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PUSAN NATIONAL UNIVERSITY HOSPITAL

Endovascular Treatment of Aortoiliac Disease

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이 한 철

CASE : Iliac Artery Disease

소O F/70

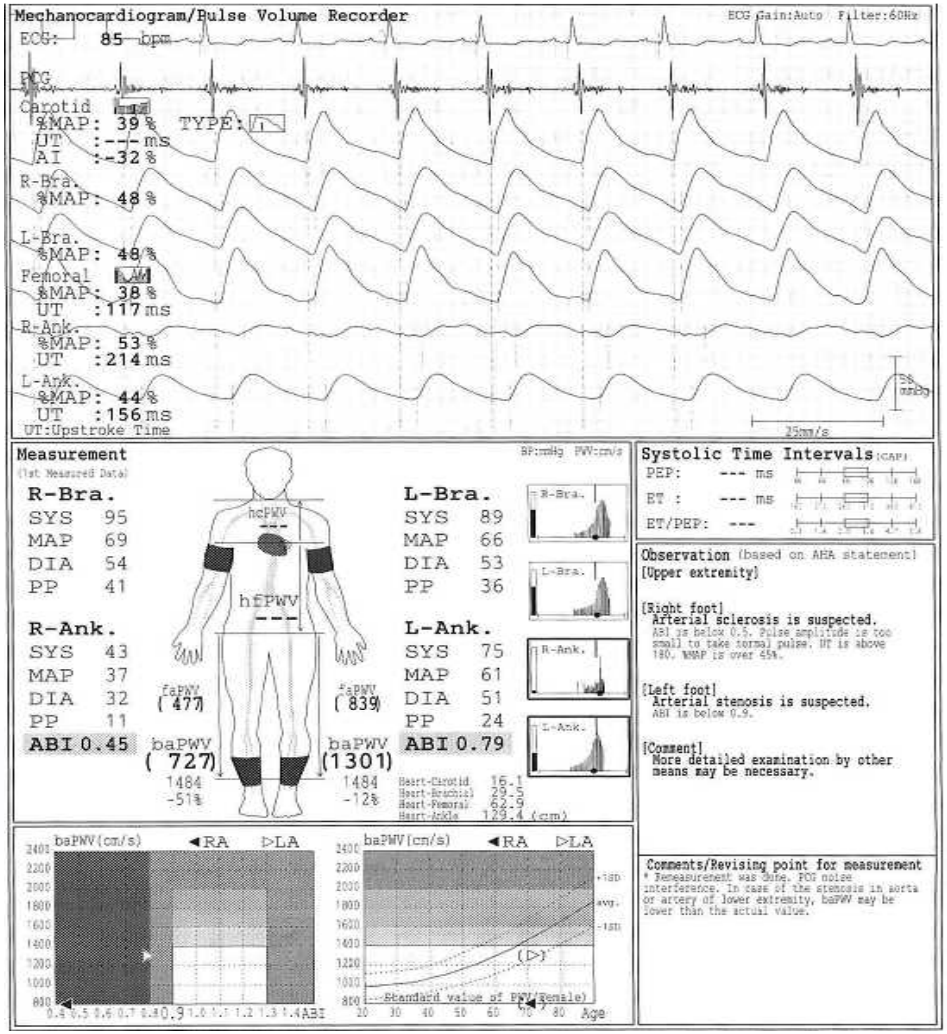
- Chief Complaint : right leg claudication

- 상기 환자는 수년전부터 50m 만 걸어도 intermittent claudication이 있어 오다가 2주전부터 심해져서 방문하심 ,

- Past History : HT(-), DM(+) 20년 전 발병 ,
  Hyperlipidemia(-), CVA(-)
  3년전 Ovarian Ca.로 op.하심

- Social History : Smoking (-)

Ankle Brachial index



CT


Idx 1
Sensation 16
Se 602
Im 1
CT
0.0thk
0.0
H
R
FOV 1024X1024
TP 0.0
TI 0
kVp 0.0
mAs 0
GT 0
Vascular^AngioRunOff (Adult)
VRT Collection
2008-02-13/20:58:01
50pt
F
Idx 50
Sensation 16
Se 4
Im 25
CT
FFS
6.0thk
APPLIED
0.0
L
FOV 324X324
TP 212.0
TI 500
kVp 120.0
mAs 140(266 mA)
GT 0
Vascular^AngioRunOff (Adult)
Angio_ce 6.0 B30f
2008-02-13/18:56:06
P
50mm
W 320
L 40
Z 100%
Compression 4:1

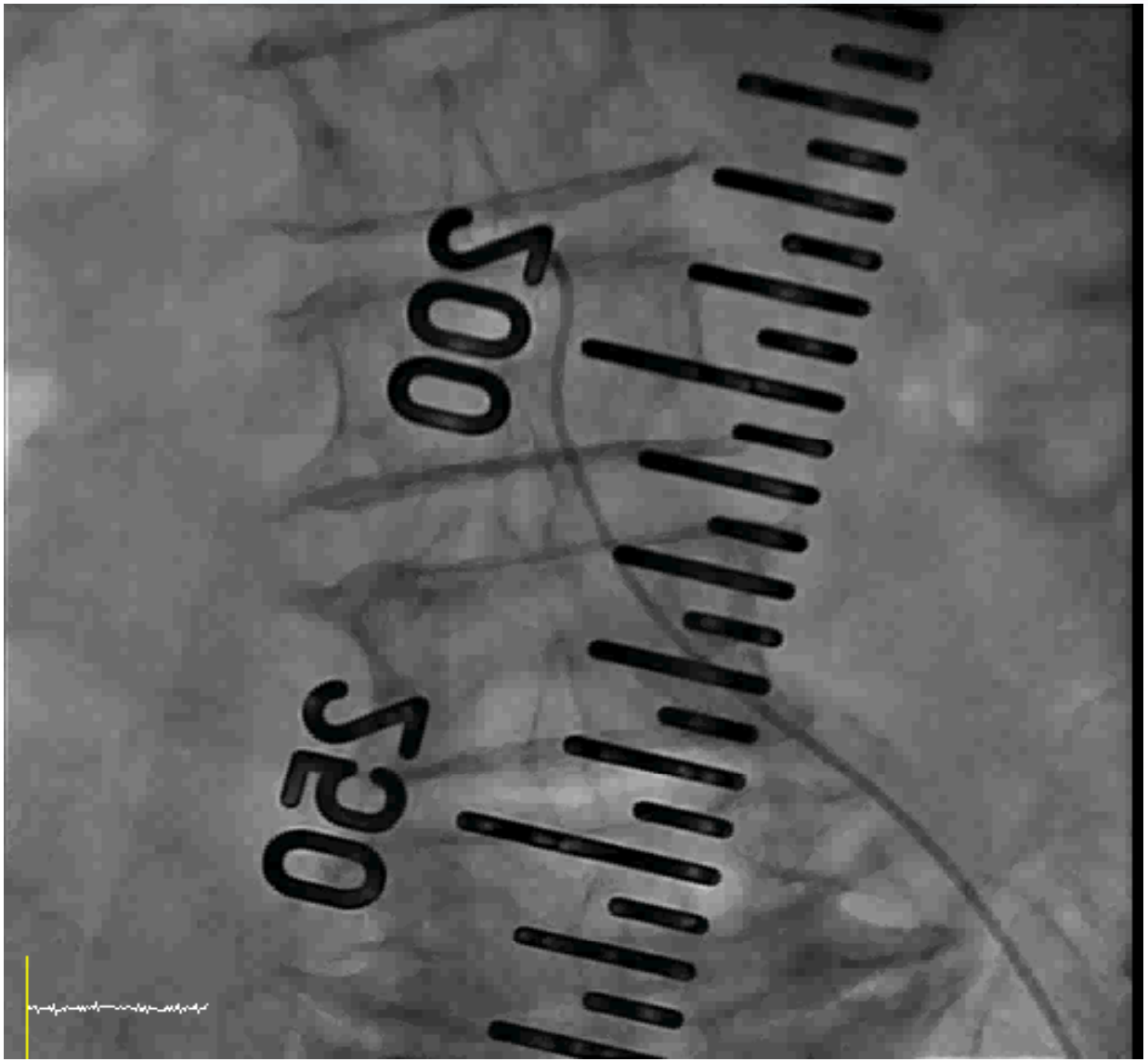
Assessment

1. PAD(Right common iliac artery total occlusion)
2. DM

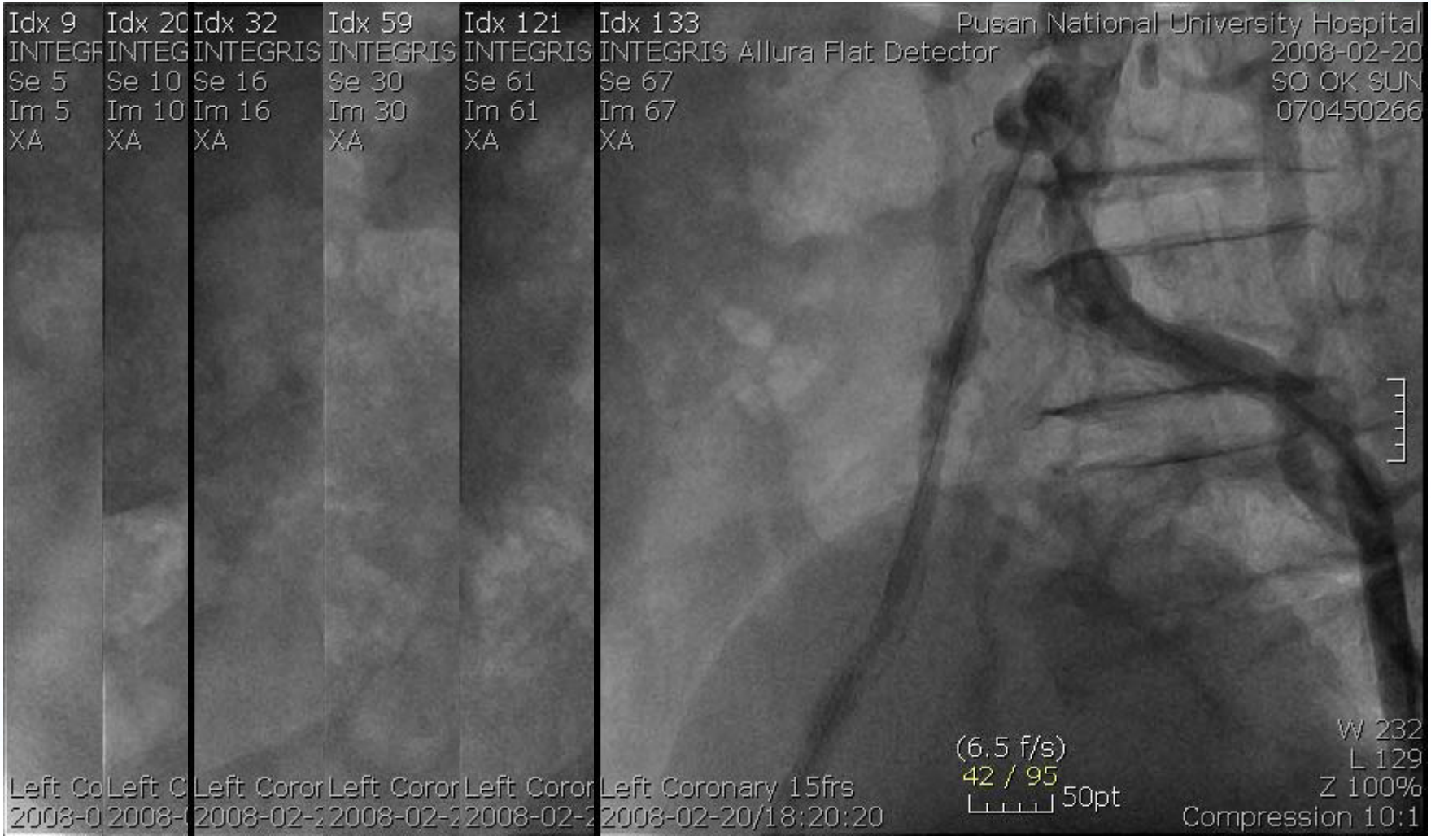
Plan

1. PTA for right CIA
2. DM control

Peripheral Angiography



Peripheral Angiography



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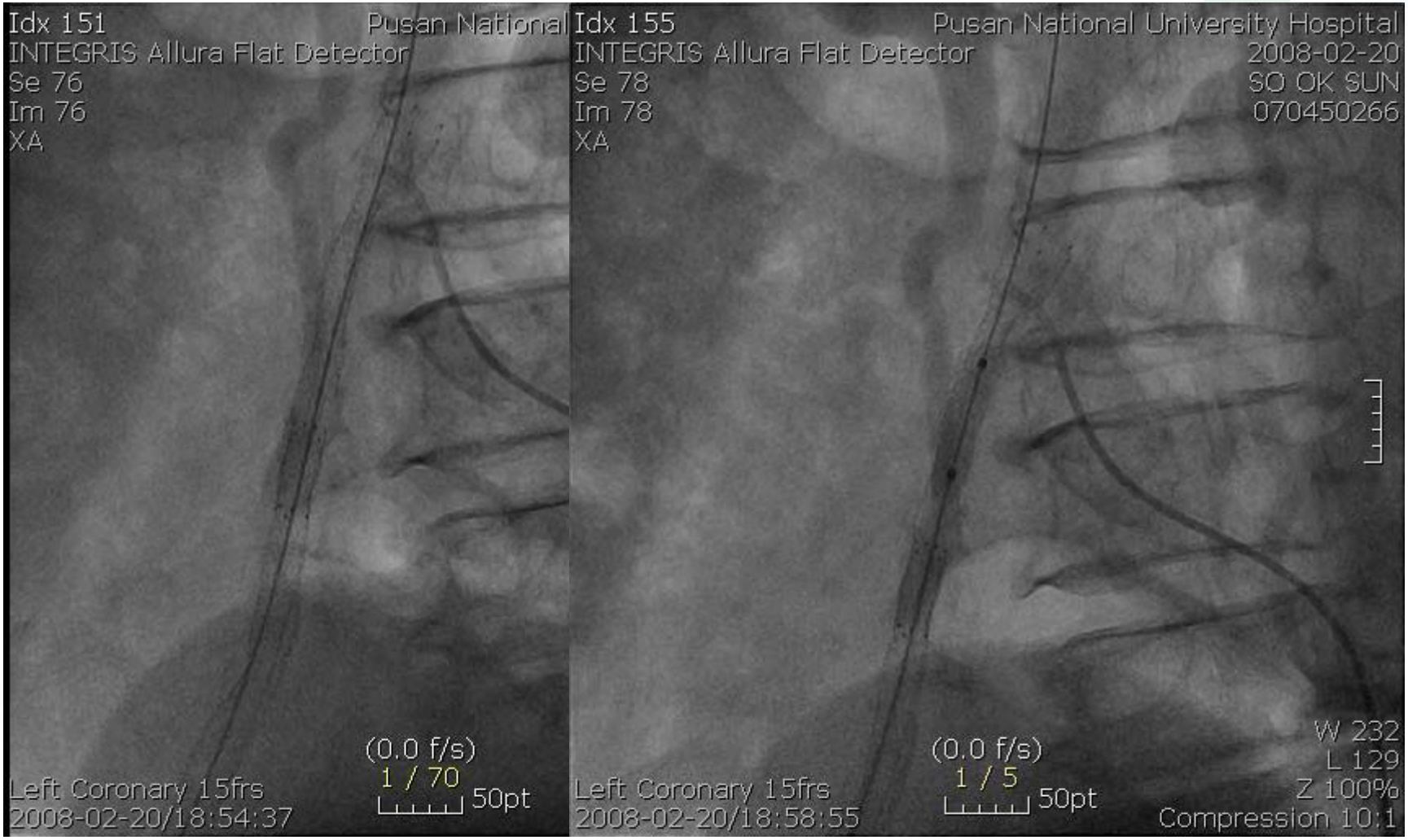
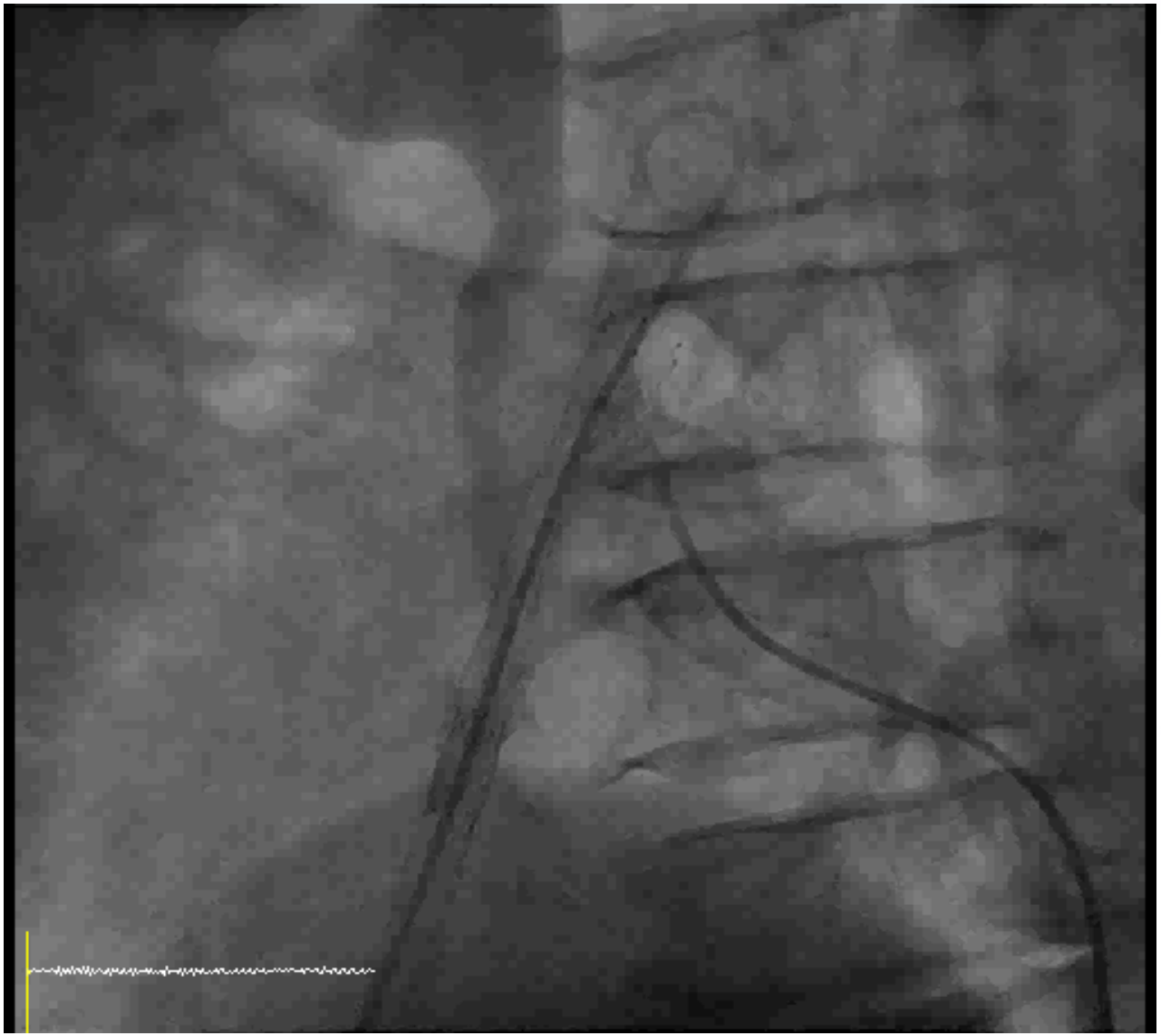


Peripheral Angiography



Aortoiliac Disease : Patient Selection

- 일상생활에 지장을 주는 claudication (Fontaine class III or IV and Rutherford class 4, 5, 6.)
- Resting pain
- Critical limb ischemia
- 정형외과 문제로 오진

Aortoiliac Disease : Diagnosis

- History and Physical examination.

