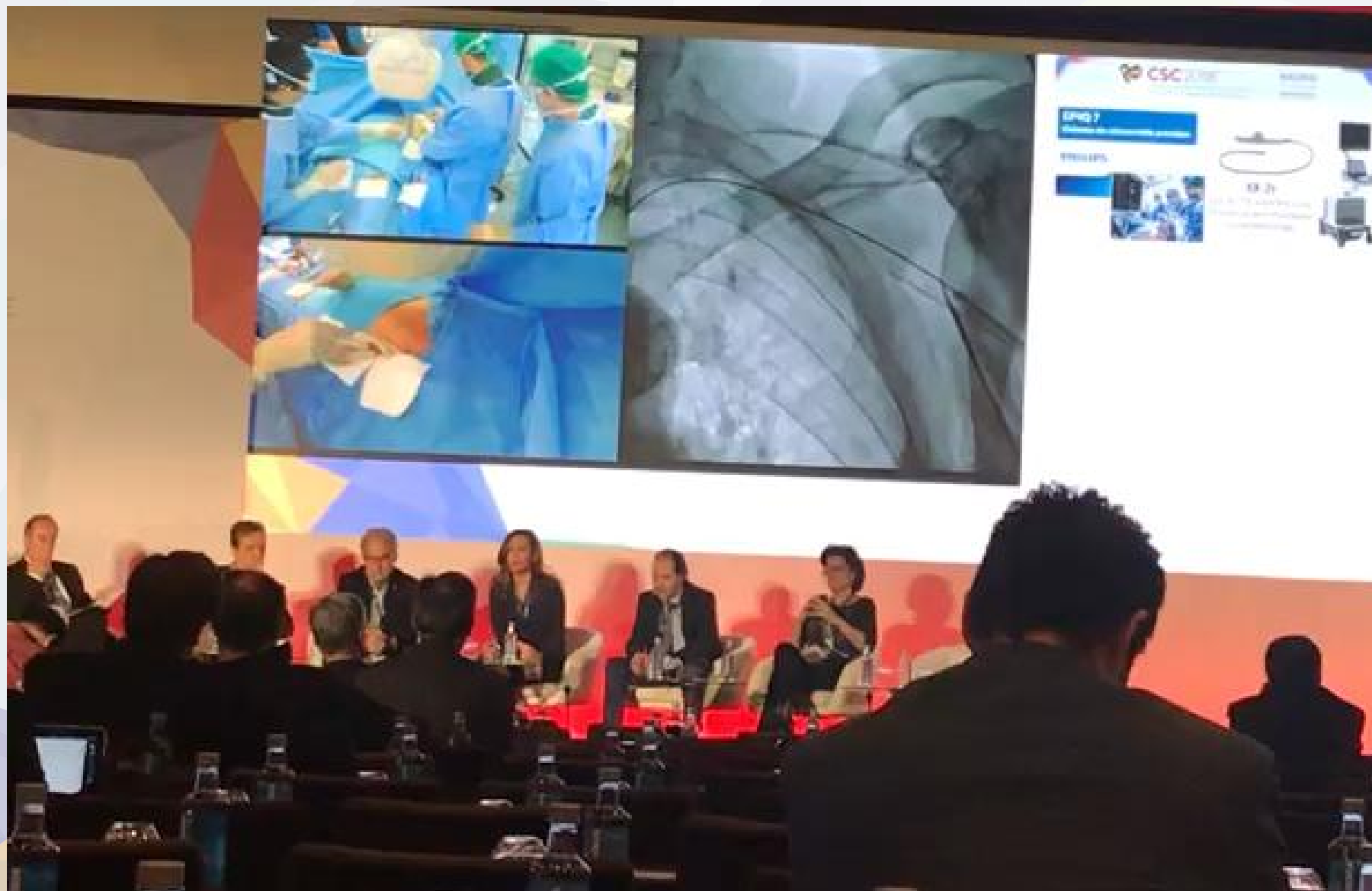
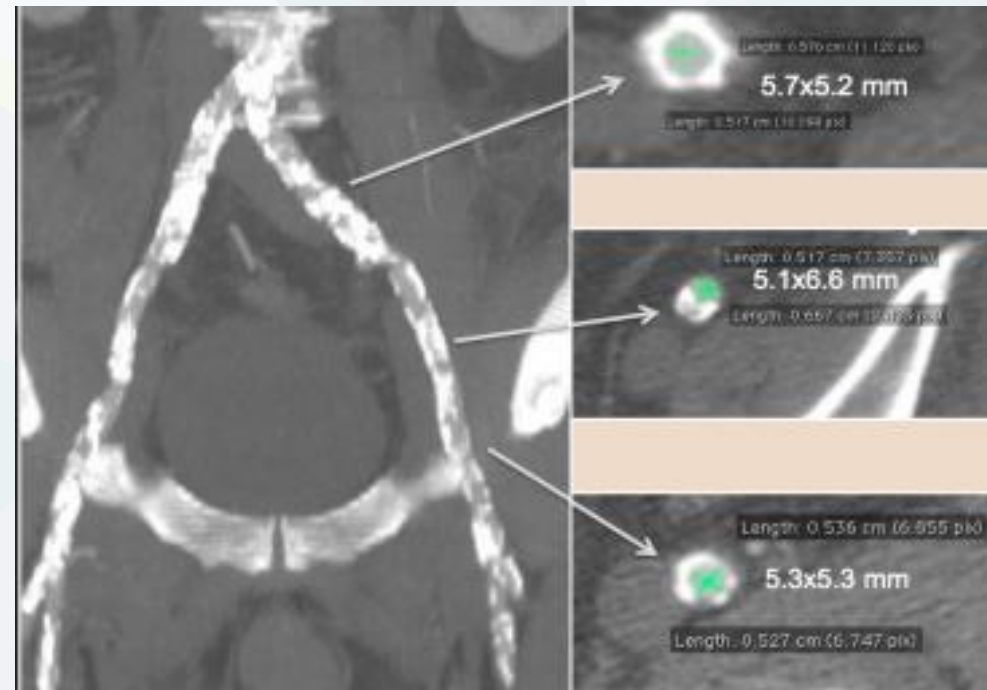


TAVI: Acceso alternativo transaxilar

Ignacio J. Amat-Santos
Director, Cardiología Intervencionista
Hospital Clínico Universitario de Valladolid

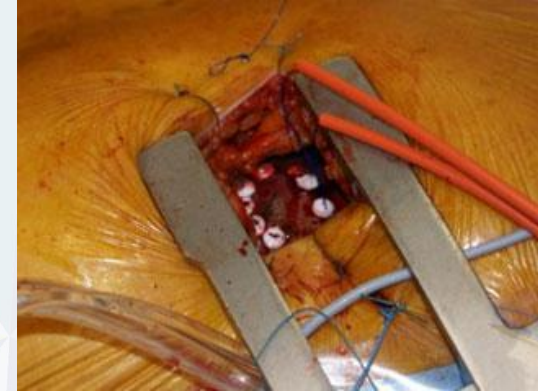


- **Transfemoral:** primera elección en pacientes que se van a someter a una TAVI
- Sin embargo, entre un 15% y un 30% de los pacientes no tienen un acceso femoral adecuado.



ACCESOS ALTERNATIVOS AL ACCESO TRANSFEMORAL:

- Acceso trans-apical.
- Acceso trans-aortico.
- Acceso trans-subclavio.
- Acceso trans-carotideo.
- Acceso trans-cavo-aórtico.

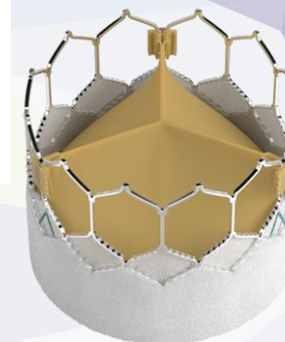


Outcomes Following Subclavian and Axillary Artery Access for Transcatheter Aortic Valve Replacement

Society of the Thoracic Surgeons/American College of Cardiology TVT Registry Report

Thom G. Dahle, MD,^a Tsuyoshi Kaneko, MD,^b James M. McCabe, MD^c

5, 6 y 7 NOVIEMBRE
HOTEL RIU PLAZA DE ESPAÑA



63,581 Sapien

TABLE 5 30-Day Outcomes Among Propensity-Matched Transaxillary and Transapical or Transaortic Patients

| | TAx (n = 1,180) | TA/Tao (n = 1,180) | p Value |
|---|------------------|--------------------|---------|
| All-cause mortality | 58 (5.3) | 94 (8.4) | 0.005 |
| All stroke | 72 (6.3) | 35 (3.1) | 0.0002 |
| New-onset atrial fibrillation | 23 (2.0) | 150 (13.0) | <0.0001 |
| All readmissions | 120 (11.6) | 157 (15.1) | 0.03 |
| New requirement for dialysis | 8 (0.7) | 28 (2.5) | 0.001 |
| New pacemaker | 133 (11.7) | 115 (10.1) | 0.14 |
| Life-threatening bleeding | 5 (0.5) | 6 (0.6) | 0.78 |
| Major vascular complication | 29 (2.5) | 20 (1.7) | 0.19 |
| Change in KCCQ overall summary score from baseline to 30 days | 25.9 ± 27.4 | 19.2 ± 30.6 | <0.0001 |
| NYHA functional class I/II | 723/824 (87.8) | 663/789 (84.0) | 0.01 |
| Length of index hospital stay (days) | 3.0 (2.0–5.0) | 6.0 (4.0–8.0) | <0.0001 |
| Length of ICU stay (h) | 26.3 (19.5–48.0) | 47.0 (25.0–95.5) | <0.0001 |

Values are n (%), mean ± SD, n/N (%), or median (interquartile range).

ICU = intensive care unit; KCCQ = Kansas City Cardiomyopathy Questionnaire; other abbreviations as in Table 1.

Transfemoral
(n = 57,889)

TAx
(n = 1,249)

TA/TAo
(n = 1,815)



Dahle TG, Kaneko T, McCabe JM. Outcomes Following Subclavian and Axillary Artery Access for Transcatheter Aortic Valve Replacement: Society of the Thoracic Surgeons/American College of Cardiology TVT Registry Report. JACC Cardiovasc Interv. 2019 Apr 8;12(7):662-669. doi: 10.1016/j.jcin.2019.01.219. PMID: 30947940.

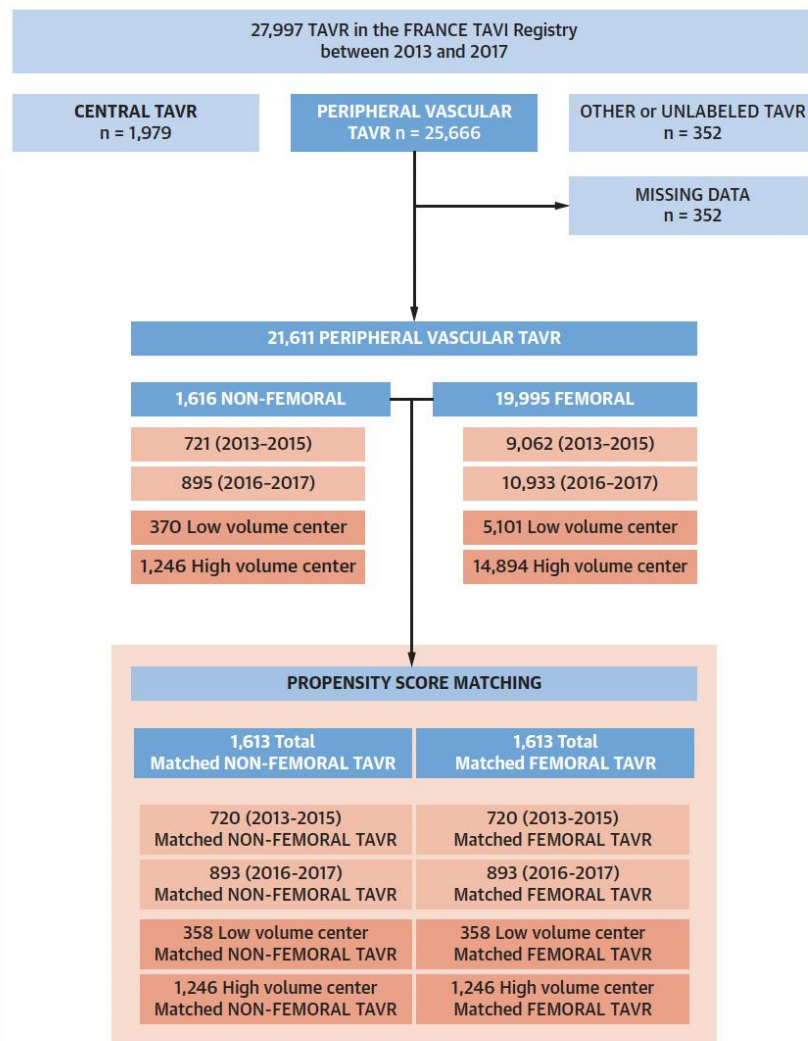
Femoral Versus Nonfemoral Peripheral Access for Transcatheter Aortic Valve Replacement

Sylvain Beurtheret, MD,^a Nicole Karam, MD, PhD,^{b,c,d} Noemie Resseguier, MD,^e Remi Houel, MD,^a Thomas Modine, MD, PhD,^f Thierry Folliguet, MD, PhD,^g Chekrallah Chamandi, MD,^{b,c,d} Olivier Com, MD,^h Richard Gelisse, MD,^h Jacques Bille, MD,^h Patrick Joly, MD,^h Nicolas Barra, MD,^h Alain Tavildari, MD,^h Philippe Commeau, MD,ⁱ Sebastien Armero, MD,^j Mathieu Pankert, MD,^k Michel Pansieri, MD,^k Sabrina Siame,^a René Koning, MD,^l Marc Laskar, MD, PhD,^m Yvan Le Dolley, MD,^a Arnaud Maudiere, MD,^a Bertrand Villette, MD,^a Patrick Khanoyan, MD,^h Julien Seitz, MD,^h Didier Blanchard, MD,^{b,c,d} Christian Spaulding, MD, PhD,^{b,c,d} Thierry Lefevre, MD,ⁿ Eric Van Belle, MD, PhD,^o Martine Gilard, MD, PhD,^p Helene Eltchaninoff, MD, PhD,^q Bernard Iung, MD, PhD,^r Jean Philippe Verhoye, MD, PhD,^s Ramzi Abi-Akar, MD,^t Paul Achouh, MD, PhD,^t Thomas Cuisset, MD, PhD,^u Pascal Leprince, MD, PhD,^v Eloï Marijon, MD, PhD,^{b,c,d} Hervé Le Breton, MD, PhD,^w Antoine Lafont, MD, PhD,^{b,c,d}

No-TF patients worst
EuroScore (19.95 Vs 16,65).

Beurtheret, S, Karam, N, Resseguier, N. et al. Femoral Versus Nonfemoral Peripheral Access for Transcatheter Aortic Valve Replacement. JACC. 2019 Dec, 74 (22) 2728–2739.

FIGURE 1 Study Flowchart



Among 27,997 patients included in the FRANCE TAVI (French Transcatheter Aortic Valve Implantation) registry, 21,611 patients were included in the study. Patients who underwent nonfemoral peripheral (n-FP) transcatheter aortic valve replacement (TAVR) (n = 1,613) with complete data were matched with 1,613 patients who underwent FP TAVR for comparison purposes.

TABLE 2 Impact of Access Type on Outcome of the Matched Population

| | Nonfemoral Access (n = 1,613) | Femoral Access (n = 1,613) | Multivariate Analysis | |
|-------------------------------|-------------------------------------|----------------------------------|-----------------------|---------|
| | | | OR* (95% CI) | p Value |
| Procedural mortality | 64 (3.97) | 47 (2.91) | 1.29 (0.87–1.94) | 0.211 |
| STEMI | 4 (0.25) | 3 (0.19) | 0.81 (0.19–3.87) | 0.774 |
| Stroke | 54 (3.35) | 35 (2.17) | 1.38 (0.88–2.19) | 0.156 |
| Annulus rupture | 0 (0.00) | 3 (0.19) | 0.14 (0.00–1.62) | 0.126 |
| Aortic dissection | 4 (0.25) | 2 (0.12) | 1.63 (0.32–10.45) | 0.564 |
| Valve migration/embolization | 16 (0.99) | 11 (0.68) | 1.09 (0.50–2.48) | 0.833 |
| Tamponade | 24 (1.49) | 18 (1.12) | 1.38 (0.73–2.65) | 0.321 |
| Permanent pacemaker insertion | 287 (17.79) | 254 (15.75) | 0.95 (0.78–1.16) | 0.607 |
| Pulmonary embolism | 4 (0.25) | 3 (0.19) | 1.17 (0.27–5.57) | 0.829 |
| Renal failure | 62 (3.84) | 45 (2.79) | 1.39 (0.92–2.11) | 0.119 |
| Renal dialysis | 10 (0.62) | 5 (0.31) | 1.60 (0.54–5.34) | 0.408 |
| Major bleeding | 138 (8.56) | 121 (7.50) | 1.06 (0.81–1.39) | 0.676 |
| Hemorrhagic shock | 11 (0.68) | 11 (0.68) | 0.89 (0.37–2.14) | 0.795 |
| Unplanned vascular repairs | 50 (3.10) | 108 (6.70) | 0.41 (0.29–0.59) | <0.001 |
| Major vascular complications | 11 (0.68) | 22 (1.36) | 0.45 (0.21–0.93) | 0.032 |
| Surgery under bypass | 3 (0.19) | 6 (0.37) | 0.41 (0.09–1.52) | 0.183 |
| Infectious complication | 72 (4.46) | 67 (4.15) | 0.97 (0.68–1.39) | 0.861 |

Values are n (%) unless otherwise indicated. *Odds ratio (OR) expressing the excess of risk of complication for nonfemoral peripheral transcatheter aortic valve replacement after adjustment for prosthesis type and time period.

CI = confidence interval; STEMI = ST-segment elevation myocardial infarction.

Vascular Access in Patients With Peripheral Arterial Disease Undergoing TAVR



The Hostile Registry

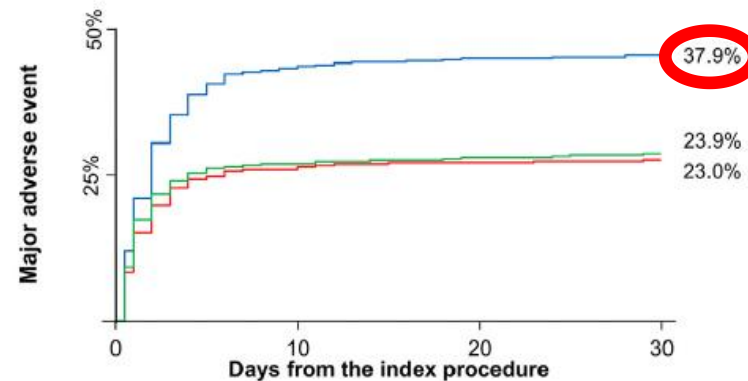
Tullio Palmerini, MD,^{a,b} Francesco Saia, MD, PhD,^{a,b} Won-Keun Kim, MD,^c Matthias Renker, MD,^c Alessandro Iadanza, MD,^d Massimo Fineschi, MD,^d Antonio Giulio Bruno, MD,^{a,b} Gabriele Gheti, MD,^{a,b} Maarten Vanhaverbeke, MD,^e Lars Søndergaard, MD,^e Ole De Backer, MD,^e Enrico Romagnoli, MD,^f Francesco Burzotta, MD,^f Carlo Trani, MD,^f Rik Adrichem, MD,^g Nicolas M. Van Mieghem, MD,^g Elena Nardi, MSc,^h Francesco Chietera, MD,^{a,b} Mateusz Orzalkiewicz, MD,^{a,b} Daijiro Tomii, MD,^h Thomas Pilgrim, MD, MSc,^h Tiziana Claudia Aranzulla, MD, MSc,ⁱ Giuseppe Musumeci, MD,ⁱ Matti Adam, MD,^j Max M. Meertens, MD,^j Nevio Taglieri, MD,^{a,b} Cinzia Marrozzini, MD,^{a,b} Hector Alfonso Alvarez Covarrubias, MD,^{k,l} Michael Joner, MD,^k Giulia Nardi, MD,^m Francesca Maria Di Muro, MD,^m Carlo Di Mario, MD,^m Lucca Loretz, MD,ⁿ Stefan Toggweiler, MD,ⁿ Enrico Gallitto, MD,^o Mauro Gargiulo, MD,^o Luca Testa, MD,^p Francesco Bedogni, MD,^p Sergio Berti, MD,^q Marco B. Ancona, MD,^r Matteo Montorfano, MD,^r Alessandro Leone, MD,^s Carlo Savini, MD,^s Davide Pacini, MD,^s Jonas Gmeiner, MD,^t Daniel Braun, MD,^t Roberto Nerla, MD,^u Fausto Castriota, MD,^u Marco De Carlo, MD,^v Anna Sonia Petronio, MD,^v Marco Barbanti, MD,^w Giuliano Costa, MD,^w Corrado Tamburino, MD,^w Pier Pasquale Leone, MD,^x Bernhard Reimers, MD,^x Giulio Stefanini, MD,^x Mitsumasa Sudo, MD,^y Georg Nickenig, MD,^y Tommaso Piva, MD,^z Andrea Scotti, MD,^{aa,bb} Azeem Latib, MD,^{aa,bb} Matteo Vercellino, MD,^{cc} Italo Porto, MD,^{cc} Pablo Codner, MD,^{dd} Ran Kornowski, MD,^{dd} Antonio L. Bartorelli, MD,^{ee,ff} Giuseppe Tarantini, MD,^{gg} Chiara Fraccaro, MD,^{gg} Mohamed Abdel-Wahab, MD,^{hh} Eberhard Grube, MD,^y Nazzareno Galié, MD,^{a,b} Gregg W. Stone, MDⁱⁱ

1,707 Patients

Facilitated
Transfemoral
access VS
Transthoracic
accesses vs
Transalternative
accesses.

A

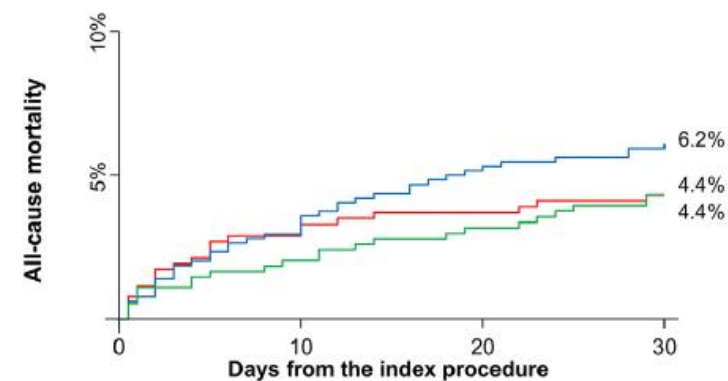
TFA vs TTA: Adjusted HR=0.58, 95% CI 0.45-0.75; p<0.0001
TAA vs TTA: Adjusted HR=0.60, 95% CI 0.47-0.78; p<0.0001
TFA vs TAA: Adjusted HR=0.96, 95% CI 0.71-1.31; p=0.81



| | | | | |
|------------------|-----|-----|-----|-----|
| Patients at risk | | | | |
| TFA | 516 | 394 | 384 | 378 |
| TTA | 642 | 406 | 395 | 390 |
| TAA | 545 | 411 | 405 | 400 |

B

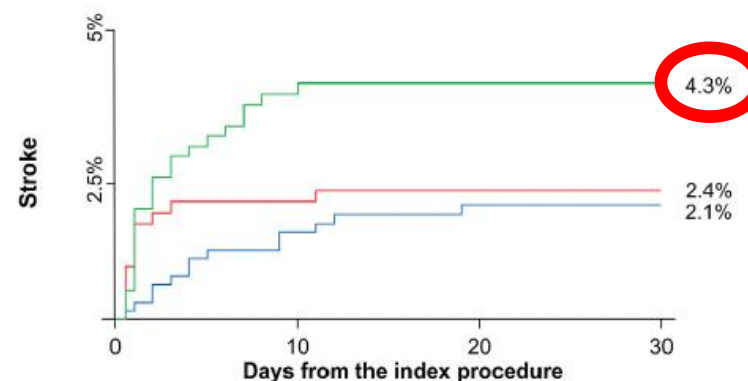
TFA vs TTA: Adjusted HR= 0.79, 95% CI 0.41-1.49 ; p=0.46
TAA vs TTA: Adjusted HR=0.56, 95% CI 0.30-1.05; p=0.07
TFA vs TAA: Adjusted HR= 1.40, 95% CI 0.68-2.86; p=0.36



| | | | | |
|------------------|-----|-----|-----|-----|
| Patients at risk | | | | |
| TFA | 516 | 484 | 467 | 459 |
| TTA | 641 | 615 | 597 | 587 |
| TAA | 545 | 512 | 502 | 493 |

C

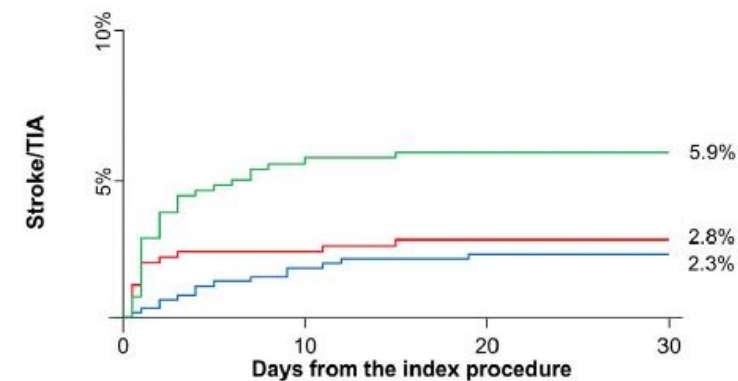
TFA vs TTA: Adjusted HR=1.27, 95% CI 0.52-3.11; p=0.60
TAA vs TTA: Adjusted HR=2.09, 95% CI 0.92-4.79; p=0.08
TFA vs TAA: Adjusted HR=0.61, 95% CI 0.27-1.38; p=0.23



| | | | | |
|------------------|-----|-----|-----|-----|
| Patients at risk | | | | |
| TFA | 516 | 472 | 453 | 446 |
| TTA | 641 | 603 | 584 | 575 |
| TAA | 545 | 494 | 486 | 479 |

D

TFA vs TTA: Adjusted HR=1.31, 95% CI 0.57-3.03; p=0.53
TAA vs TTA: Adjusted HR=2.62, 95% CI 1.24-5.52; p=0.01
TFA vs TAA: Adjusted HR=0.50, 95% CI 0.24-1.03; p=0.06



| | | | | |
|------------------|-----|-----|-----|-----|
| Patients at risk | | | | |
| TFA | 516 | 471 | 454 | 447 |
| TTA | 641 | 604 | 585 | 576 |
| TAA | 545 | 486 | 477 | 470 |

Transsubclavian approach: A competitive access for transcatheter aortic valve implantation as compared to transfemoral

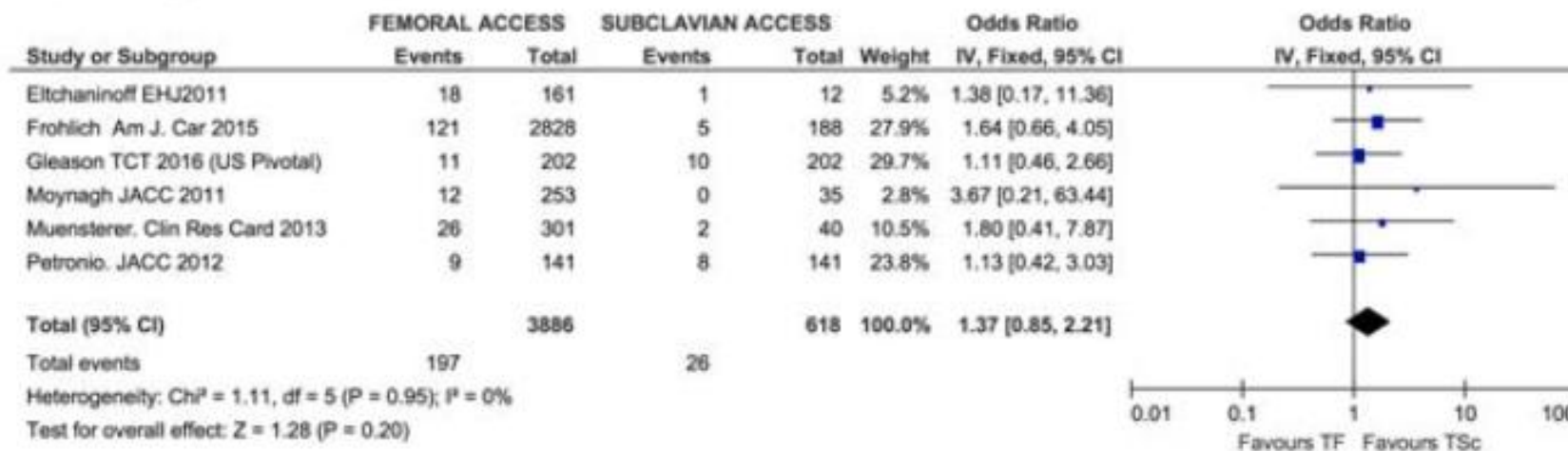
Ignacio J. Amat-Santos, MD, PhD^{1,2}  | Paol Rojas, MD² |
Hipólito Gutiérrez, MD^{1,2} | Silvio Vera, MD² | Javier Castrodeza, MD² |
Javier Tobar, MD² | L. Renier Goncalves-Ramirez, MD² | Manuel Carrasco, MSC²
Pablo Catala, MD² | José A. San Román, MD, PhD^{1,2}

6 | CONCLUSION

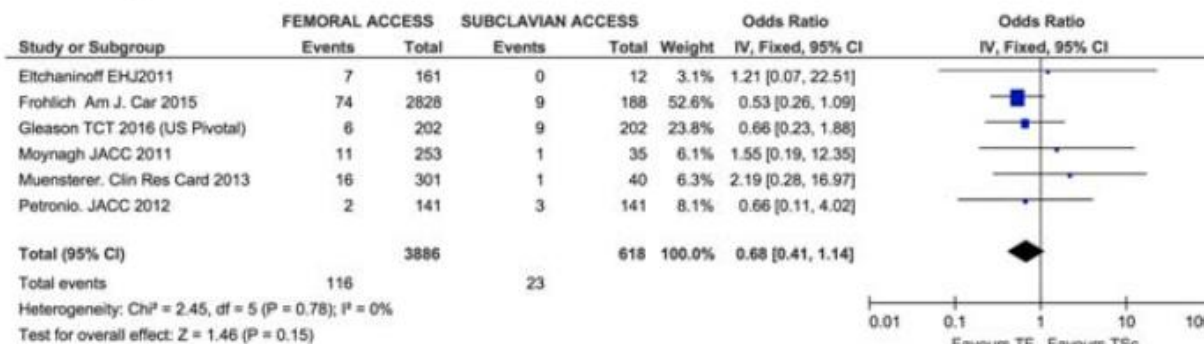
In conclusion, our study suggests that TSc approach may be, not only an alternative route to TF approach for TAVI, but even a competitive approach in certain patients with increased risk of vascular injury.

| Variables | Nr. of patients | Global TAVR population | Transfemoral TAVR | Transsubclavian TAVR | P-value |
|----------------------------------|-----------------|------------------------|-------------------|----------------------|---------|
| Main 30-day outcomes | | | | | |
| Stroke (%) | 4,504 | 139/4,504 (3.1%) | 116/3,886 (3%) | 23/618 (3.7%) | 0.15 |
| Major vascular complications (%) | 4,504 | 238/4,504 (5.3%) | 198/3,886 (5.1%) | 40/618 (6.5%) | 0.36 |
| Life-threatening bleeding (%) | 686 | 63/686 (9.2%) | 29/343 (8.4%) | 34/343 (9.9%) | 0.75 |
| Major bleeding | 3,639 | 133/3,639 (3.6%) | 79/3,270 (2.4%) | 54/369 (14.6%) | 0.35 |
| Renal failure (AKI) | 4,216 | 179/4,216 (4.2%) | 143/3,633 (3.9%) | 36/583 (6.2%) | 0.25 |
| New pacemaker | 4,216 | 681/4,216 (16.5%) | 554/3,633 (15.2%) | 127/583 (21.8%) | 0.73 |
| Aortic regurgitation ≥ 3 | 3,357 | 274/3,357 (8.2%) | 252/3,129 (8%) | 22/228 (9.6%) | 0.53 |
| 30-Day mortality | 4,504 | 223/4,504 (4.9%) | 197/3,886 (5.1%) | 26/618 (4.2%) | 0.20 |

