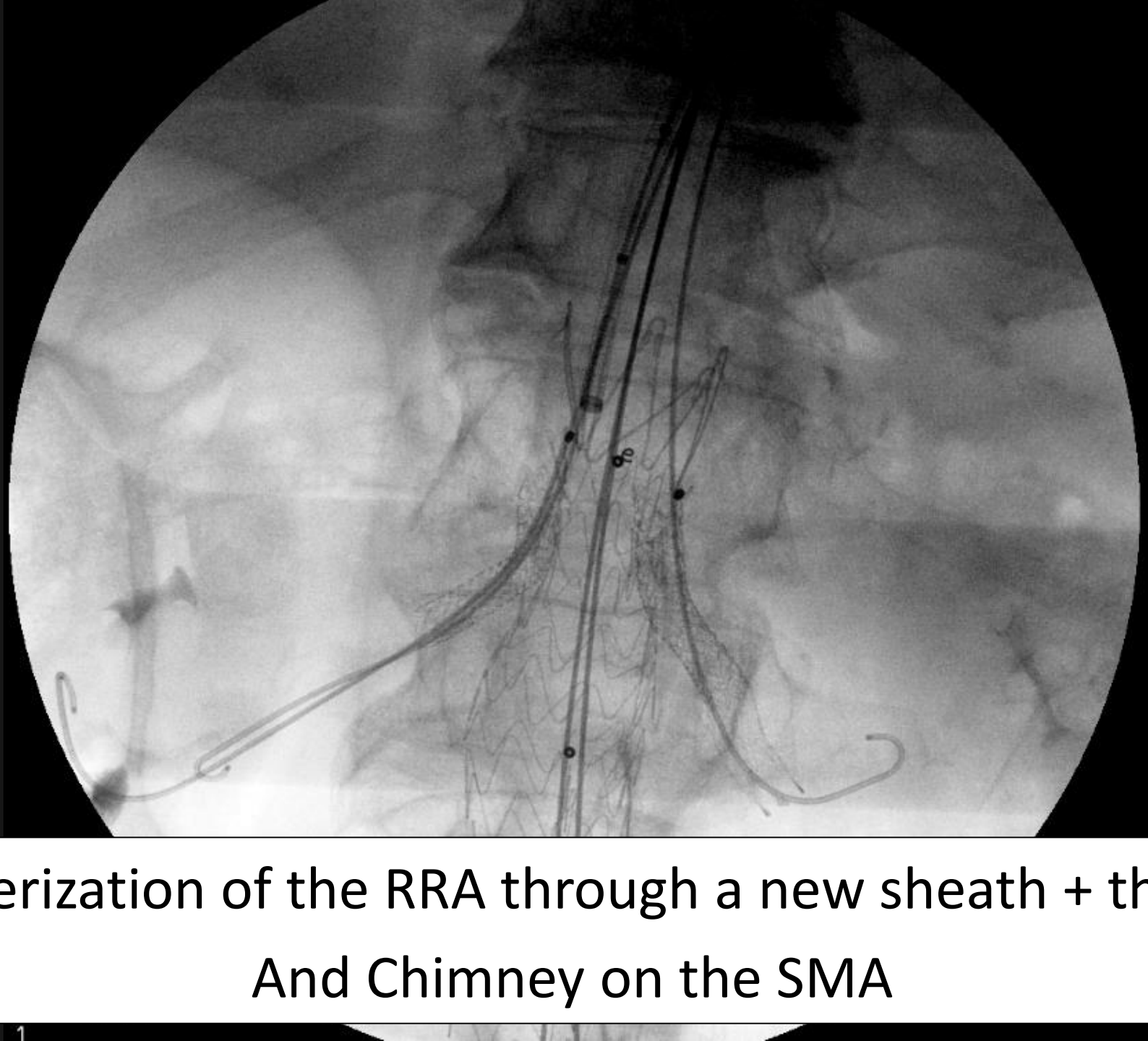


The right renal introducer is completely blocked