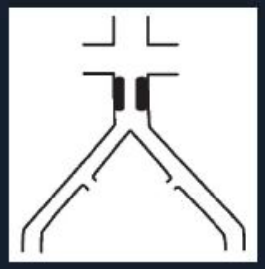
- Ankle brachial index (ABI)
- CT
- MRI
- Duplex ultrasonography
- Angiography

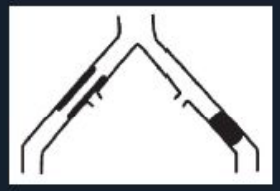
TASC II Recommended Therapy of Aorto-Iliac Artery Stenosis/Occlusion

Endovascular Treatment of Choice

Type A

Preferred Endovascular Treatment





Types B

Preferred Surgical Treatment

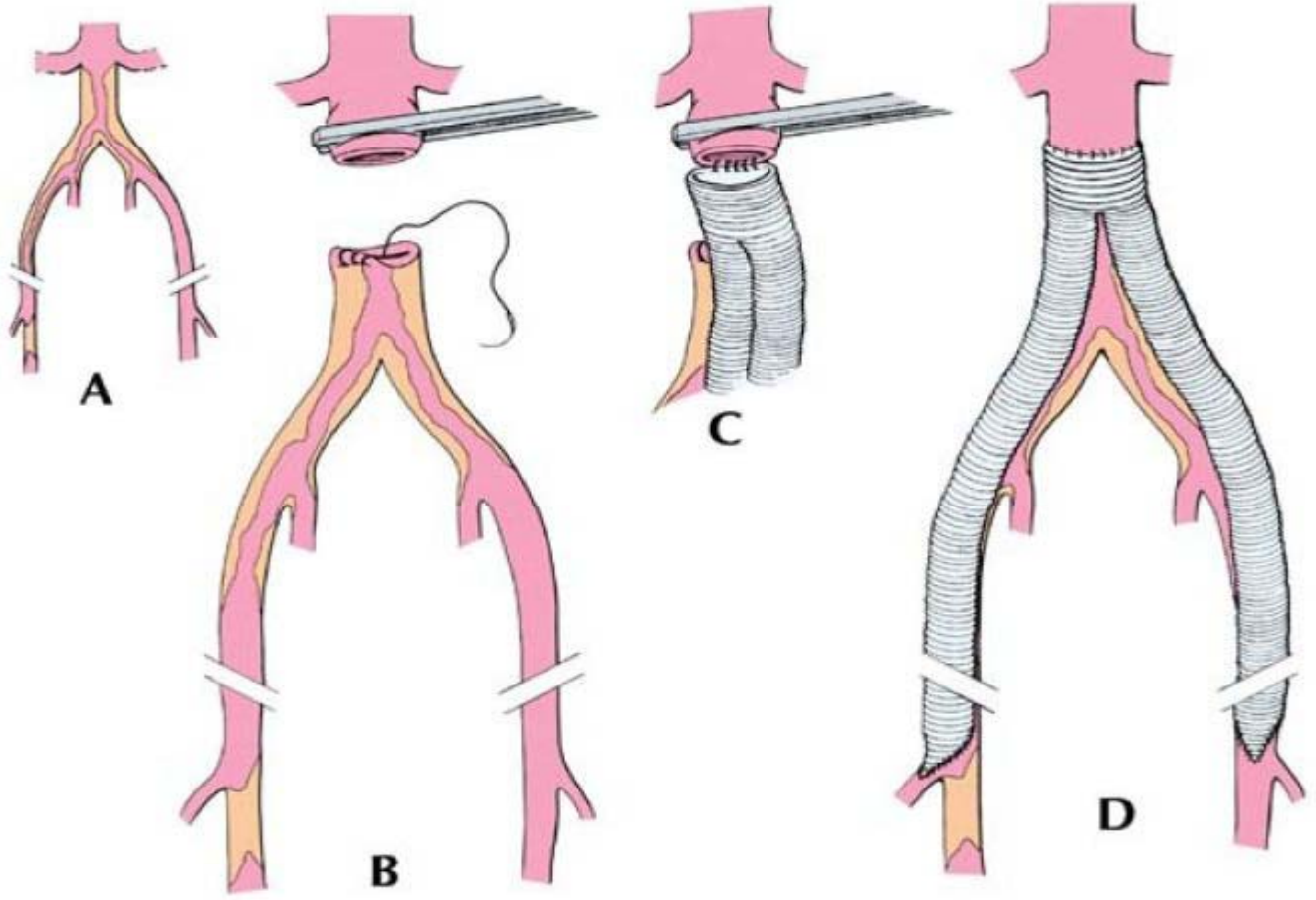
Types C

Surgical Treatment of Choice

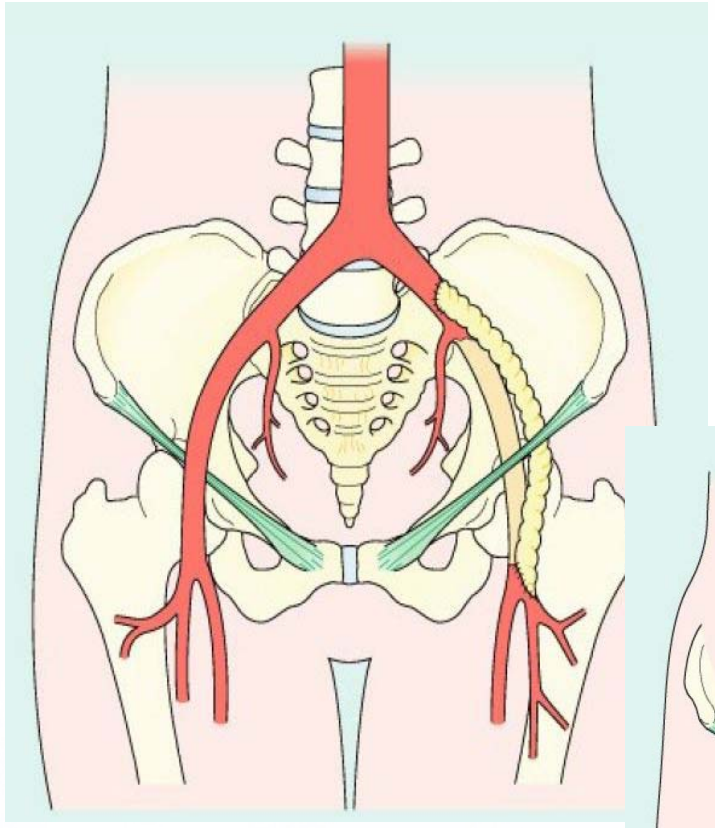
Type D

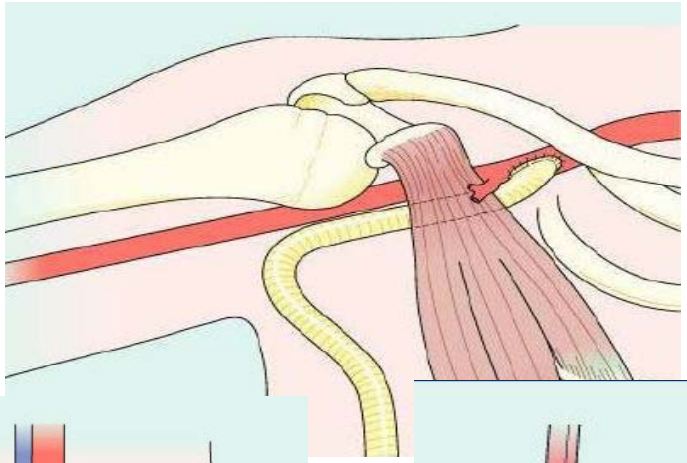
Norgren L et al. *JVS*. 2007:S5A–S67A

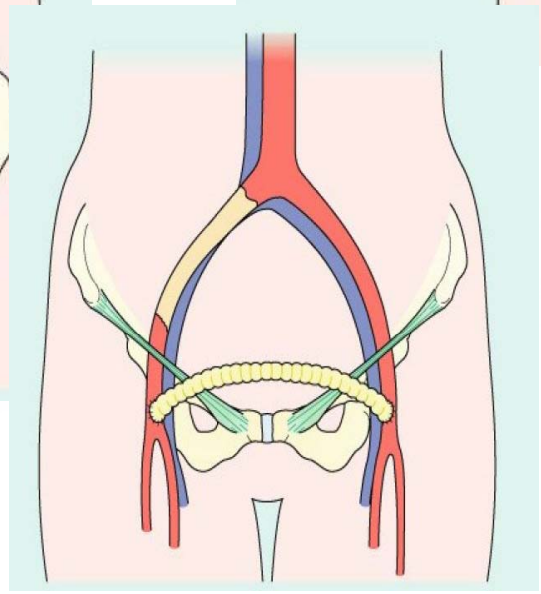
Aortoiliac Operation

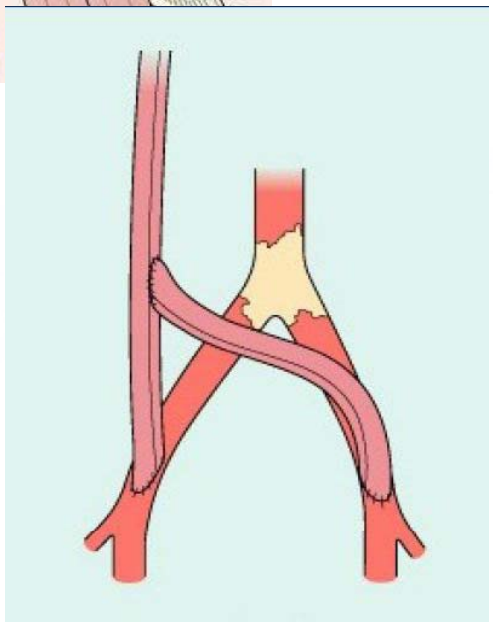


Aortoiliac Operation









Aortobifemoral Bypass Operation

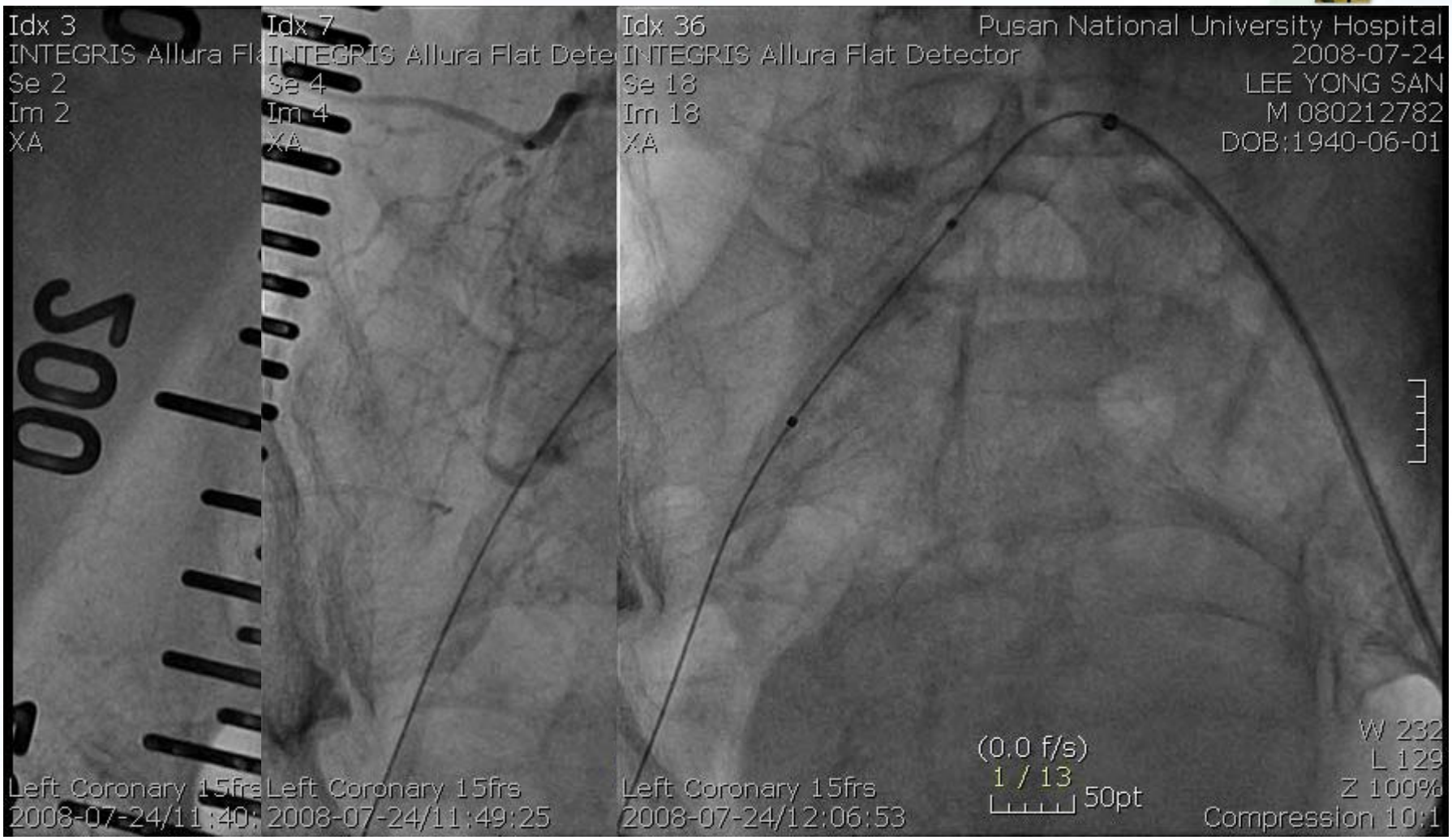
	Pre 1975	Post 1975
Mortality	4.6%	3.3%
Morbidity	13.1%	8.3%

- Patency Rates

	5 yr	10 yr
Claudication	91.0%	86.8%
Limb Ischemia	87.5%	81.8%

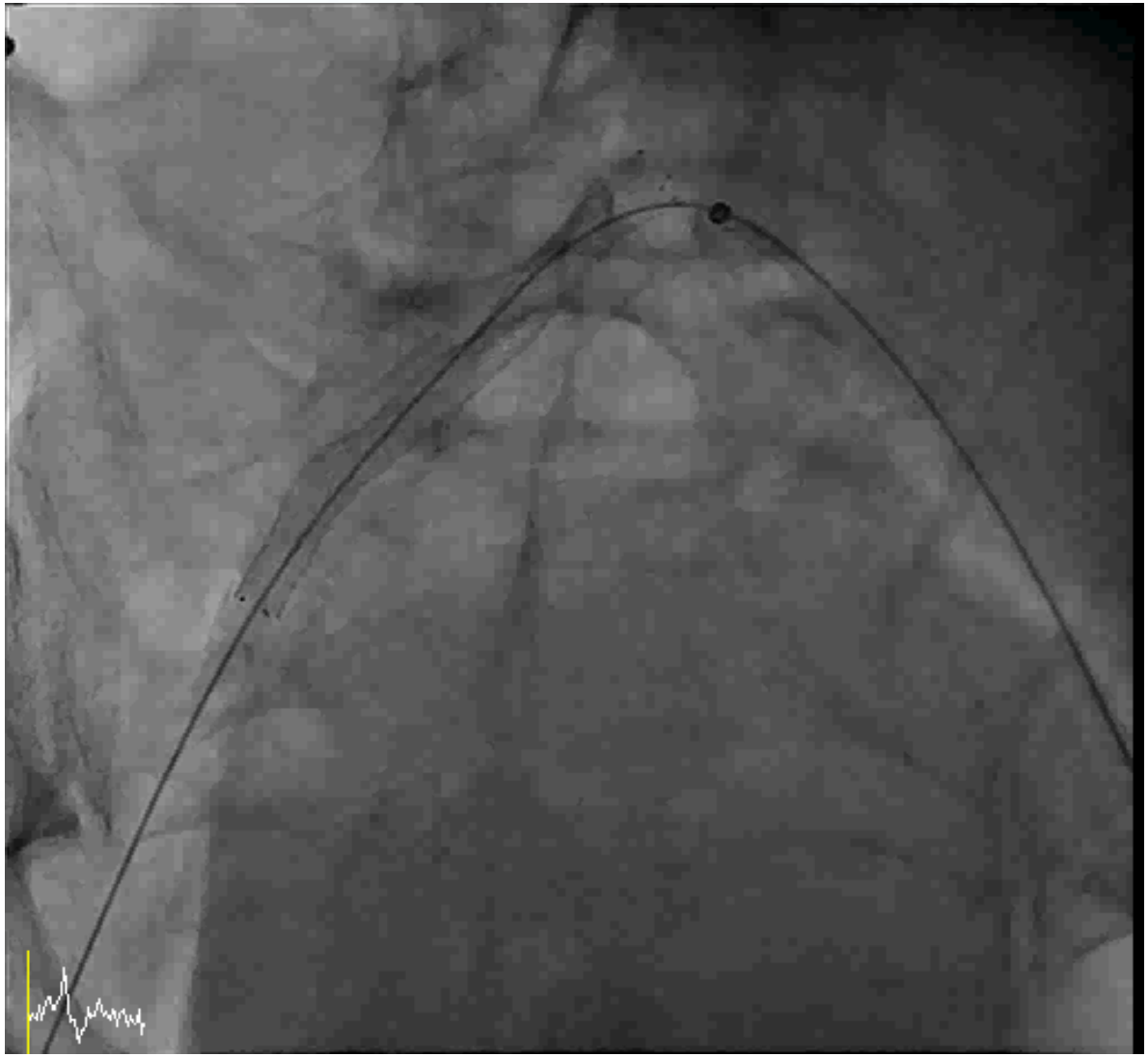
De Vries and Hunink, JVS 1997; 26:558-569.

Aortoiliac Balloon Angioplasty



Aortoiliac Balloon Angioplasty

Aortoiliac Balloon Angioplasty

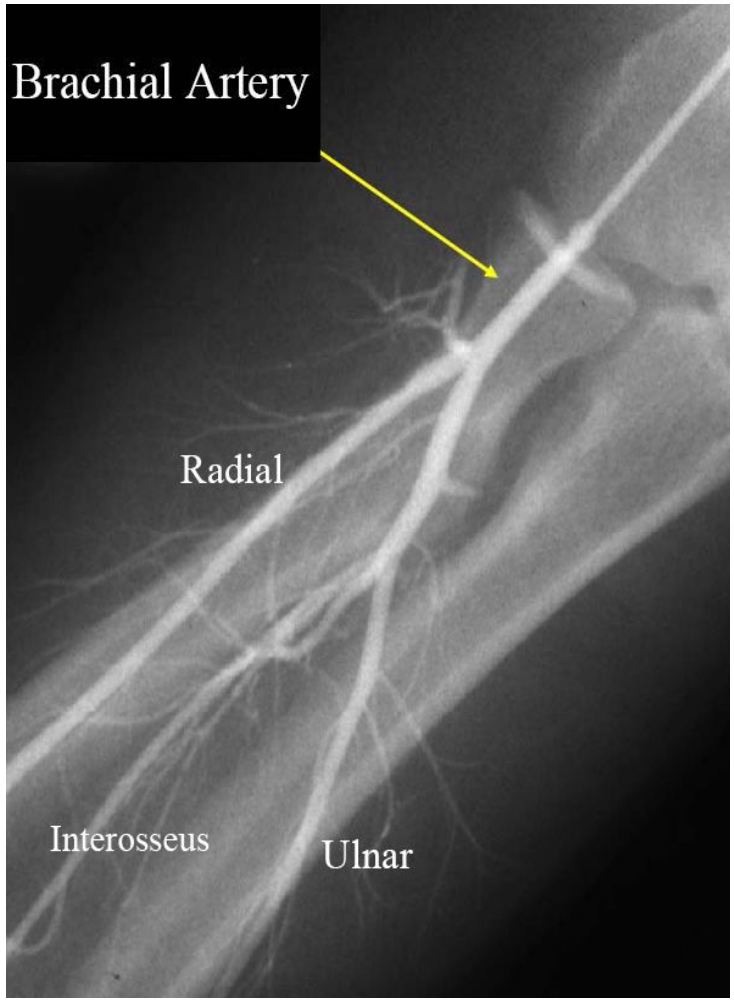


Aortoiliac Balloon Angioplasty : Access Site

- Contralateral femoral
- Ipsilateral femoral
- Radial / Brachial

Access Site : Brachial Artery

- Puncture 2 cm above joint
- Micropunture set
- Larger vessel
- Closer to target
- Higher risk
  - Hematoma
  - Compartment syndrome
  - Pseudoaneurysm



Interventional Device

- **Balloons**

- **Debulking devices**
  - Excimer laser
  - Excisional atherectomy

- **Stents**
  - Nitinol self-expandable
    Bare, Covered
  - Balloon-expandable : Bare, Covered