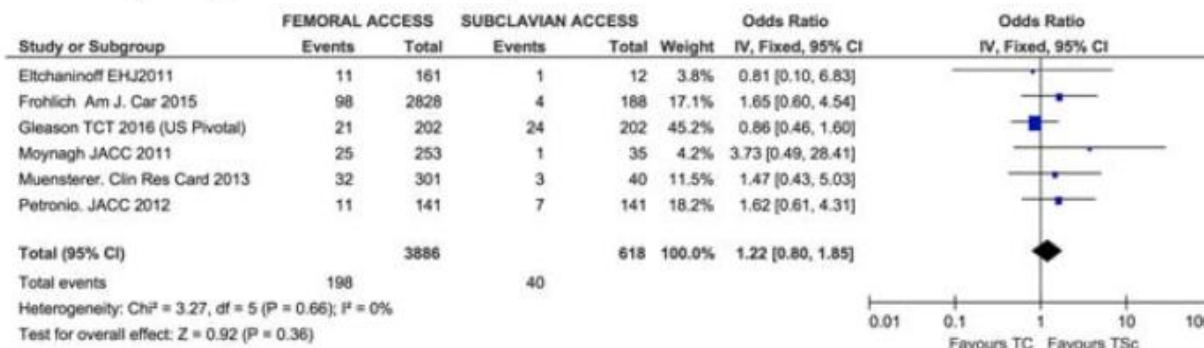
30-day Mortality



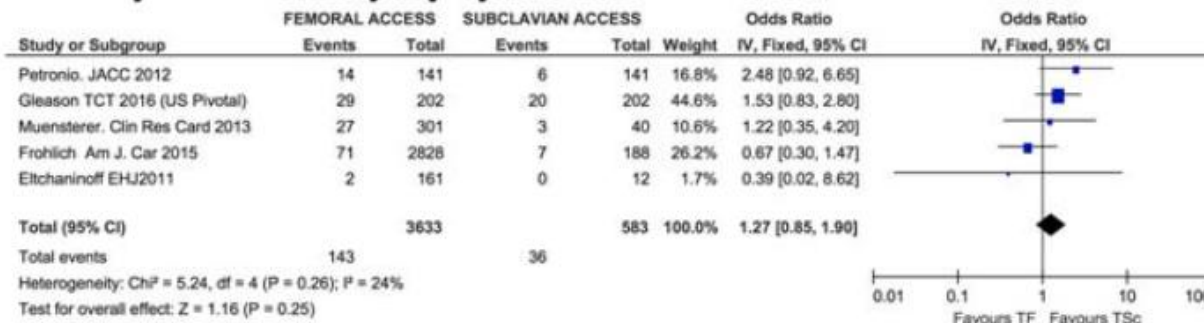
30-day Stroke



30-day Major vascular complication

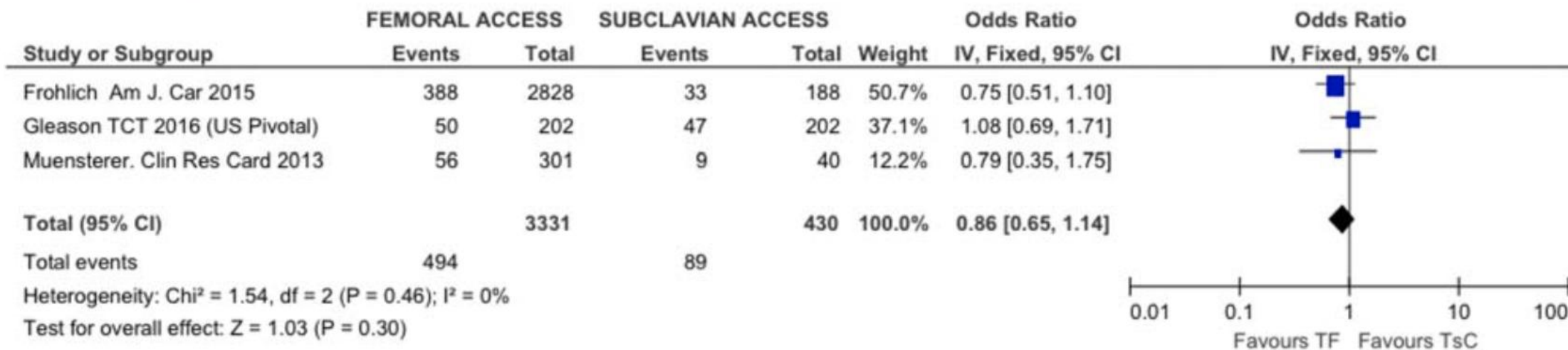


30-day Acute kidney injury

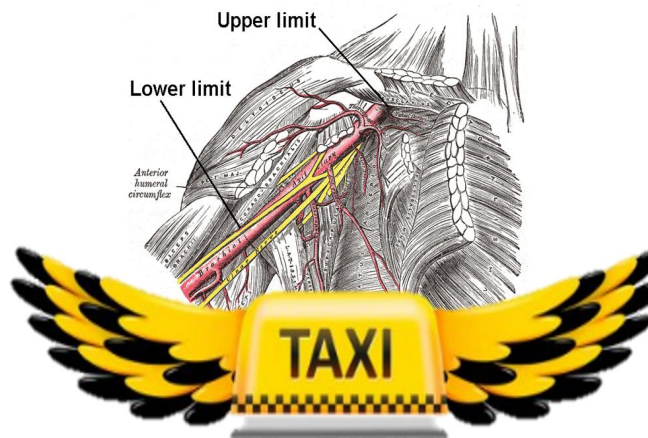


| Variables | Nr. of patients | Global TAVR population | Transfemoral TAVR | Transsubclavian TAVR | P-value |
|-----------------------------|-----------------|------------------------|-------------------|----------------------|---------|
| Main 1-year outcomes | | | | | |
| 1-Year mortality | 3,761 | 583/3,761 (15.5%) | 494/3,331 (14.8%) | 89/430 (20.7%) | 0.30 |

1-YEAR mortality



Trans-AXillary Intervention



Same MACCEs as
with subclavian access
(OR=0.60 [0.26; 1.38], p=0.230)



Fewer brachial plexus
impairments
(OR=0.16 [0.03; 0.71], p=0.016)



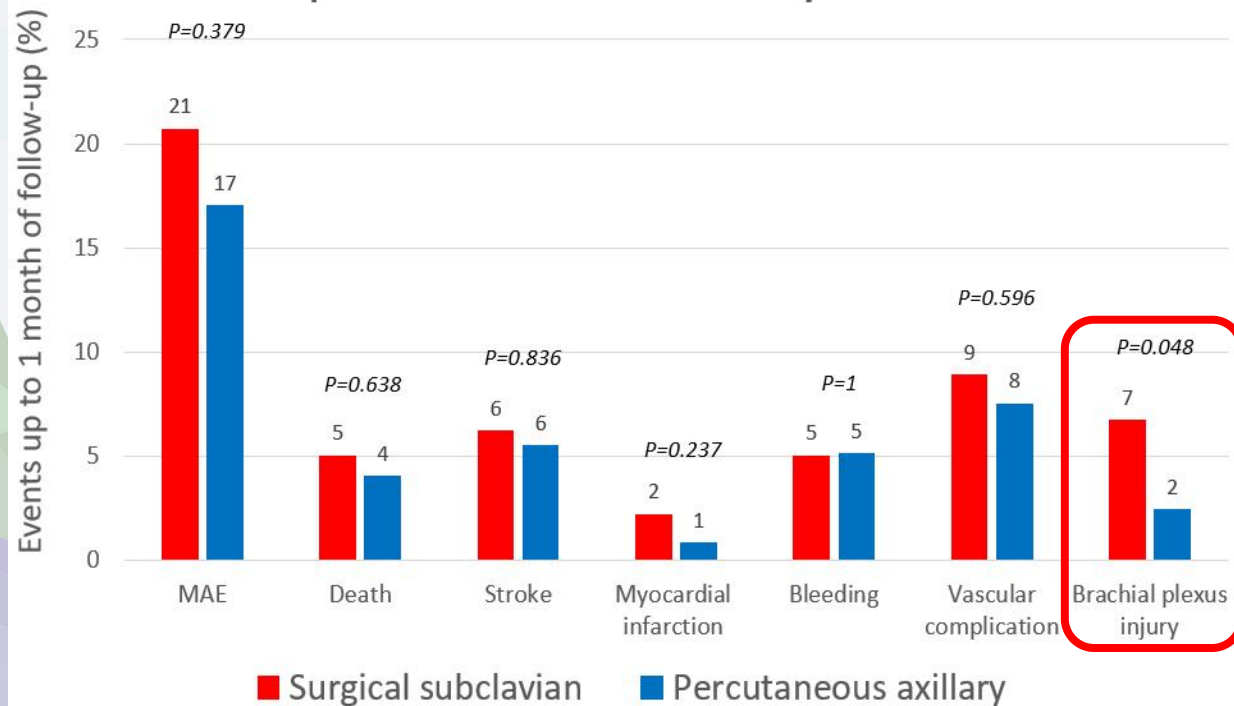
Shorter hospital stays than
subclavian access
(RC=-2.9 [-5.3; -0.4], p=0.021)

| Feature | Surgical subclavian access | Percutaneous axillary access |
|----------|----------------------------------|---------------------------------|
| Patients | 179 | 253 |

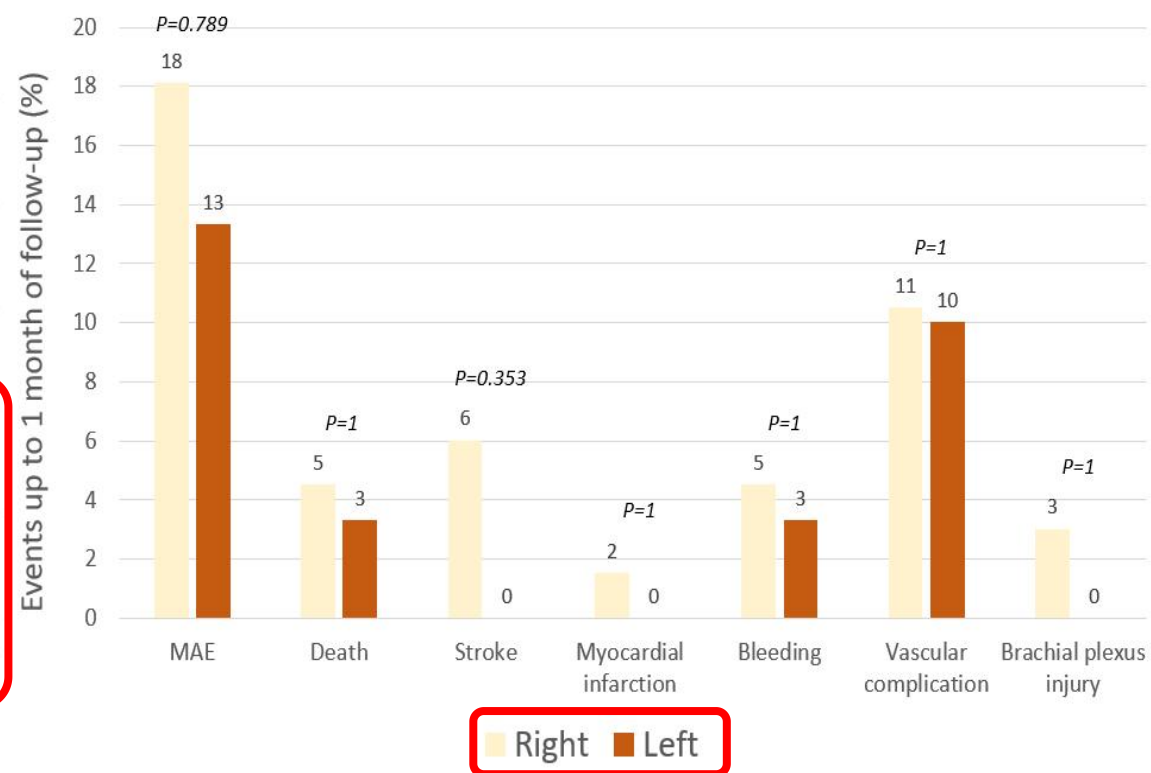


TAVI AXILAR PERCUTANEA

Surgical subclavian vs percutaneous axillary TAVI



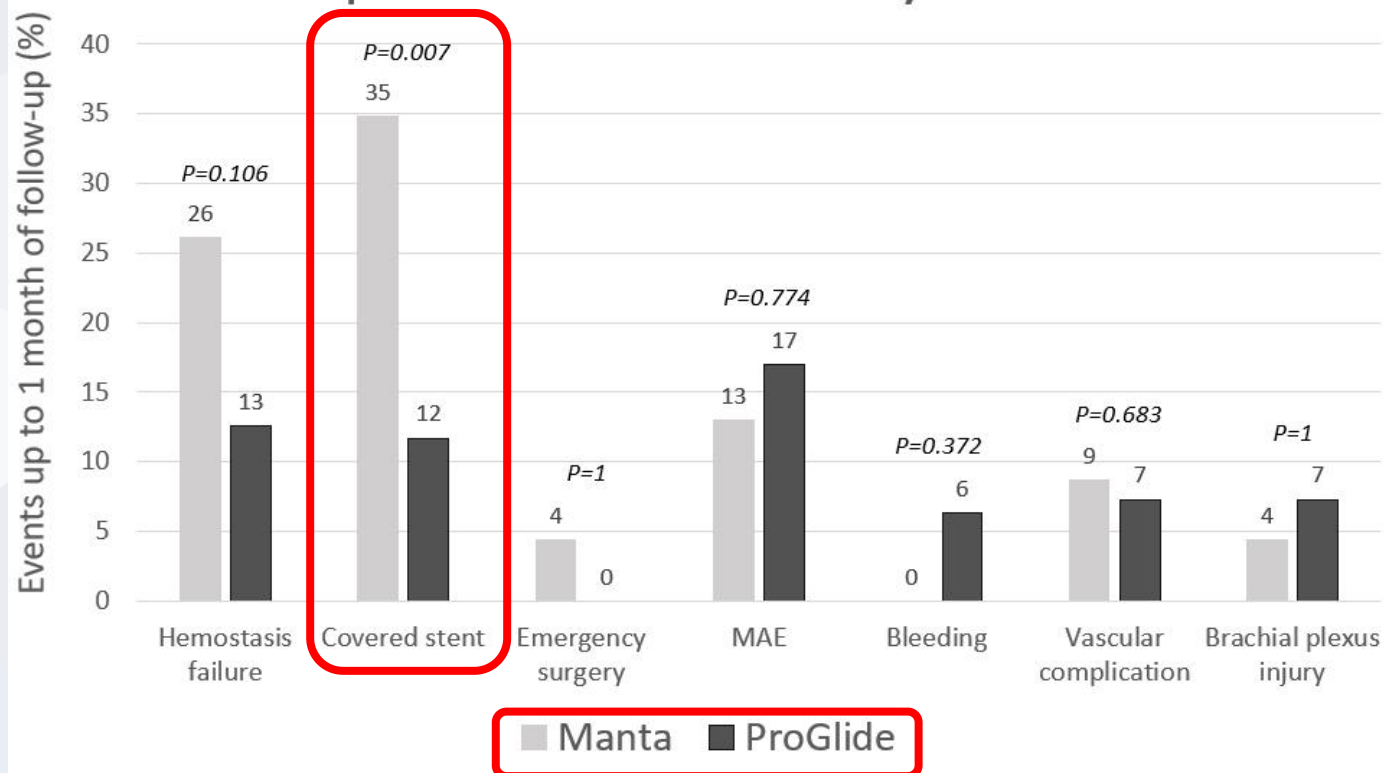
Right vs left percutaneous axillary access





TAVI AXILAR PERCUTANEA

Vascular closure device for percutaneous axillary TAVI

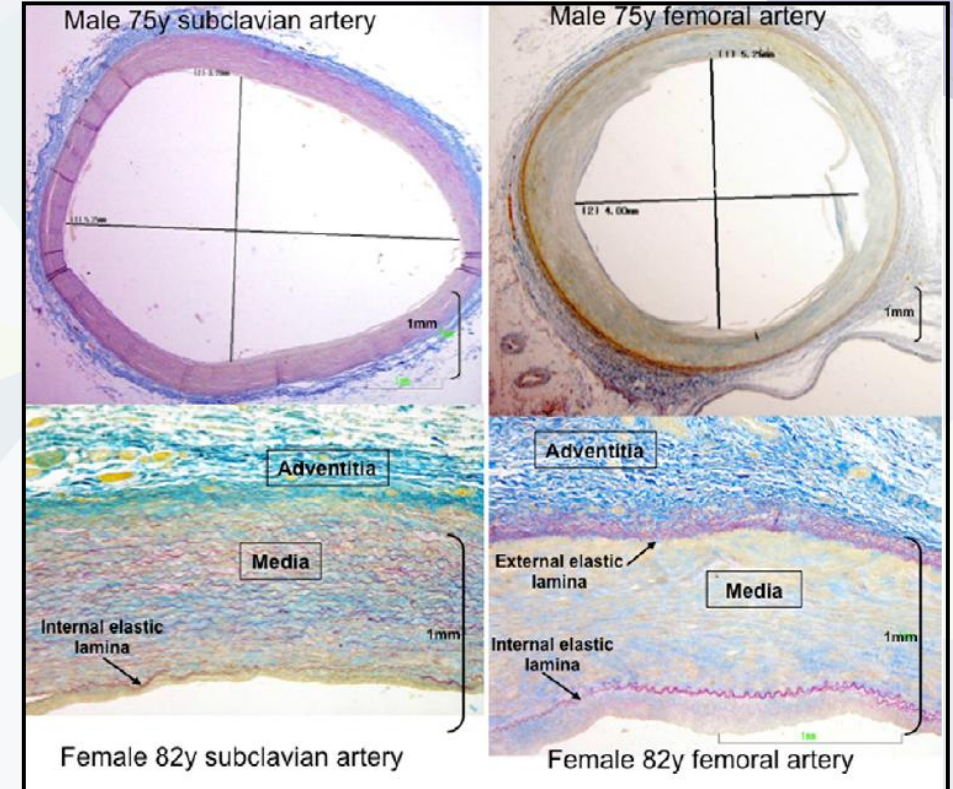


VENTAJAS DEL IMPLANTE PERCUTÁNEO:

- Independencia y autonomía.
- Menor duración del procedimiento.
- Menor agresividad: menor RIS.
- Posibilidad de hacerlo con anestesia local.



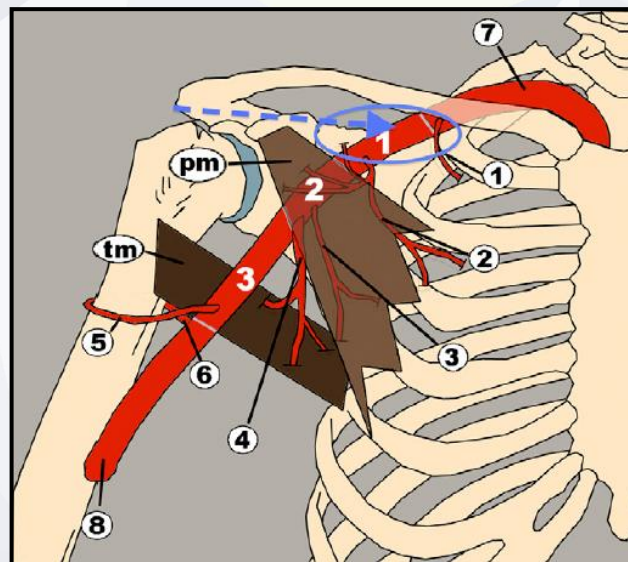
- Menor riesgo de complicaciones.
- Recuperación mas rápida.
- Menor mortalidad.



Direct Percutaneous Access Technique for Transaxillary Transcatheter Aortic Valve Implantation

“The Hamburg Sankt Georg Approach”

Ulrich Schäfer, MD,* Yen Ho, MD,† Christian Frerker, MD,* Dimitry Schewel, MD,*
Damian Sanchez-Quintana, MD,‡ Joachim Schofer, MD,§ Klaudija Bijuklic, MD,§
Felix Meincke, MD,* Thomas Thielsen, MD,* Felix Kreidel, MD,* Karl-Heinz Kuck, MD*



ASPECTOS TÉCNICOS

Estudio del acceso subclavia mediante TAC:





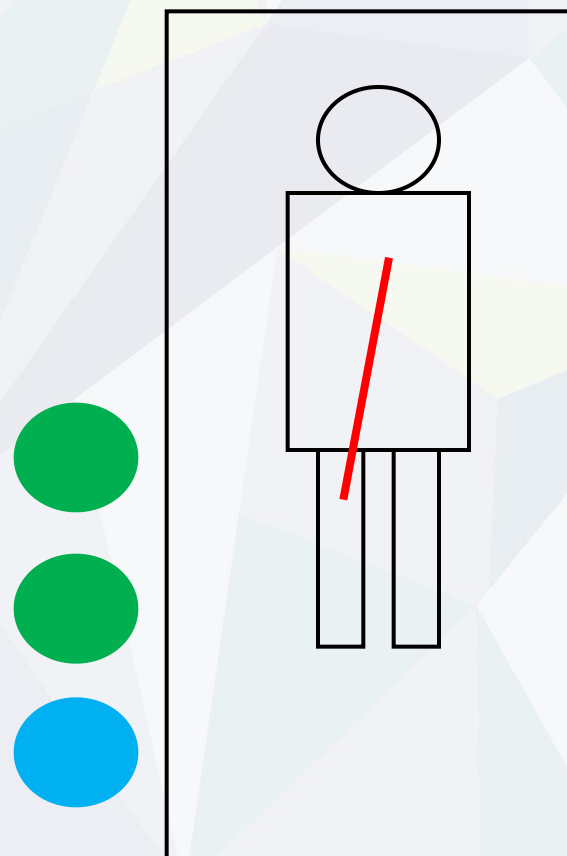


Arteria suclavia:

- Proximal: 7.3 x 7.8mm
- Zona de punción **6.5 x 6.7 mm**

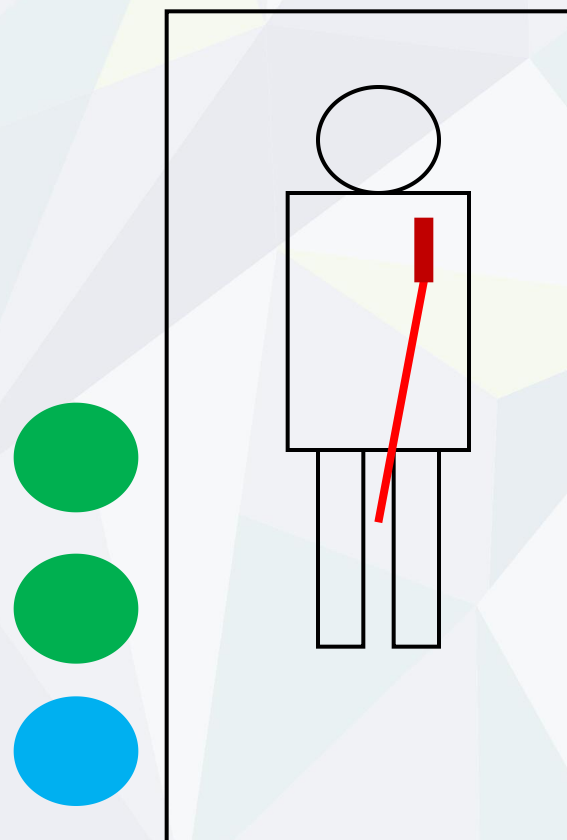


Ubicación del operador en la sala de hemodinámica:



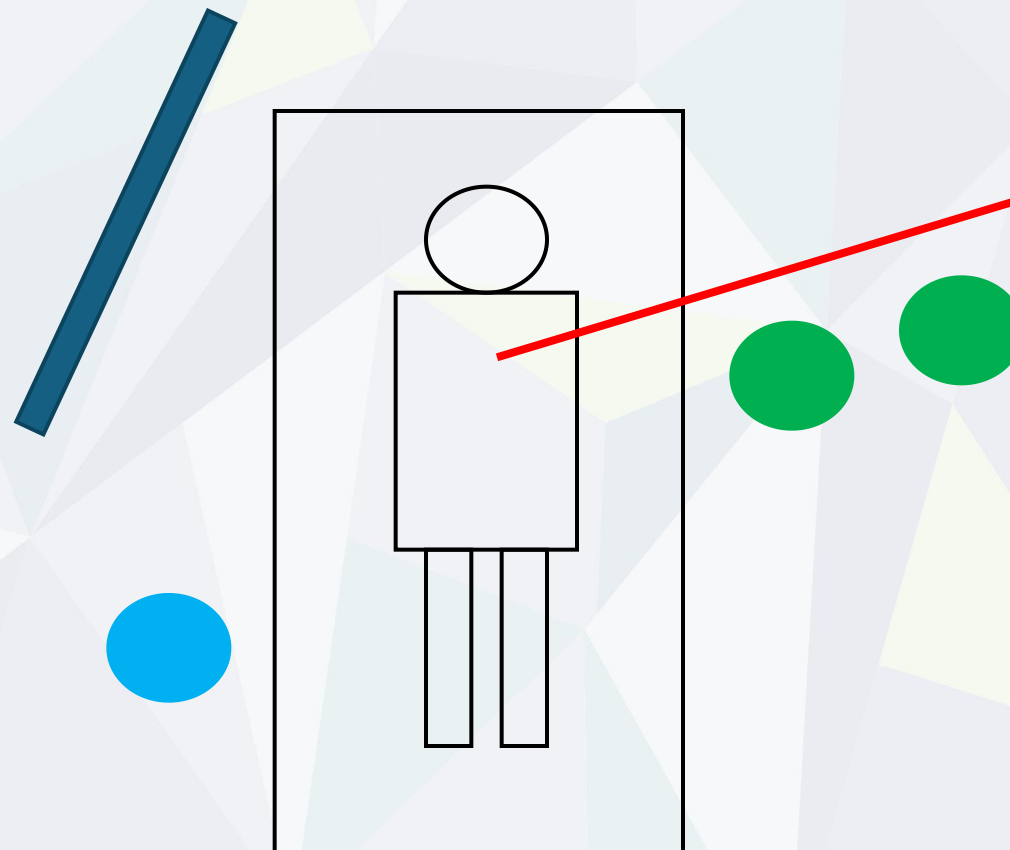
FEMORAL

Ubicación del operador en la sala de hemodinámica:



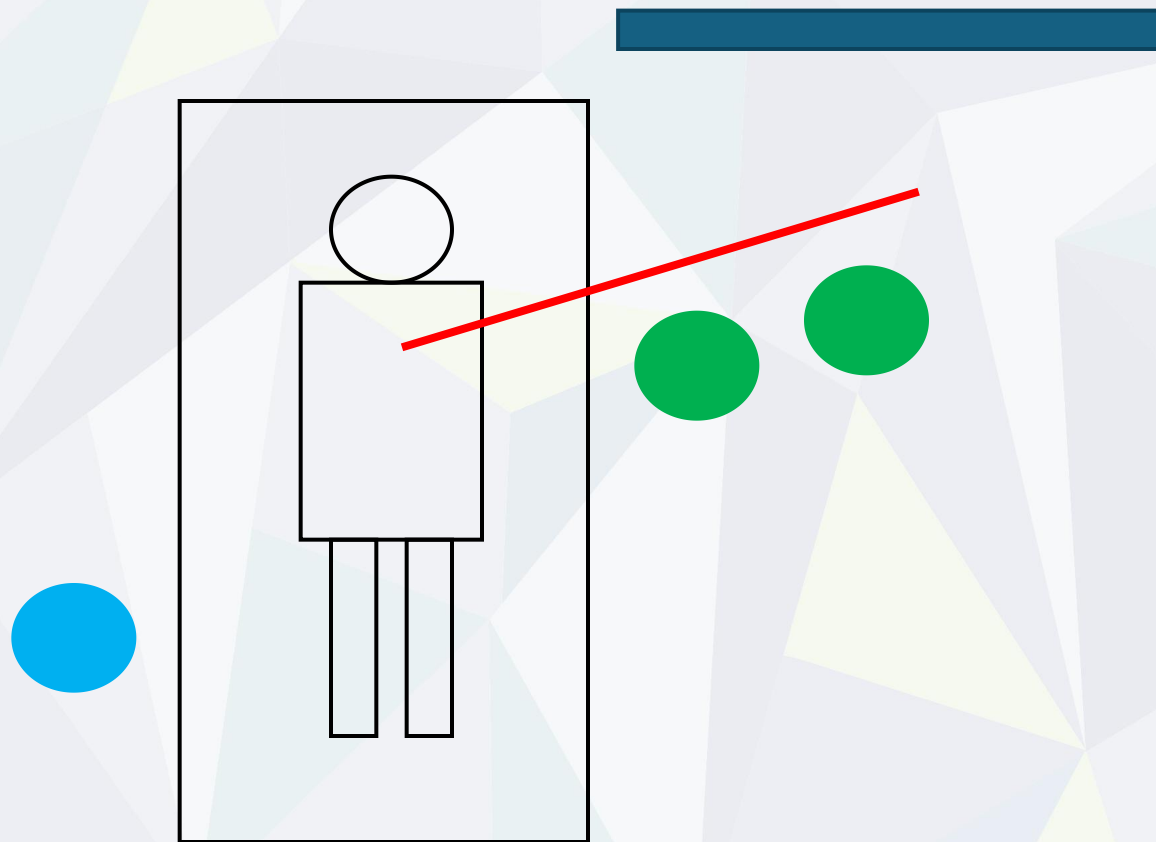
AXILAR QUIRÚRGICA

Ubicación del operador en la sala de hemodinámica:



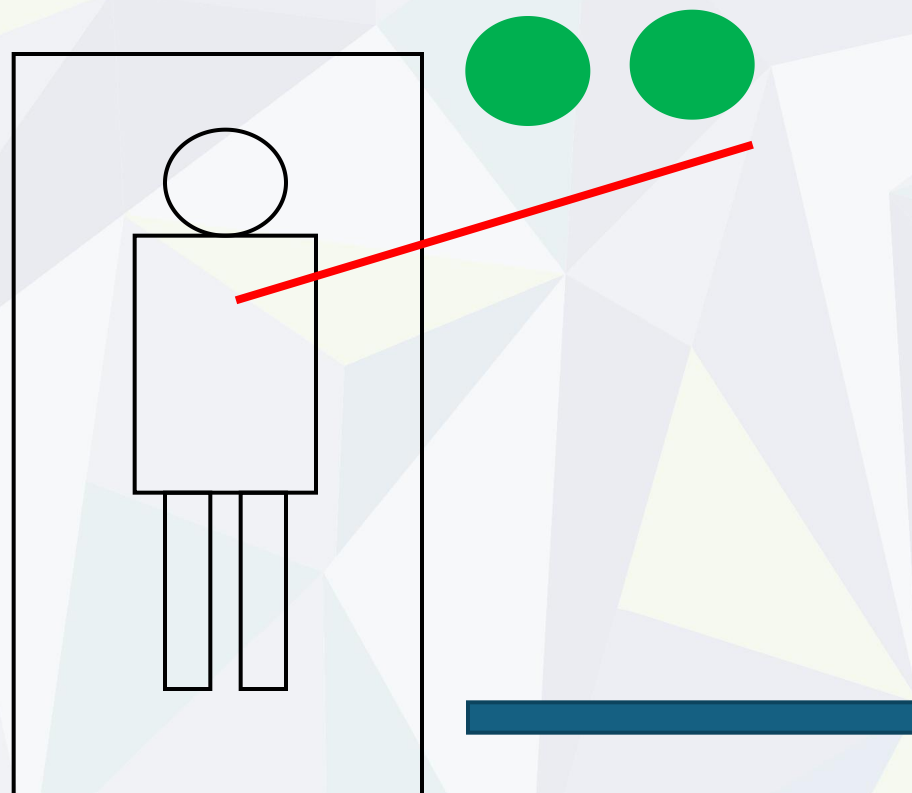
AXILAR PERCUTÁNEA

Ubicación del operador en la sala de hemodinámica:



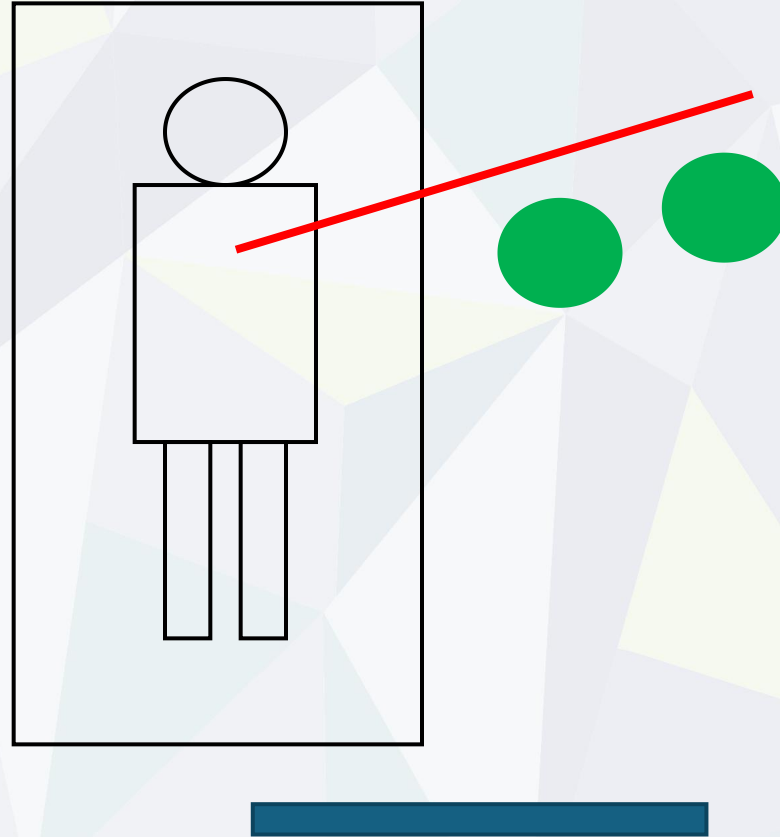
AXILAR PERCUTÁNEA

Ubicación del operador en la sala de hemodinámica:



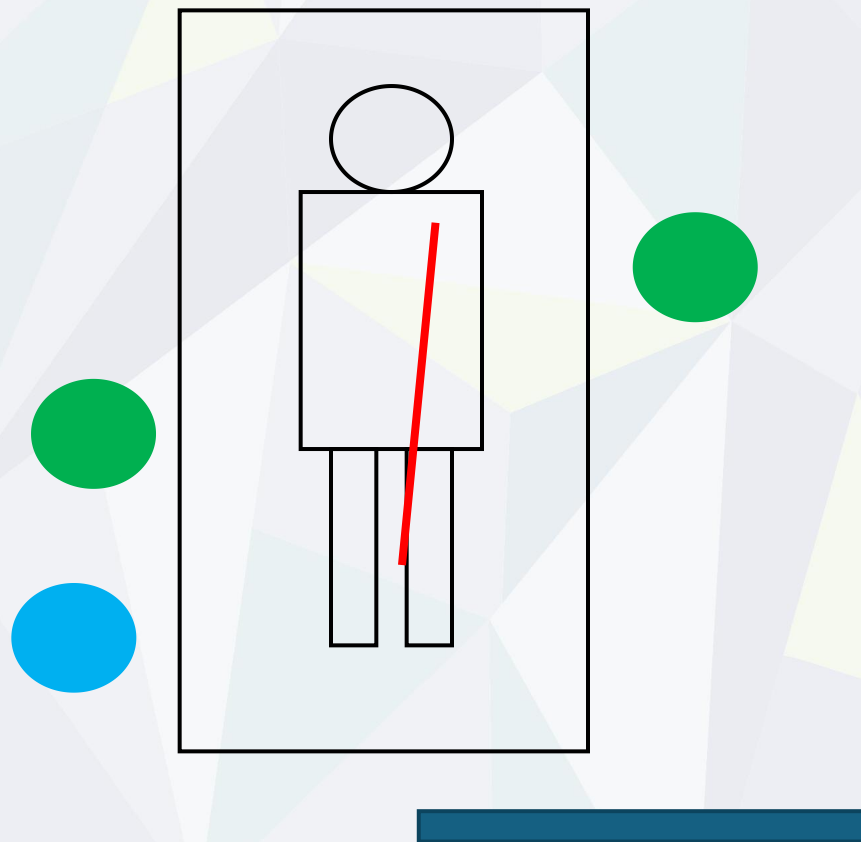
AXILAR PERCUTÁNEA

Ubicación del operador en la sala de hemodinámica:



AXILAR PERCUTÁNEA

Ubicación del operador en la sala de hemodinámica:

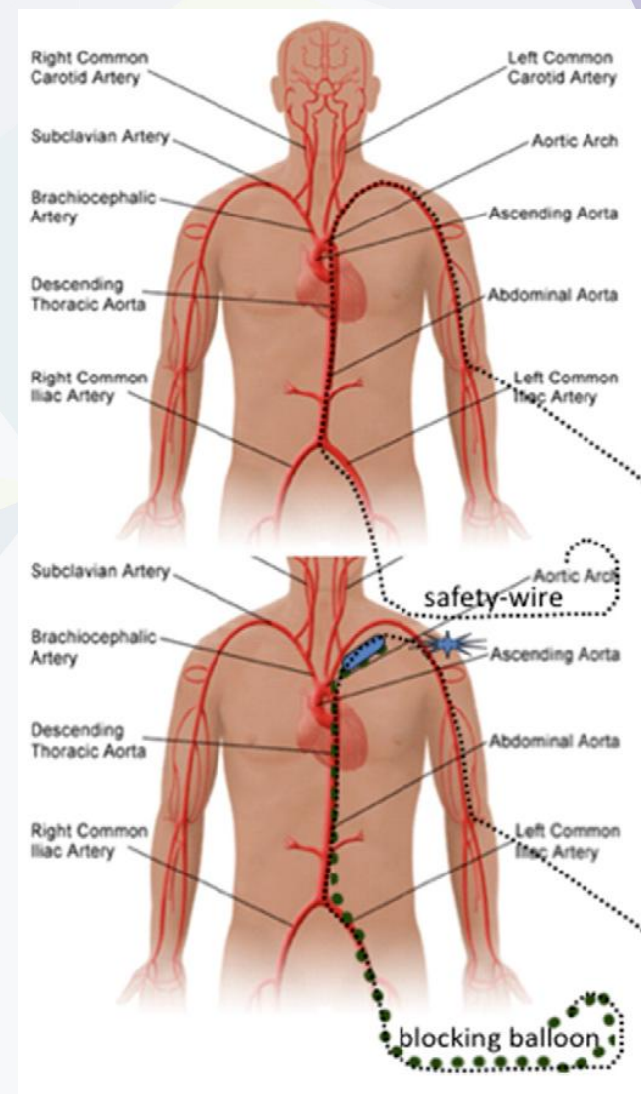


AXILAR PERCUTÁNEA

Dificultad para comprimir la arteria subclavia.

Establecimiento de un circuito de seguridad:

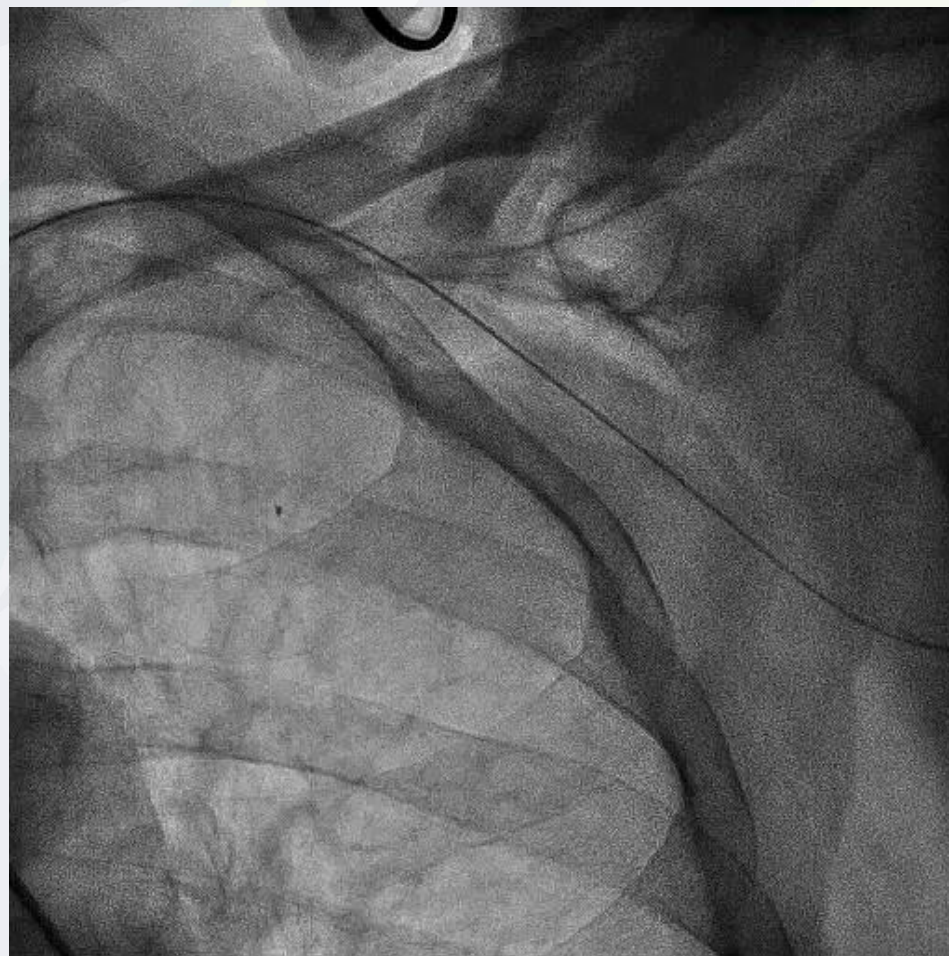
- Arteria femoral
- Arteria radial/humeral ipsilateral a la subclavia de implante.
- Guía Terumo Superstiff 400 cm.
- Balón de vascular periférico en subclavia proximal: Diámetro 1:1 respecto a la subclavia y 20 mm de longitud.
- Una vez colocado el introductor para la válvula, se puede introducir el pigtail por el mismo introductor femoral manteniendo la guía Superstiff (usar introductor 1-2 French mayor que el Pigtail)





Técnica de punción de la arteria axilar:



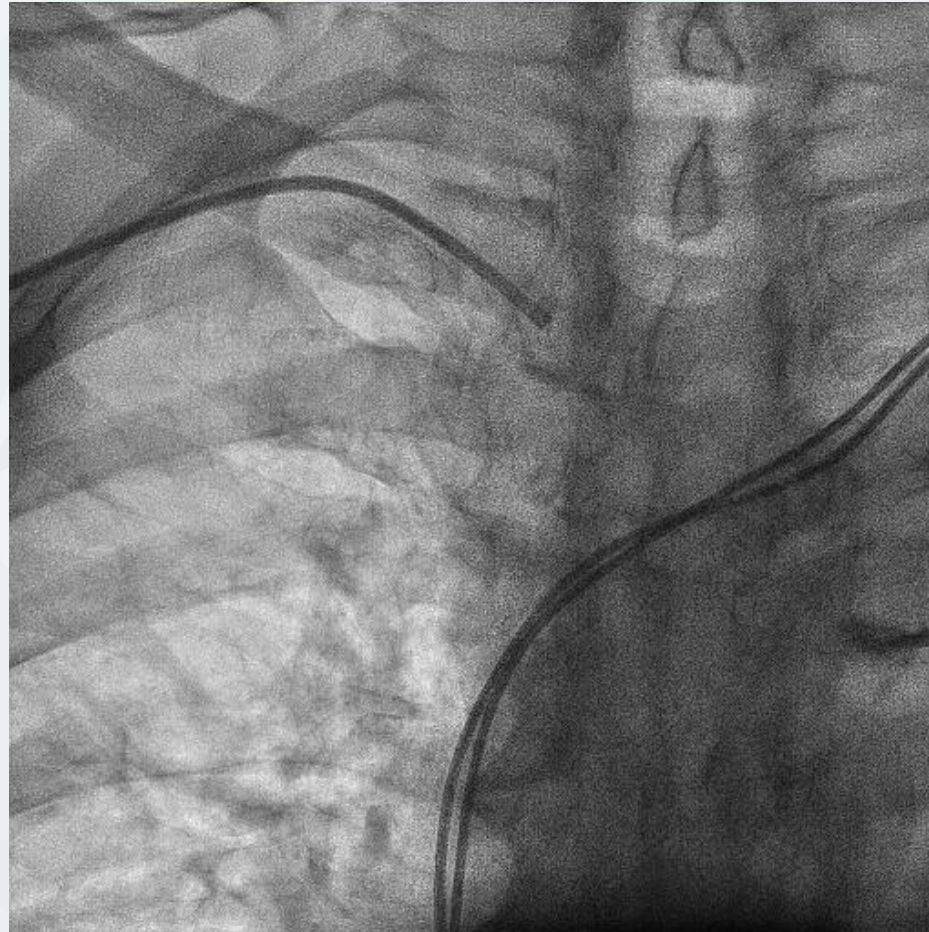


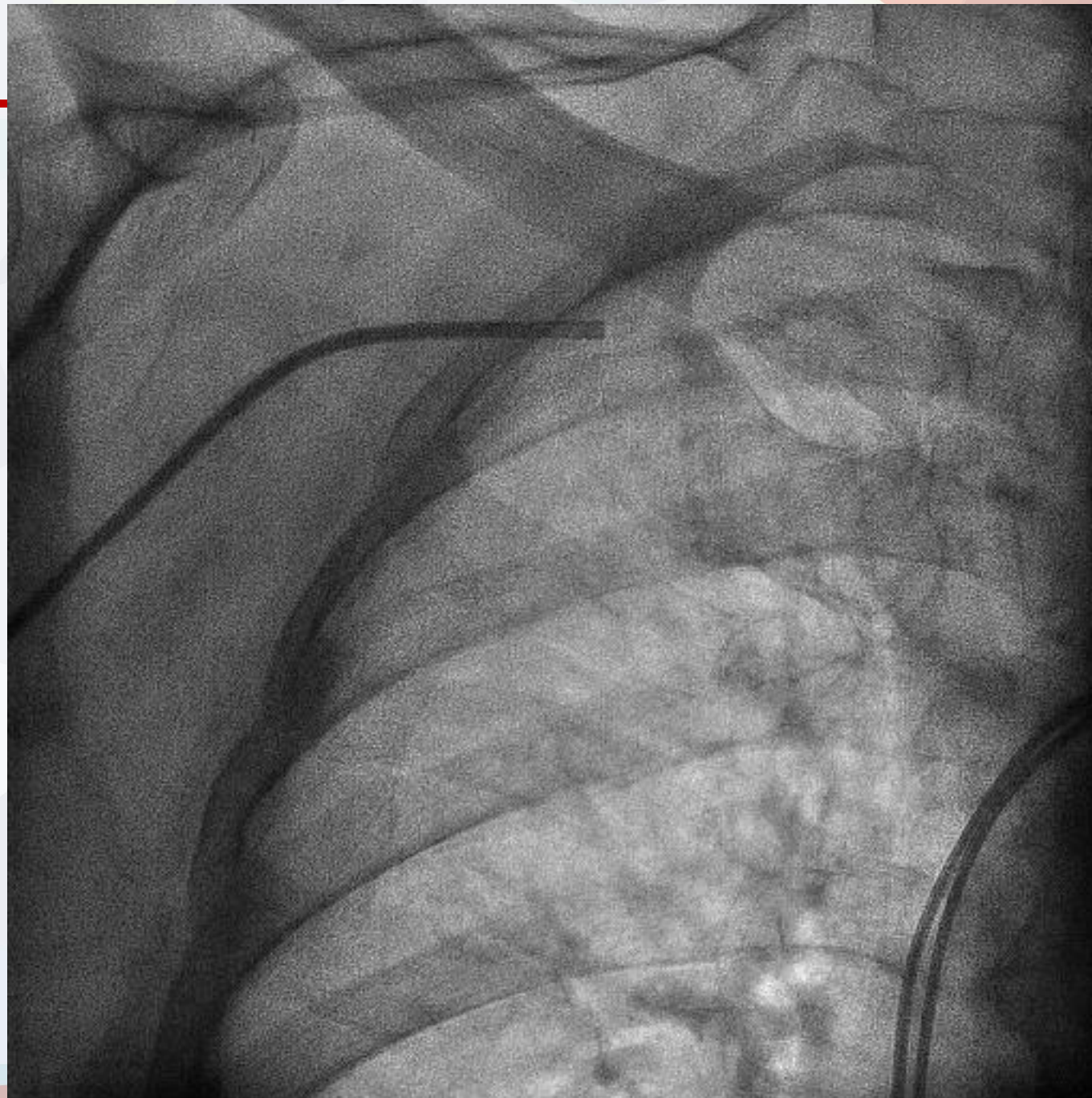
Técnica de punción de la arteria axilar:

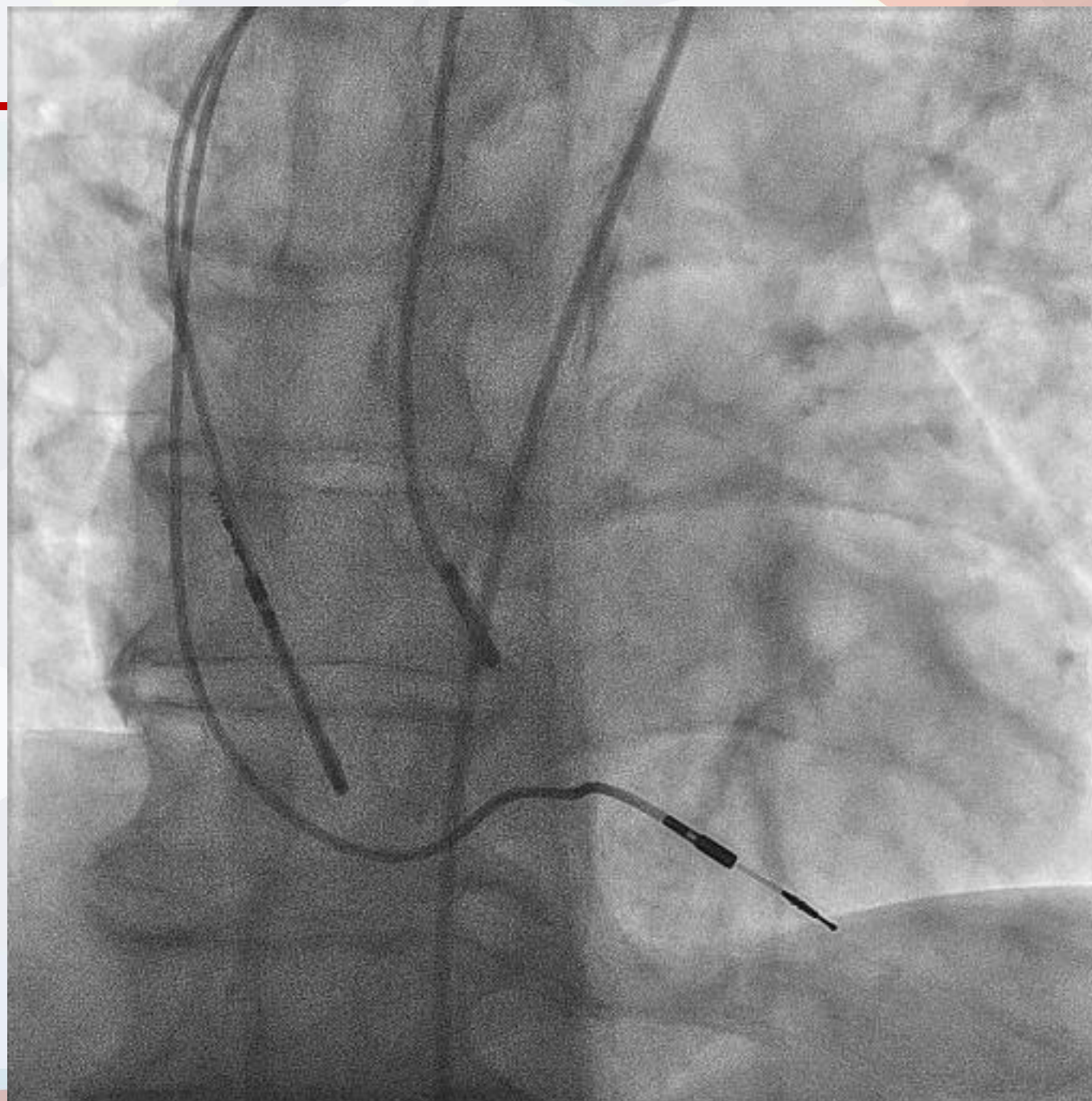


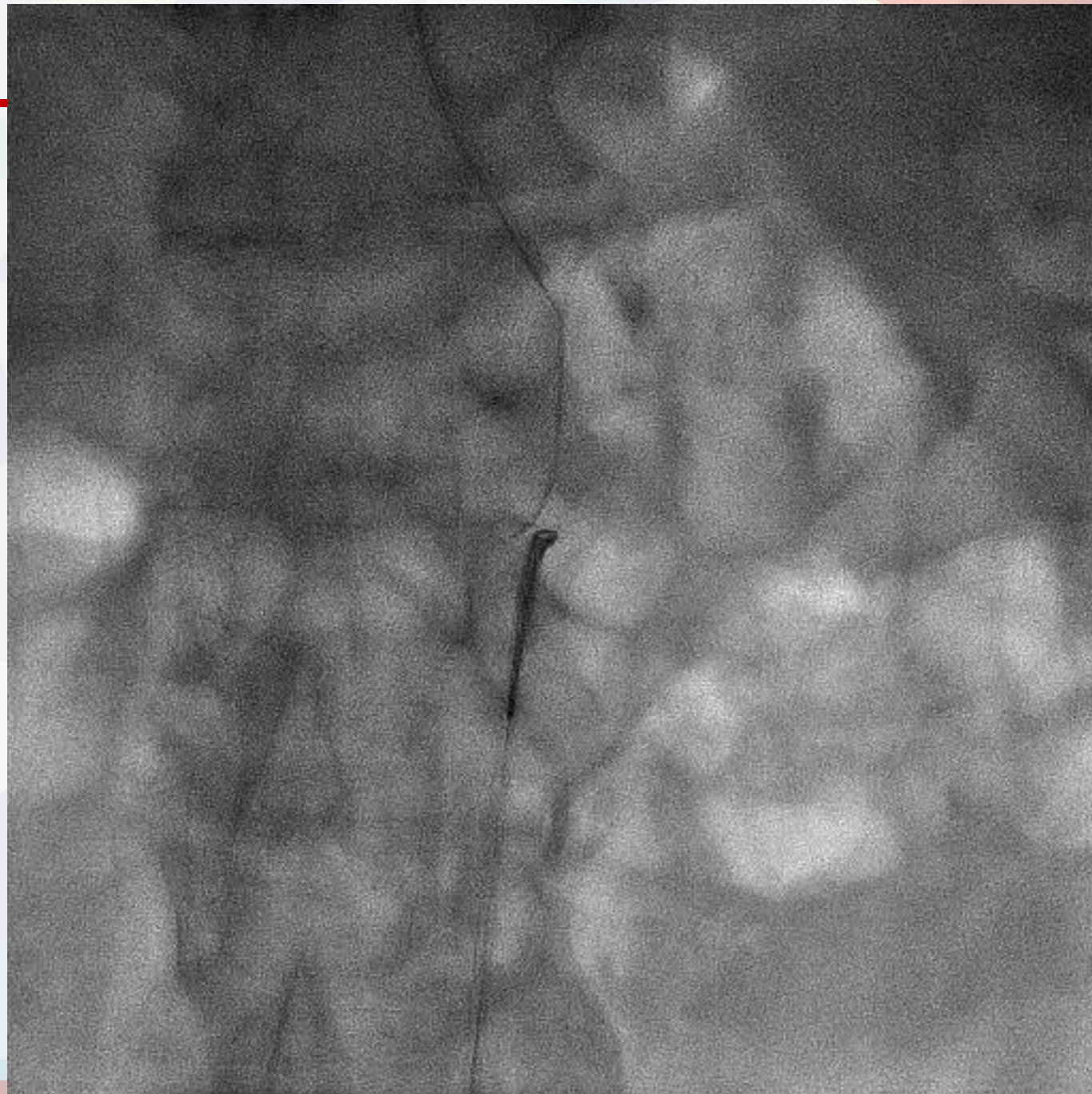
Otros aspectos técnicos:

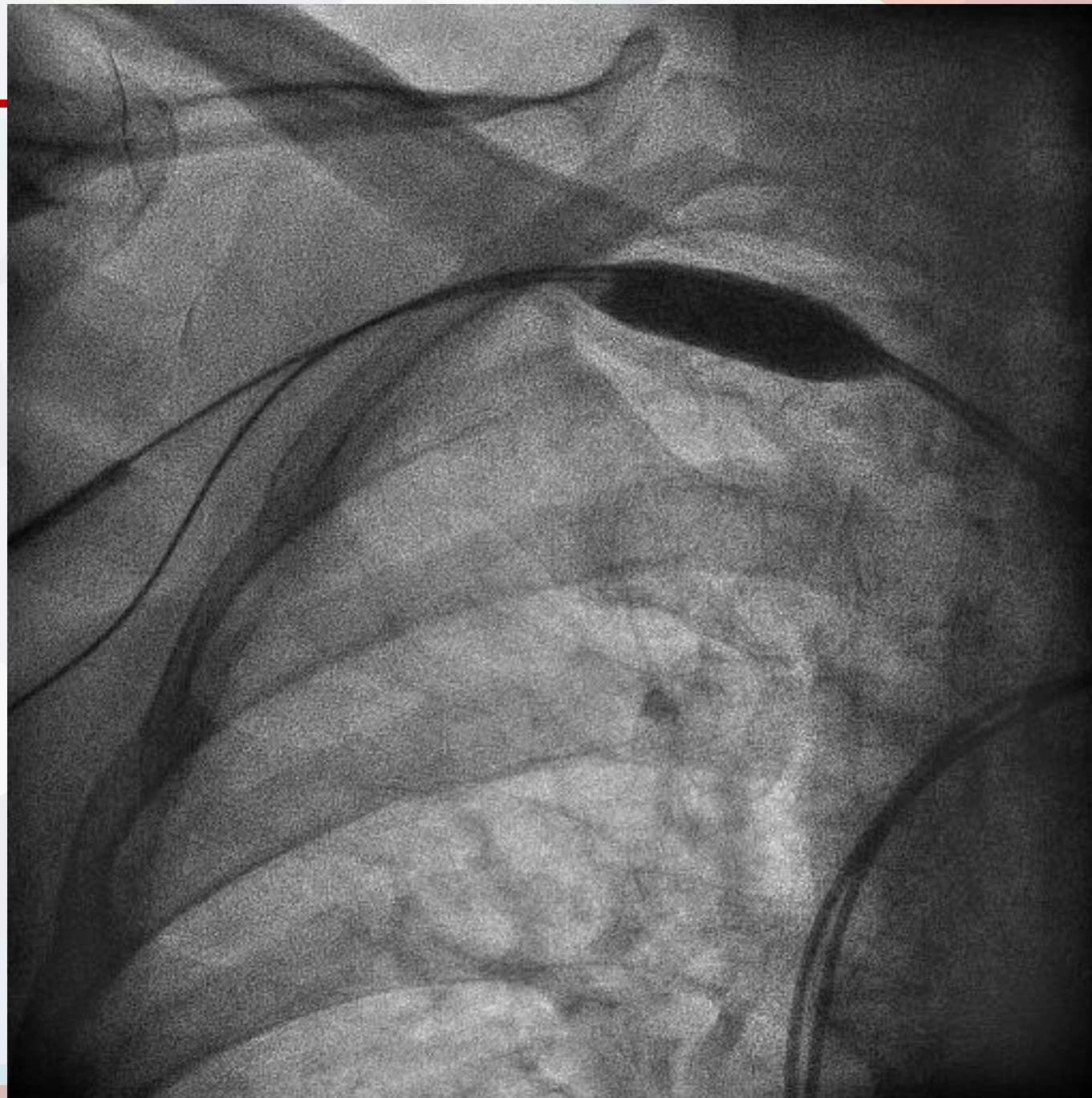
- Mejor acceso desde subclavia izquierda.