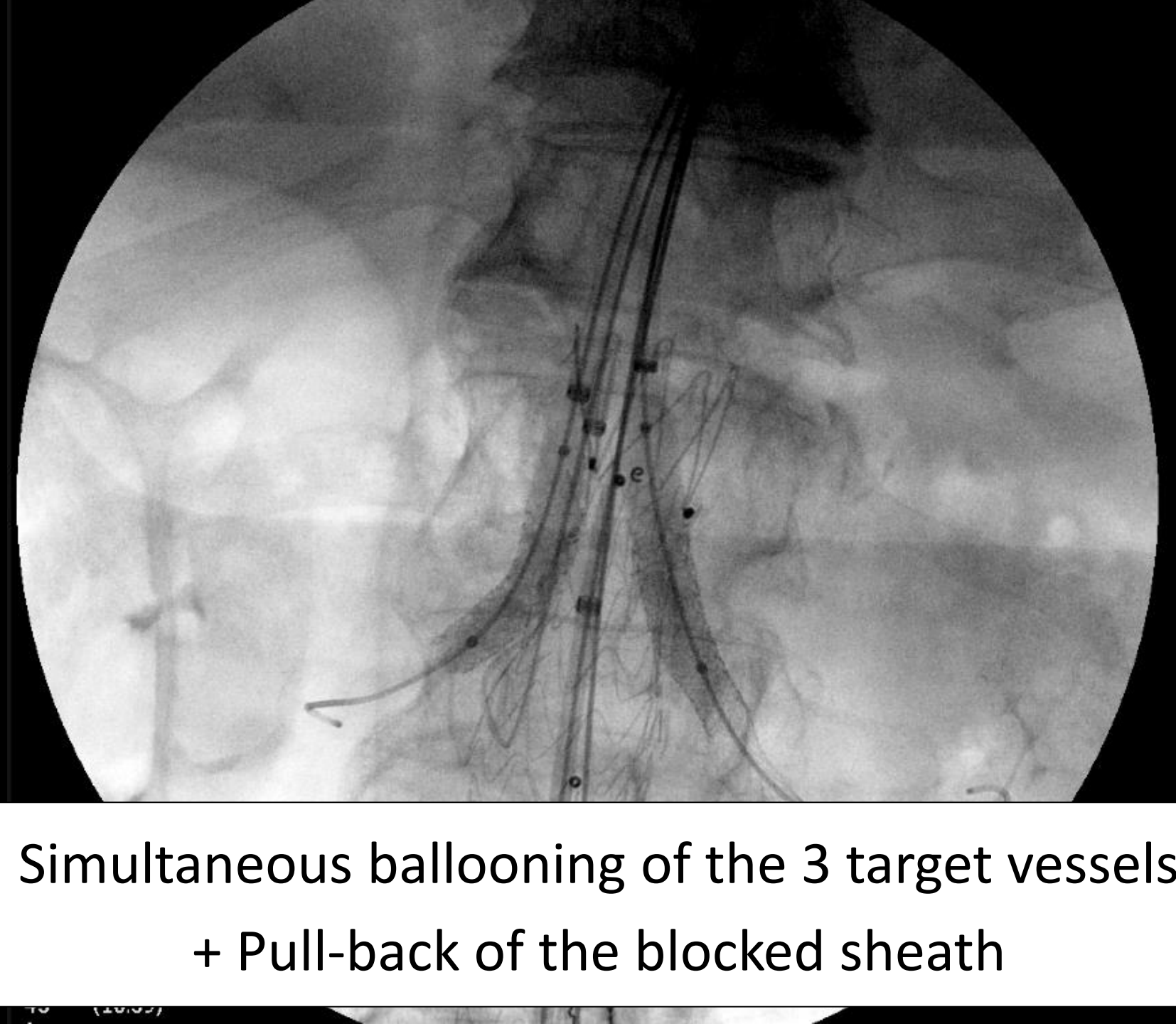


Triying to remove the sheath, the graft moves upward