Balloon Expandable Stent : Advantages

- High radial strength
- Accurate deployment

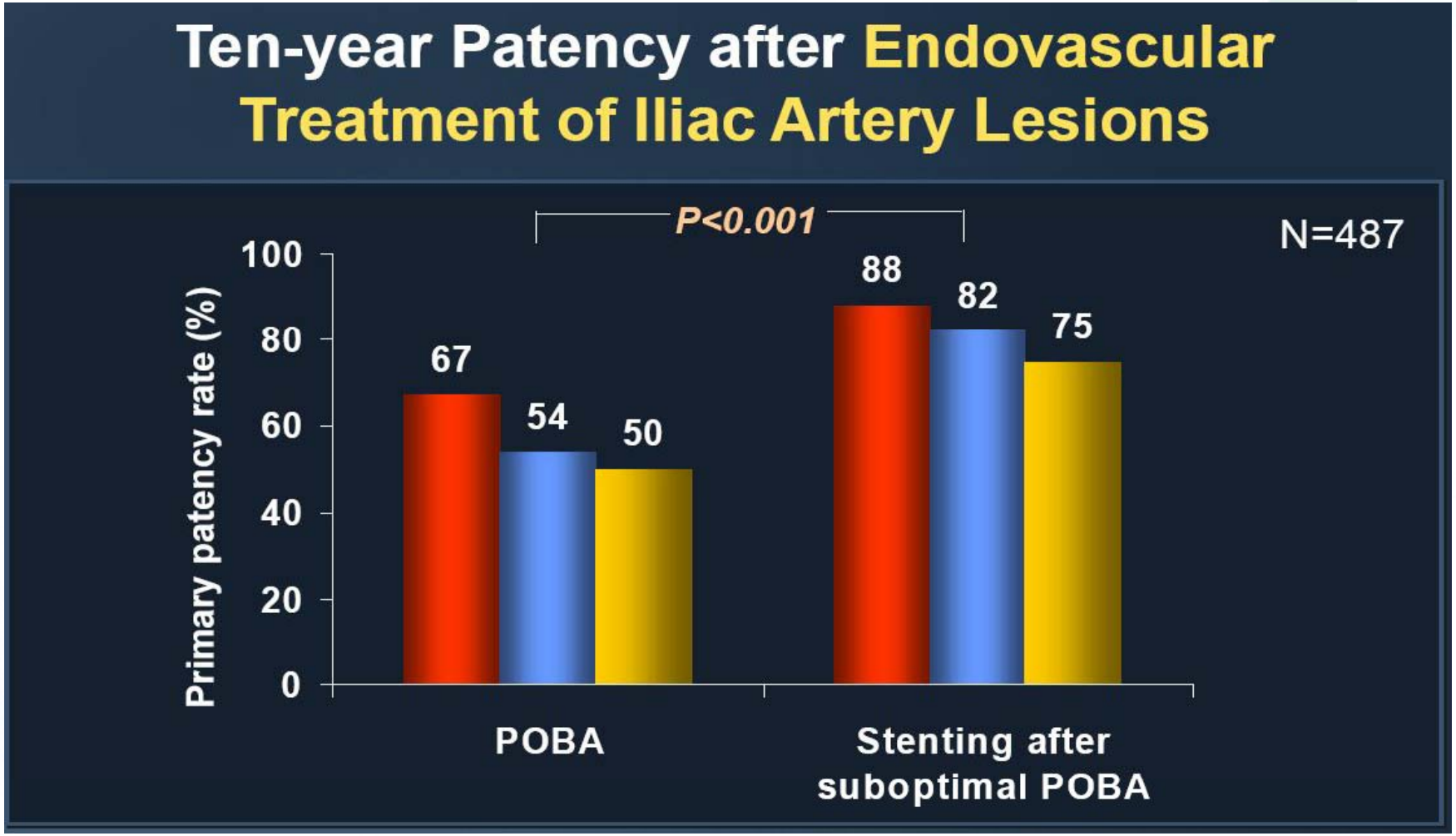
Nitinol Stents vs. Stainless Stents

Results:

Primary patency at 12 months was 94.7% and 91.1% with the SMART stent and Wallstent, respectively

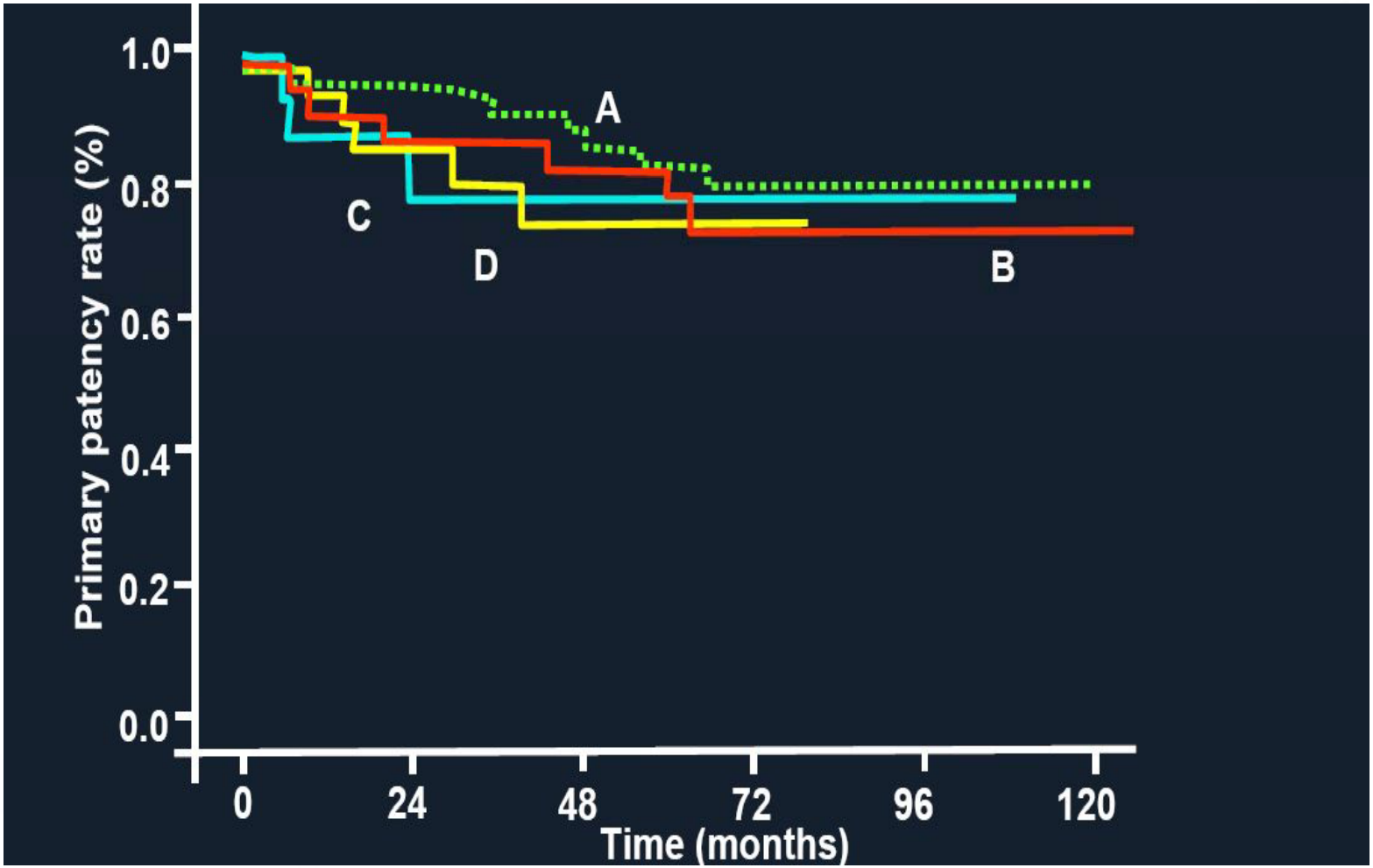
Ponec D et al; J Vasc Interv Radiol 2004; 15:911–918

Angioplasty vs. Stent



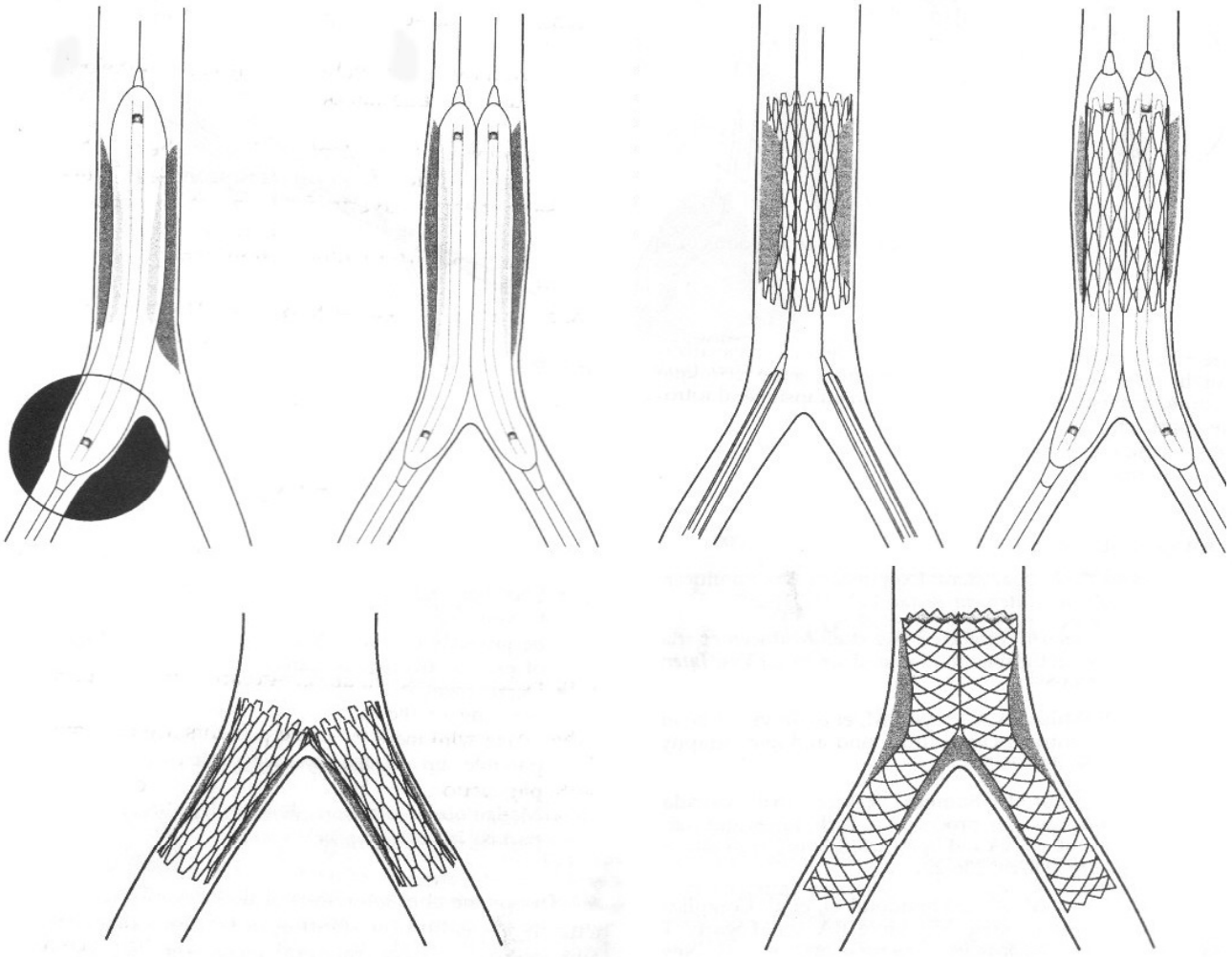
Koizumi A, et al. Circ J 2009;73(5):860-6

TASC-II Lesion Type and Long-term Patency after Endovascular Treatment of Iliac Artery Lesions

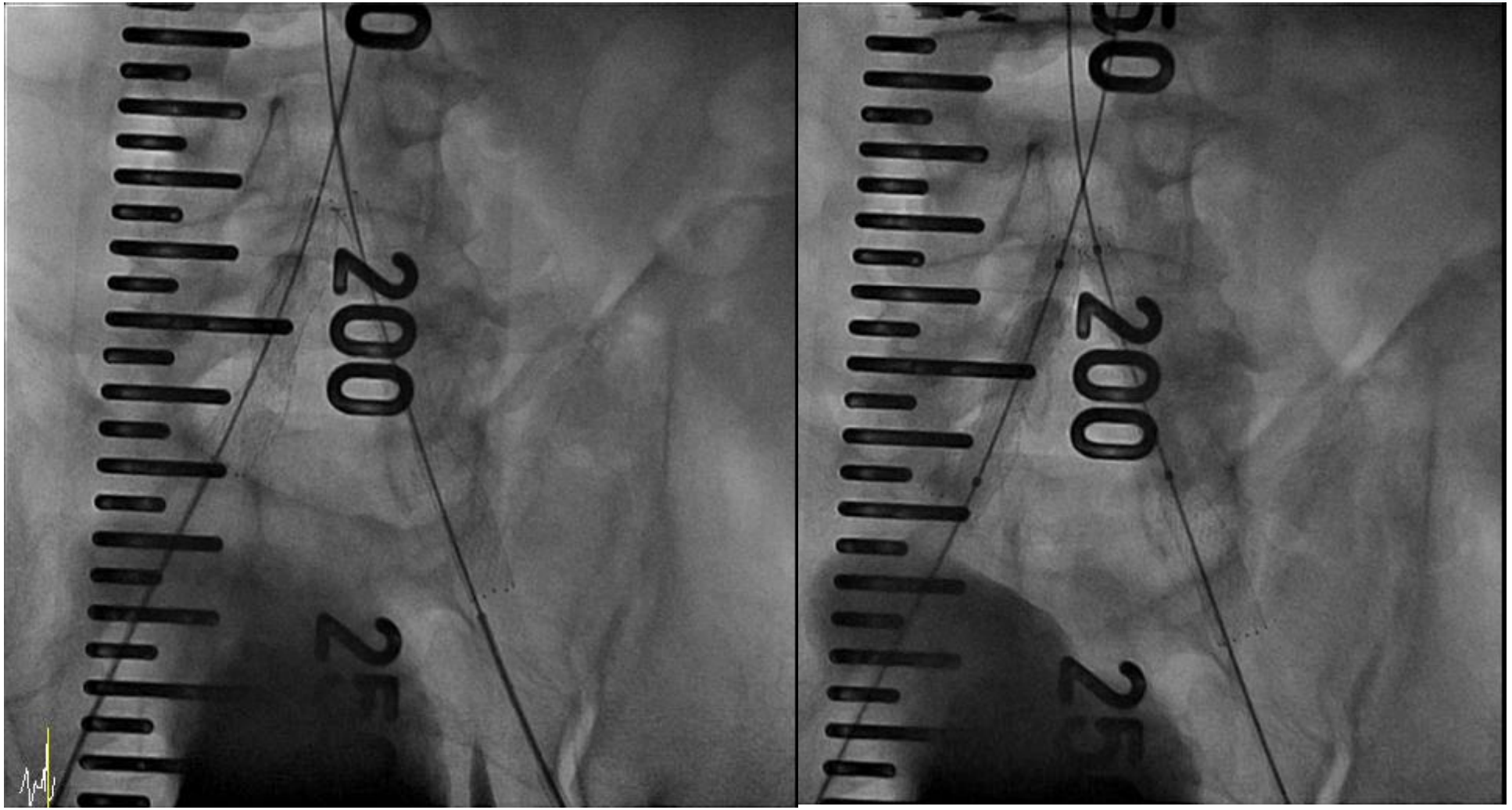


Koizumi A, et al. Circ J 2009;73(5):860-6

Kissing stents or Distal Aortic Stent at the Aortoiliac Bifurcation



Kissing stents or Distal Aortic Stent at the Aortoiliac Bifurcation



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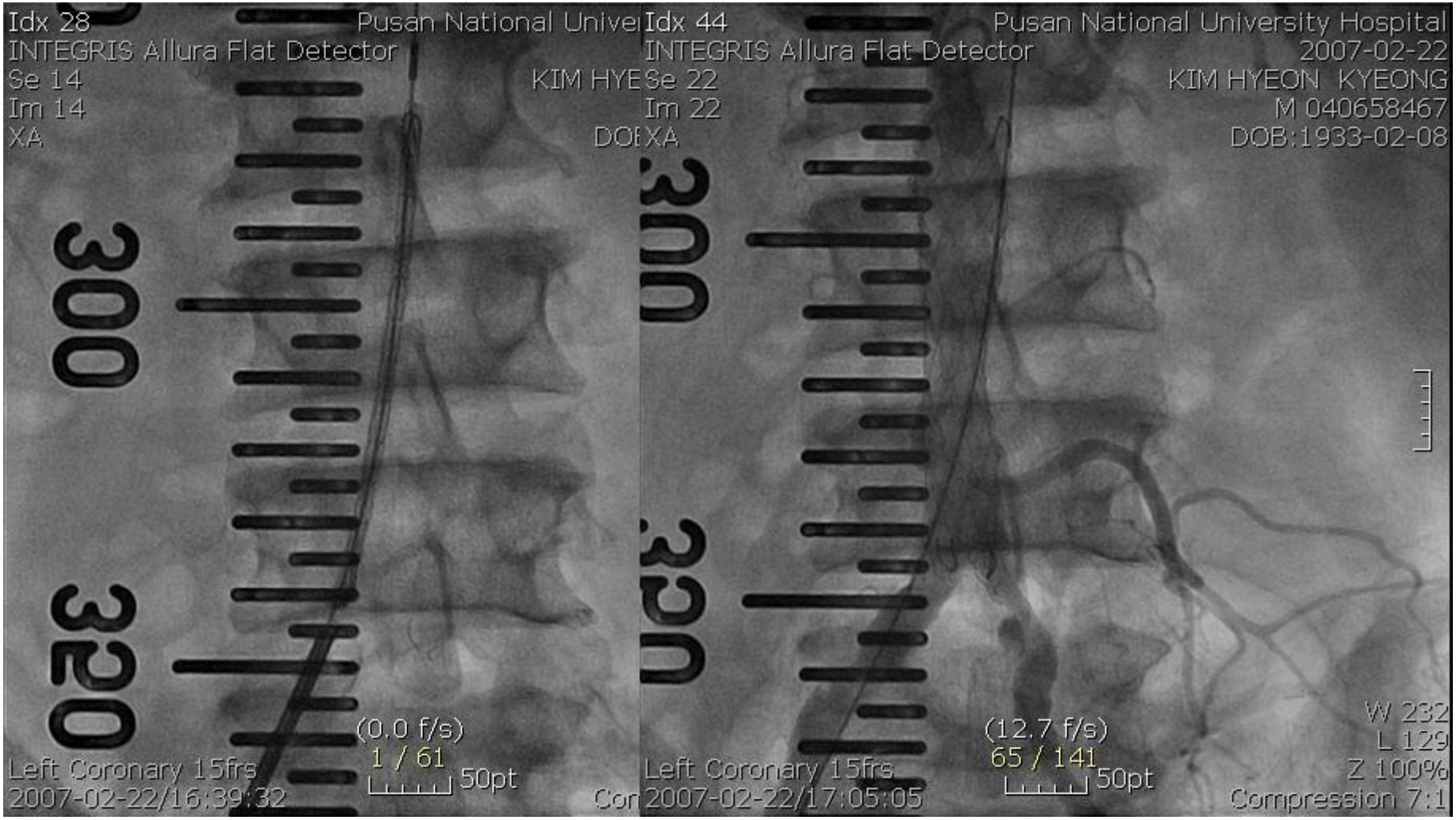
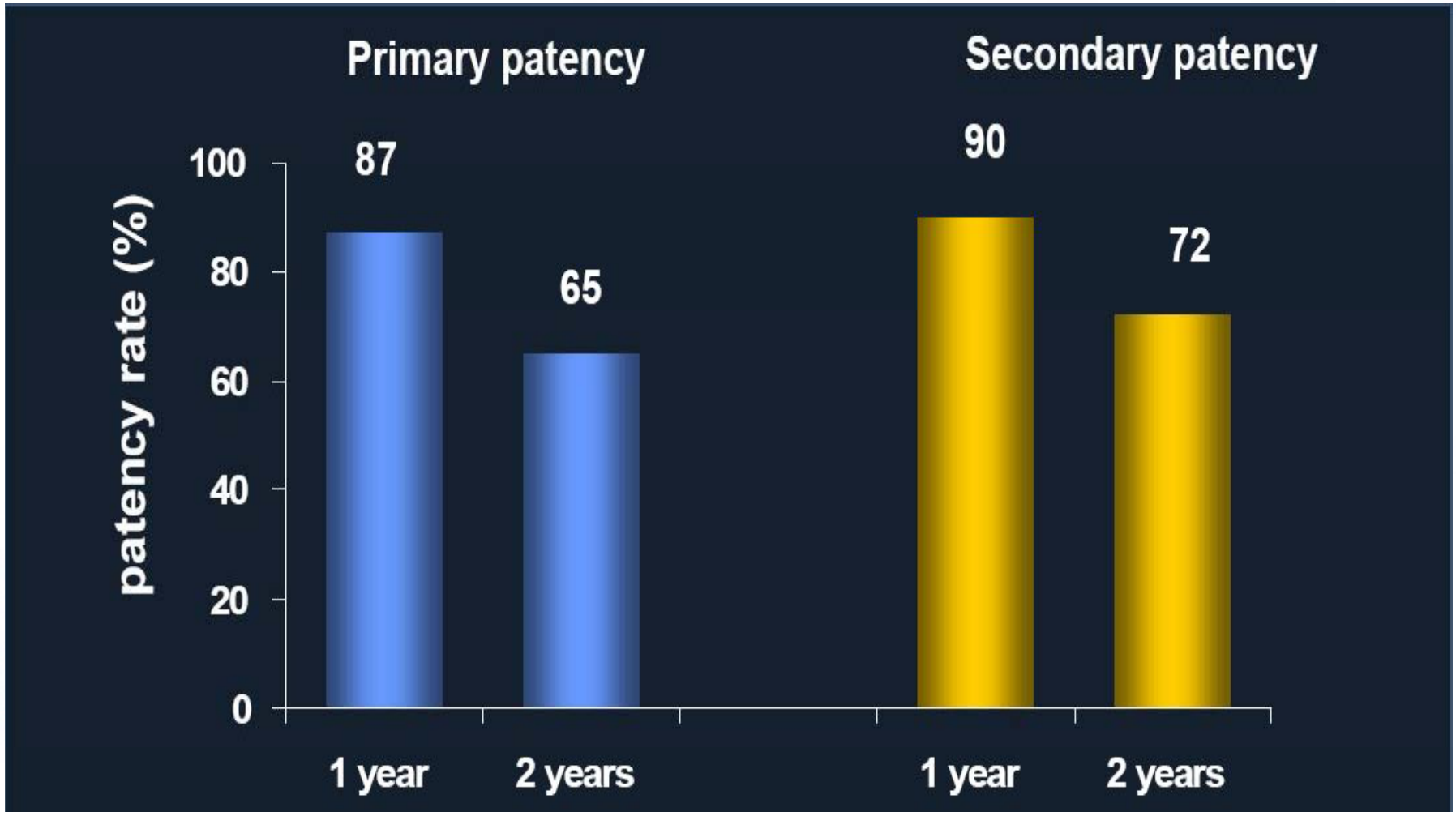