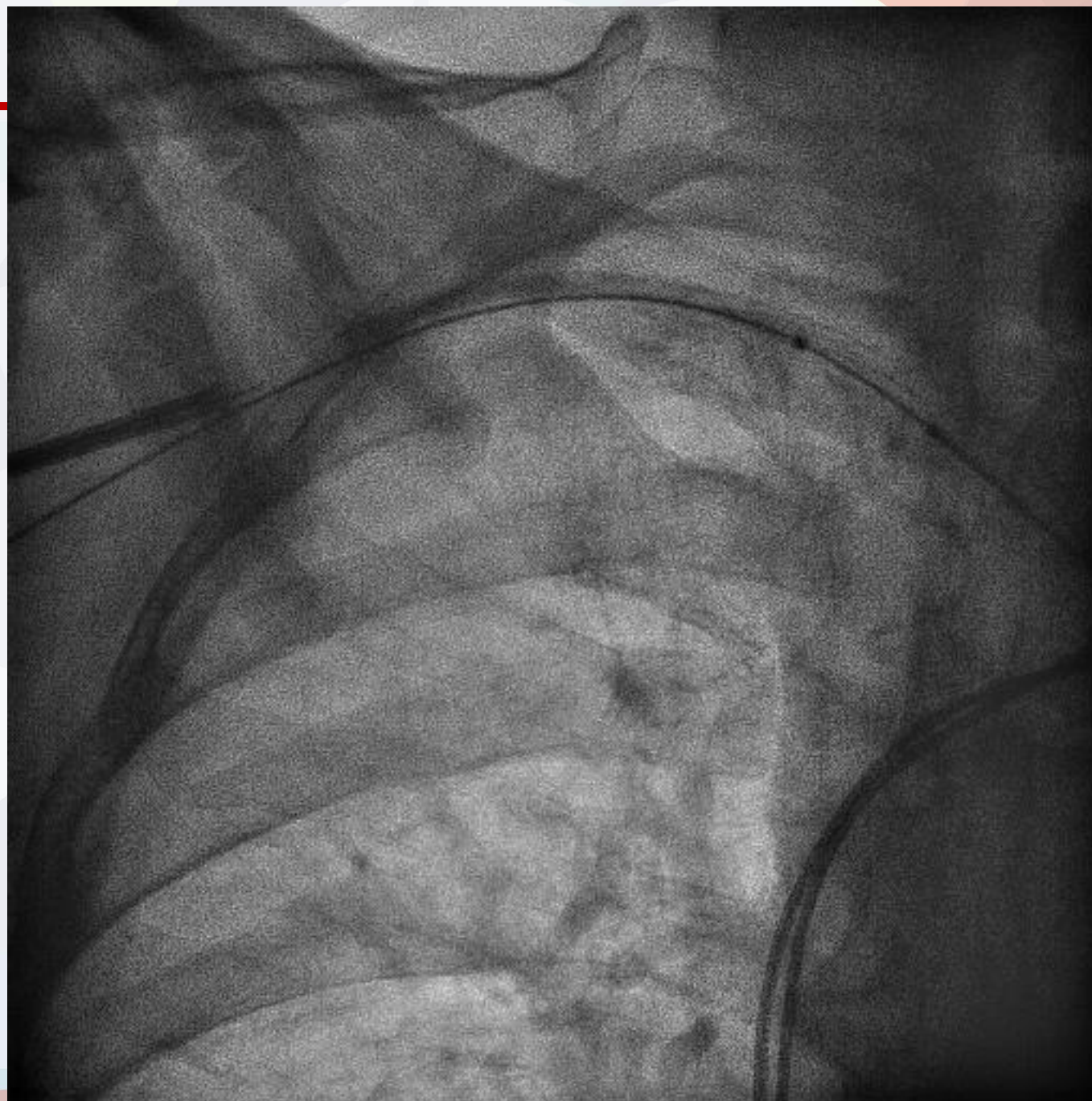




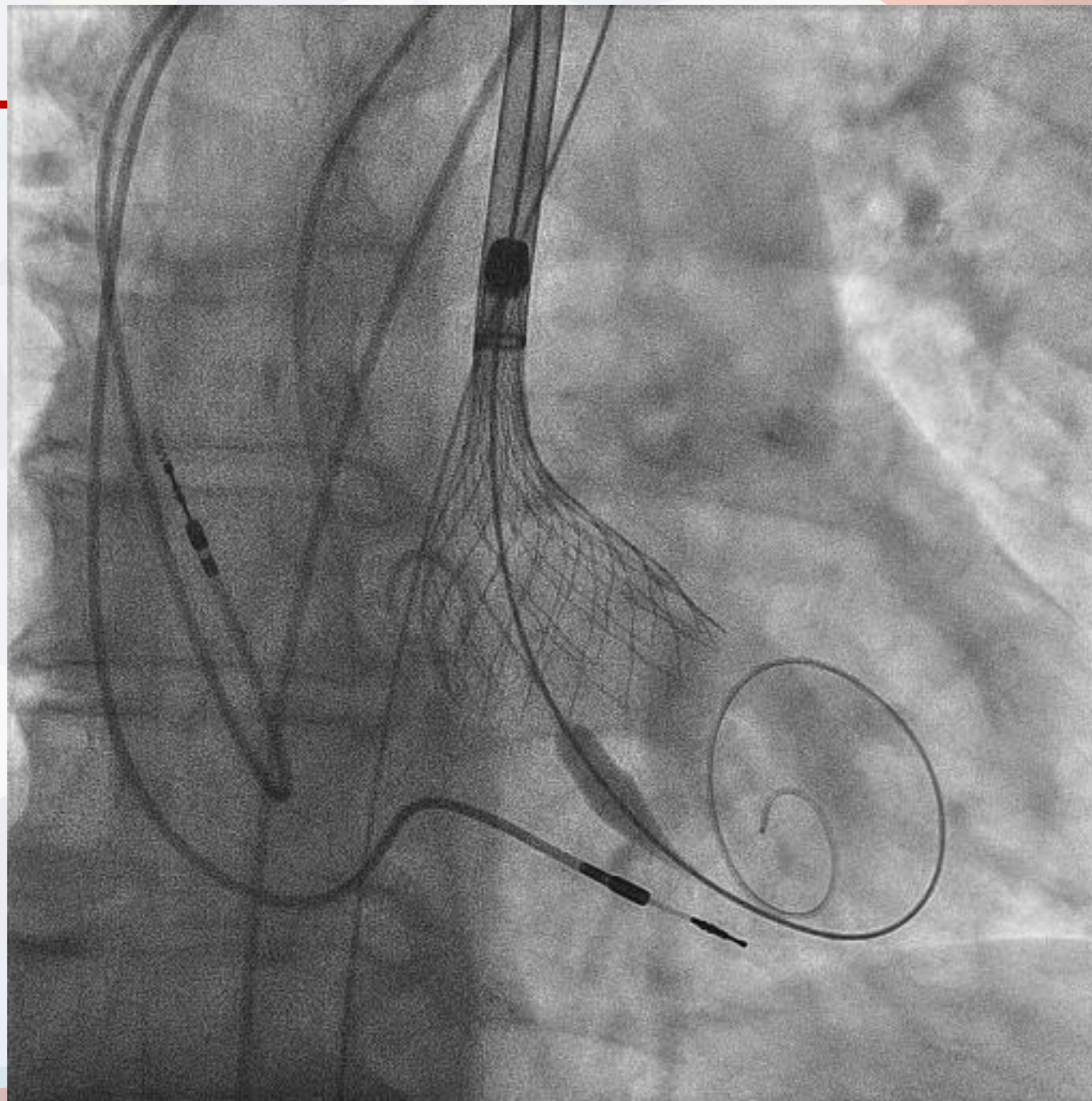


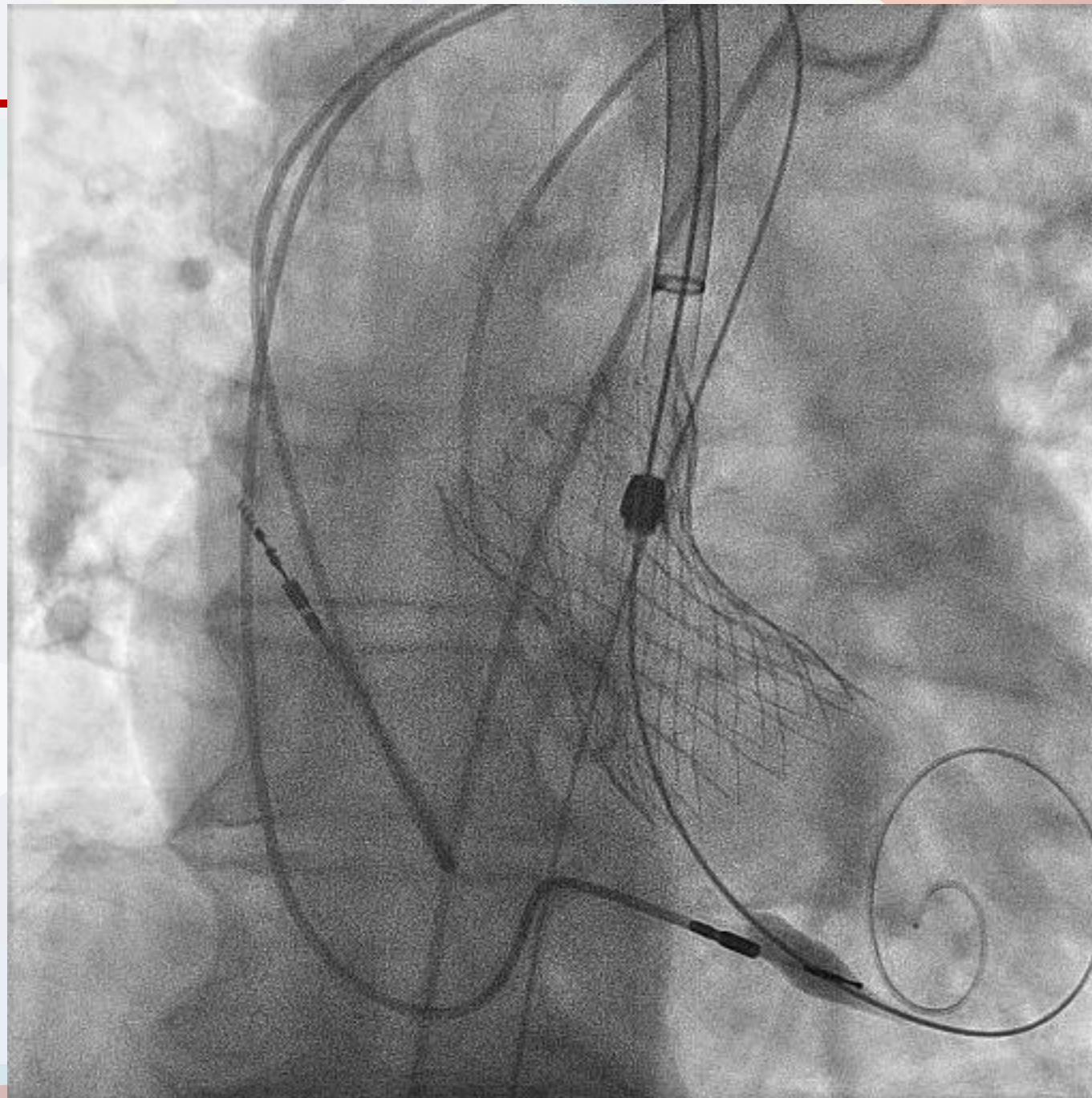


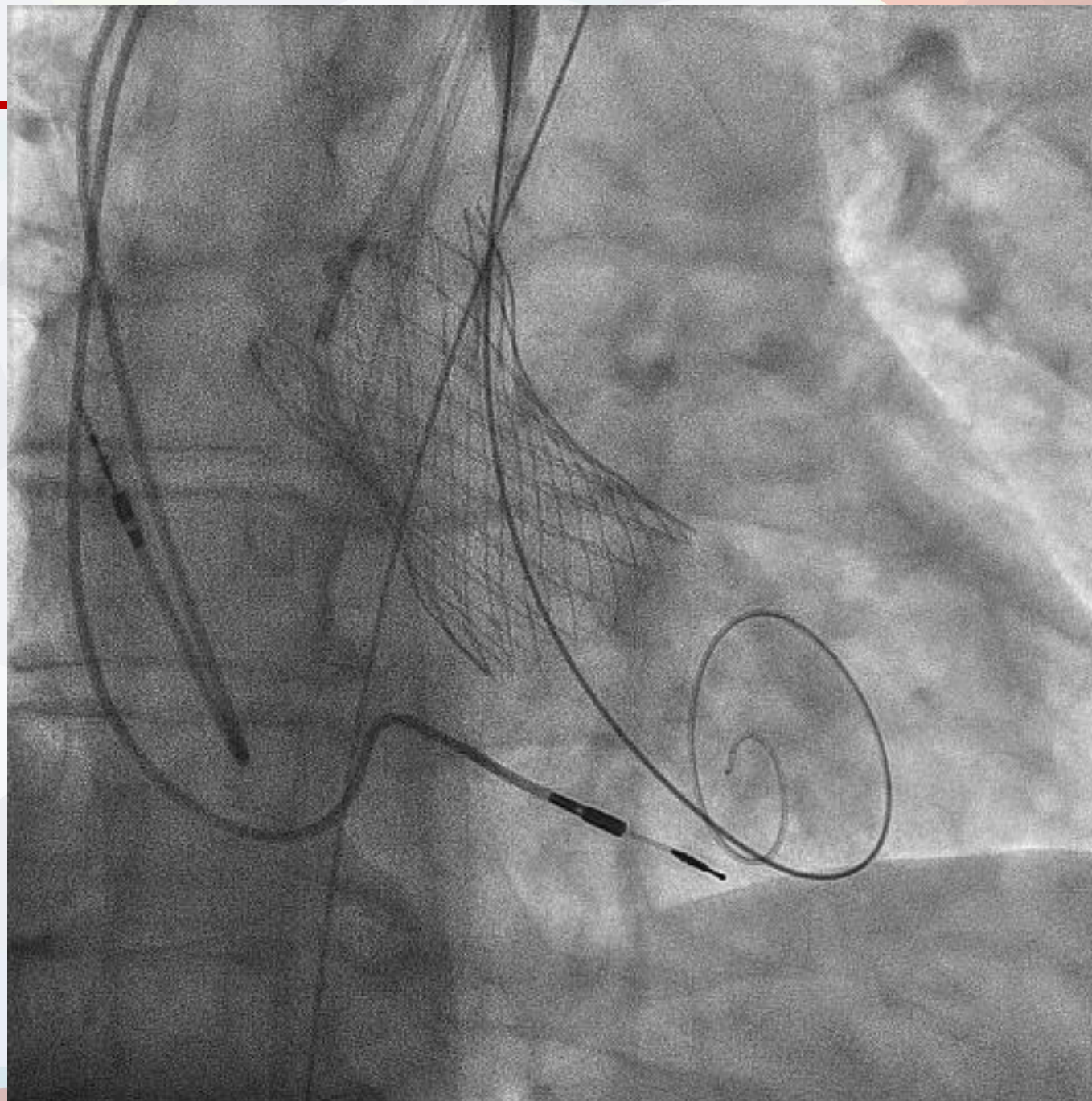


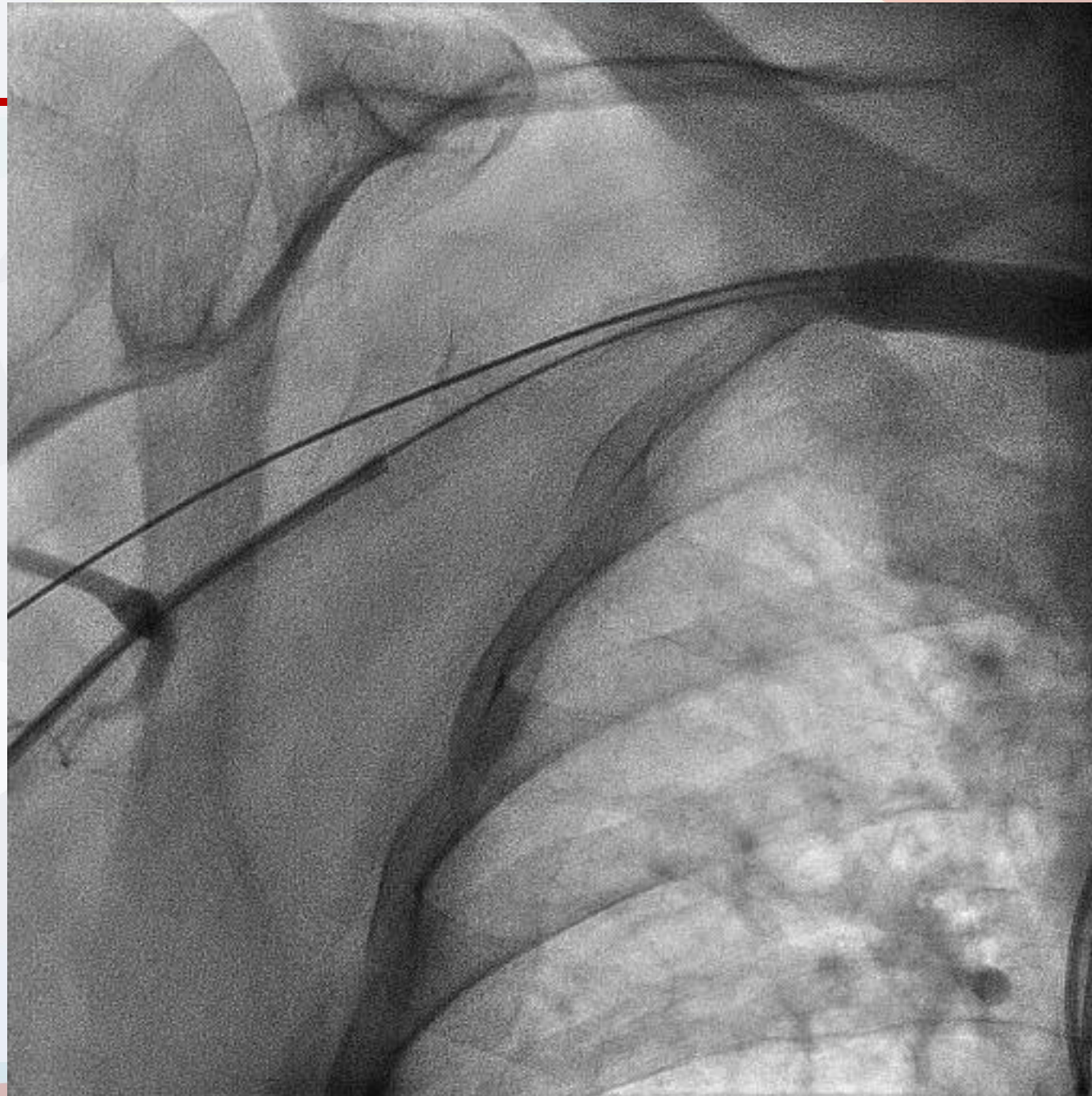


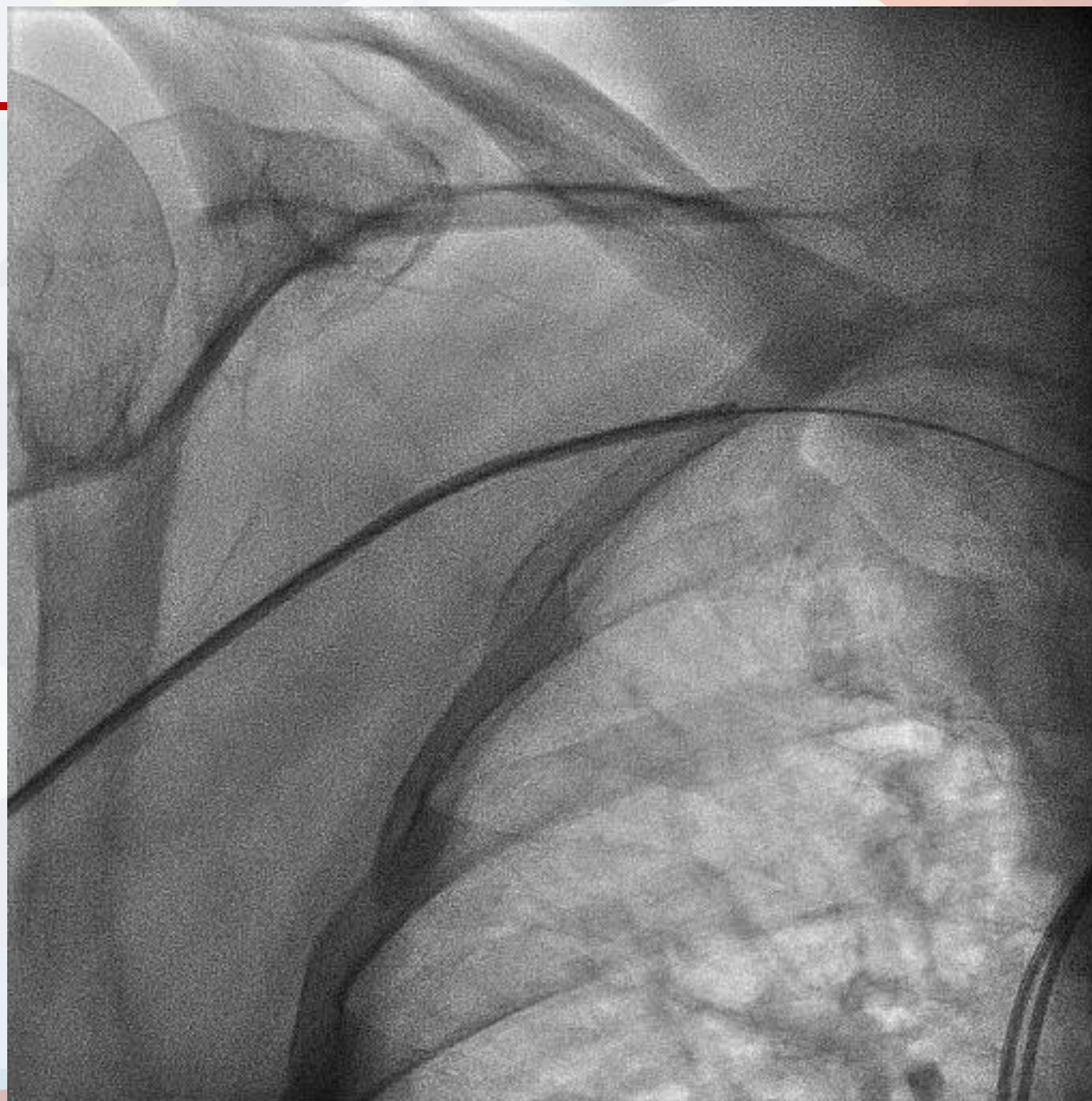








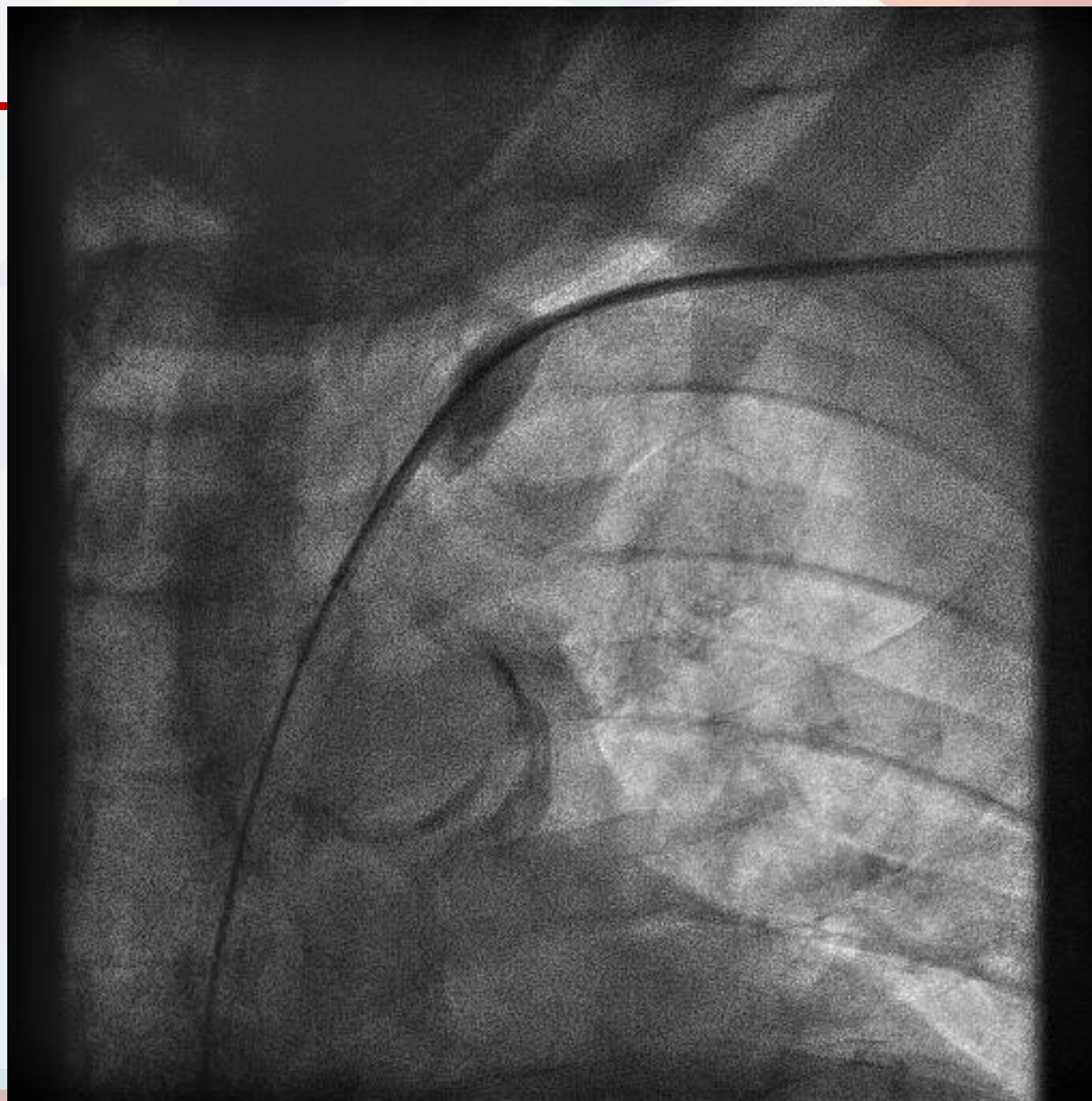


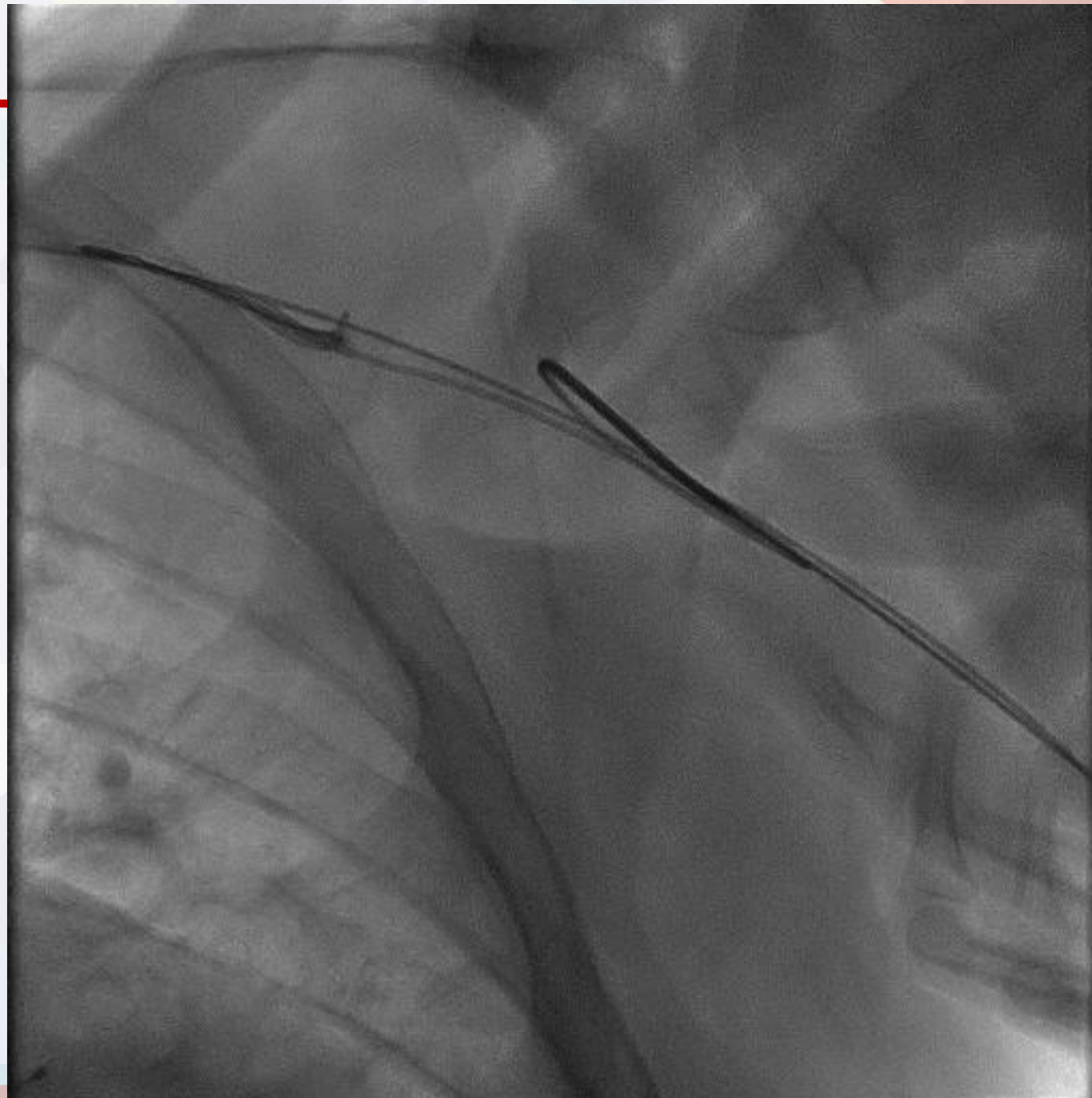


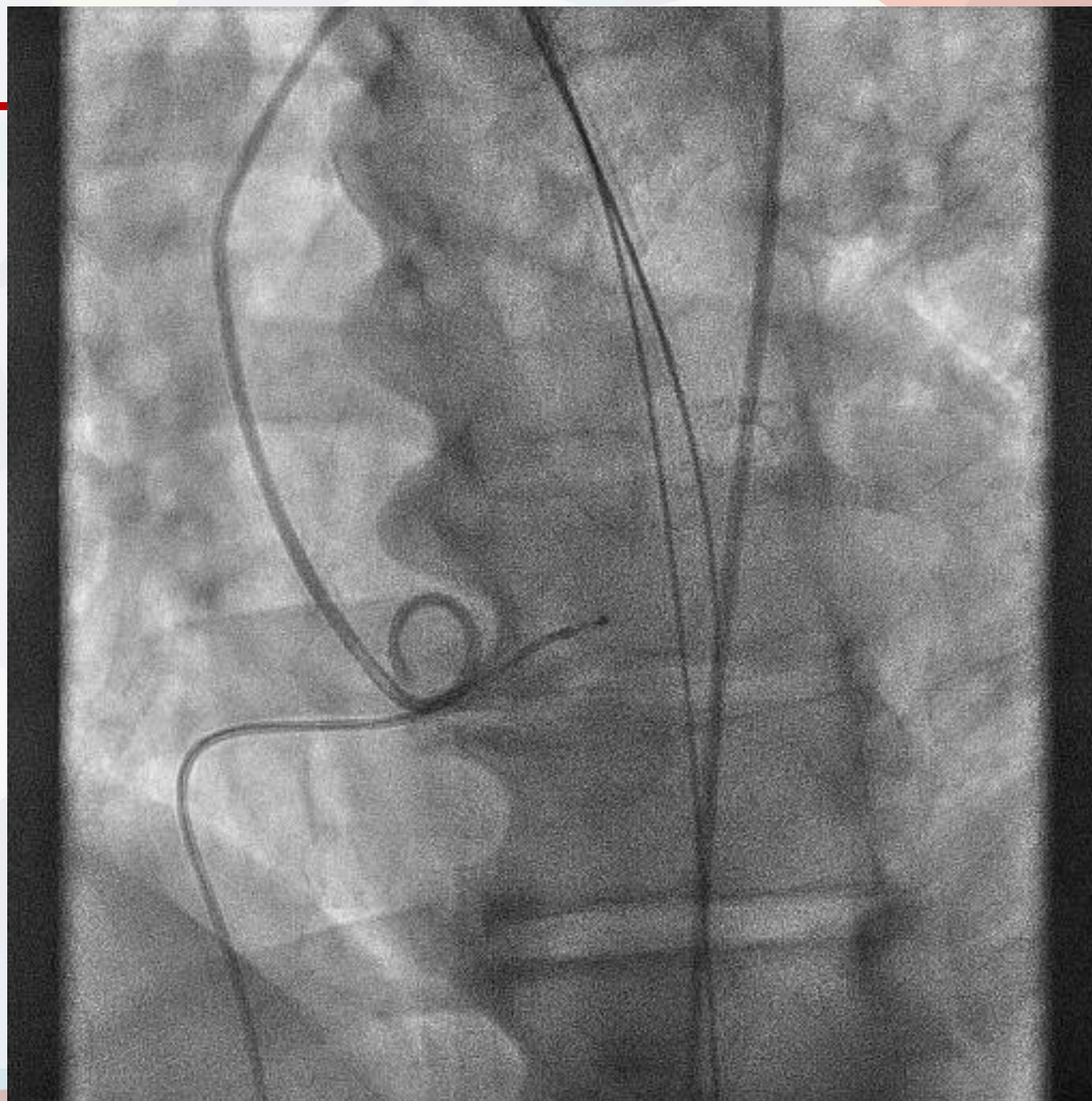


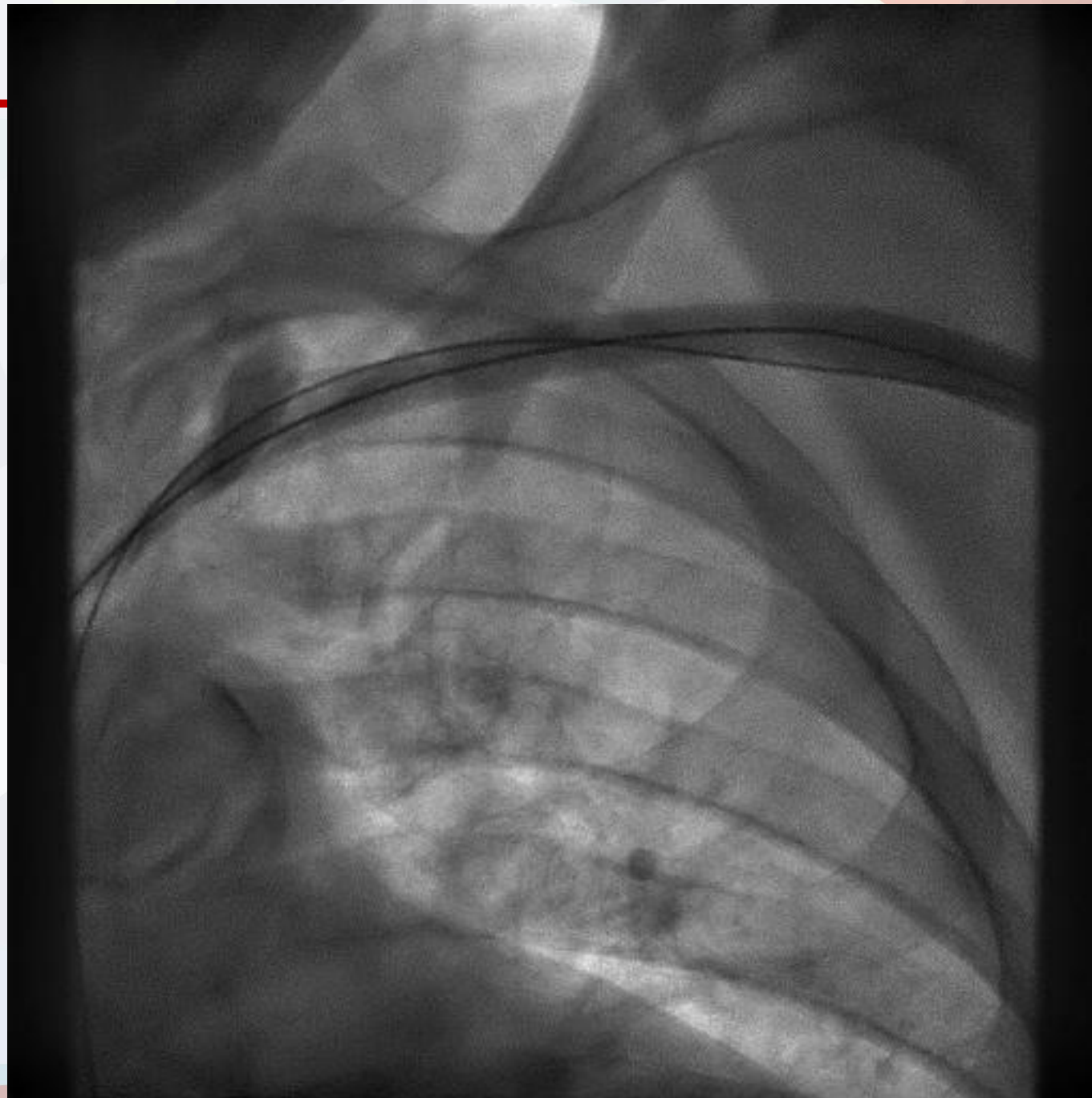
Otros aspectos técnicos:

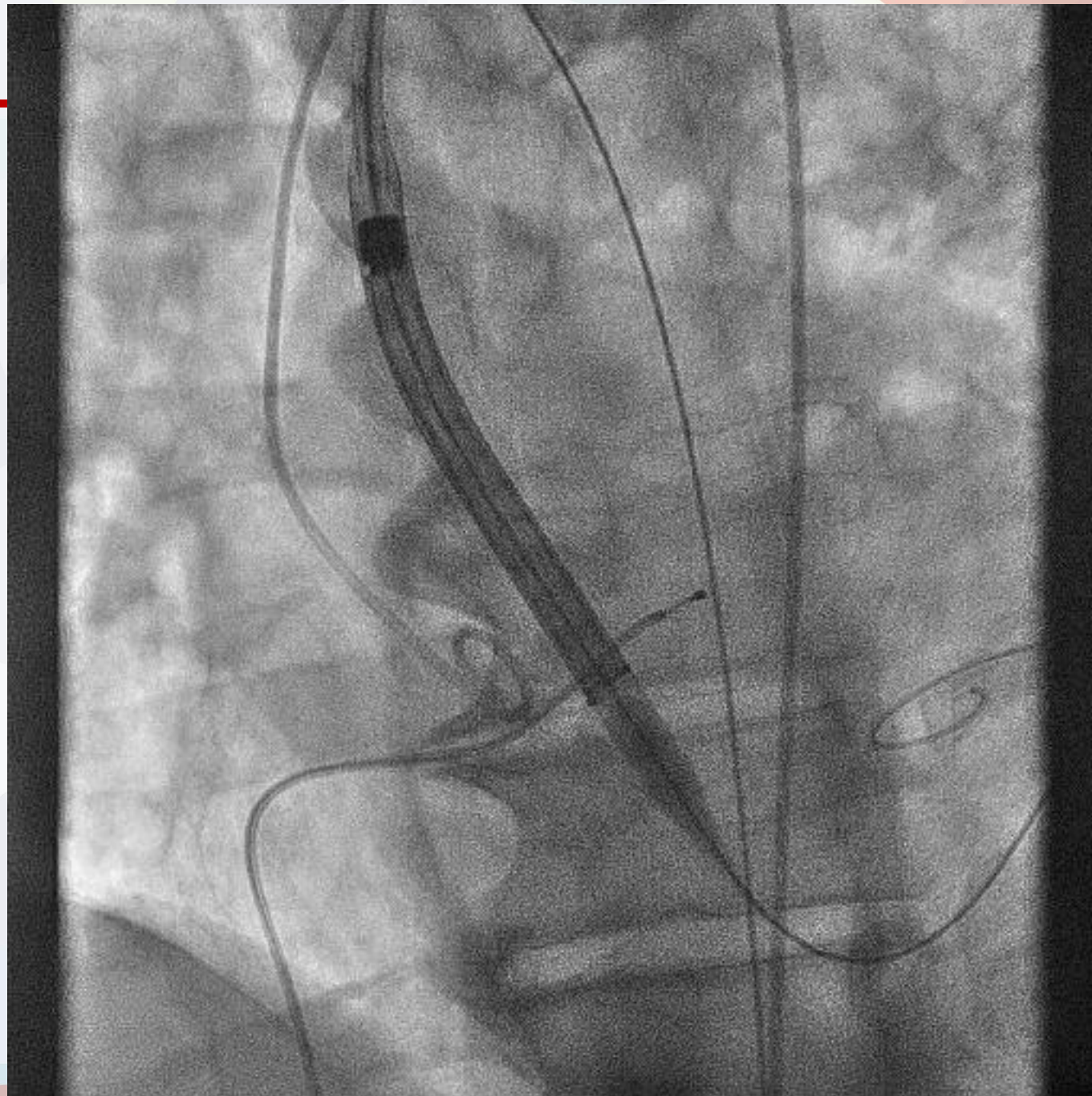
- Mejor acceso desde subclavia izquierda.
- Anticoagular desde que se empiezan a hacer inflados oclusivos de la arteria subclavia.
- Intentar acceso directo
- En caso de intentar acceso directo con valvula poner un introductor 9-11 F tras los Proglides.
- Dilatar progresivamente hasta el diámetro de la valvula.
- Realizar cierre axilar “en seco”.
- Umbral bajo para tratar las posibles complicaciones vasculares.
- No poner el manguito de presión en ese brazo después.

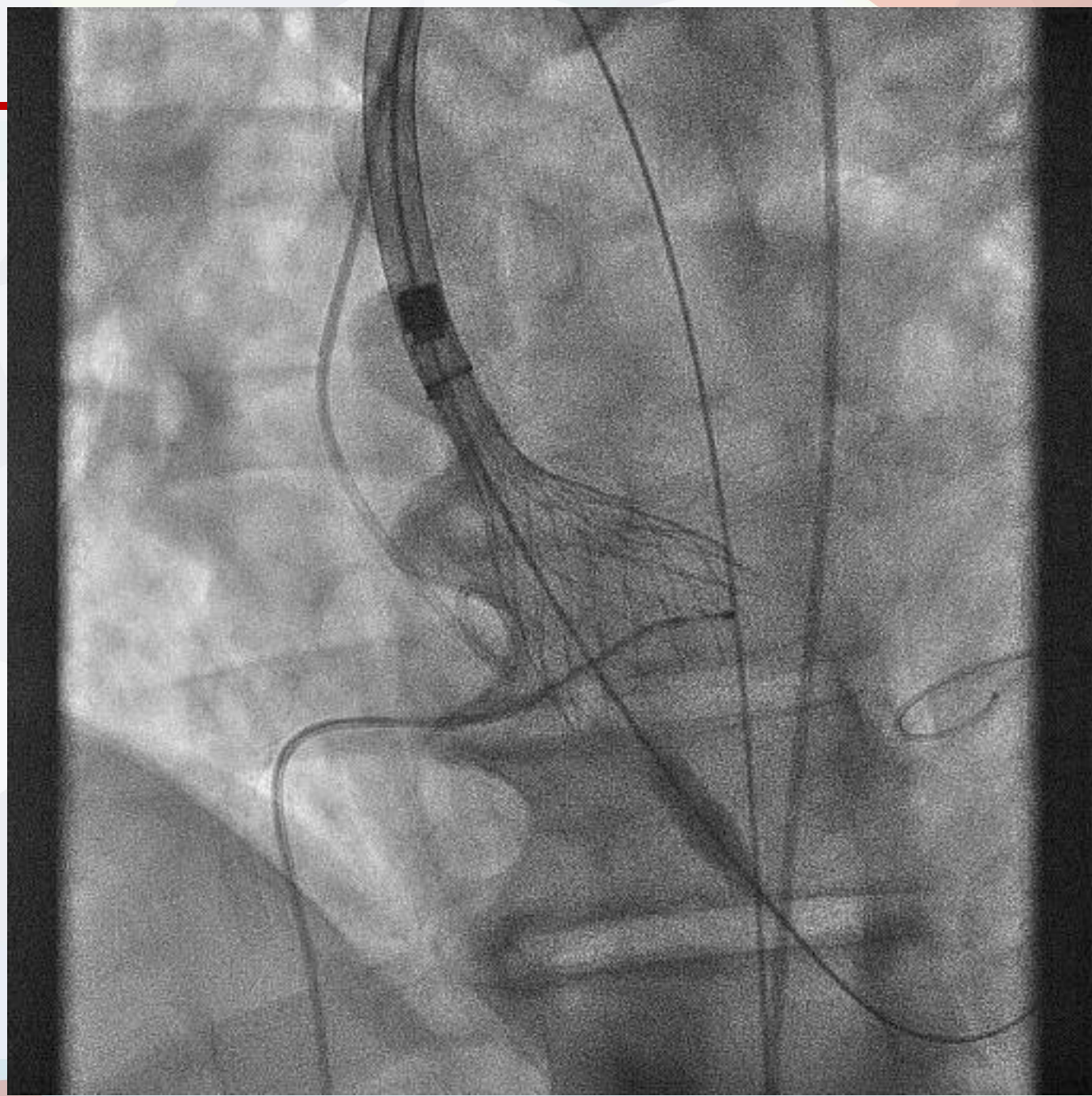


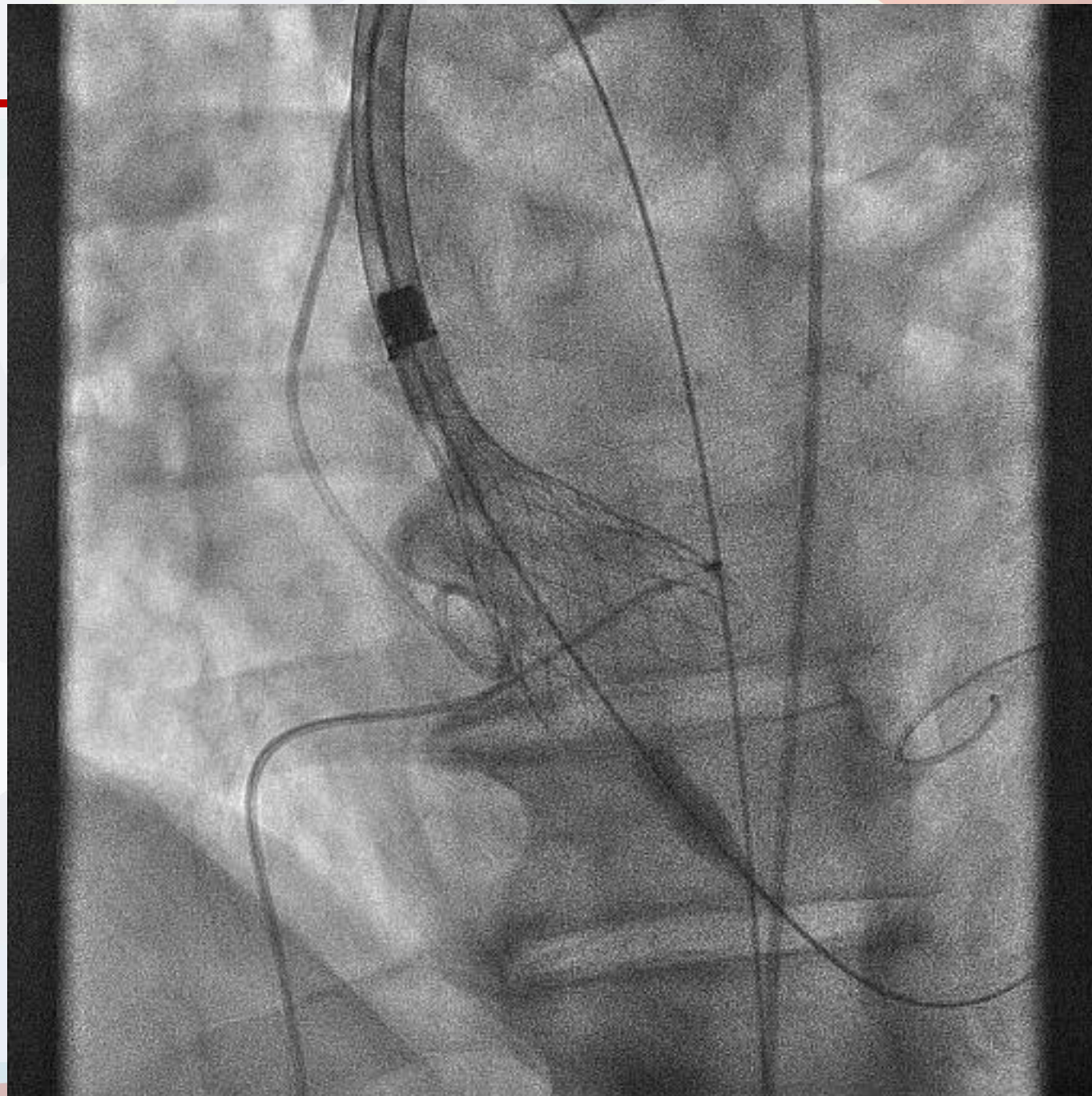


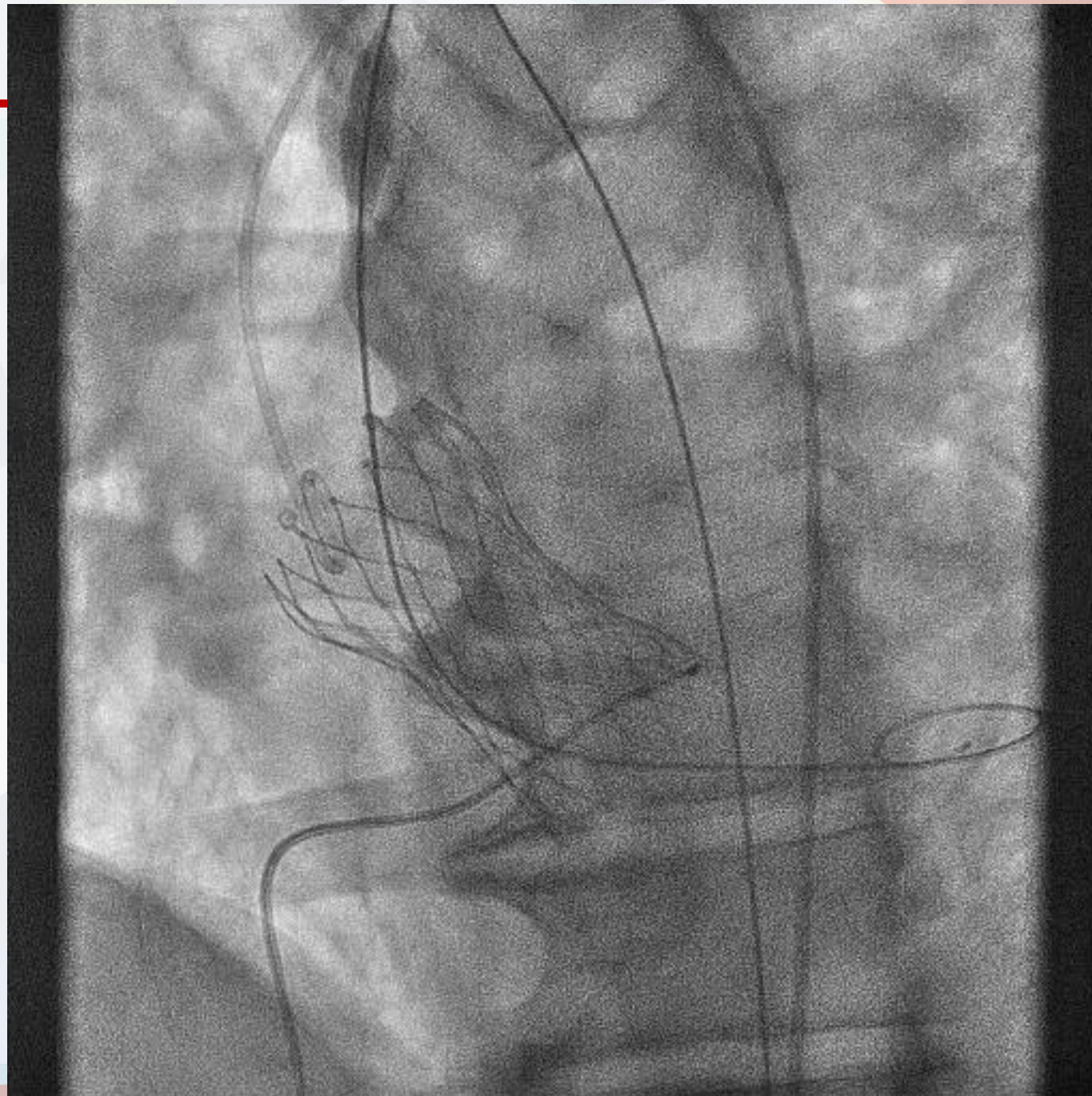












Características basales

CLÍNICA

165 pacientes

77,9 años

77 varones

92 art.perif. severa

12 ictus previos

Hb 10.4

STS 3

ES-II 2.8

ECO

FEVI 53.5%

AVA 0.7

G.Máx 68

G.Medio 43

TAC

Bicúspide 15

Porcelana 14

Diám.mínimo femoral D 3,8mm

Resultados del procedimiento

| PROCEDIMIENTO | | INTRA-HOSPITALARIO | | ECO |
|------------------|----|-----------------------|---|------------|
| Predilat 117 | | Estancia | 3 | FEVI |
| | | d | | 53,6% |
| Evolut | | PPM | | AVA 1,9 |
| 84 | | 25 | | G.Máx 17 |
| Portico/Navitor | 22 | Ictus | | G.Medio 9 |
| Acurate neo | 25 | 1 | | |
| Myval | | In-hospital death | 6 | AOREG: |
| 18 | | Sangrado mayor | | - III/IV 7 |
| Vitaflow | 3 | 5 | | |
| Otras | | - 11 stents | | |
| 13 | | - 1 cirugía (humeral) | | |
| Rotura de anillo | | | | |
| 0 | | | | |
| Taponamiento | | | | |

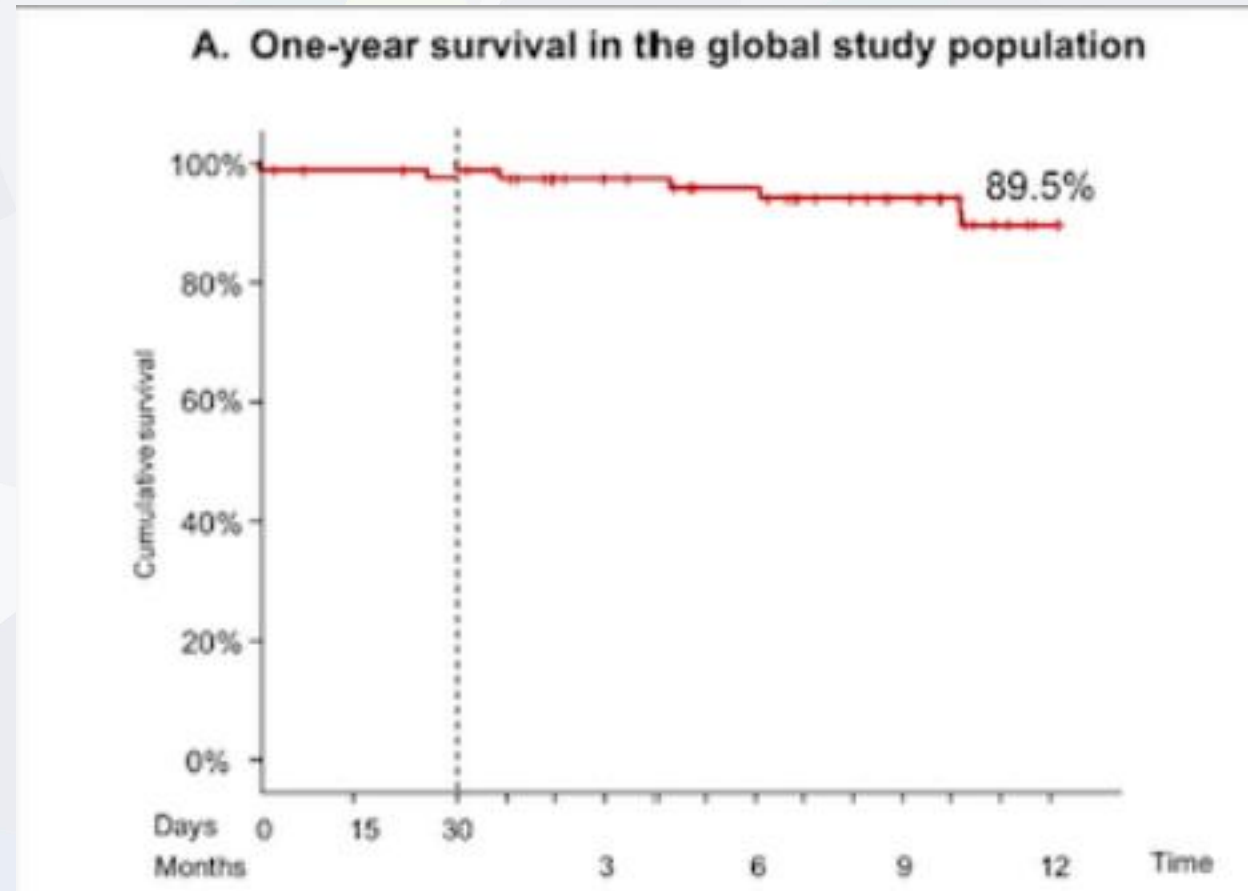
Resultados en el seguimiento (12 meses)

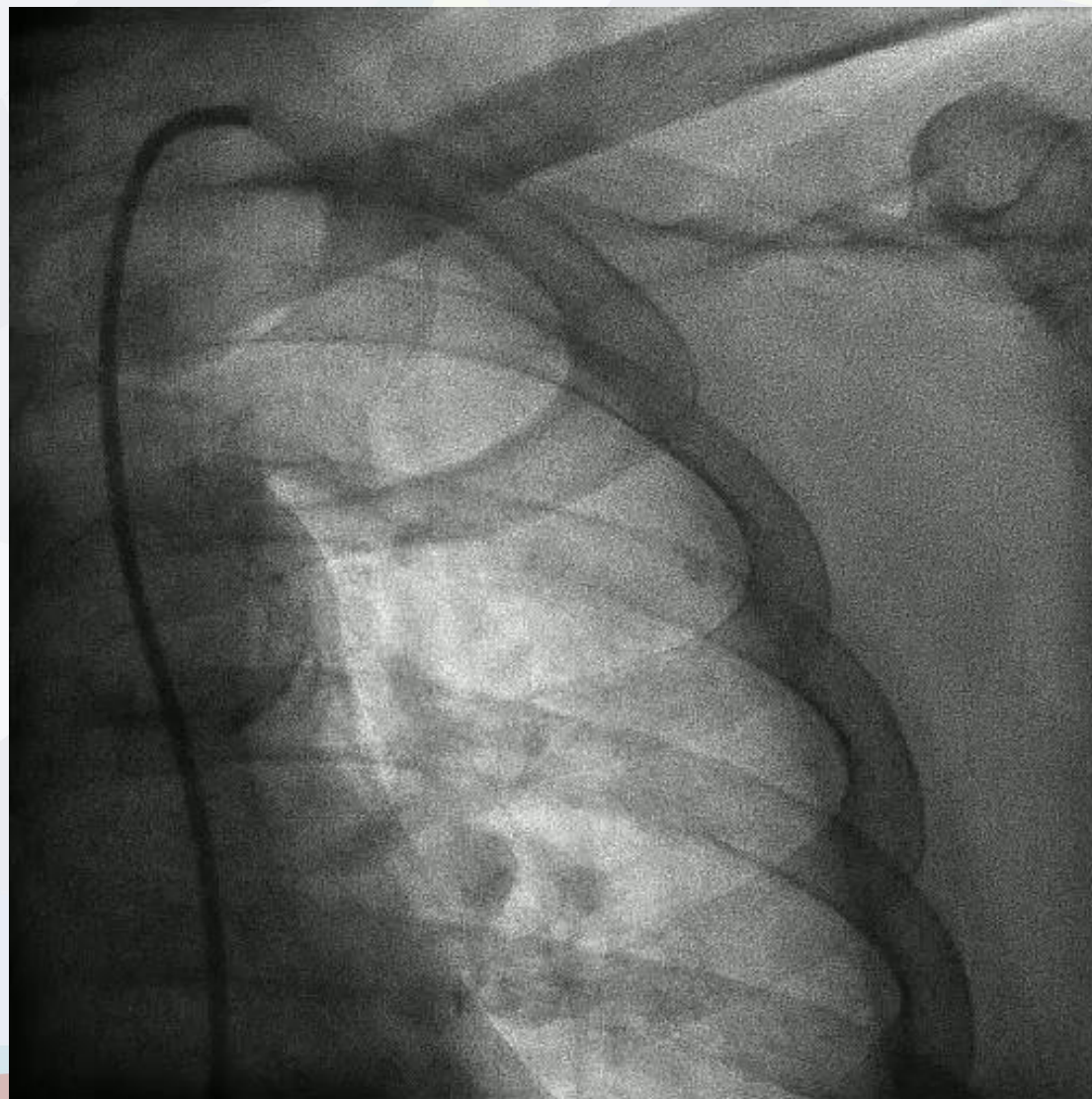
Ninguna complicación vascular o neurológica tardía



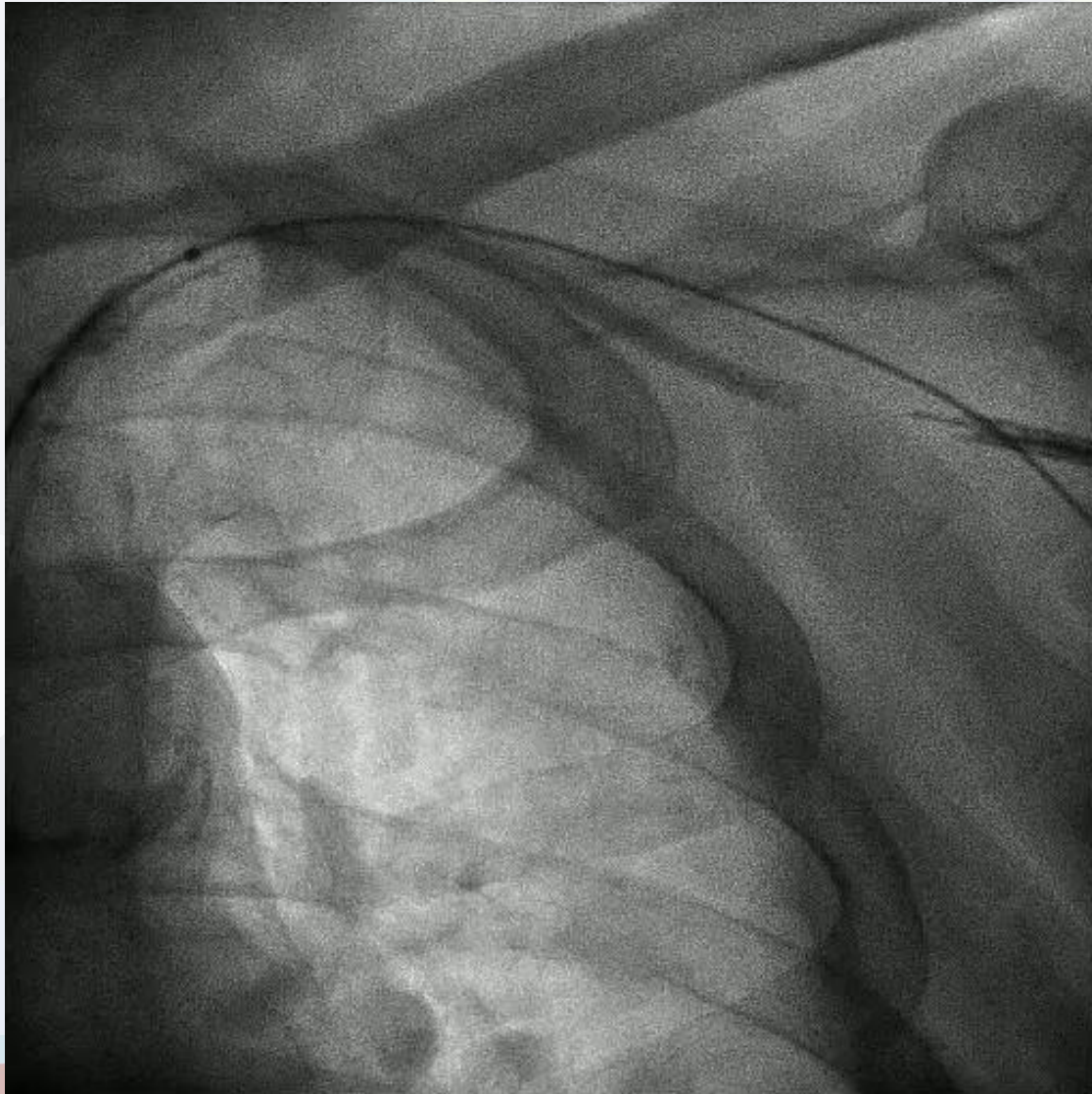
ACURATE NEO / NEO2

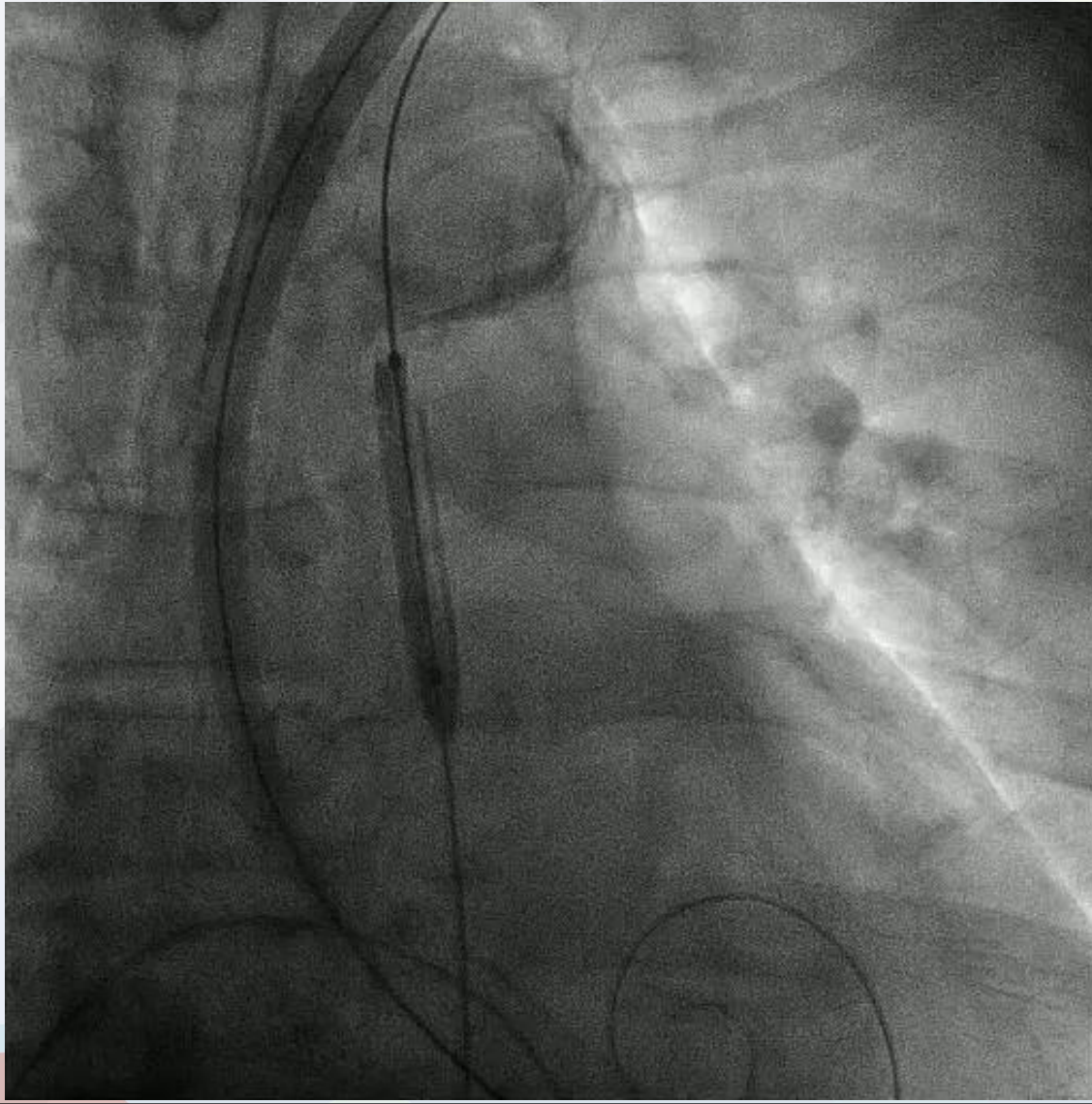
Transaxillary transcatheter ACURATE neo aortic valve
implantation – The TRANSAX Multicenter Study.