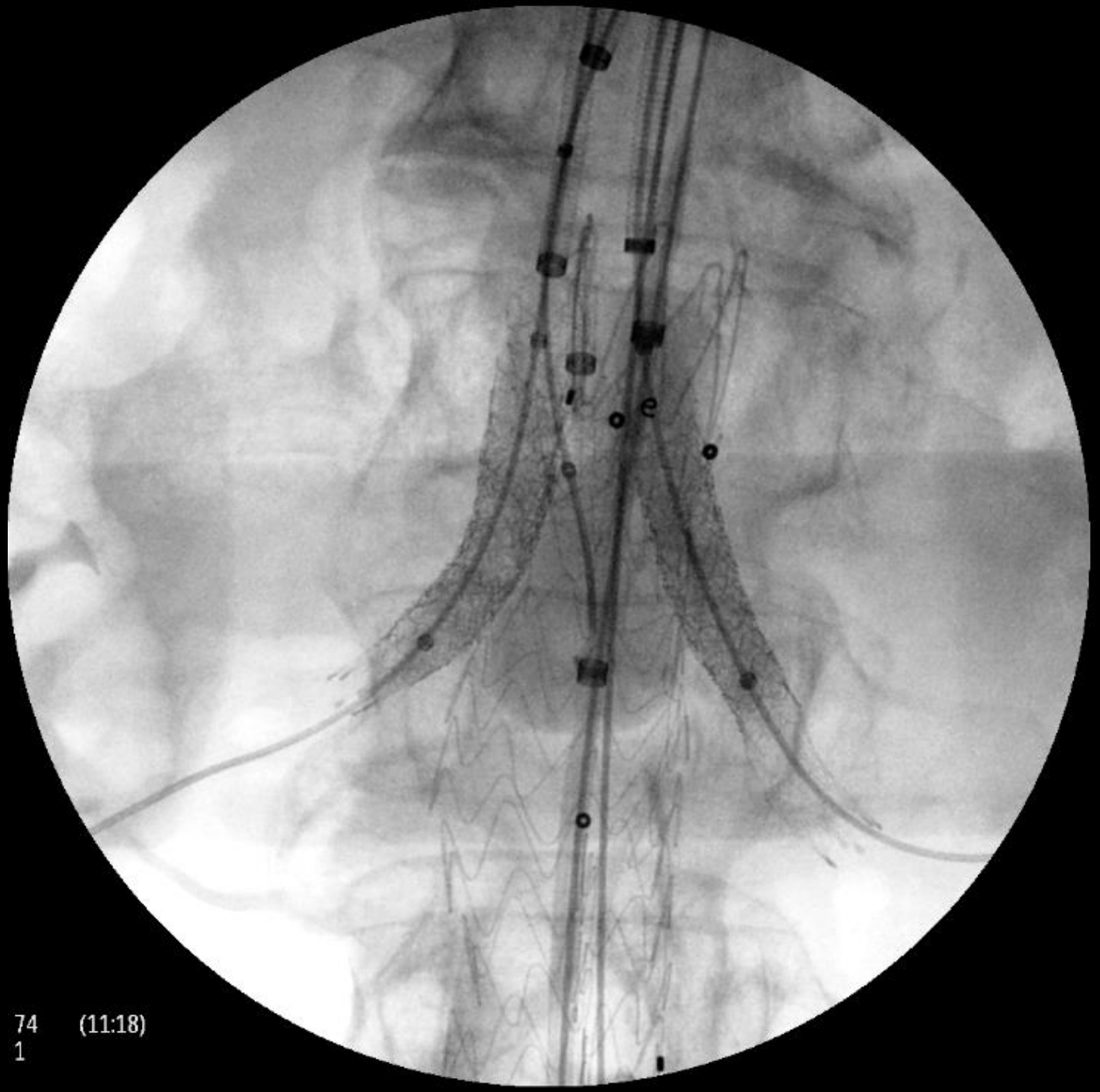
Catheterization of the RRA through a new sheath + the SMA