Kissing stents or Distal Aortic Stent at the Aortoiliac Bifurcation

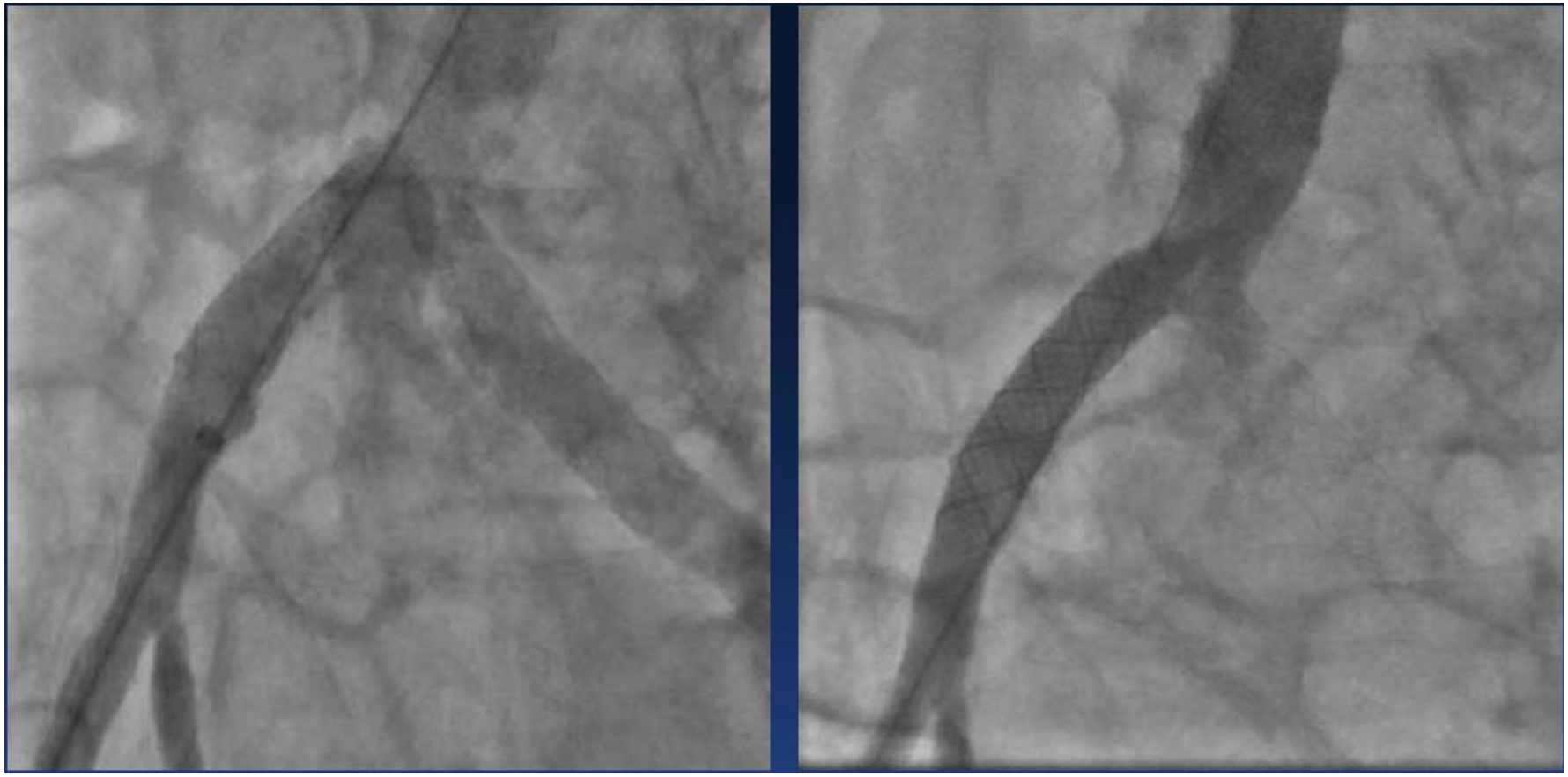


van't Riet M, et al. *J Vasc Nurs* 2008;26(3):82-5.

Iilac artery Perforation

Perforation

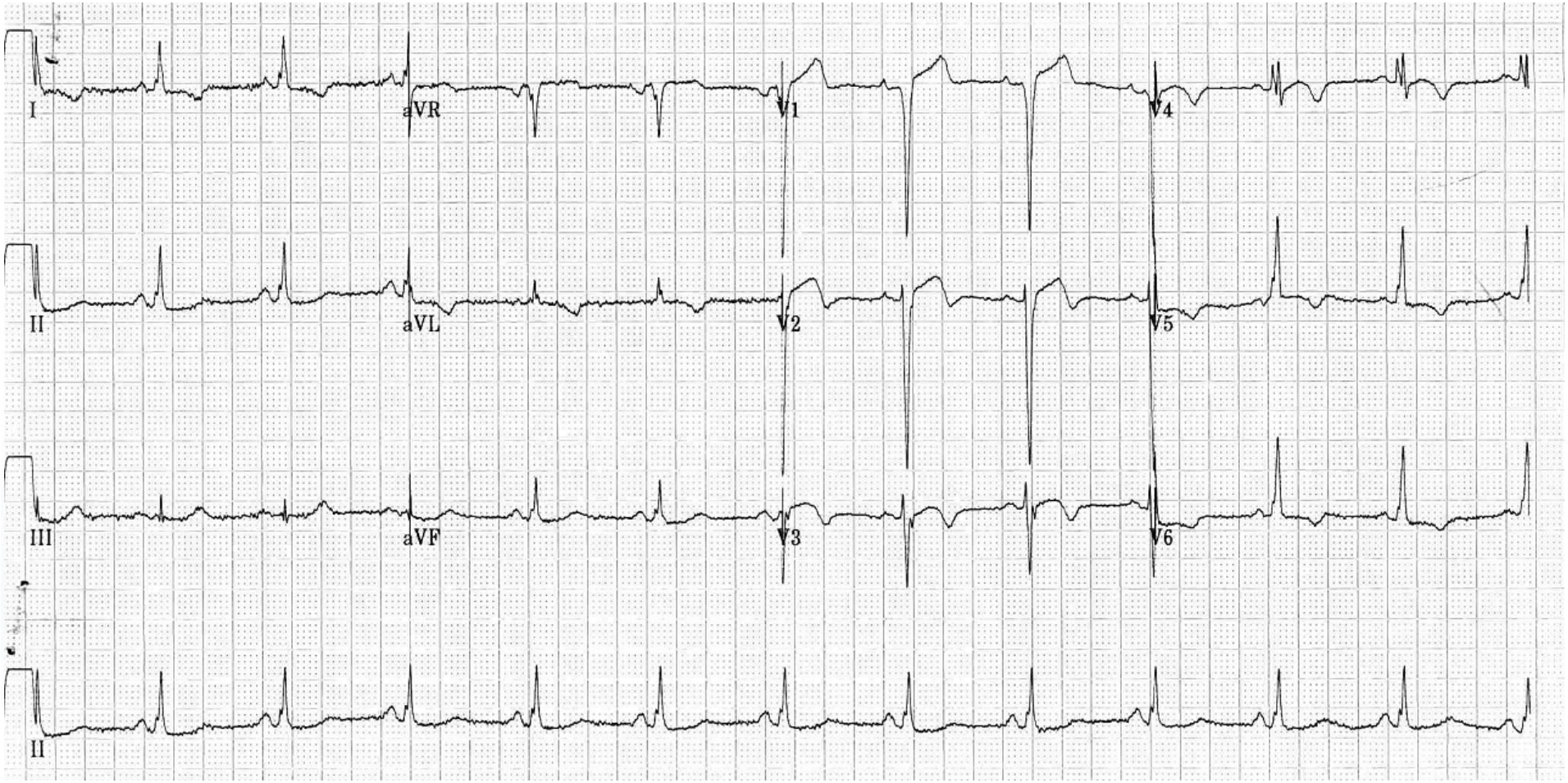
Graft stent



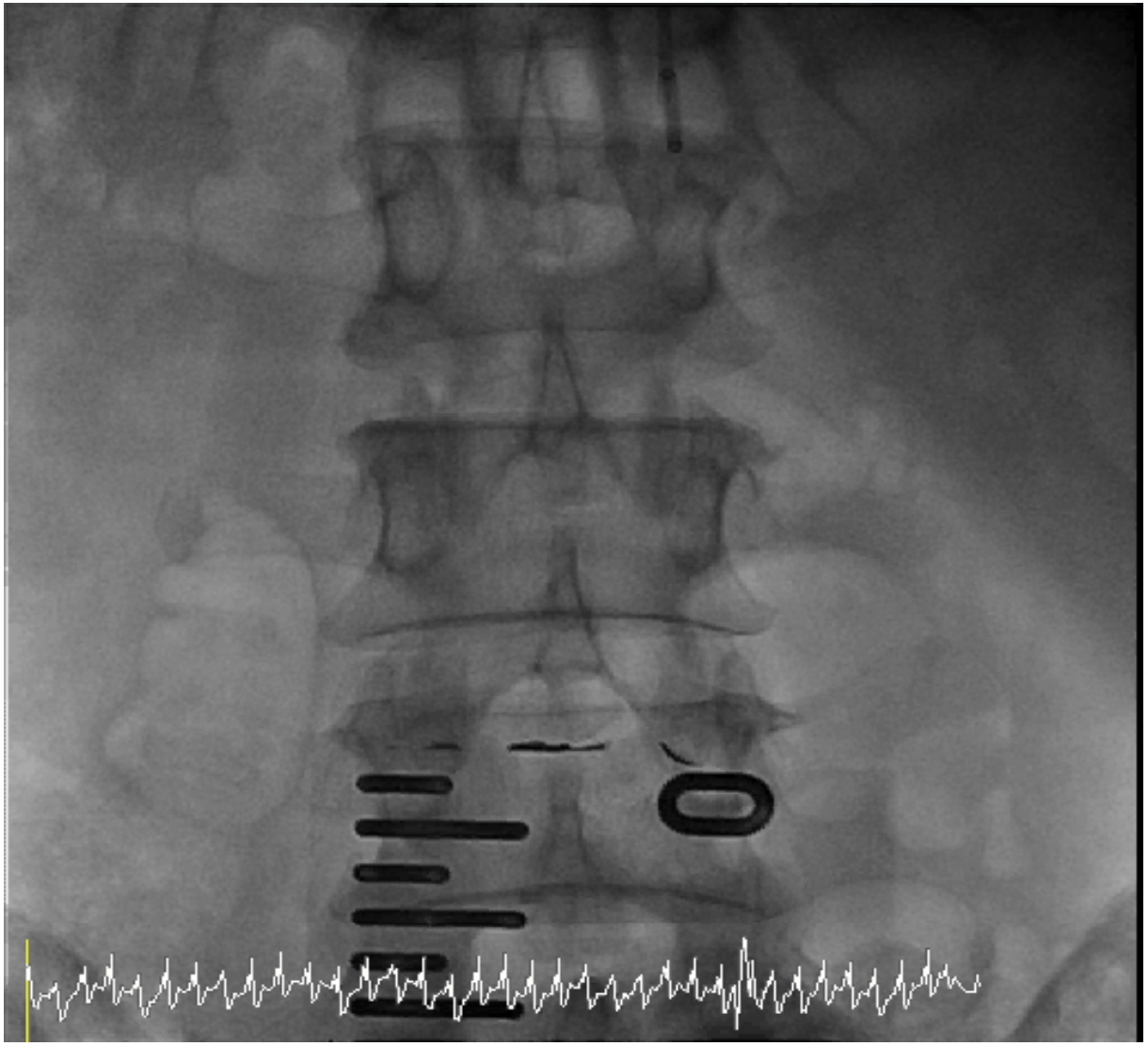
Acute Occlusion of Aorta : Case

- M/56
- 2 개월전부터 30분 보행시 왼발 저린감과 통증 발생하여 걷기 힘들었음
- 휴식중에 갑작스럽게 발생한 오른발 부위 통증으로 방문
- Smoking : 40PY, DM(-), HT(-)
- Both leg : coldness (+), pallor (+)
  popliteal a. pulse (-)
  dorsalis pedis a. pulse (-)
- CK/Myoglobin 479/1344