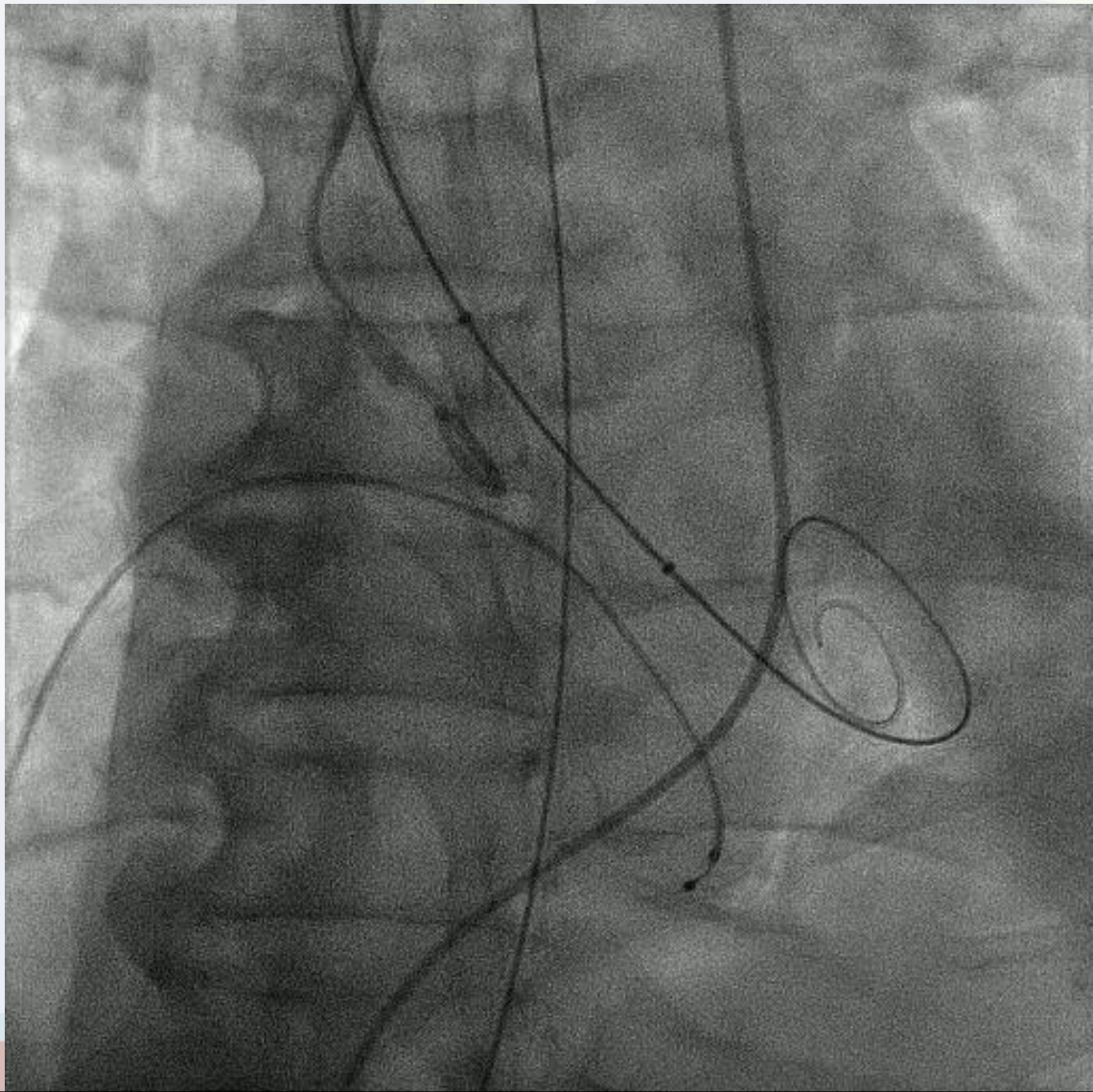


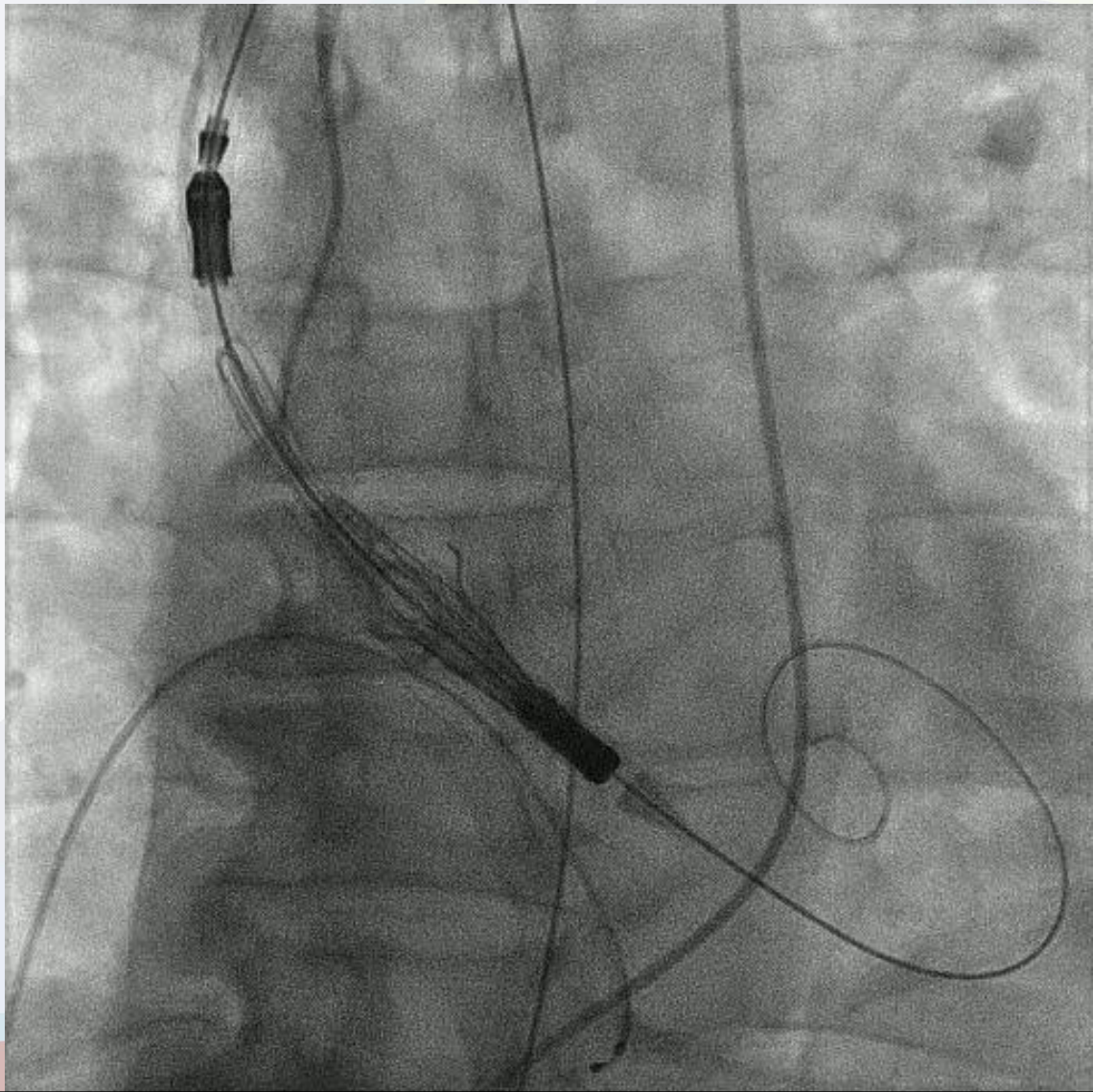


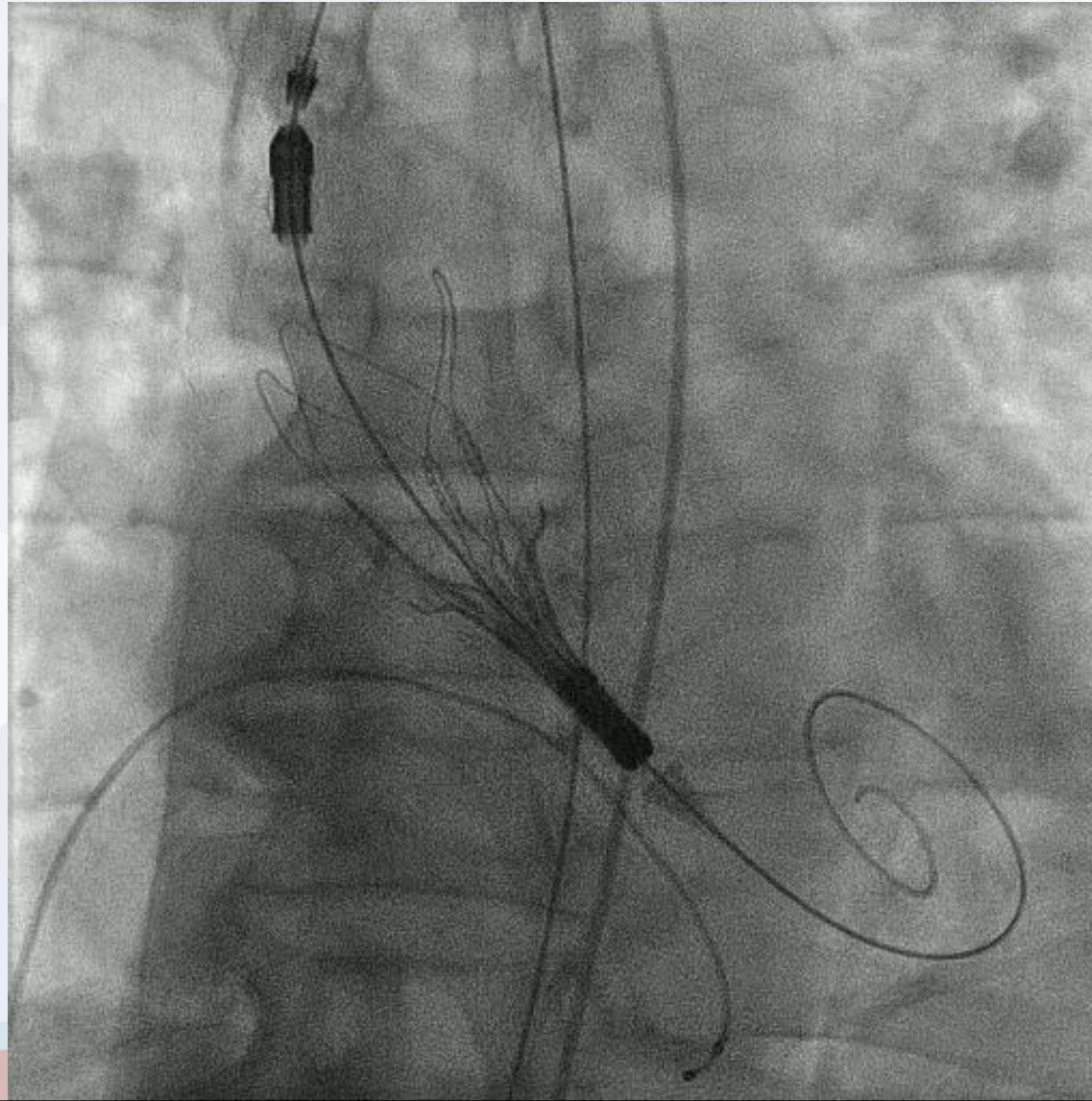
ACURATE neo CASO 1

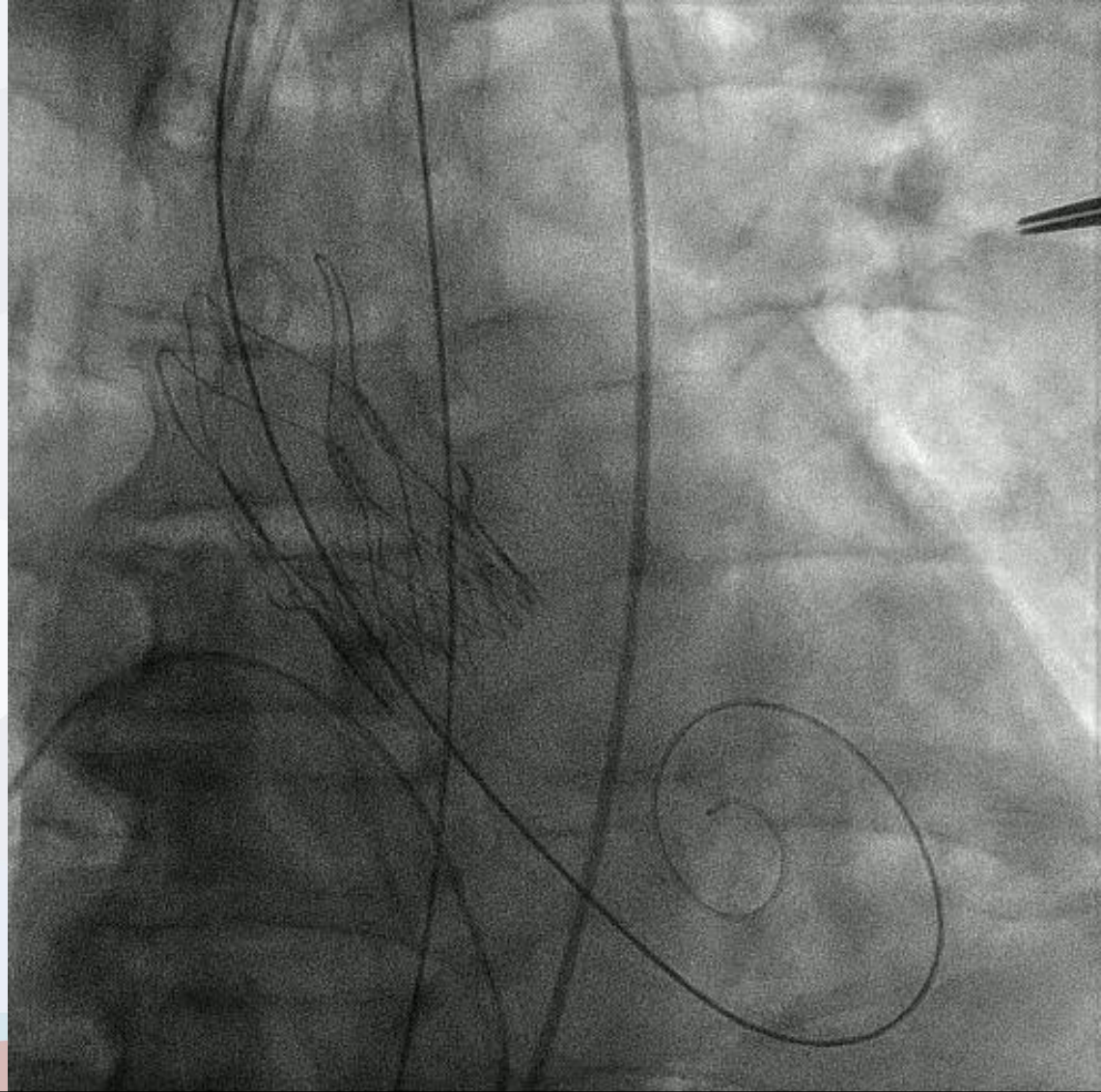


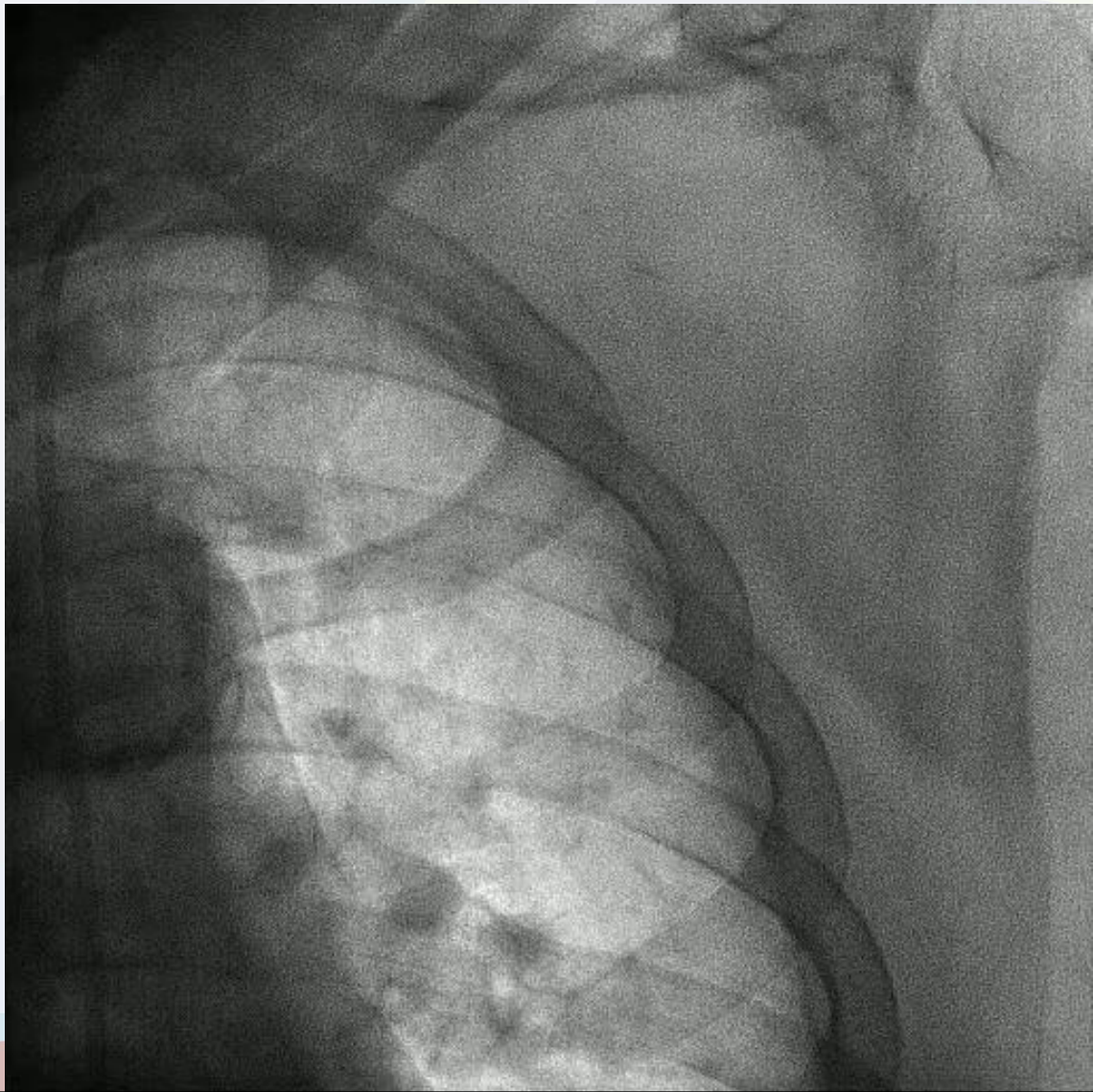


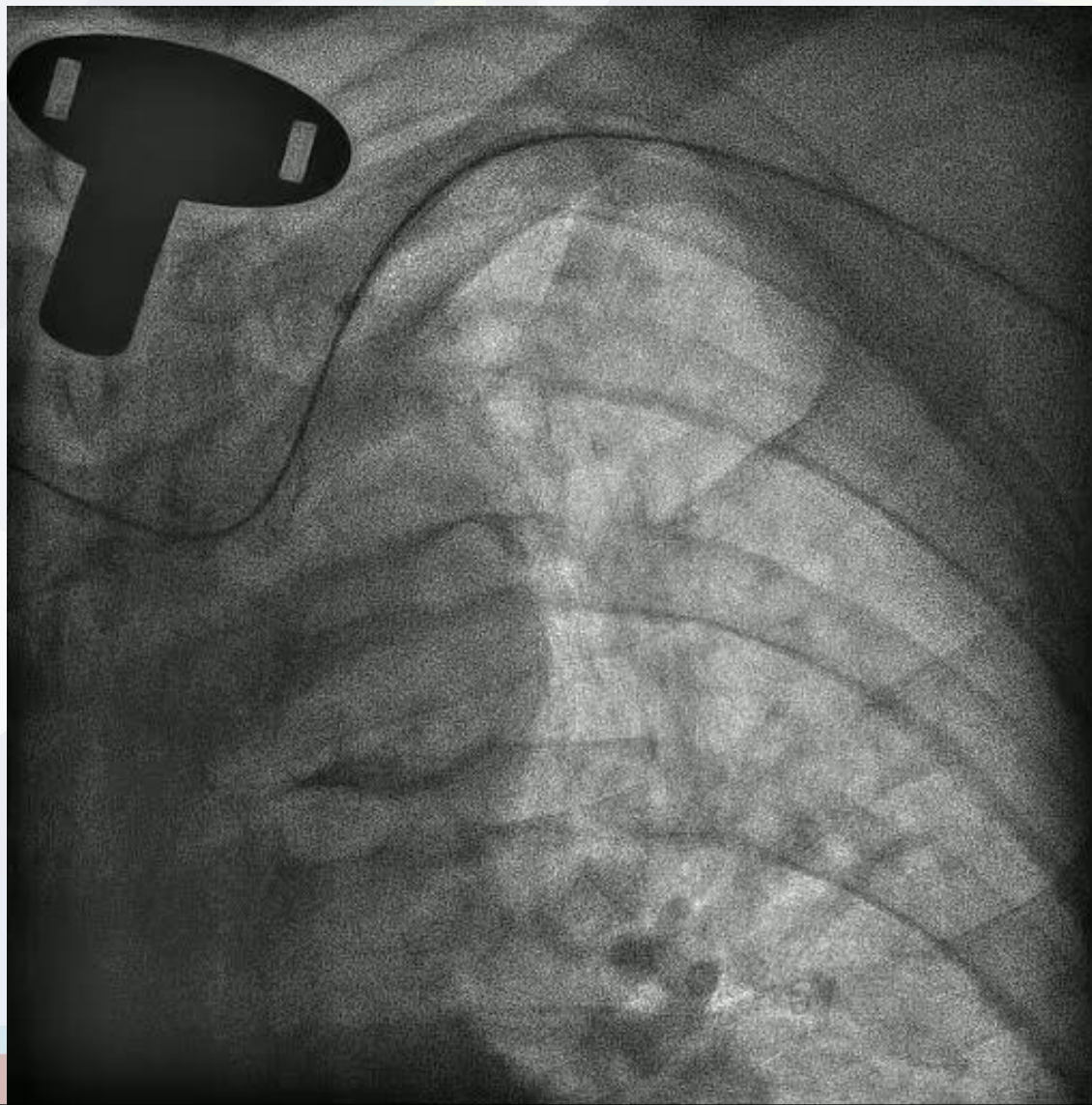




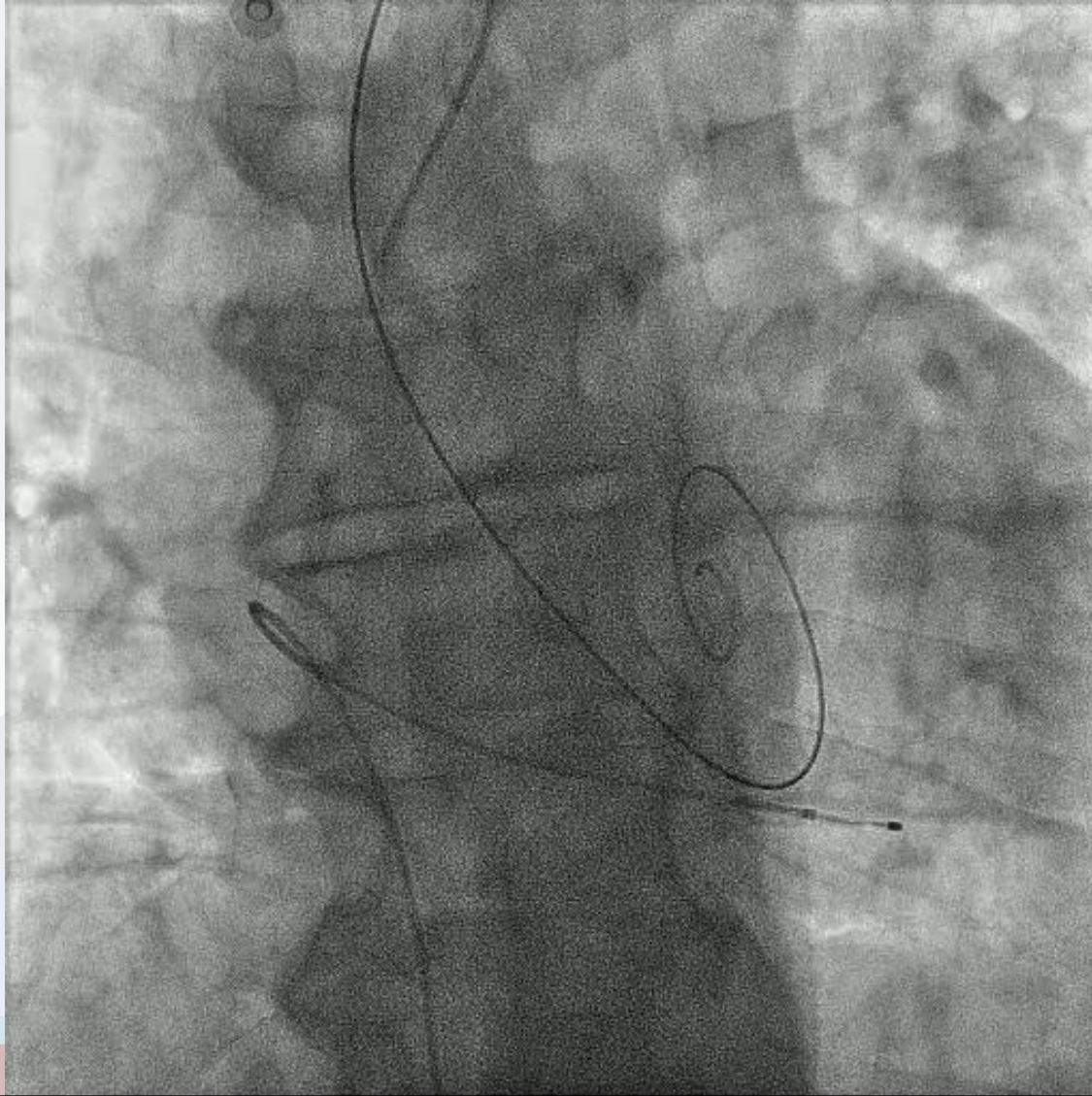


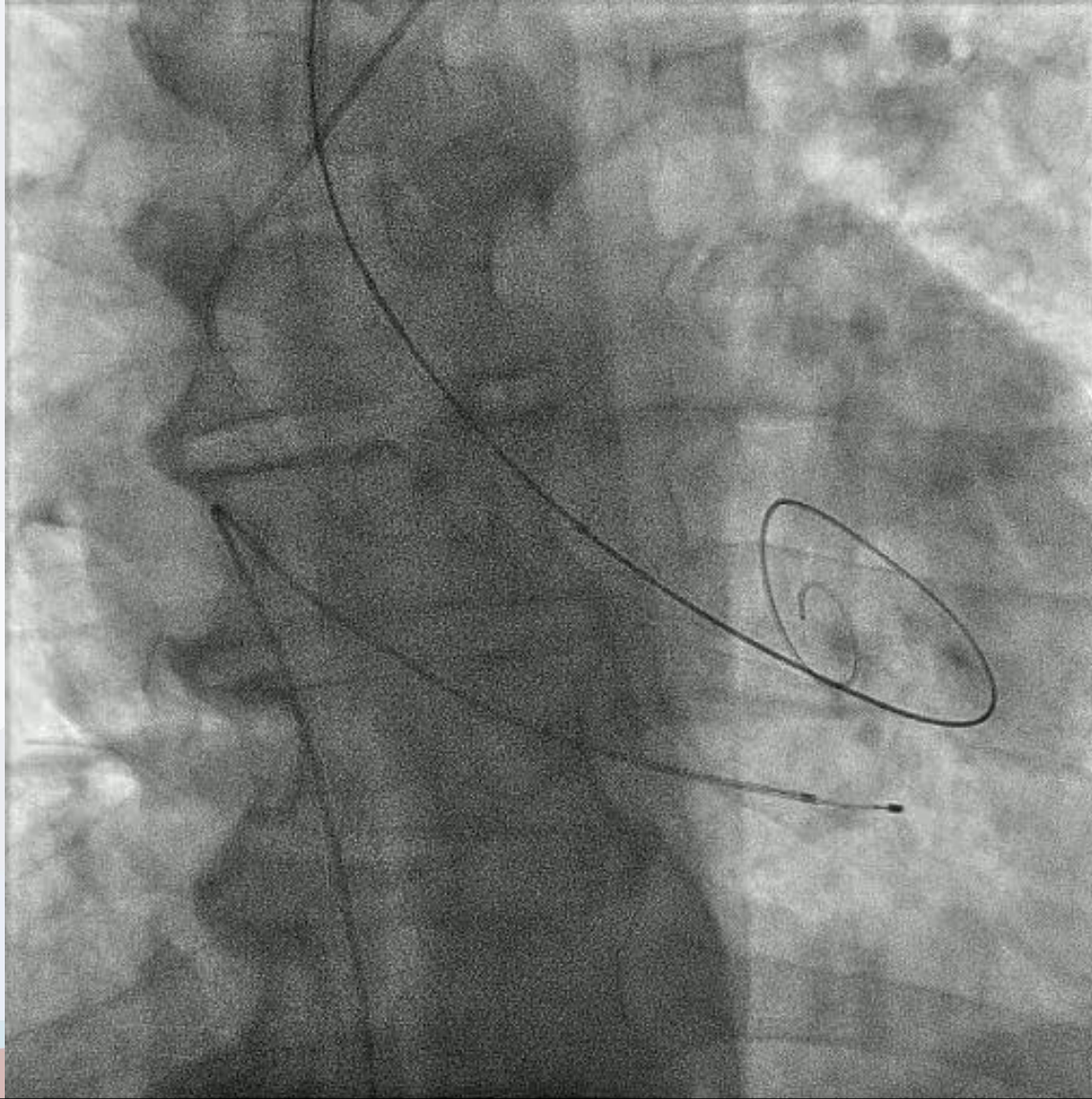


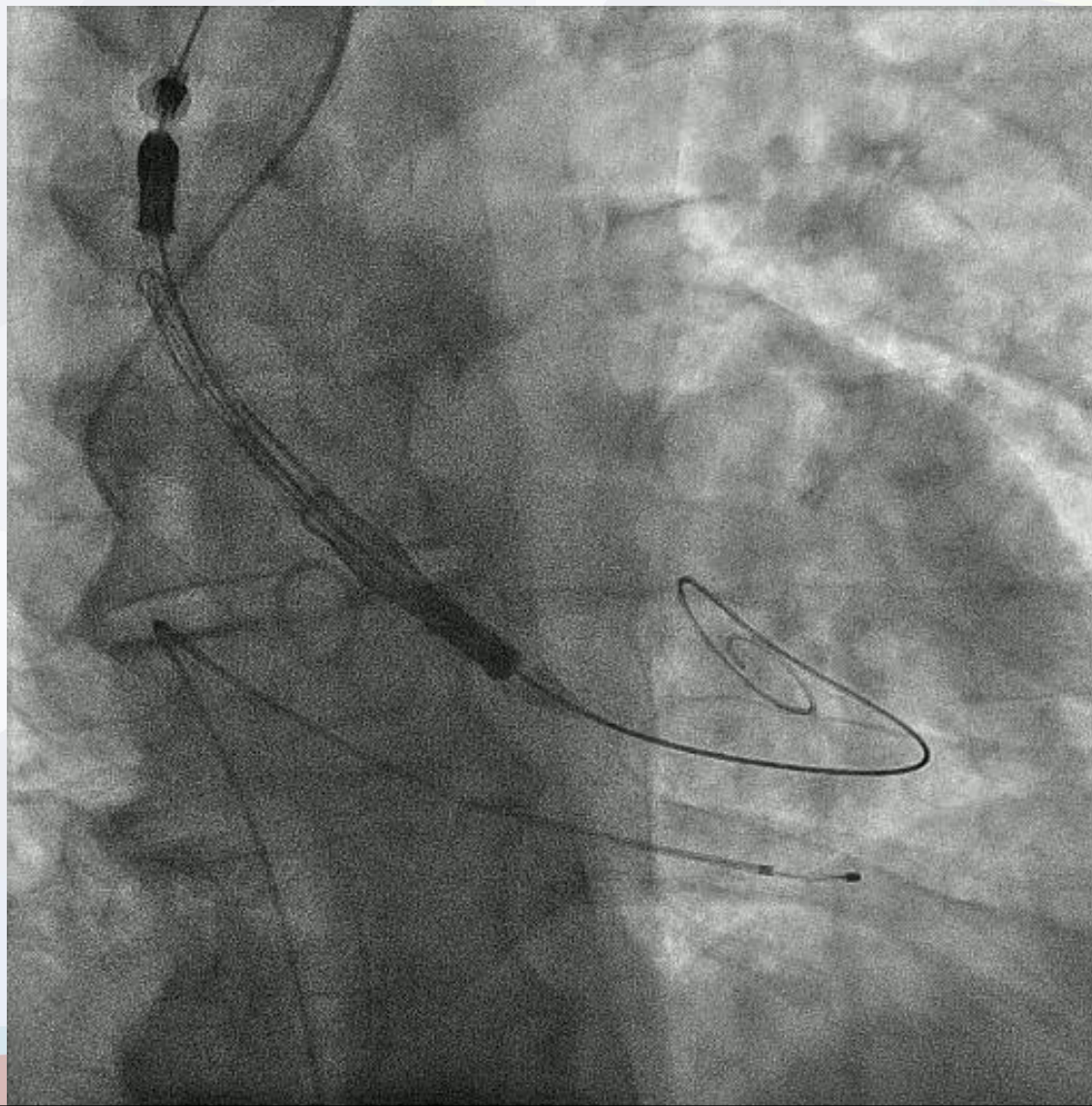