And Chimney on the SMA



Simultaneous ballooning of the 3 target vessels

+ Pull-back of the blocked sheath



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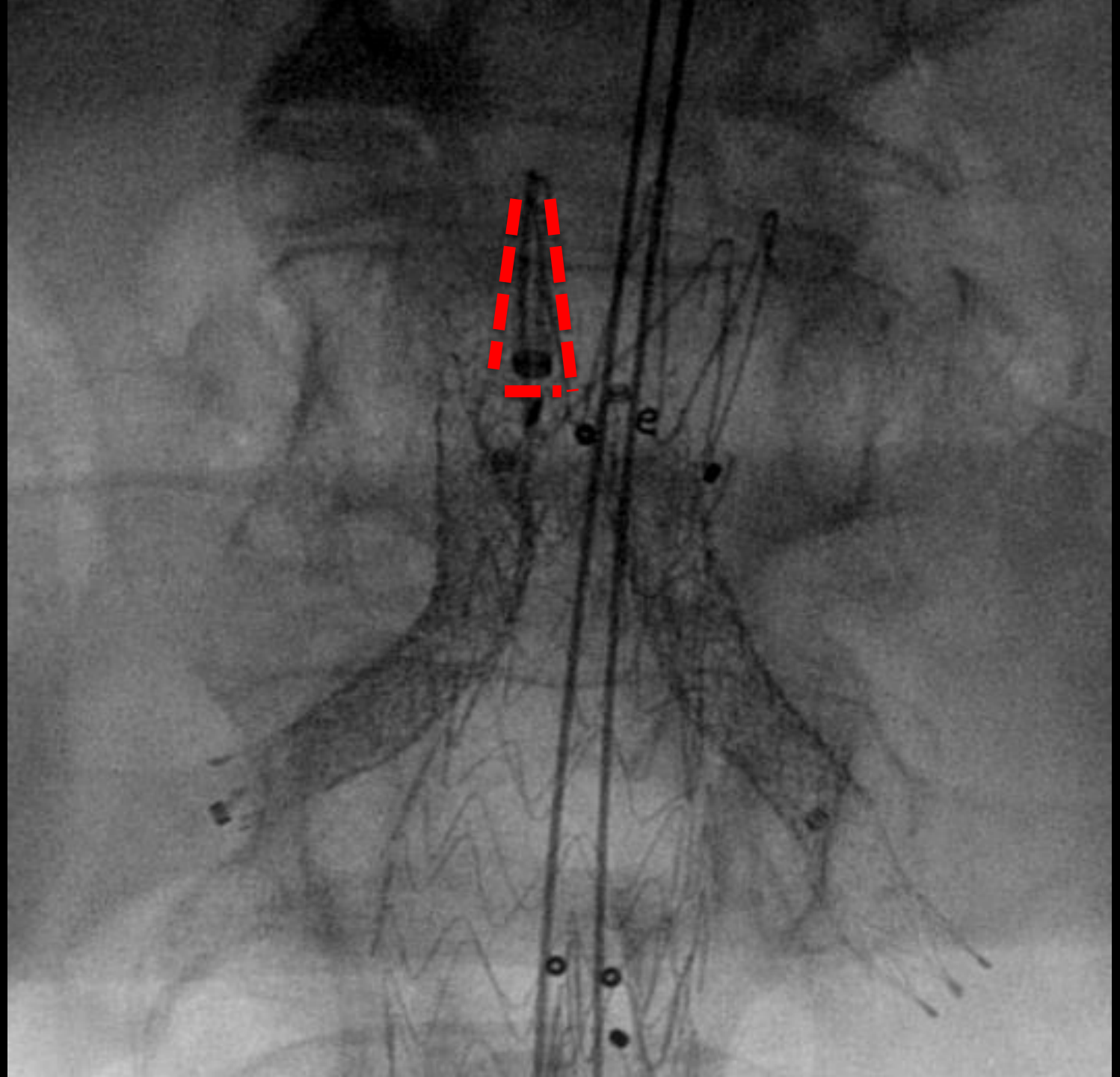

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Conclusions

- In France, between 2008 and 2016, Ch-EVAR was associated with an exceptionally high 30-d mortality
- These poor results are the picture of a period where the technique was not standardized
- This study, as other studies with Ch-EVAR, was not performed with independent external review of data
- No rigorous study has been performed. Therefore, nobody knows the real results of Ch-EVAR and no scientific conclusion can be made about this technique

Great contributors allows such presentation

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Improvement of ChEVAR with Endostaples