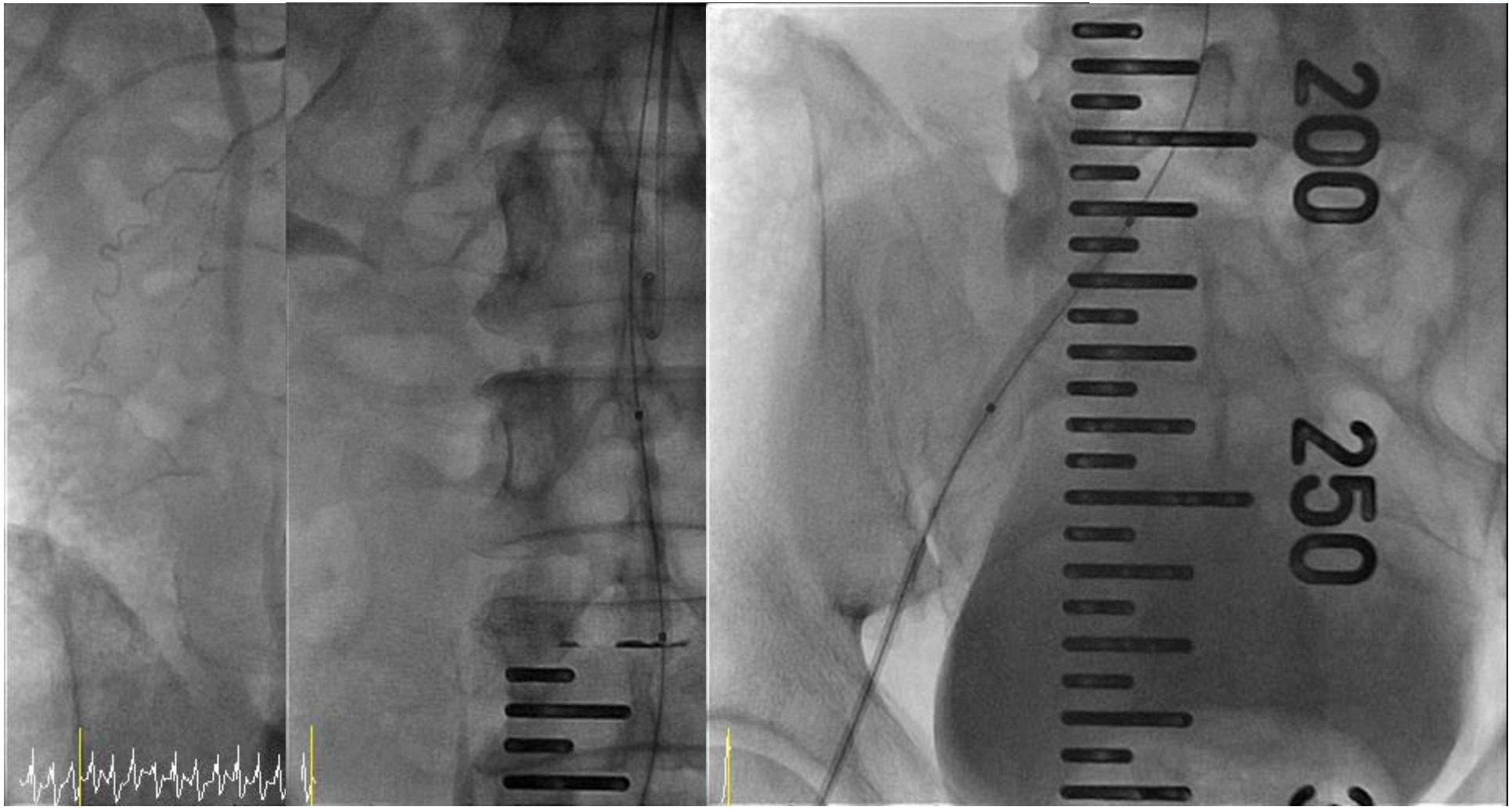
EKG



1st Angiography

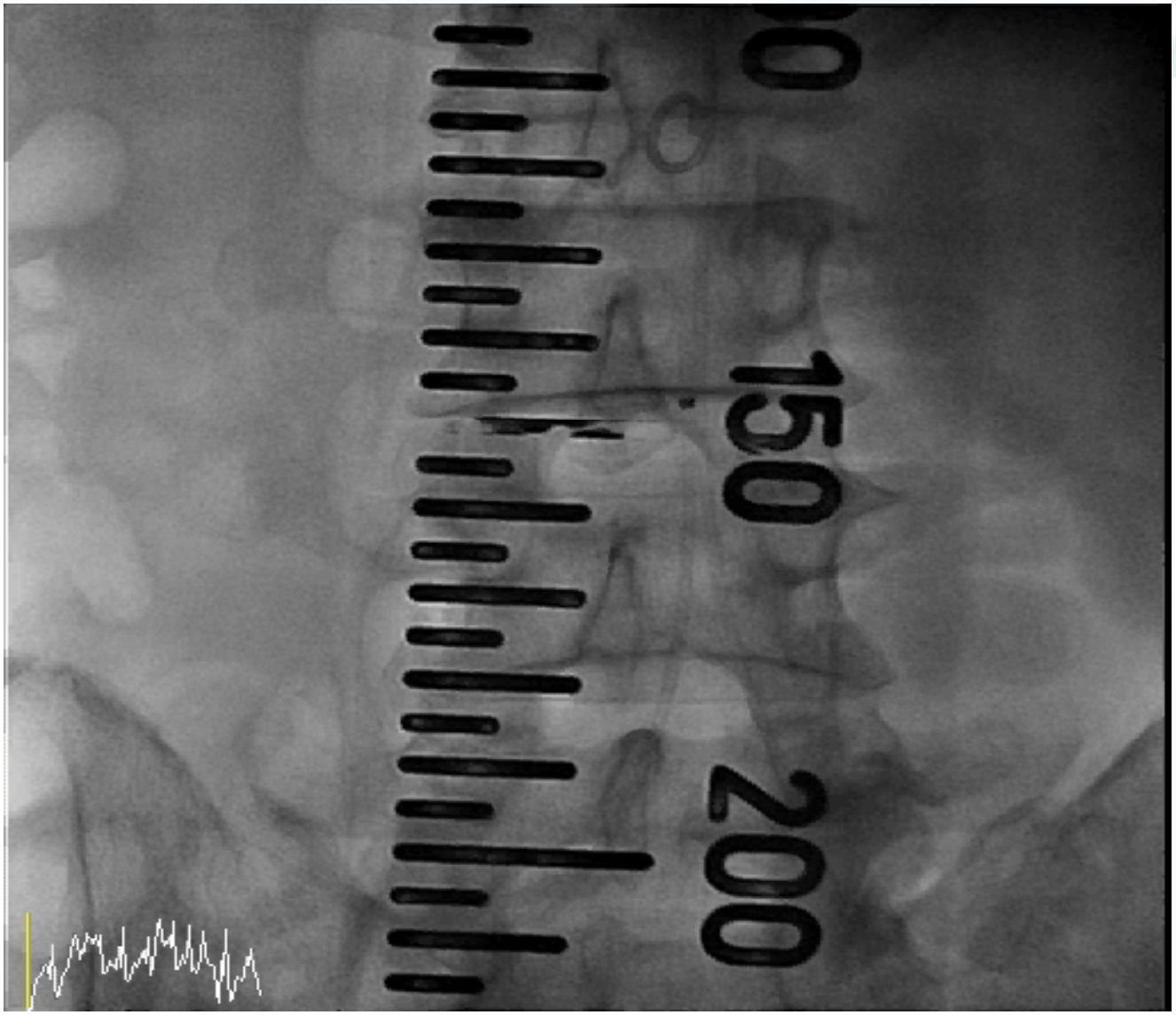


Wiring & Ballooning on Rt. Iliac Artery

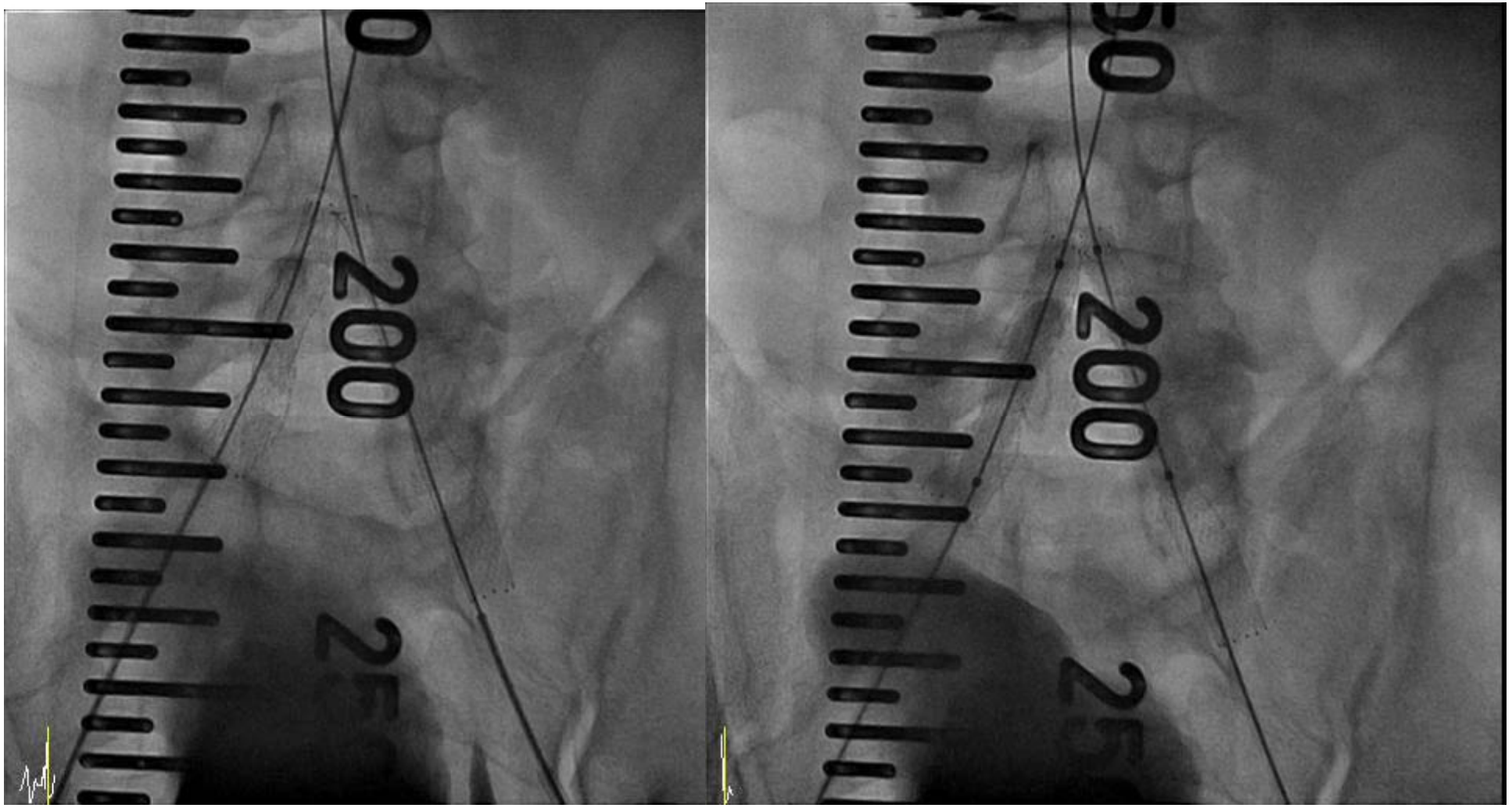


Wiring & Ballooning on Lt. Iliac Artery

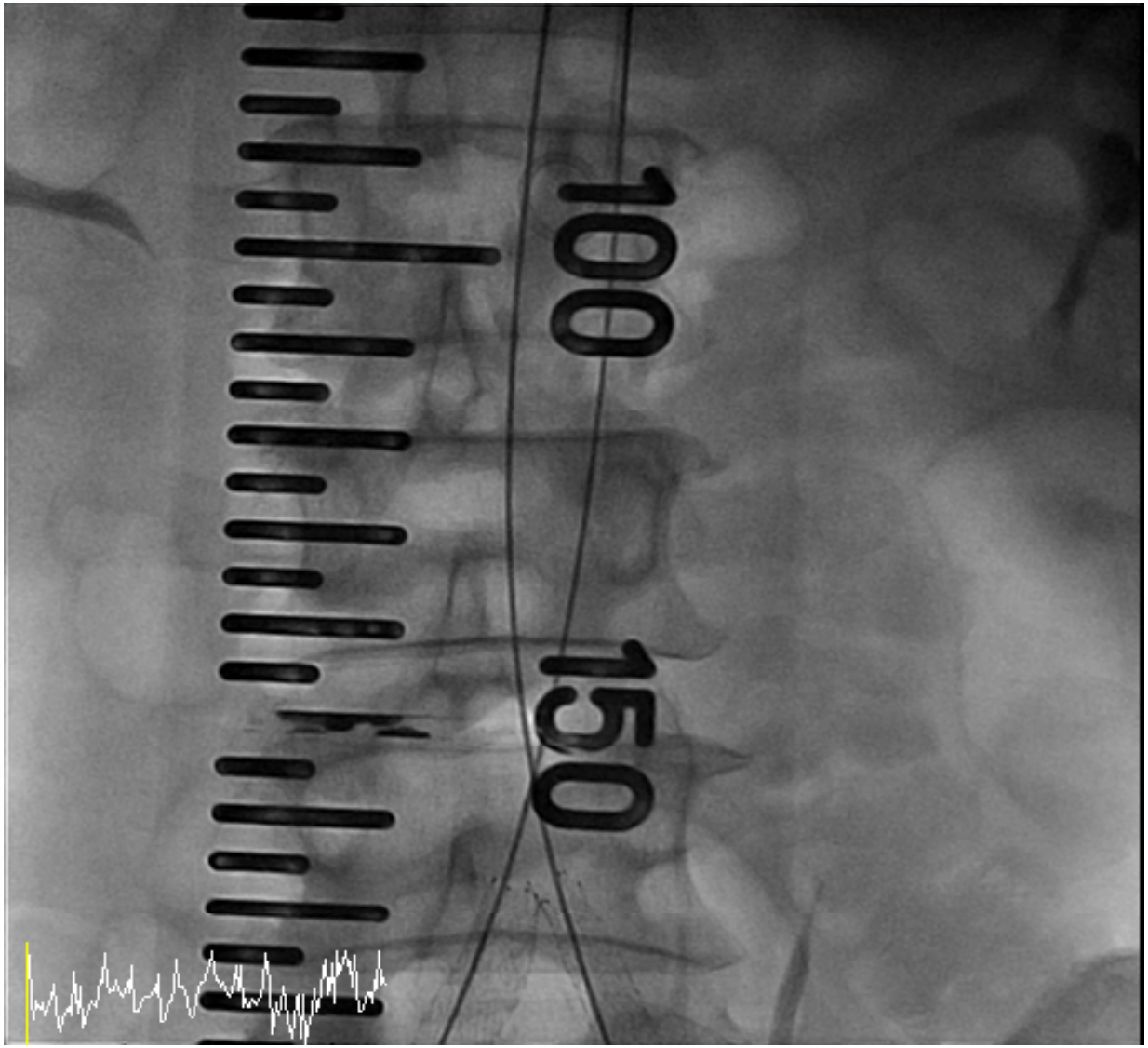
3rd Angiography



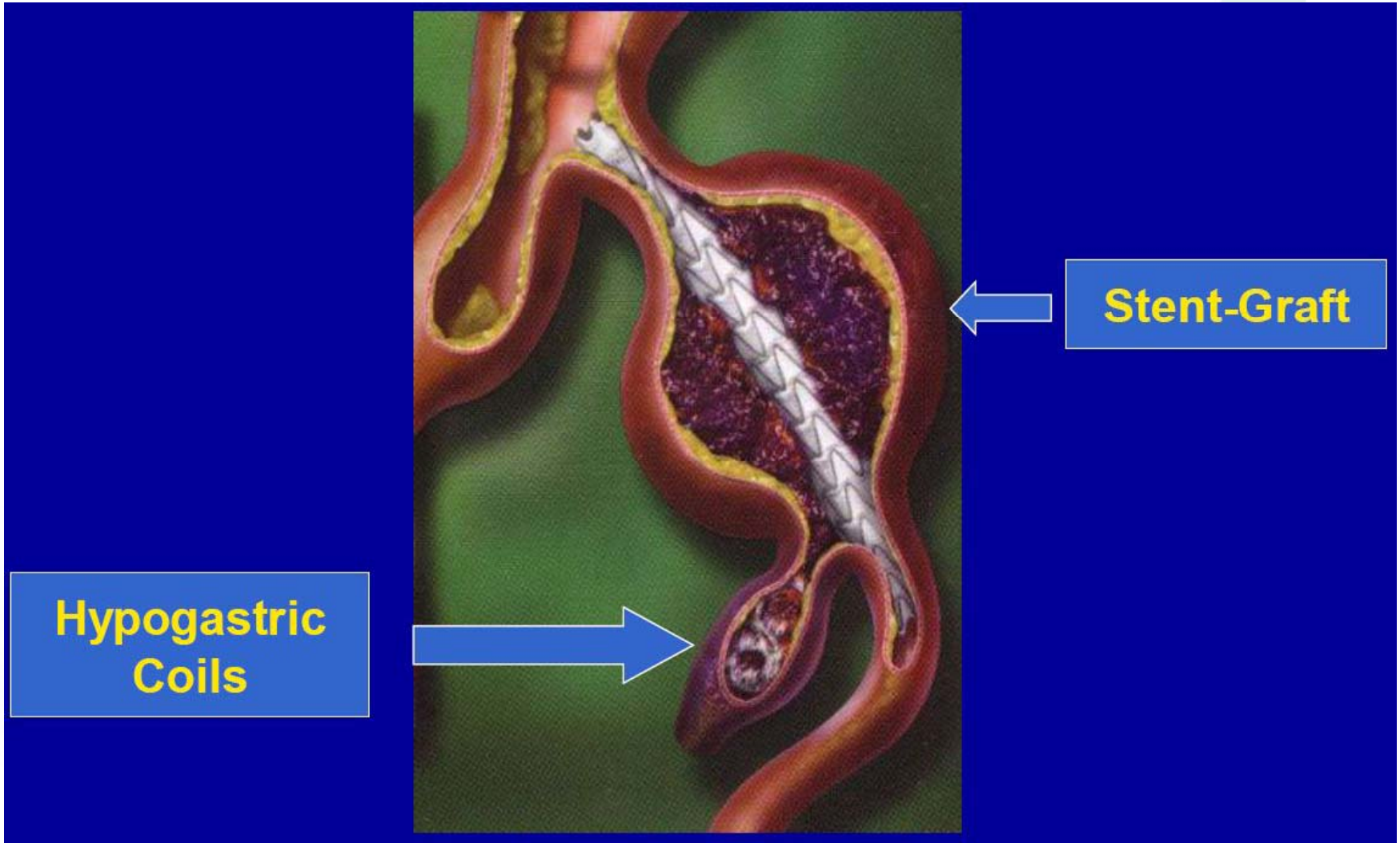
Kissing Stent insertion, Kissing ballooning on Both Ext. Iliac Artery



Final angiography



Common Iliac Artery Aneurysm



Common Iliac Artery Aneurysm : Endovascular Indication

3 – 3.5 cm

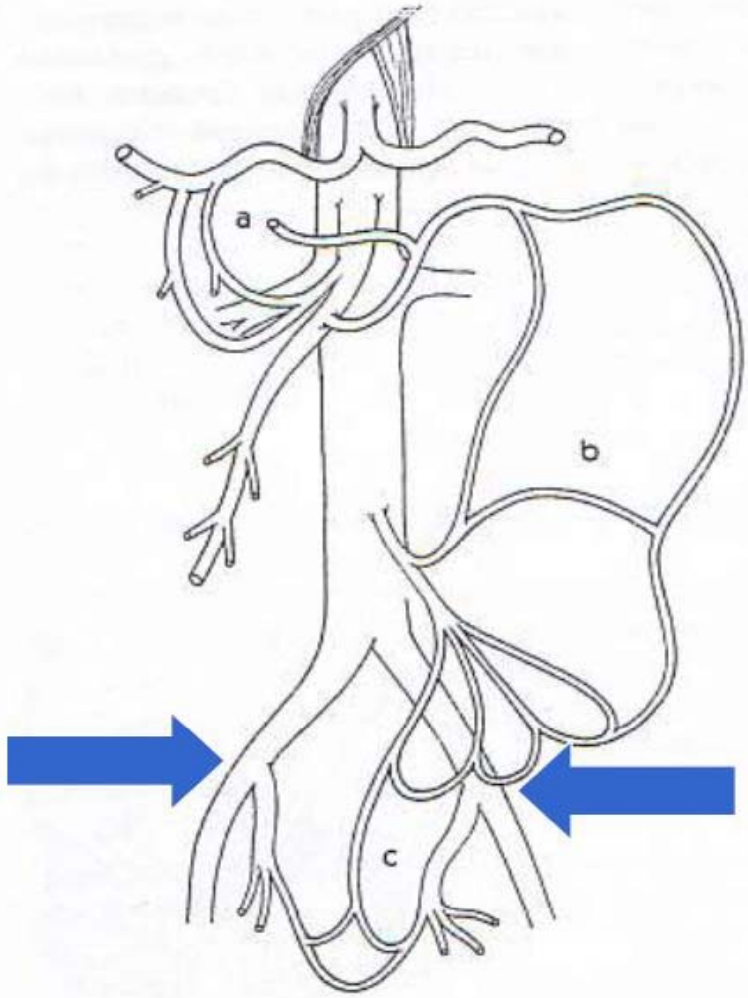
: Maxiaml external diameter

0.3 cm/ 1 year

: Median expansion rate

Common Iliac Artery Aneurysm : Hypogastric artery

- Bowel circulation
- Vascular impotence
- Buttock claudication
- Endoleak



Common Iliac Artery Aneurysm : Covered Stents

- Gore limb
- Talent limb
- S&G covered stent

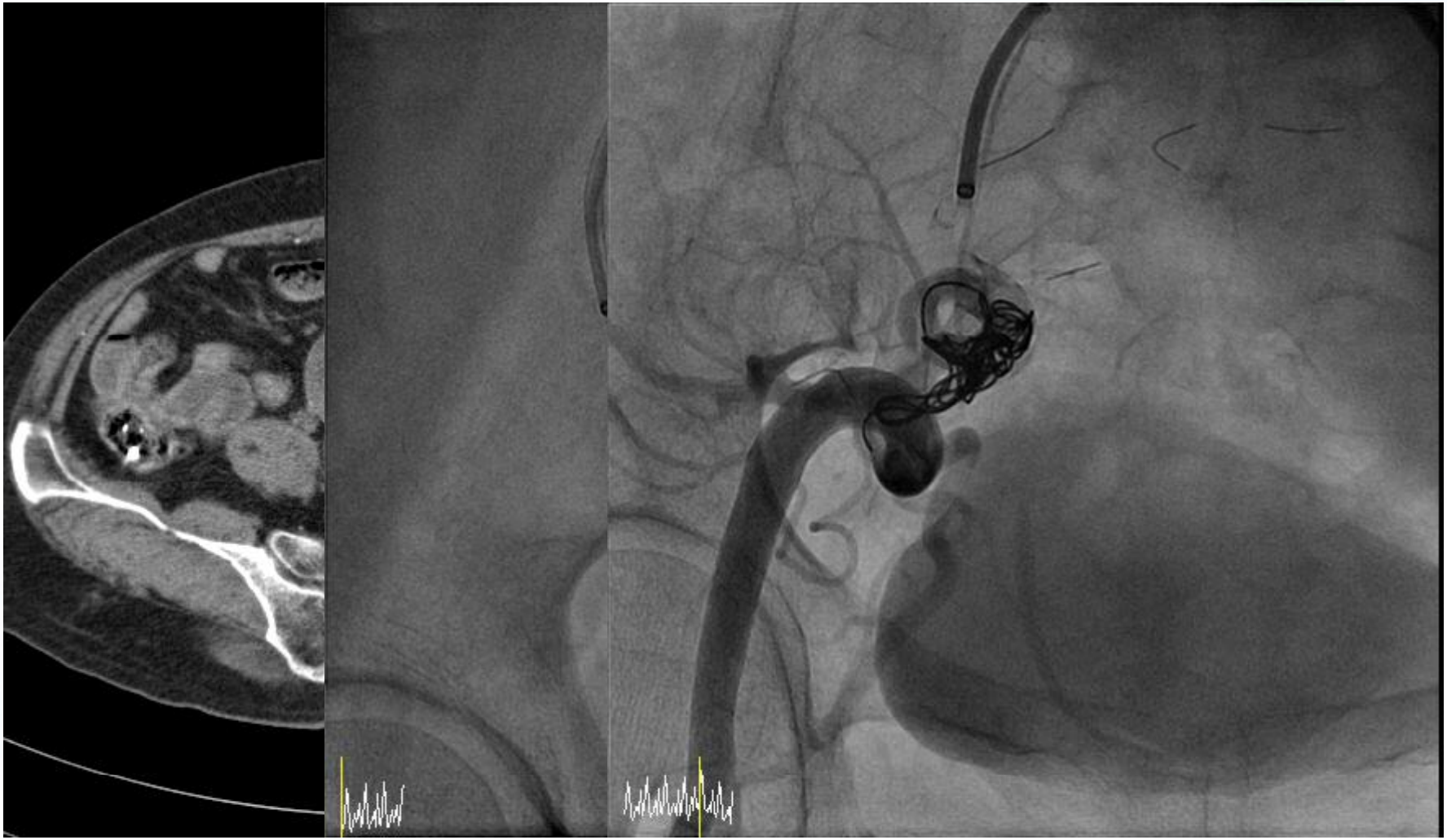
Common Iliac Artery Aneurysm : Op. vs Endovascular

Outcome	Open Surgical n = 24	Endovascular n = 32	*P* Value
Technical Success	100%	100%	1.00
30-Day Mortality	8.3%	0.0%	0.18
Length of Hospital Stay (Days)	12.3 ± 7.8	2.5 ± 3.0	<0.01

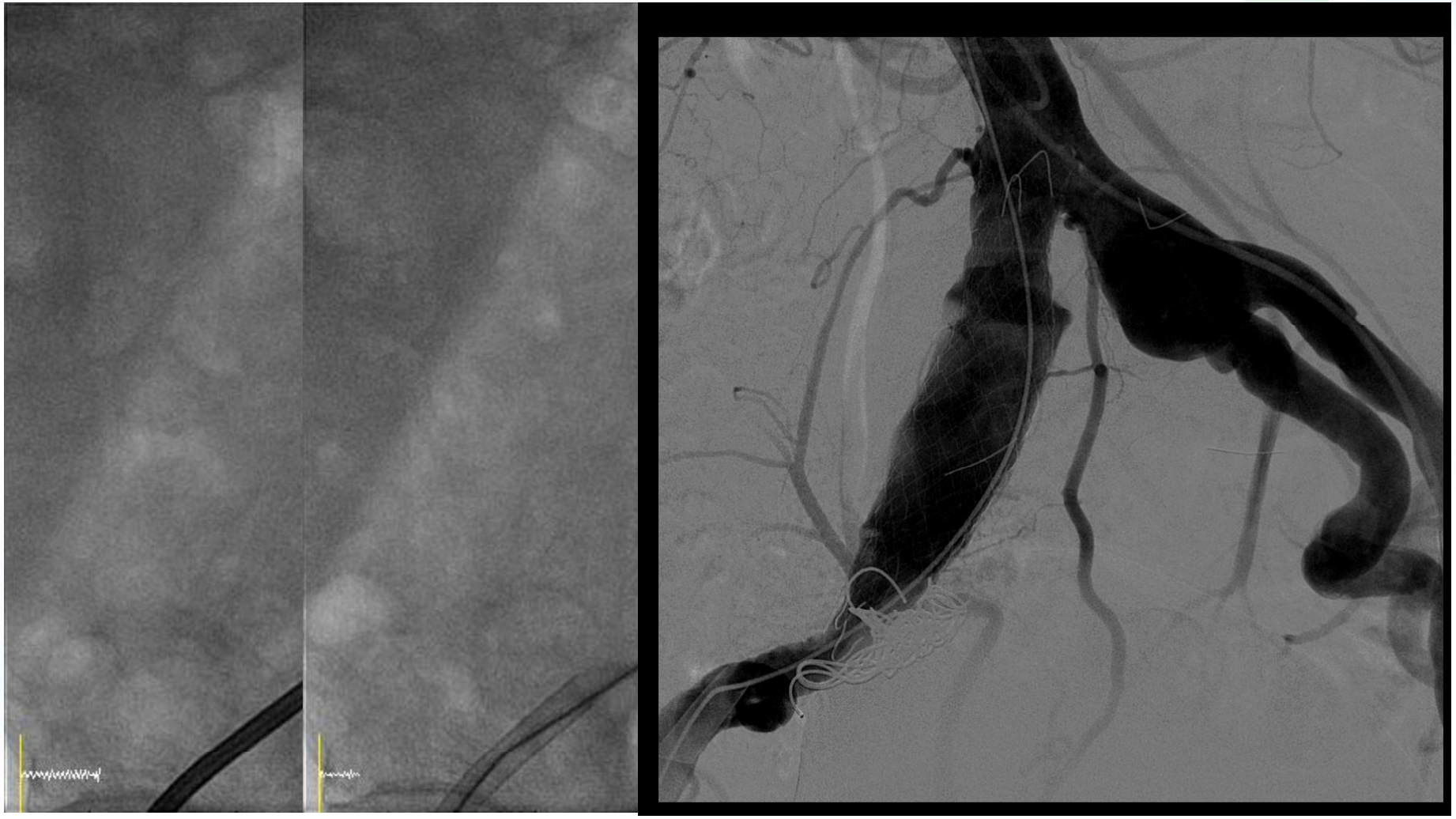
At 5 years, primary patency was 100% with open surgical repair and 96% with endovascular repair (*P* = 0.07).