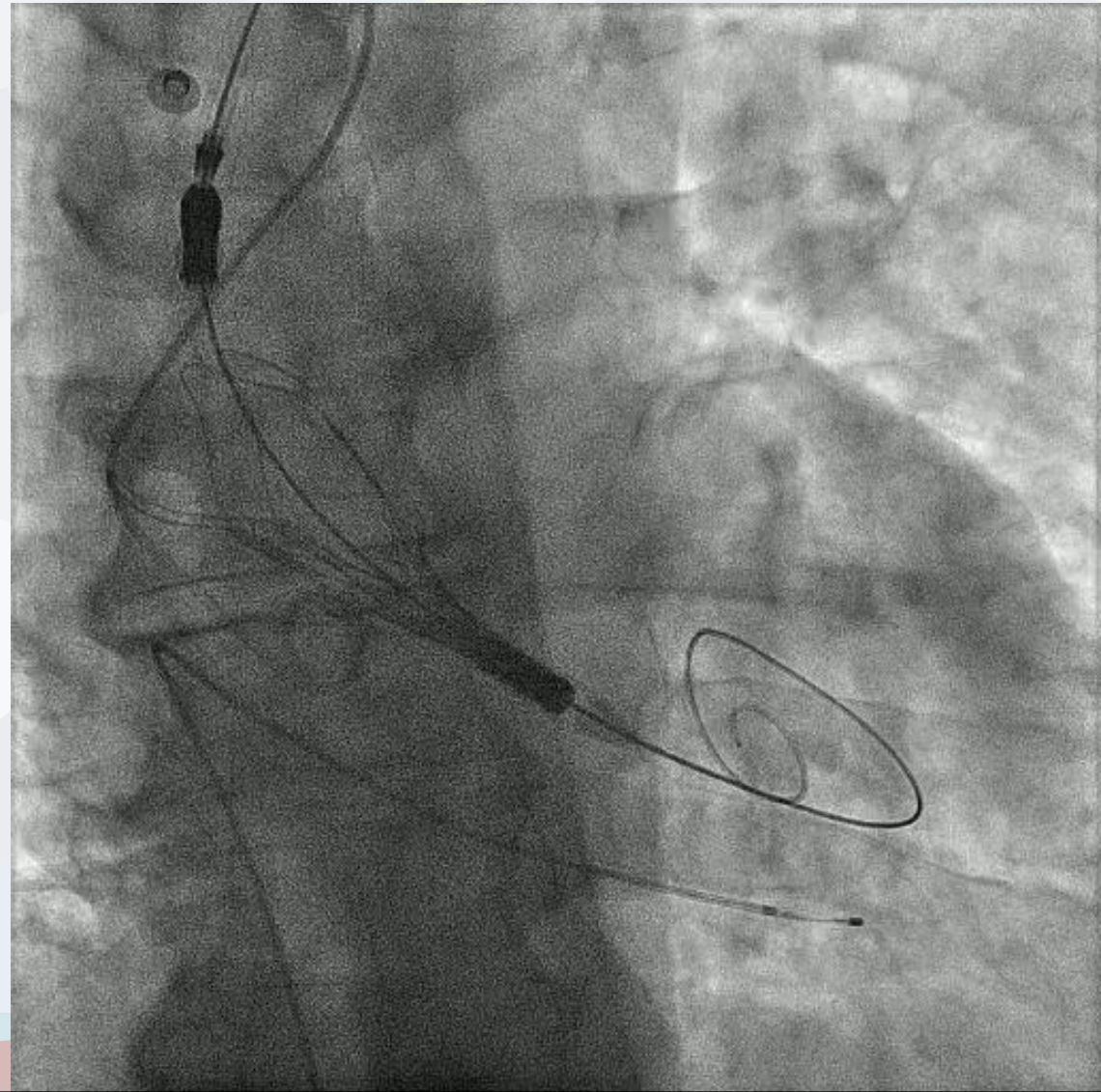


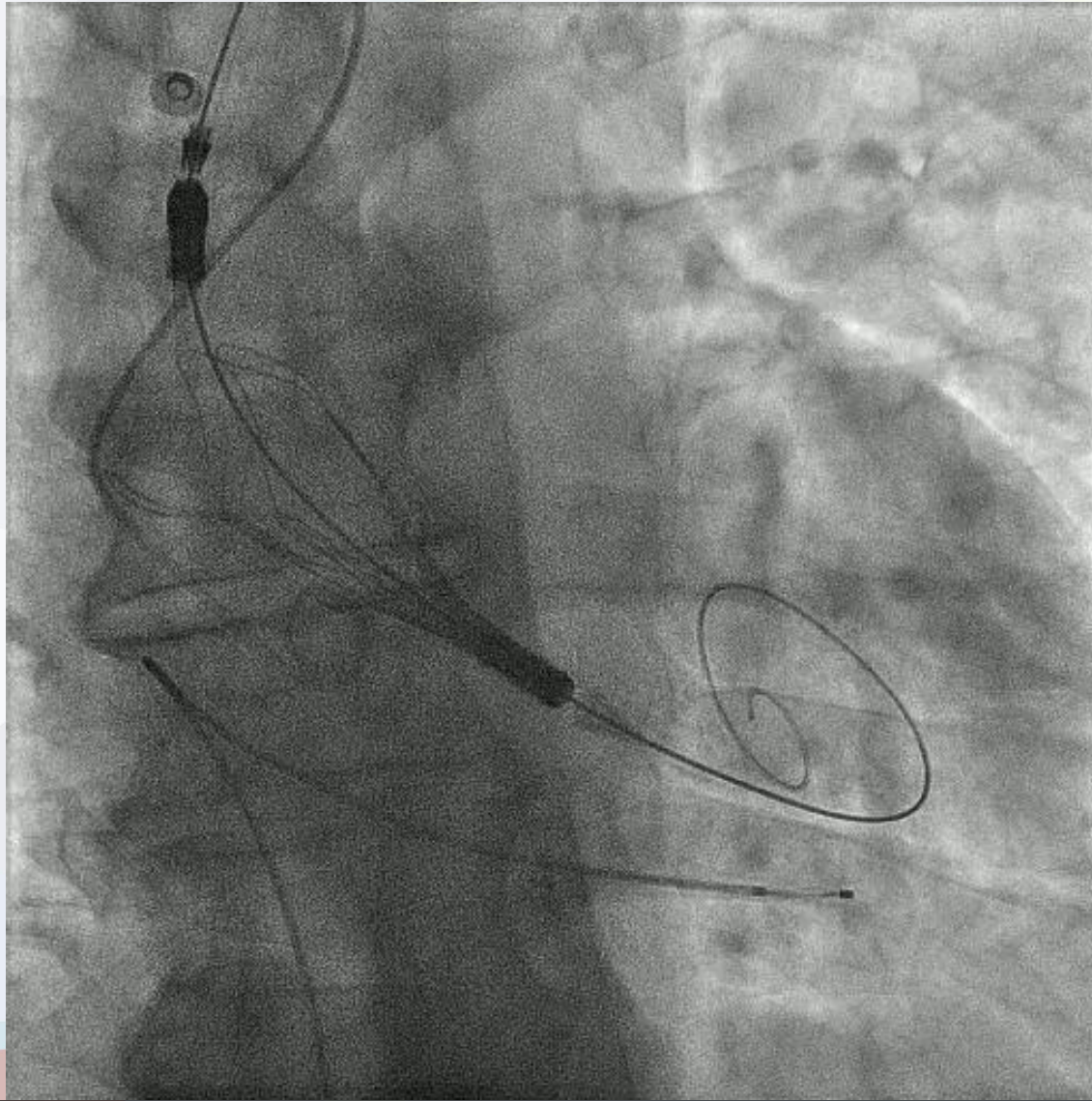
ACURATE neo
CASO 2

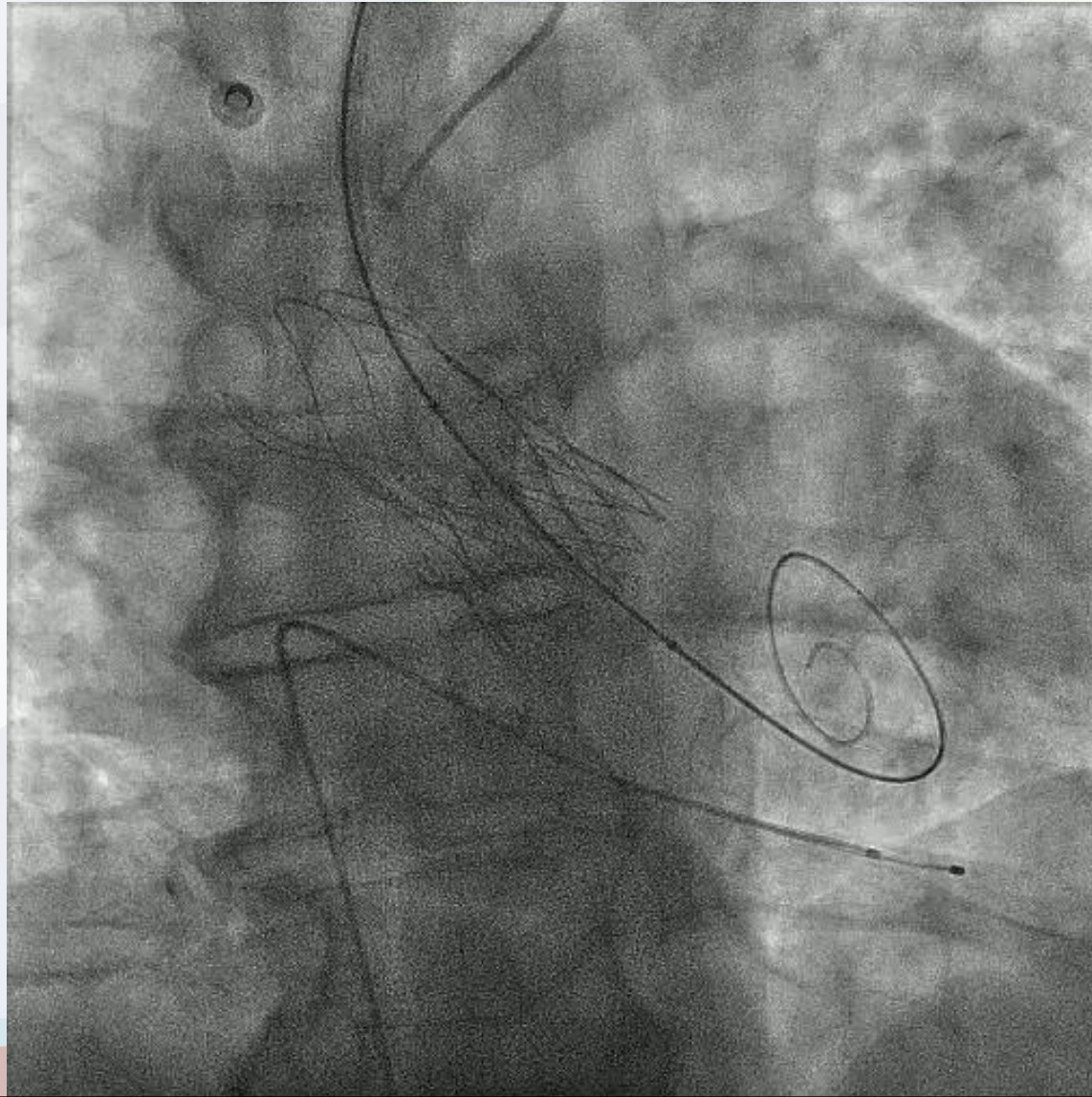


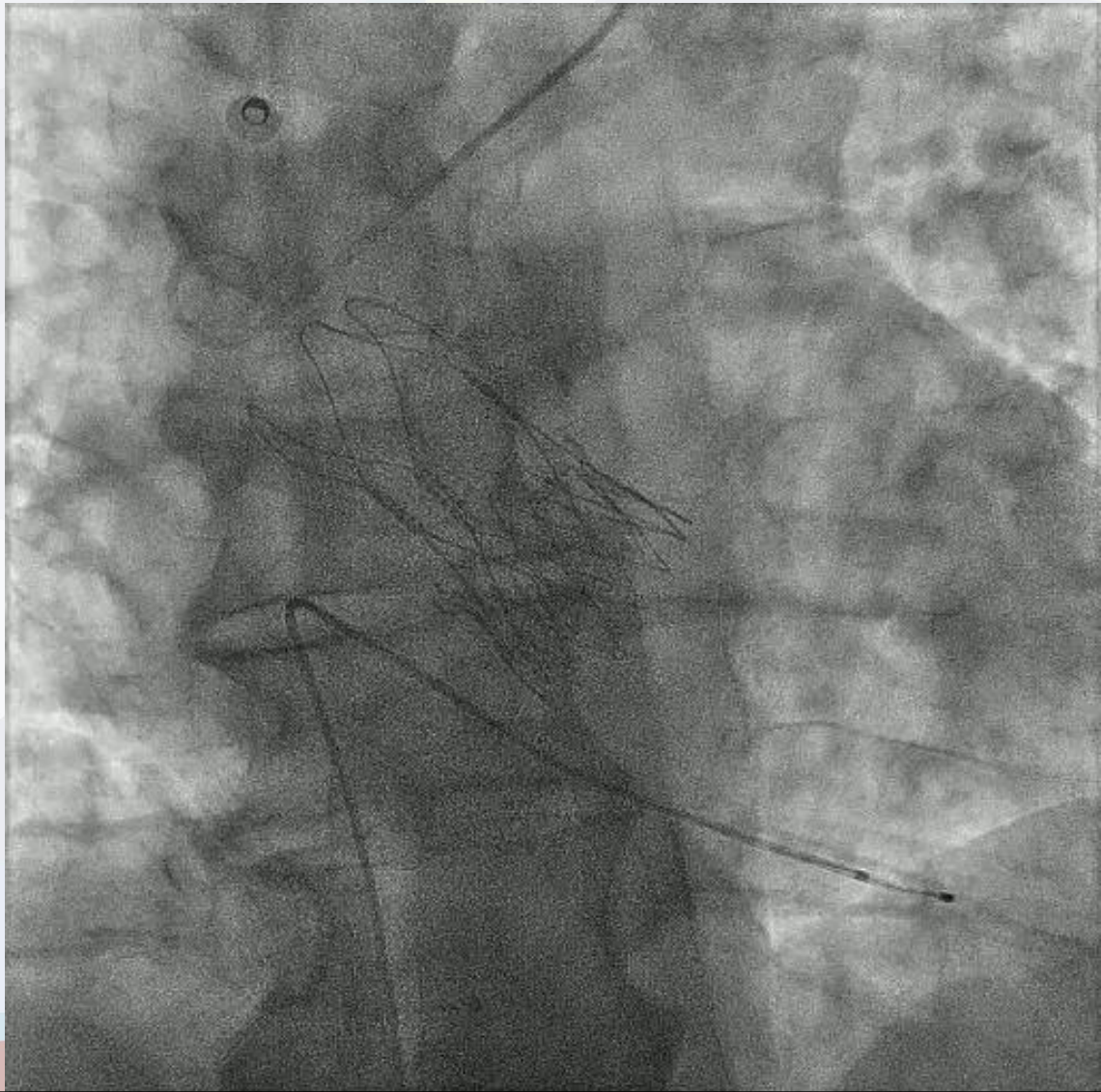


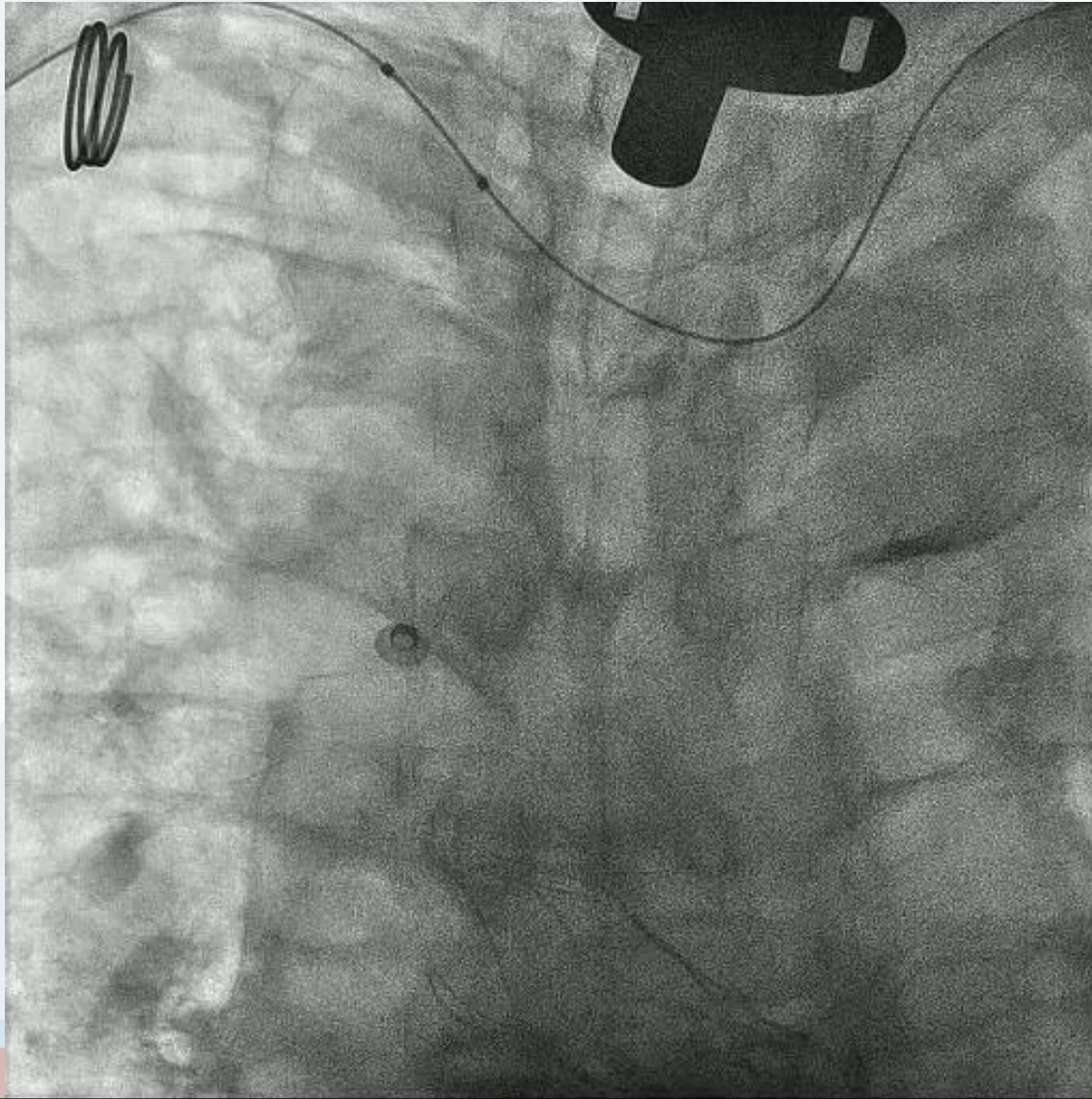


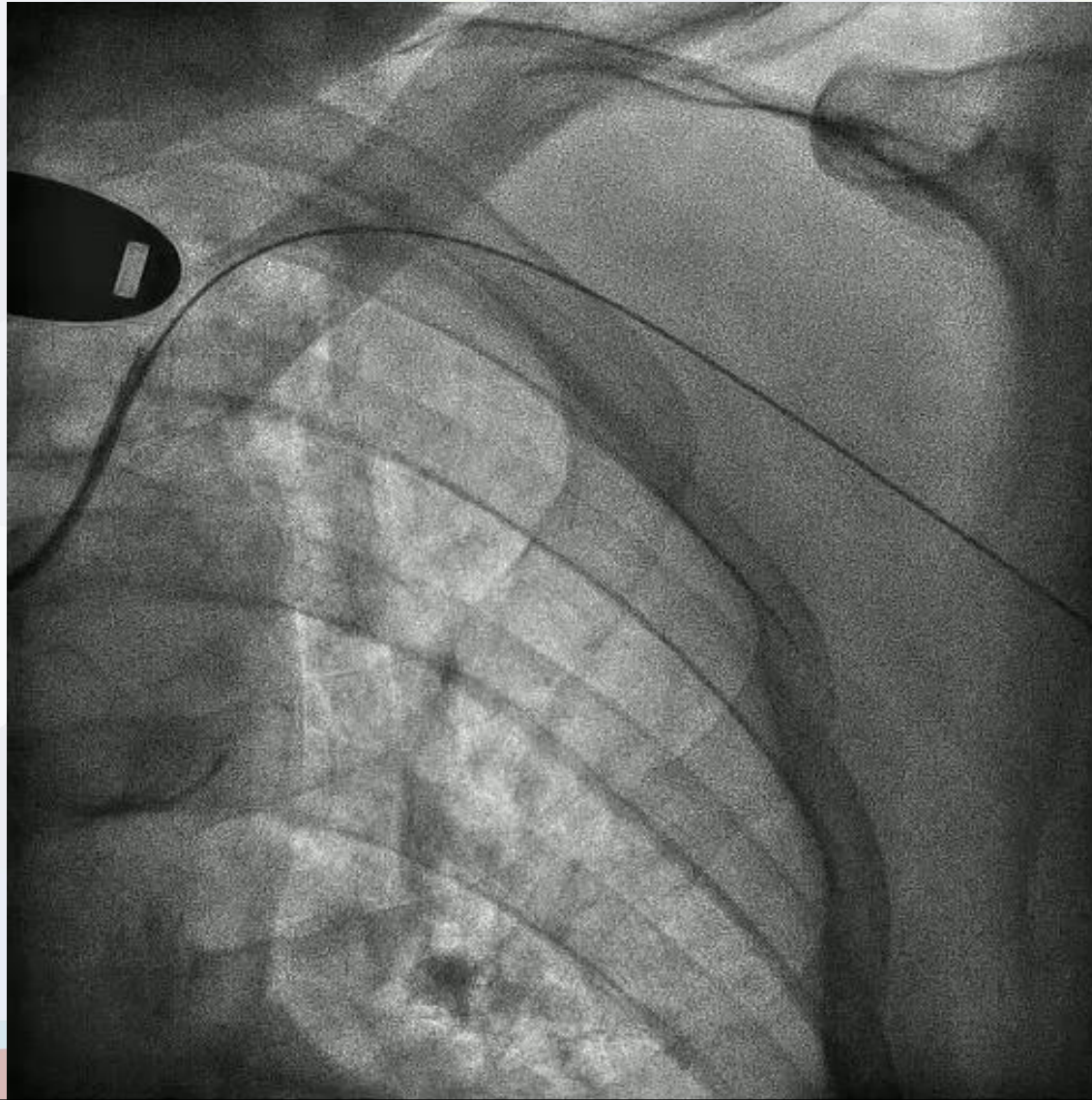




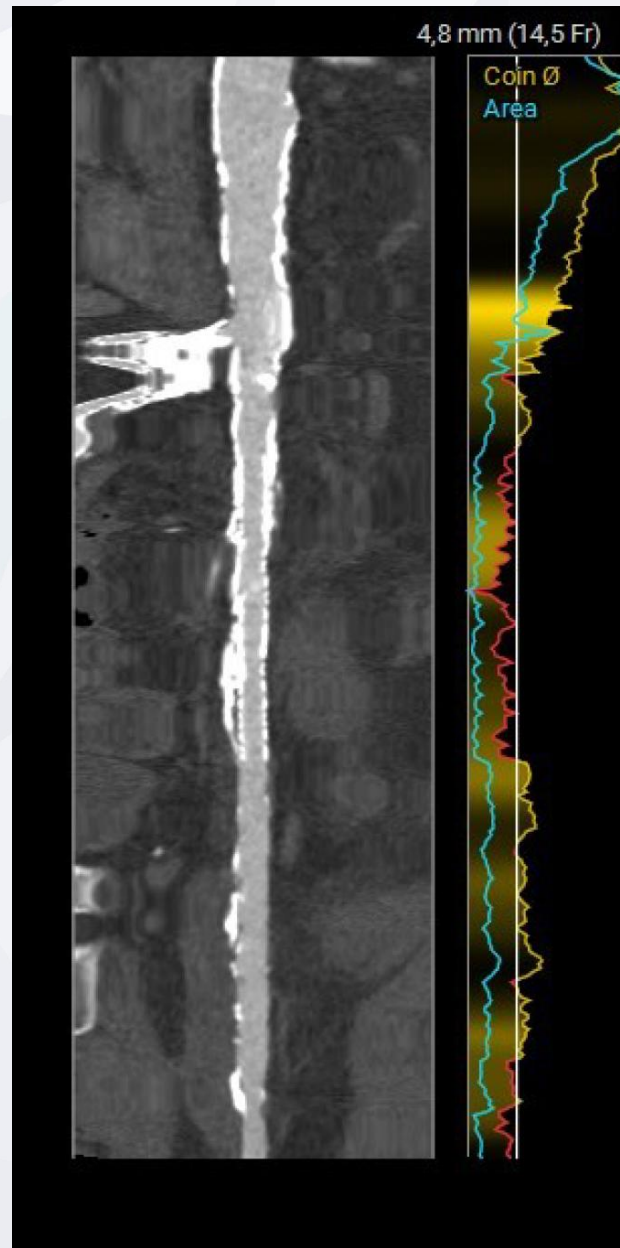
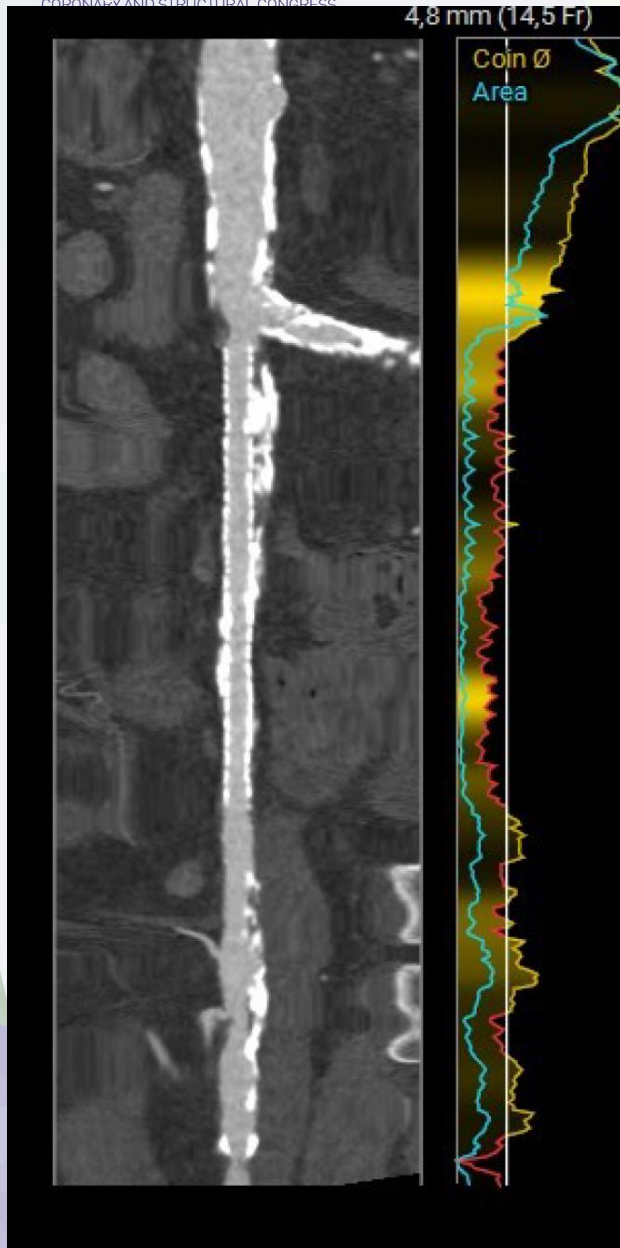