Patel NV, et al. J Vasc Surg.2009 Feb 21.

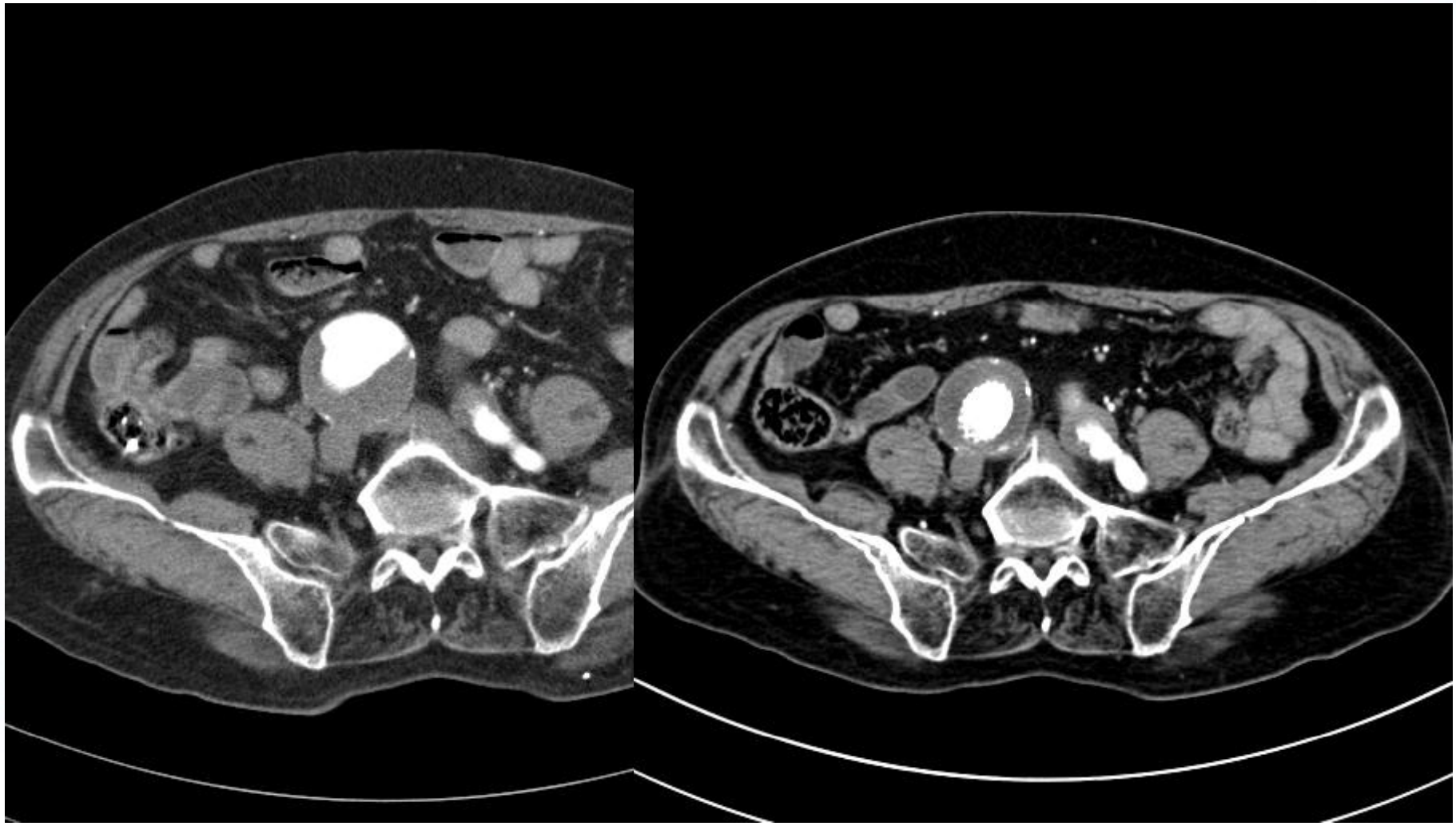
Common Iliac Artery Aneurysm : Case



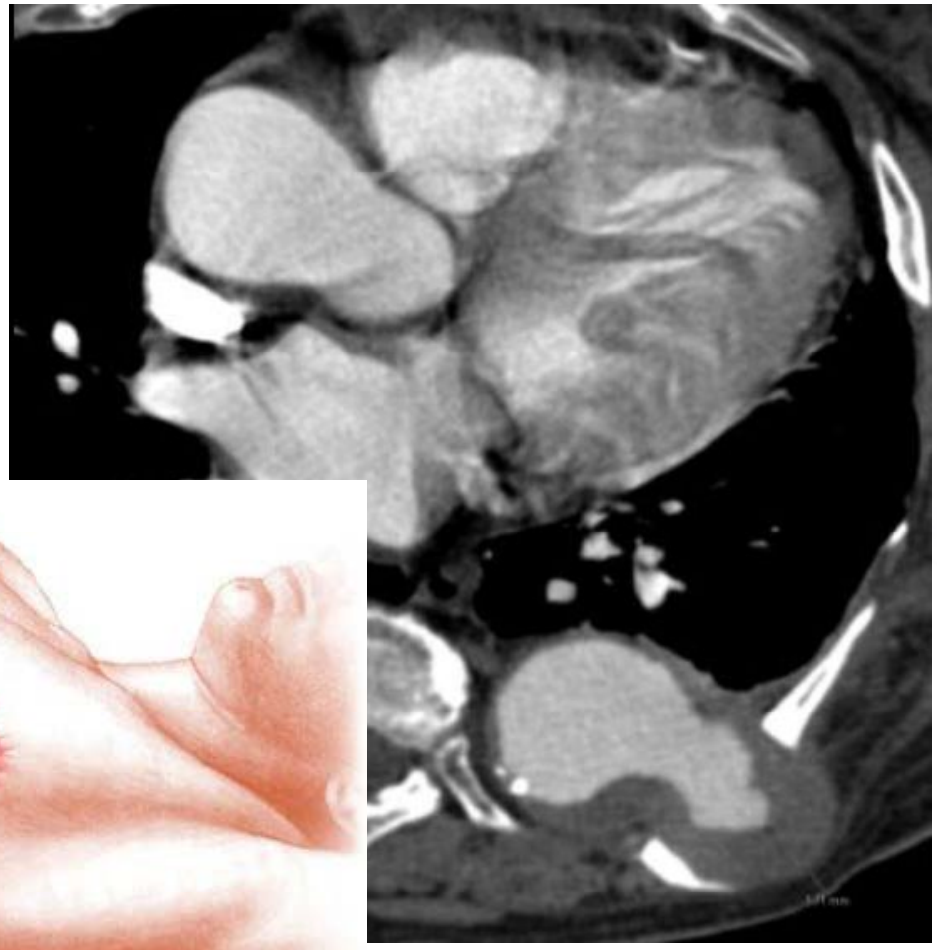
Common Iliac Artery Aneurysm : Case

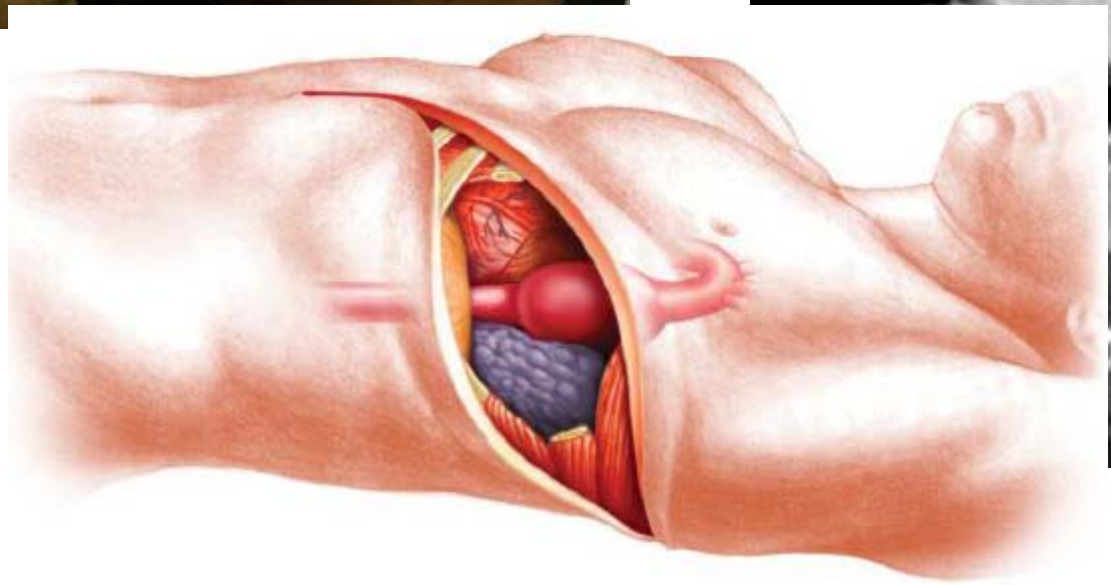


Common Iliac Artery Aneurysm : Case



Endovascular Treatment of Type B Aortic Dissection





Endovascular Treatment Indication of Type B Aortic Dissection

Acute, complicated

- rupture and/or branch vessel ischemia
- branch vessel ischemia
  - Dynamic branch vessel involvement (TL collapse)
  - Static branch vessel involvement, with re-entry
  - Static branch vessel involvement, with no re-entry
  - Combination of multiple mechanisms/branches
- Endograft vs surgery vs fenestration vs aortic and/or branch stent OR combination

Chronic, with FL aneurysm

Endovascular Treatment of Type B Aortic Dissection : An IRAD Report

N=571 acute type B

	Open Surgery	Endovascular
n	59 (11.5%)	66 (12.8%)
CVA	4 (9.1%)	2 (3.4%)
Coma	2 (4.5%)	1 (1.7%)
Spinal cord isch	3 (6.8%)	2 (3.4%)
Myocard isch	1 (2.6%)	1 (1.7%)
Acute renal fail	8 (19.0%)	4 (6.9%)
Mes isch/infarc	2 (5.0%)	4 (6.9%)
Limb isch	2 (5.0%)	2 (3.4%)
Any of above compl	16 (40.0%)	11 (20.8%)
Mortality	20 (33.0%)	7 (10.6%)

JACC 2008;1: 395-402

INSTEAD Trial : *Nienaber CA et al. : Circulation. 2009;2519-2528.*

Table 1. Outcomes at 2 Years

	Medical Therapy Alone (n = 68)	TEVAR (n = 72)	*P* Value
Survival	95.6 ± 2.5%	88.9 ± 3.7%	0.15
Freedom from Aorta-Related Mortality	97.0 ± 2.0%	94.4 ± 2.7%	0.44
Freedom from Progressive Aortic Disease	72.5 ± 5.5%	77.2 ± 5.0%	0.65

Table 2. Cumulative Events at 2 Years

	Medical Therapy Alone (n = 68)	TEVAR (n = 72)	*P* Value
Secondary Interventions	22.1%	18.1%	0.74
Adverse Events			
Persistent Paraplegia/ Paraperesis	1.4%	2.8%	0.90
Major Stroke	0	2.8%	0.53

Endovascular Treatment of Type B Aortic Dissection : Practical Approach

- Uncomplicated acute type B:
  Optimal Medical Therapy ***as bridge to*** Endograft

- Complicated acute type B:
  Endovascular (fen/sten, endograft) ***as bridge to*** Surgery

- Chronic type B with aneurysm
  Surgery ***as bridge to*** Endograft (hybrid, branched)

Endovascular Treatment of Malperfusion in AcuteType B Aortic Dissection

- 69 Patients with acute type B dissection with malperfusion were treated with a combination of flap fenestration, true lumen, or branch vessel stenting
- Malperfusion vessels: spinal cord (n=5), mesenteric (n=40), renal (n=51), and lower extremity (n=47)
- Major morbidity: dialysis need (n=11), stroke (n=3), Paralysis (n=2)
- 30-Day mortality 17.4% (n=12)
- Mean survival 84 months
- Freedom from aortic rupture or open repair at 1, 5, and 8 years was 80%, 67% and 54%

Patel HJ, et al. J Thorac Cardiovasc Surg2009;138(2):300-8

Endovascular Treatment of Malperfusion in AcuteType B Aortic Dissection

Conclusions: In acute type B dissection with malperfusion patients, percutaneous management allows for rapid restoration of end-organ perfusion with acceptable result.

Patel HJ, et al. J Thorac Cardiovasc Surg2009;138(2):300-8

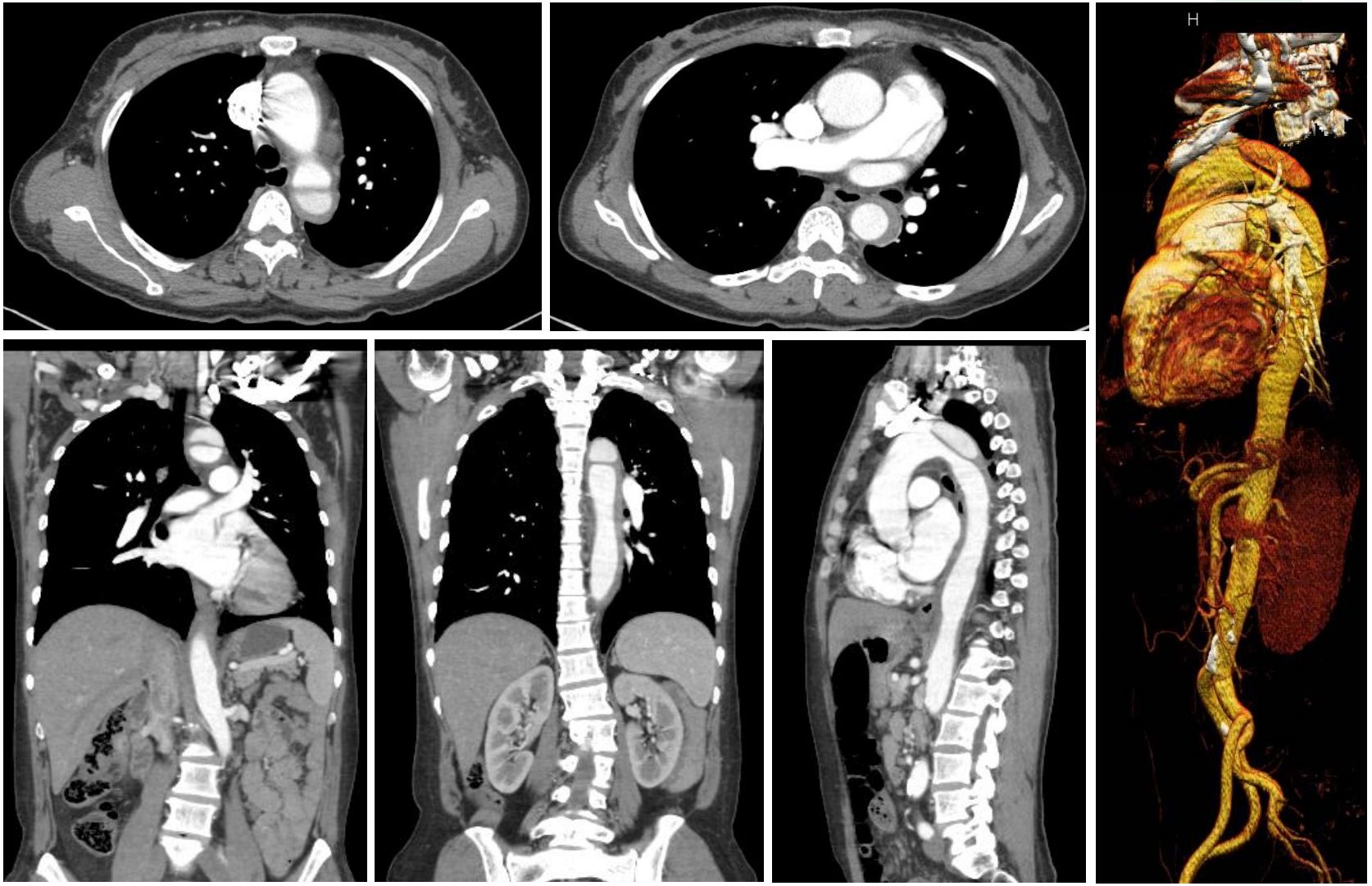
Endovascular Treatment of Malperfusion : Aortic Stent Graft Cases

- 49 year old female
- CC: Chest pain & back pain for 1 day
- V/S at ER: 220/120 mmHg & 66 bpm
- CV risk: HTN (untreated)
- CT at ER: aortic dissection, stanford type B

  (next slide)
- ICU admission and Medical treatment

  : with carvedilol, nitroprusside & ramipril

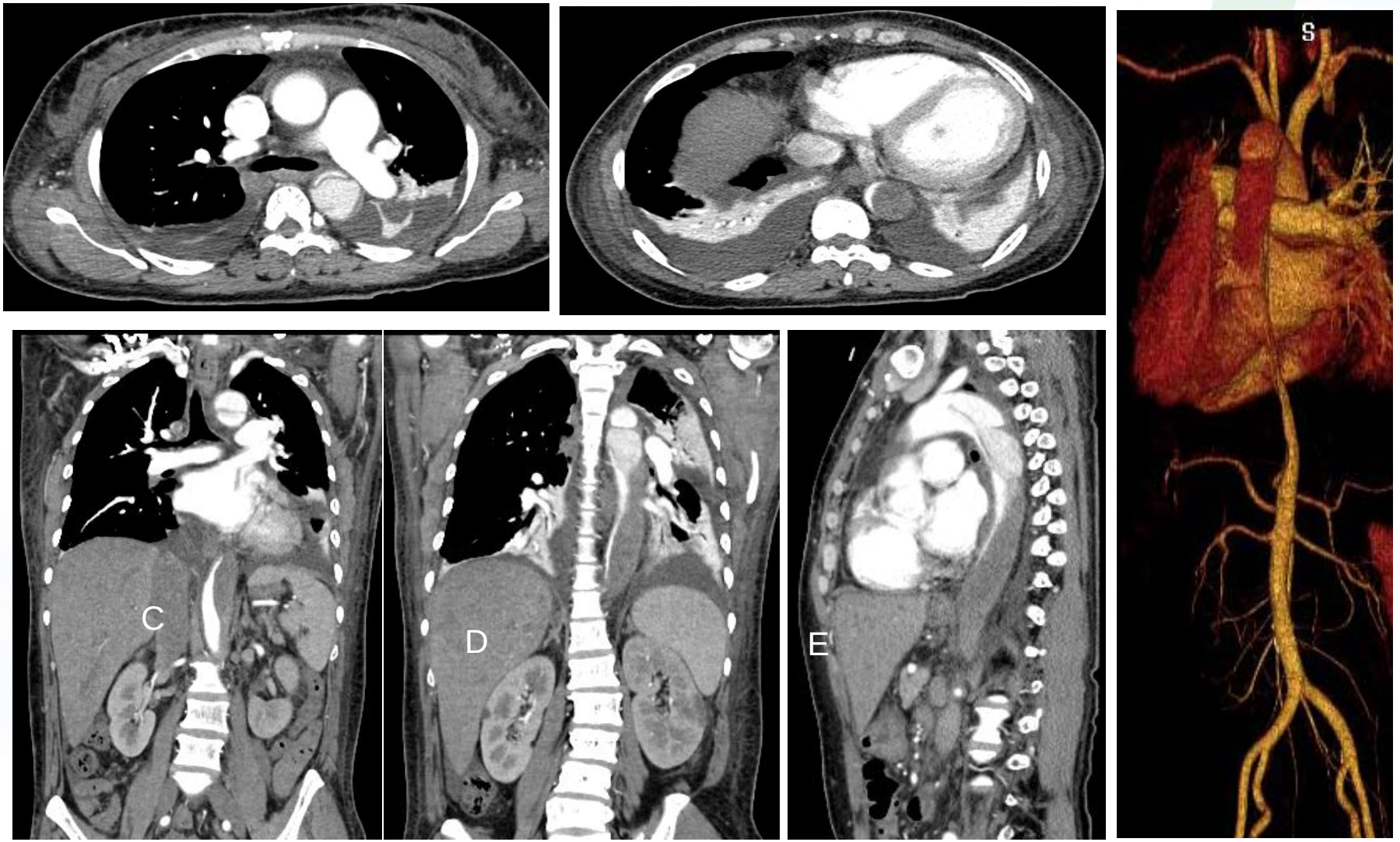
Endovascular Treatment of Malperfusion : Aortic Stent Graft Cases



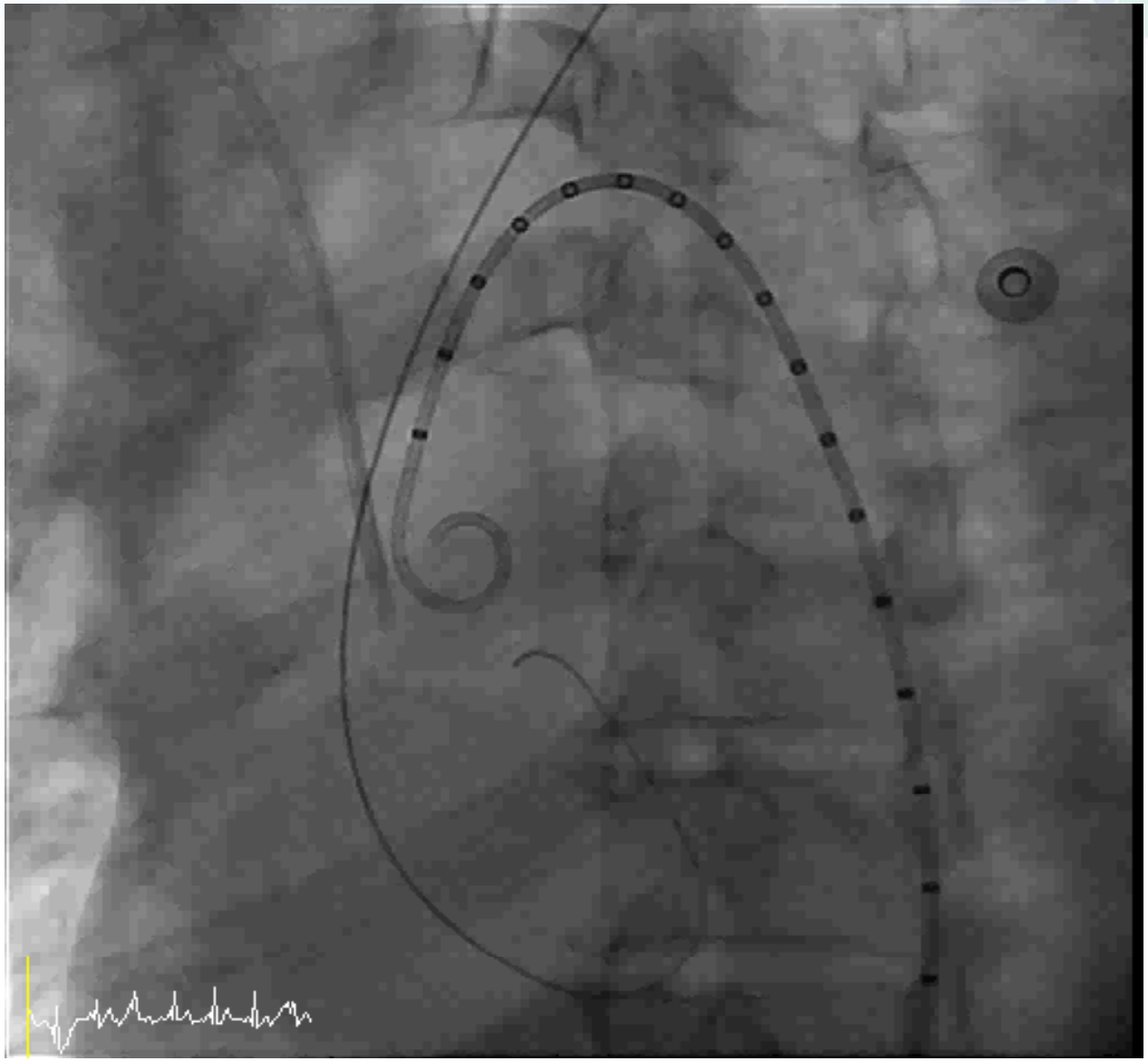
Admission day #4

- Stabbing chest and back pain
- V/S : 183/81 mmHg & 56 bpm
- Pulse deficits at lower extrimities
- Decreased urine output (< 30 cc/hour)

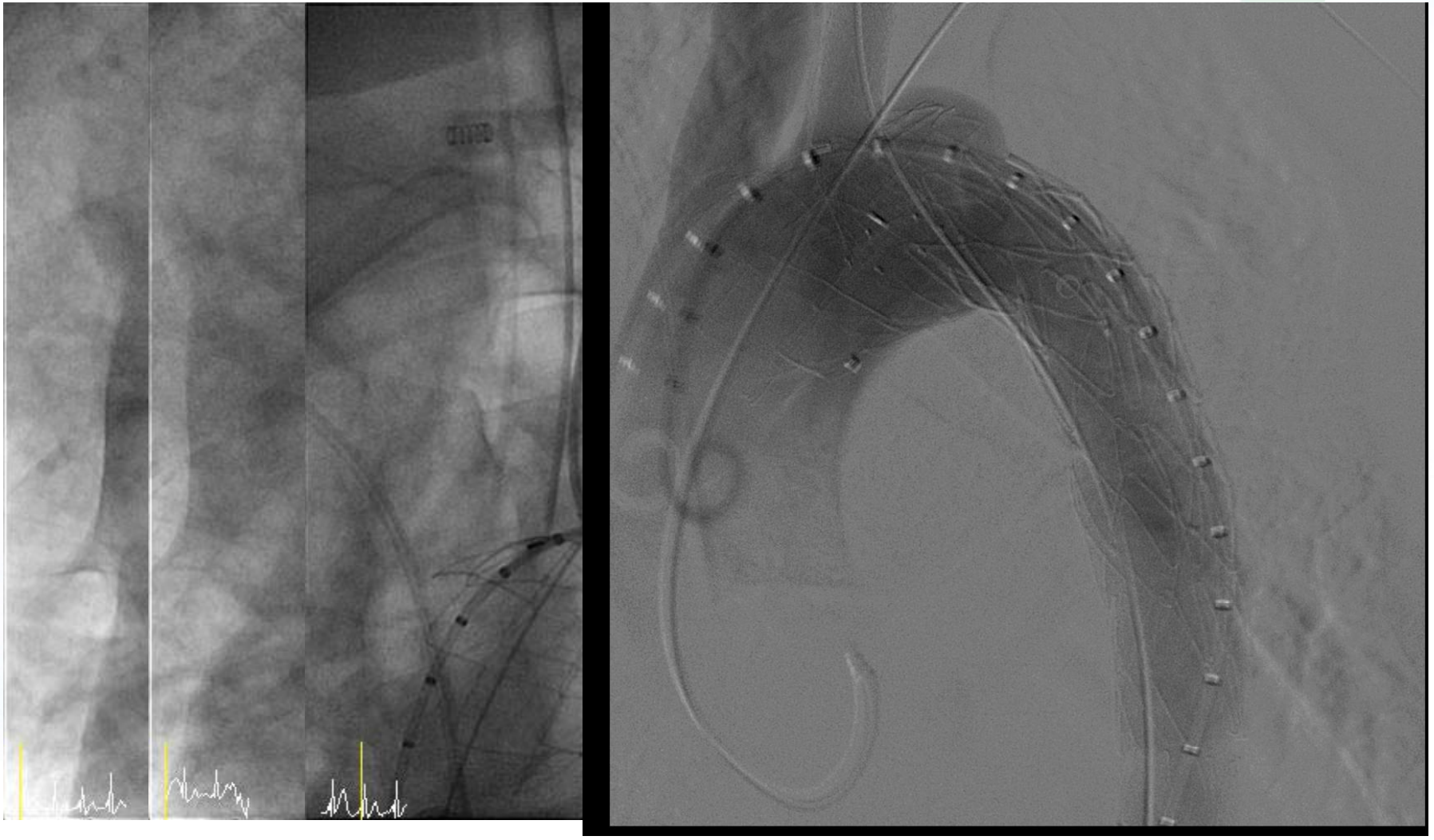
F/U CT chest (day 4)



Emergent TEVAR



Emergent TEVAR



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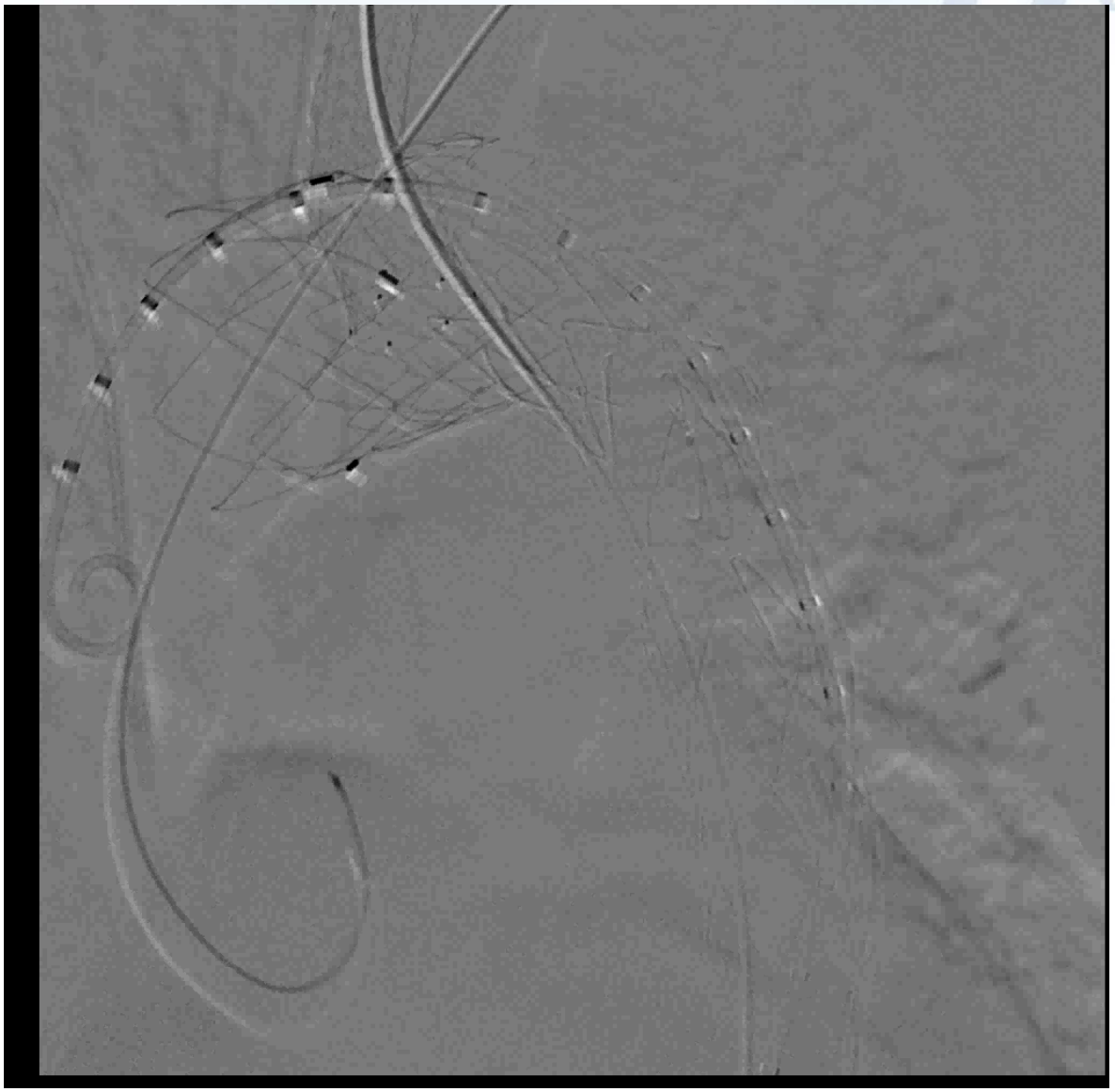

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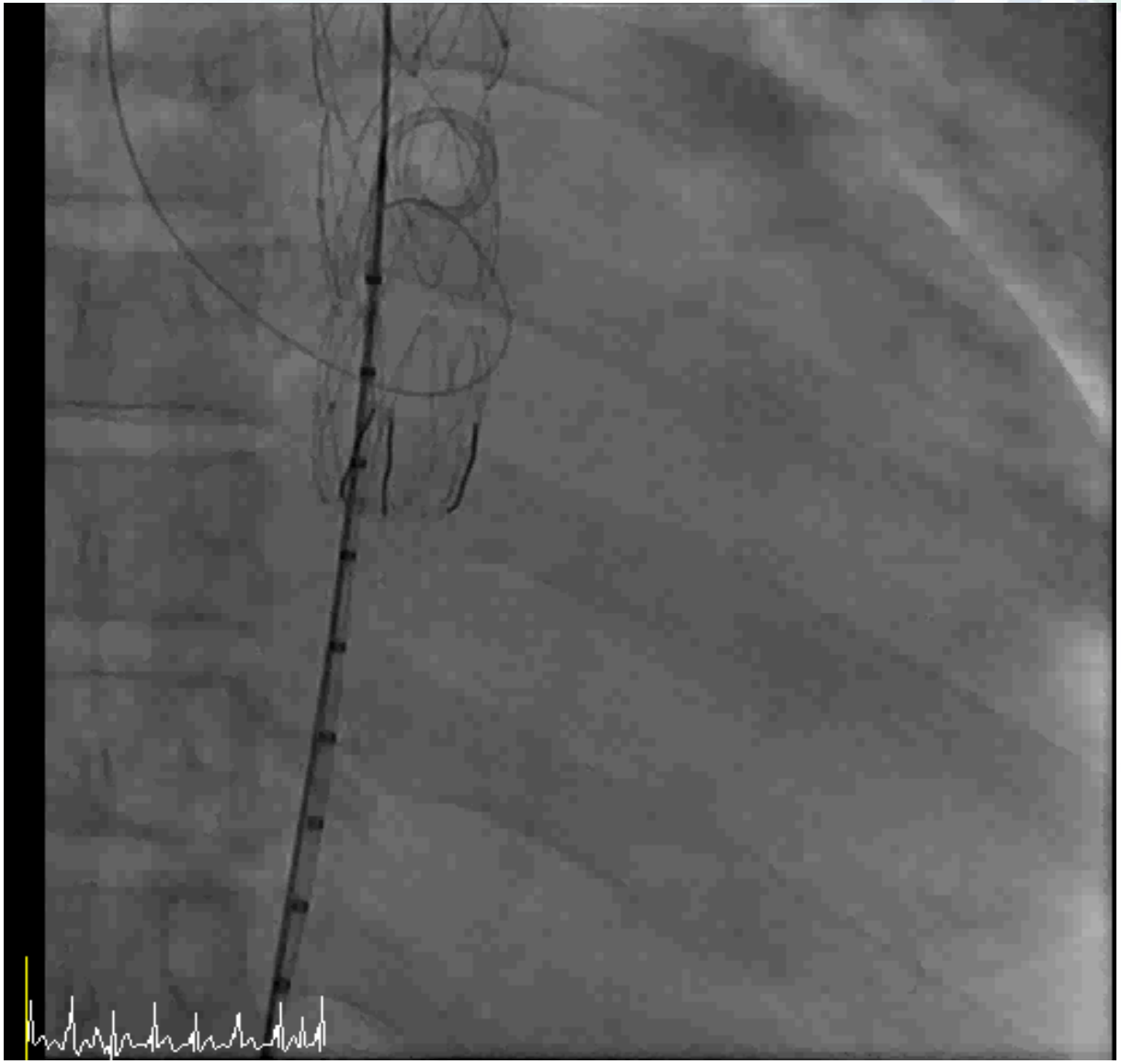
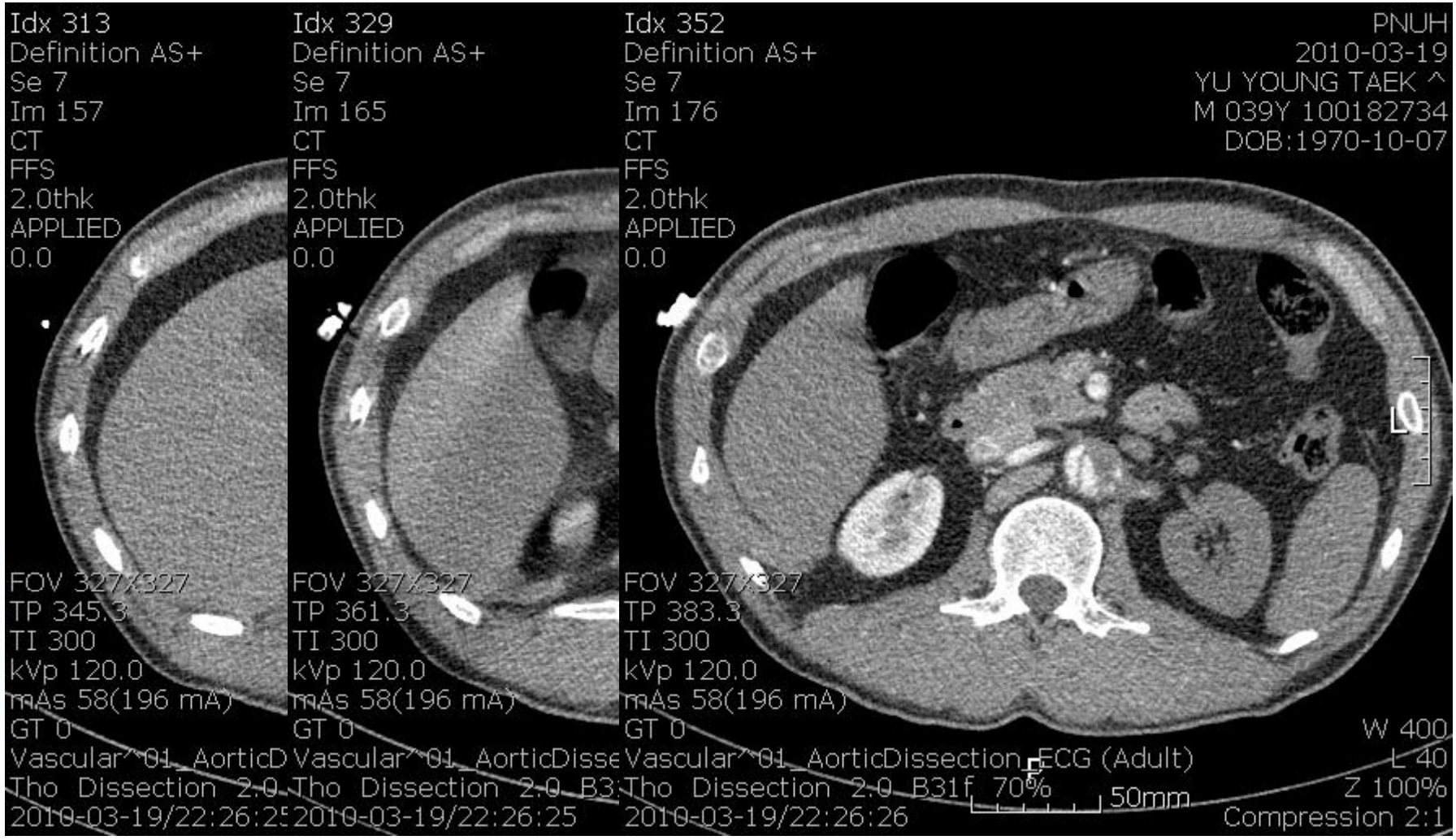
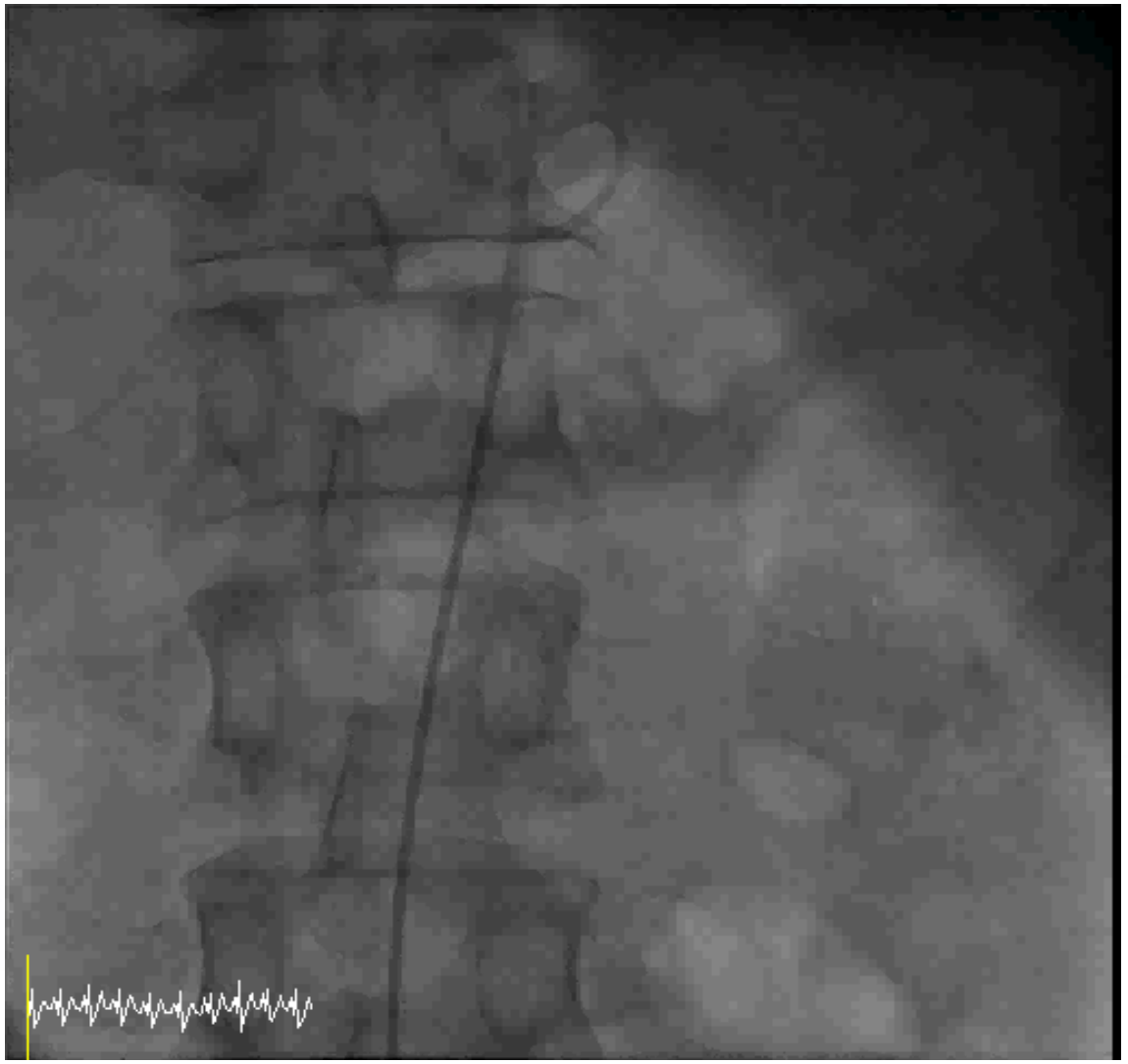