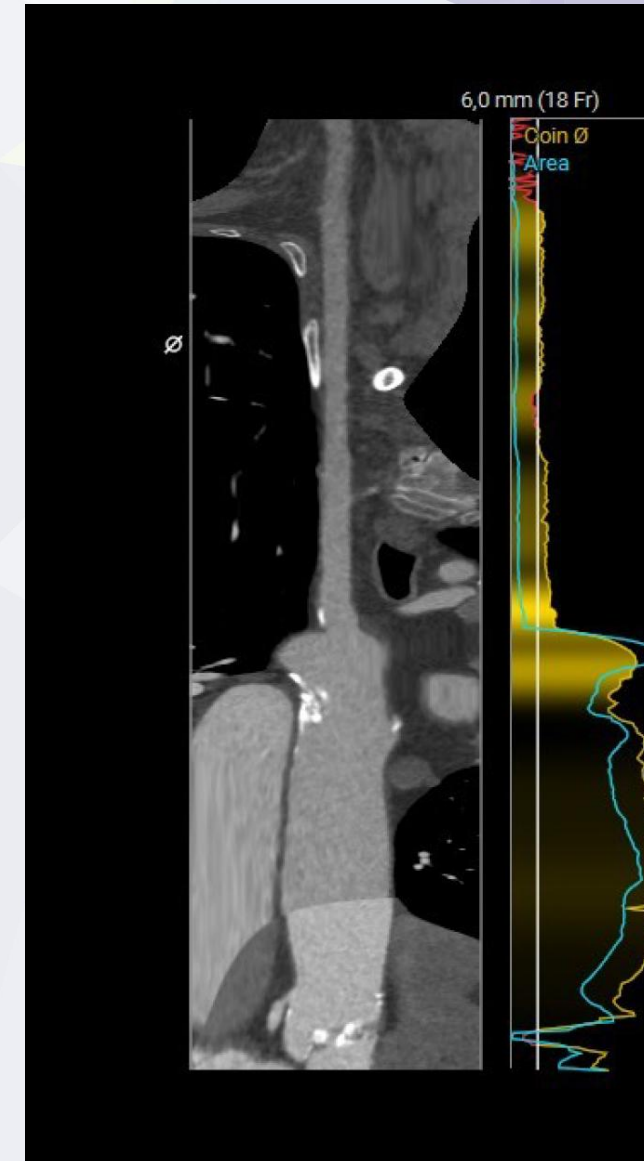
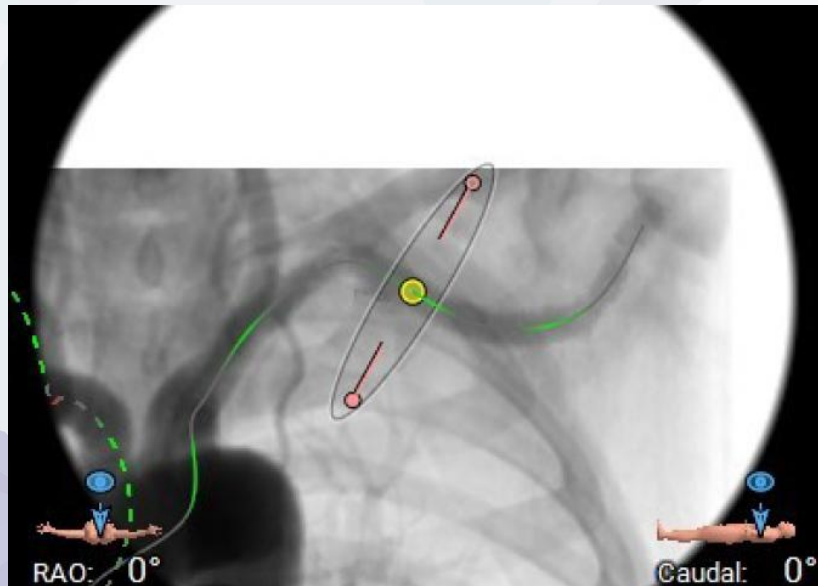
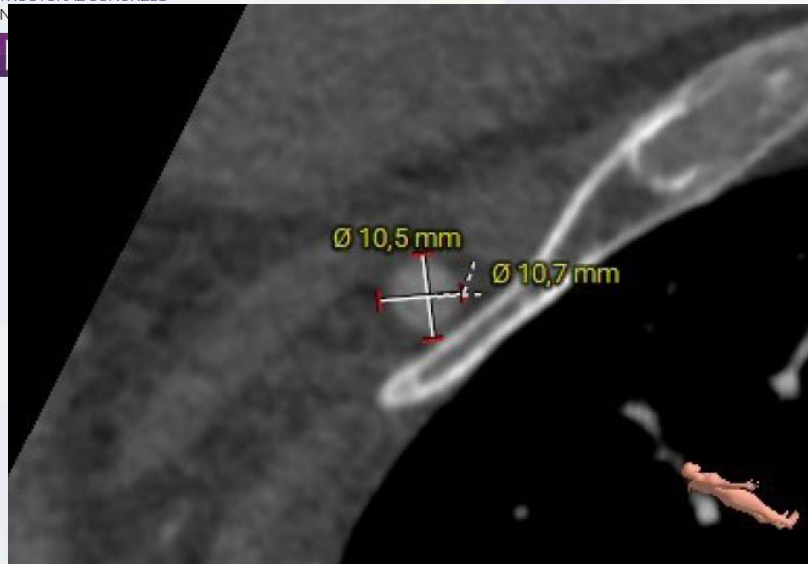


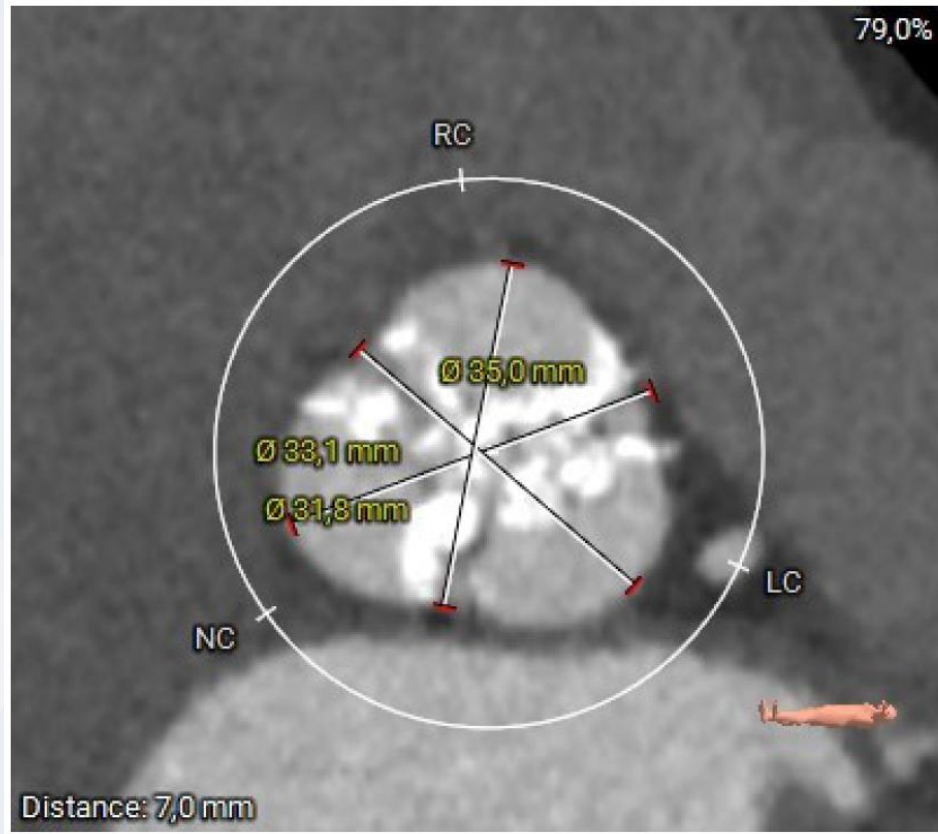
Femoral
Access
not
feasible.



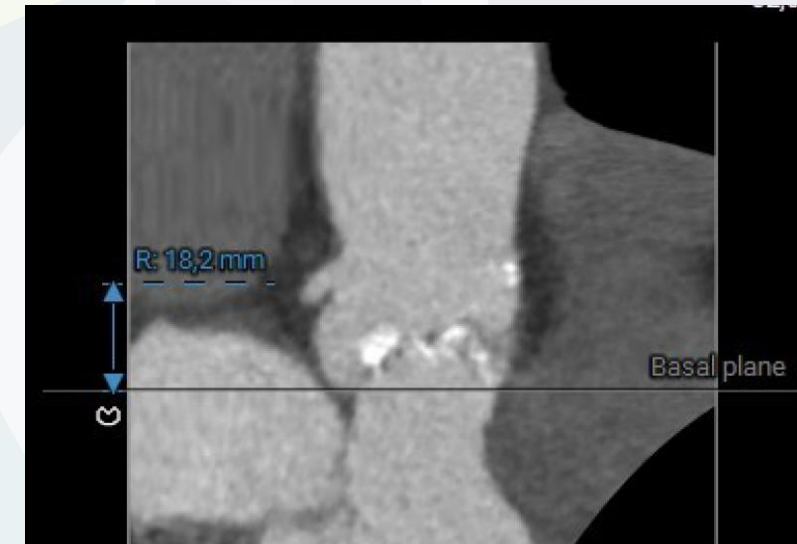
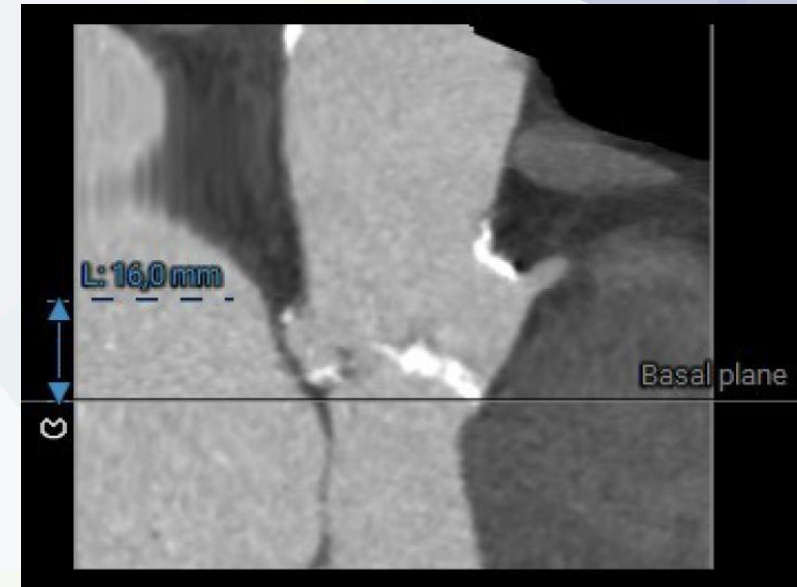
MicroPort

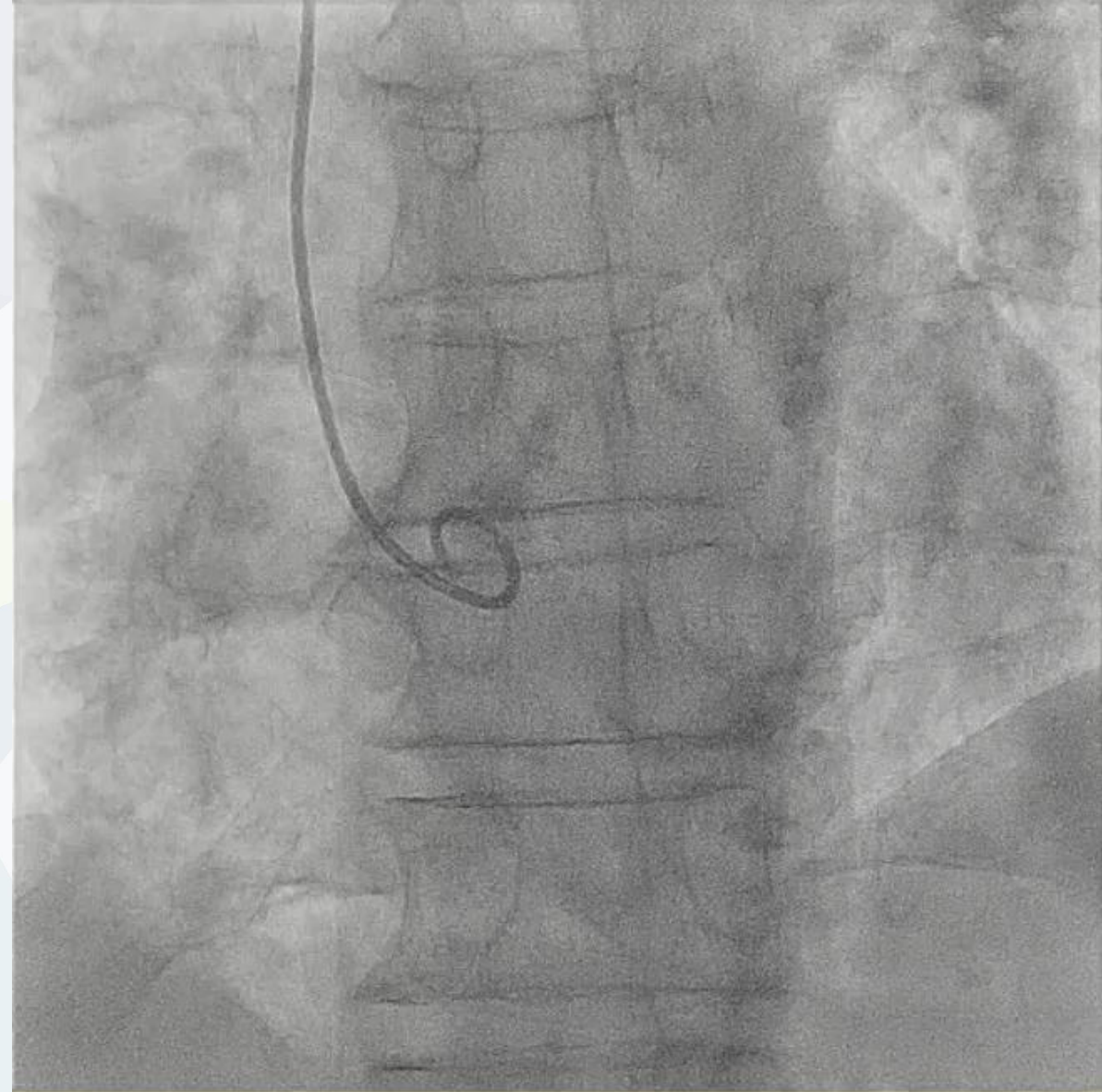


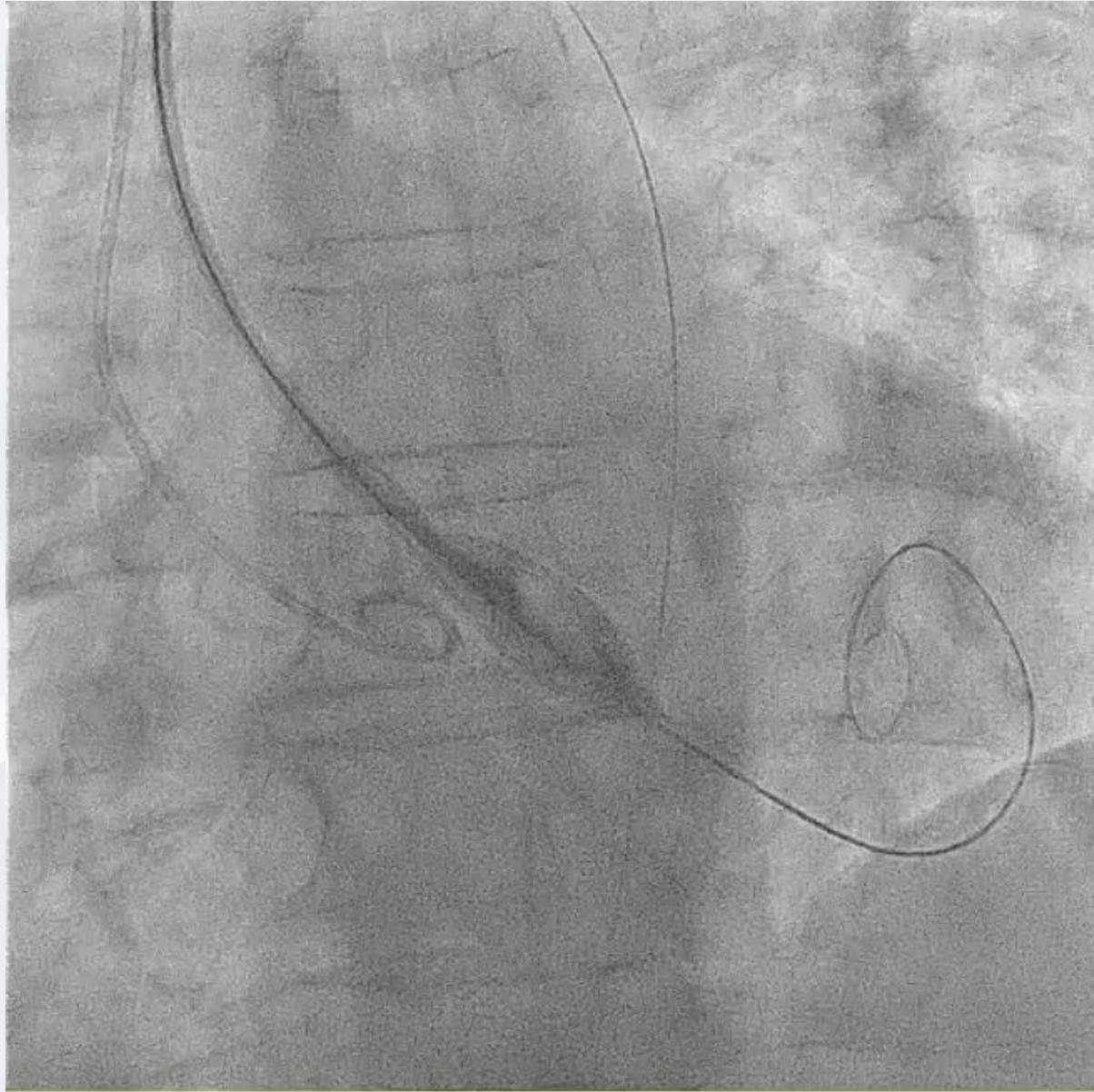


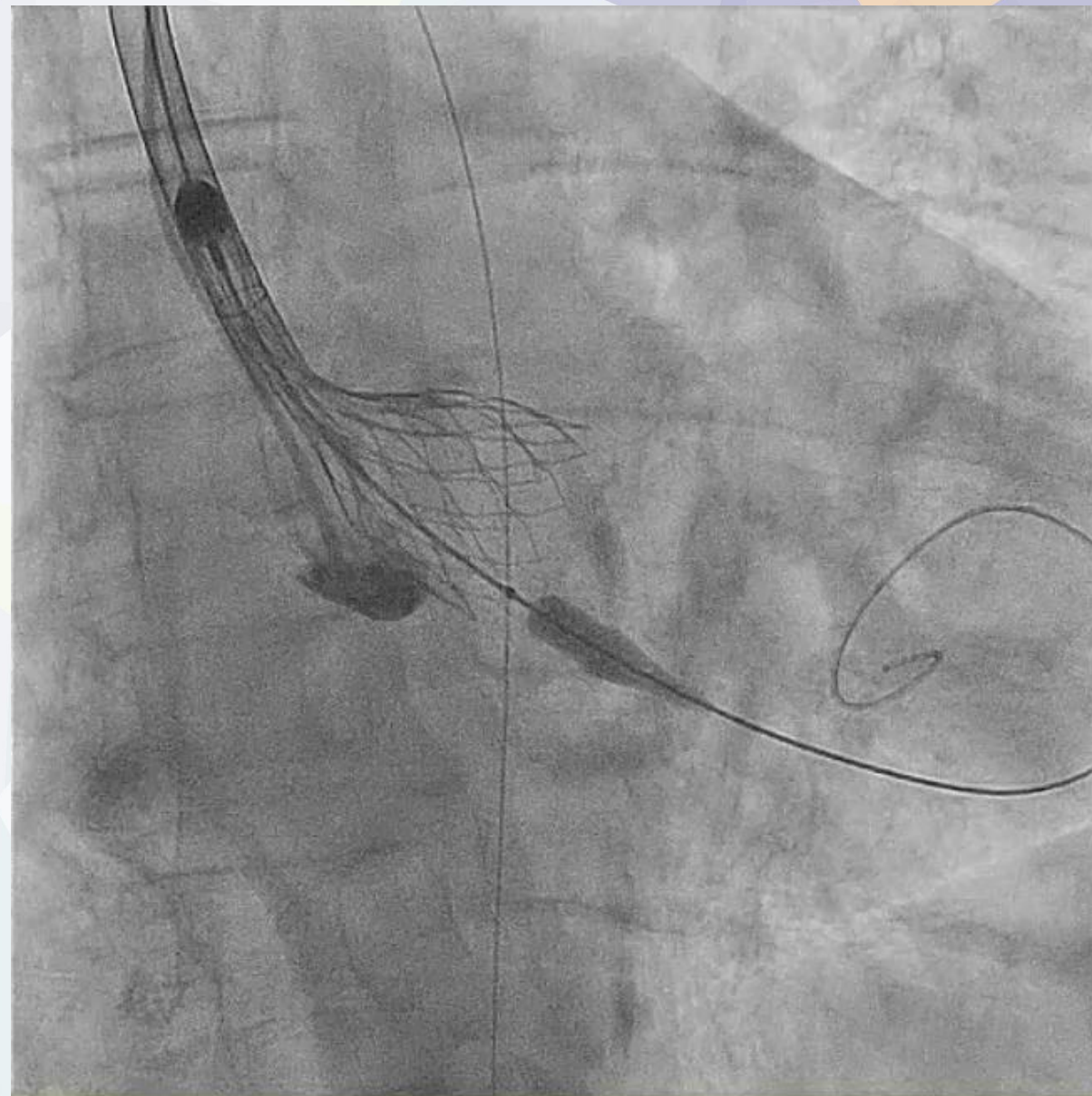
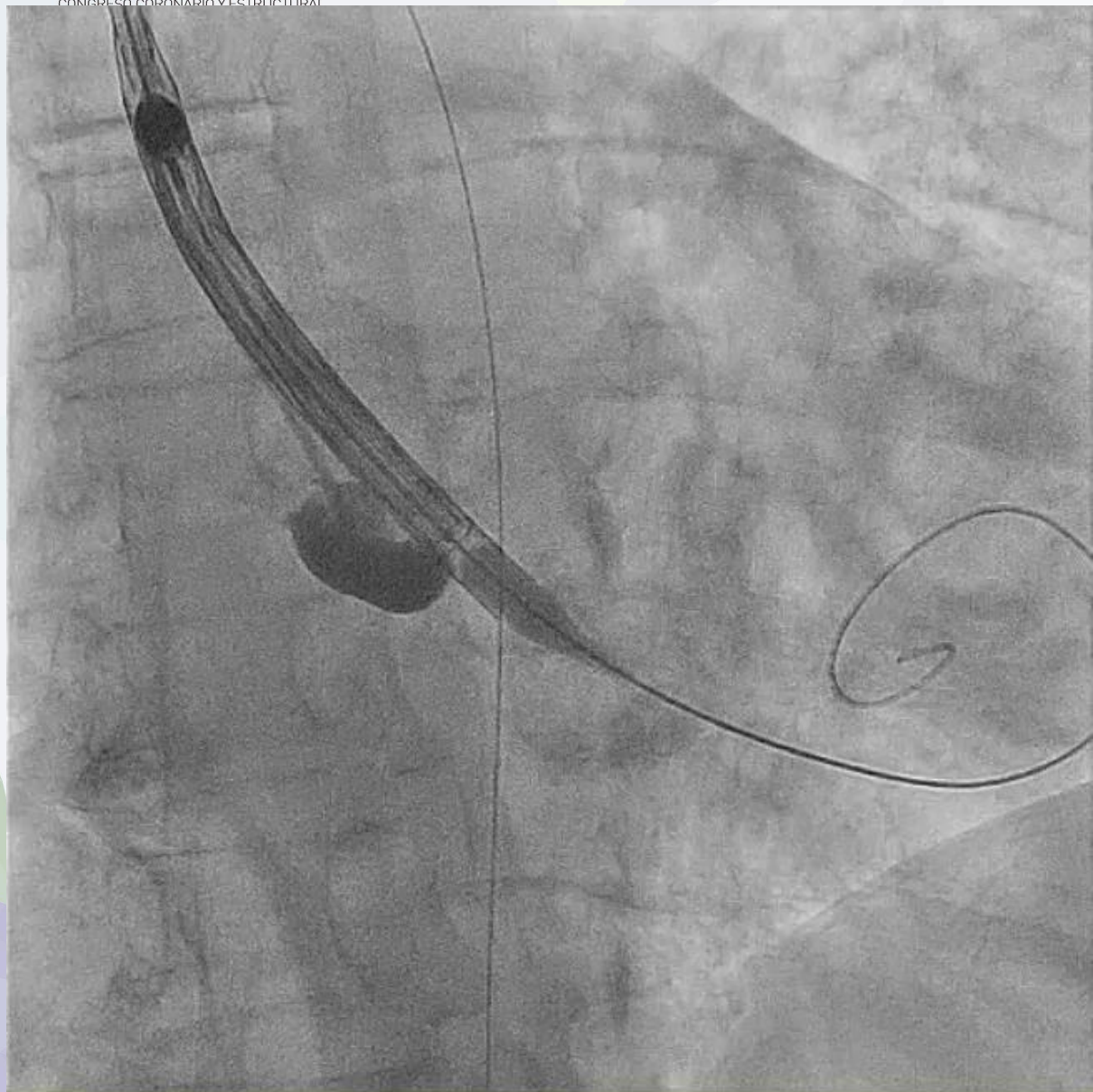


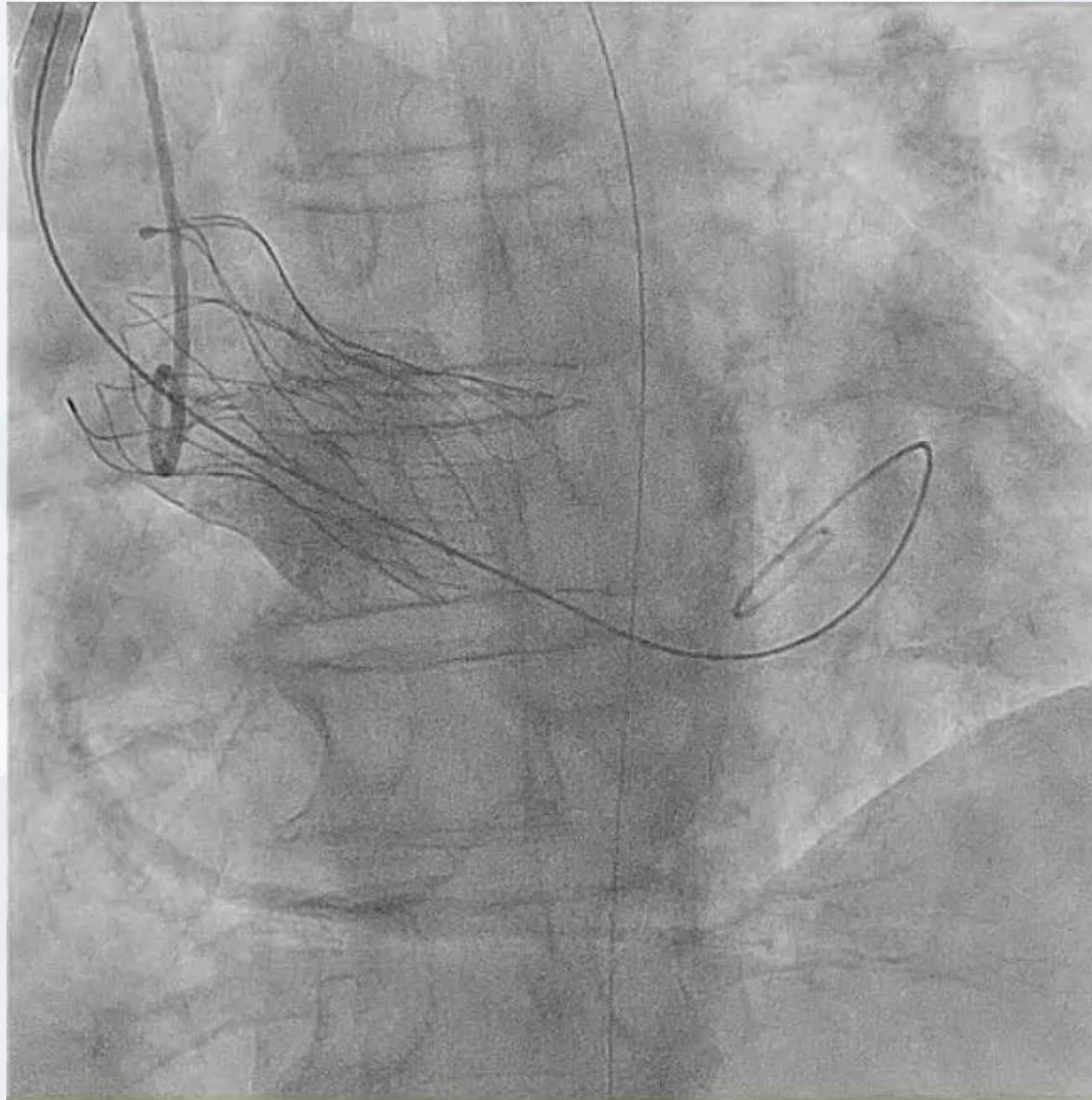
Low coronary
occlusion risk

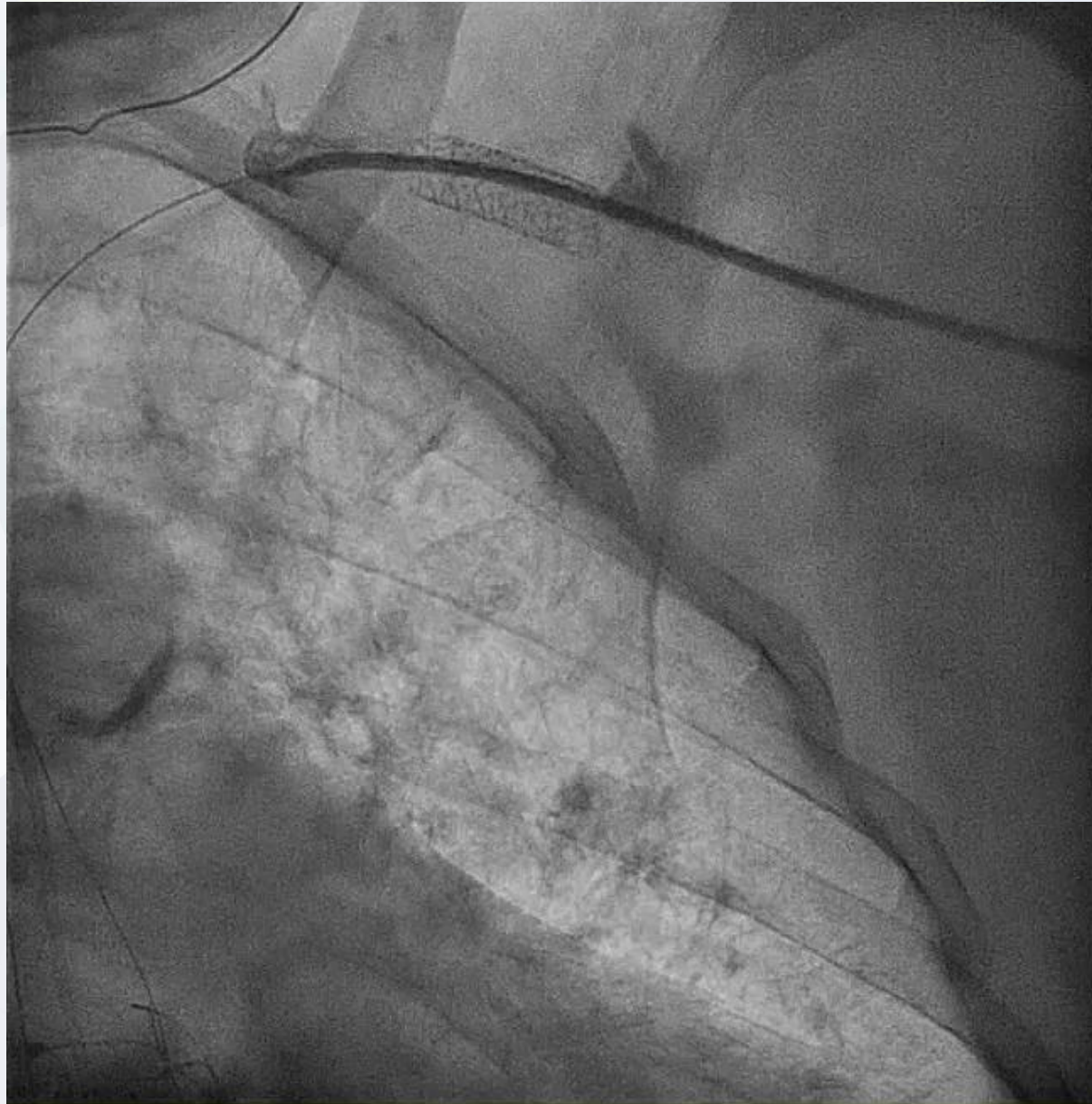






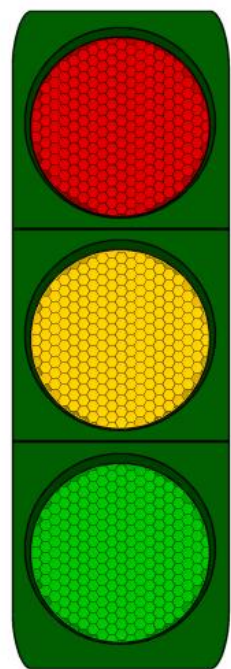






FINAL COMMENTS – Fully-percutaneous TAVR

COMPARABLE results to TF...



Technically a bit different

Potential alternative to TF even if good femorals in:

Morbid obesity, Need for early walking

Best alternative when TF not feasible