Endovascular Treatment of Malperfusion : Selective Stents Cases

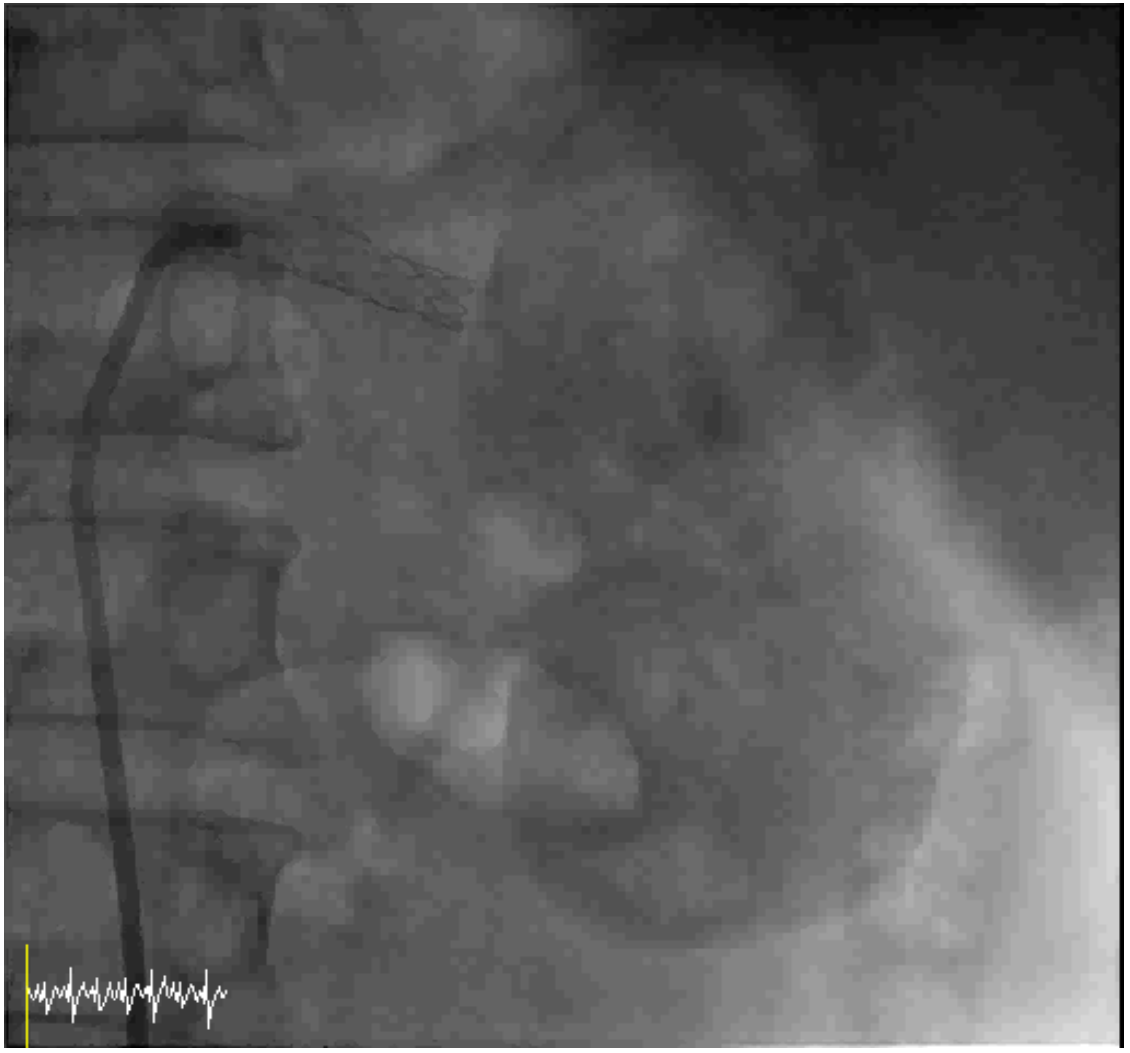
유 O (M/39)



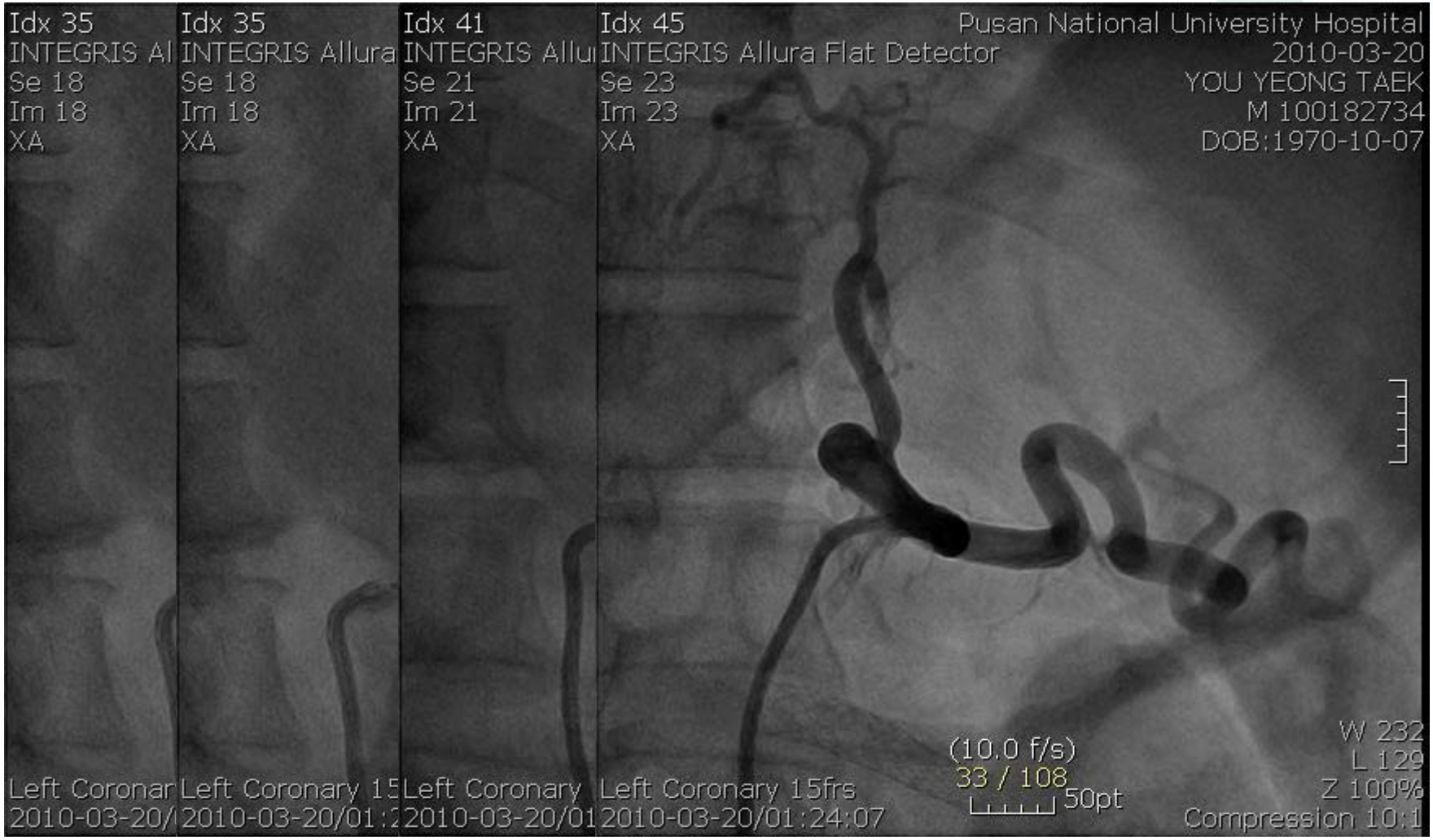
Endovascular Treatment of Malperfusion : Selective Stents Cases 2



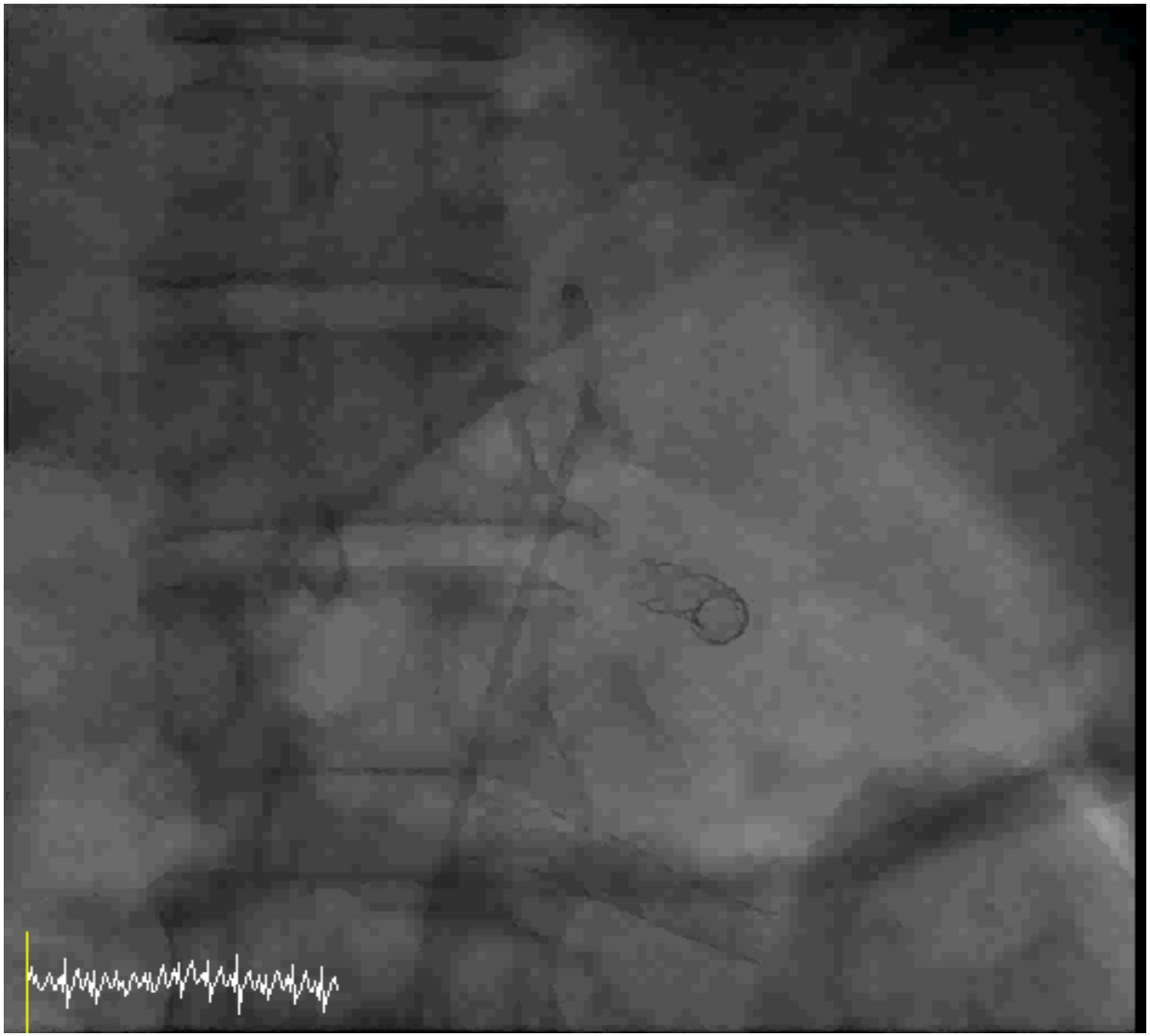
Endovascular Treatment of Malperfusion : Selective Stents Cases



Endovascular Treatment of Malperfusion : Selective Stents Cases



Endovascular Treatment of Malperfusion : Selective Stents Cases

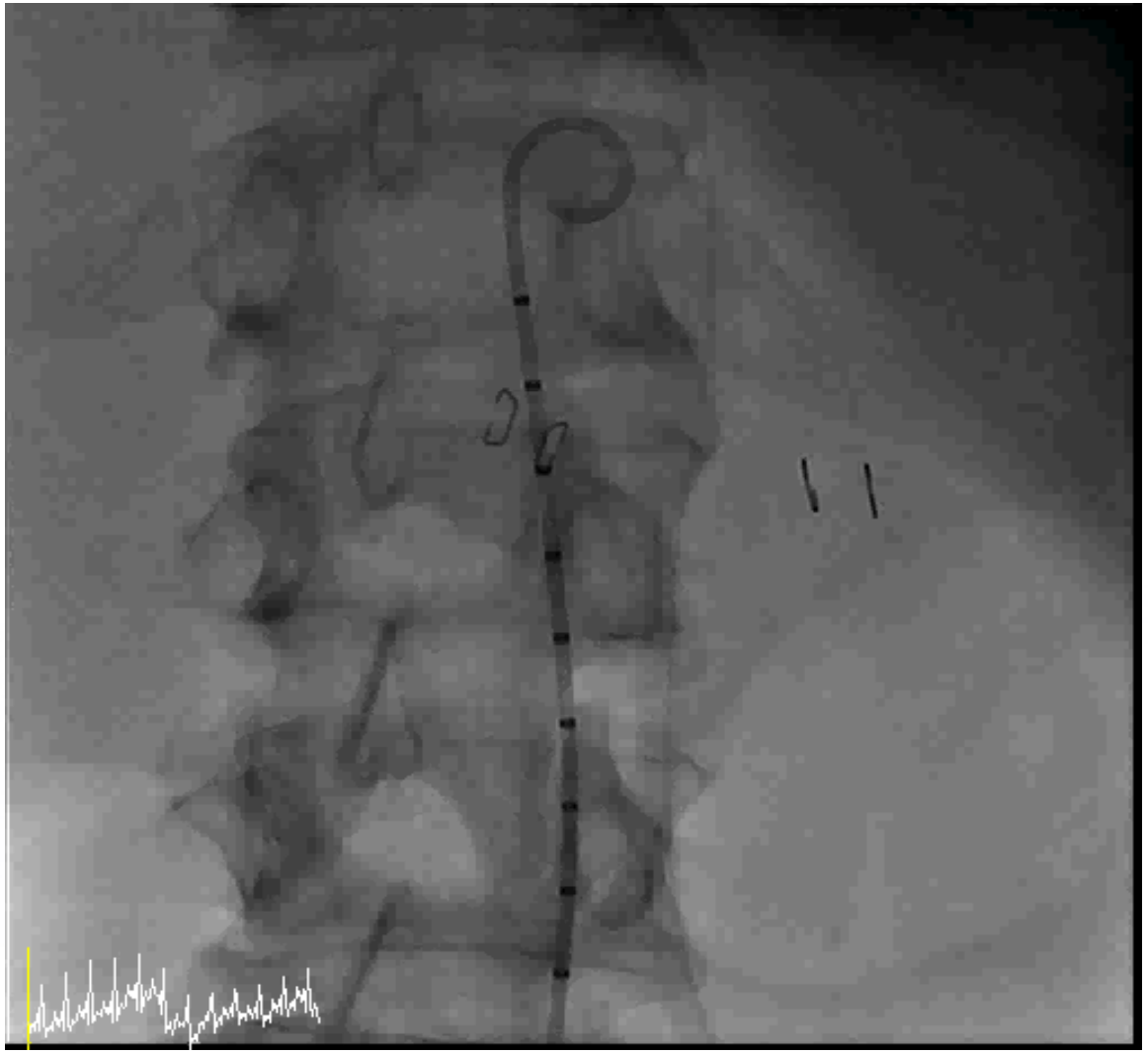


Endovascular Treatment of Malperfusion : Selecive Stents Cases

Endovascular Treatment of Malperfusion : Fenestration Cases

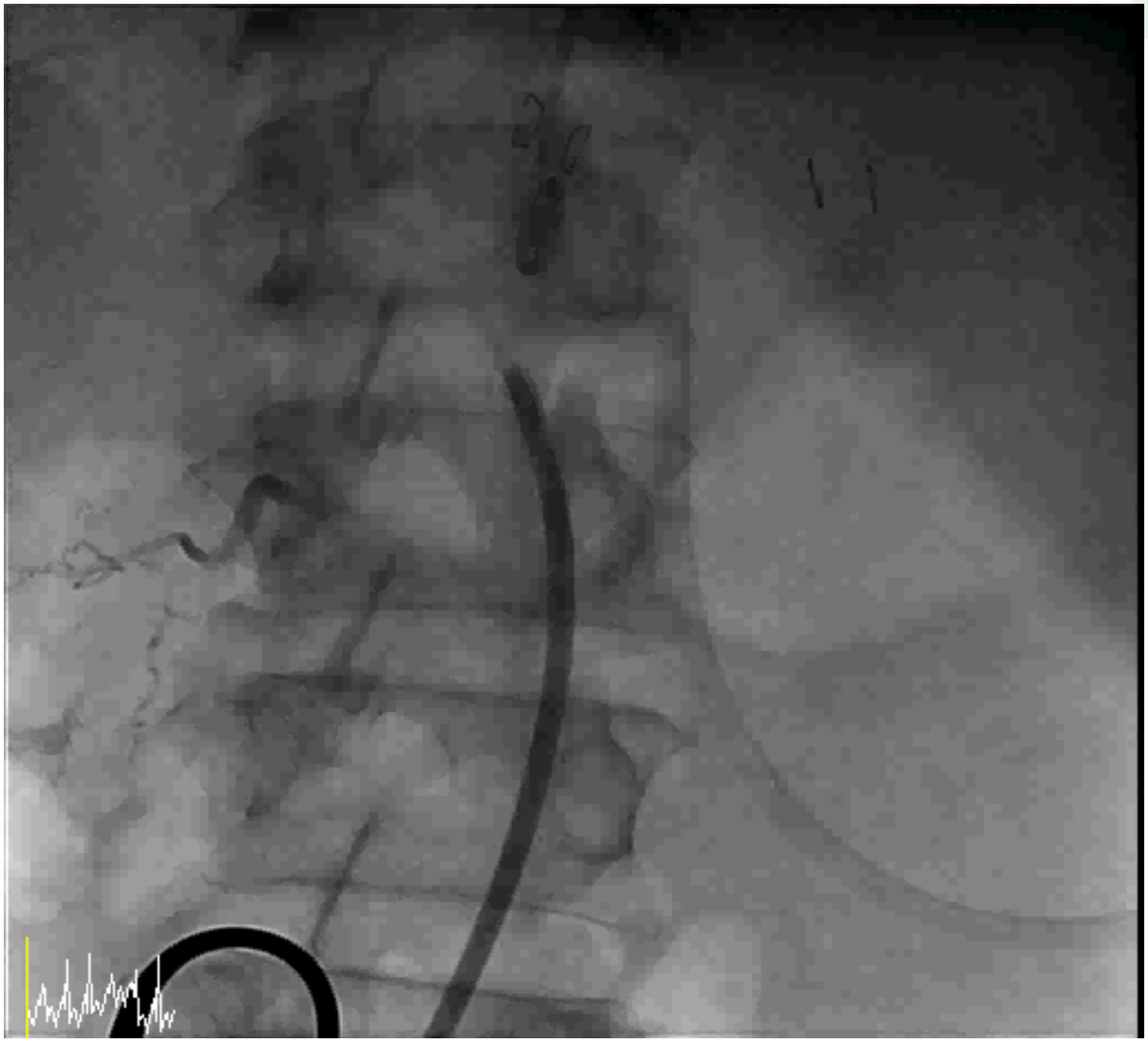
김 O (M/ 50)

Endovascular Treatment of Malperfusion : Fenestration Cases



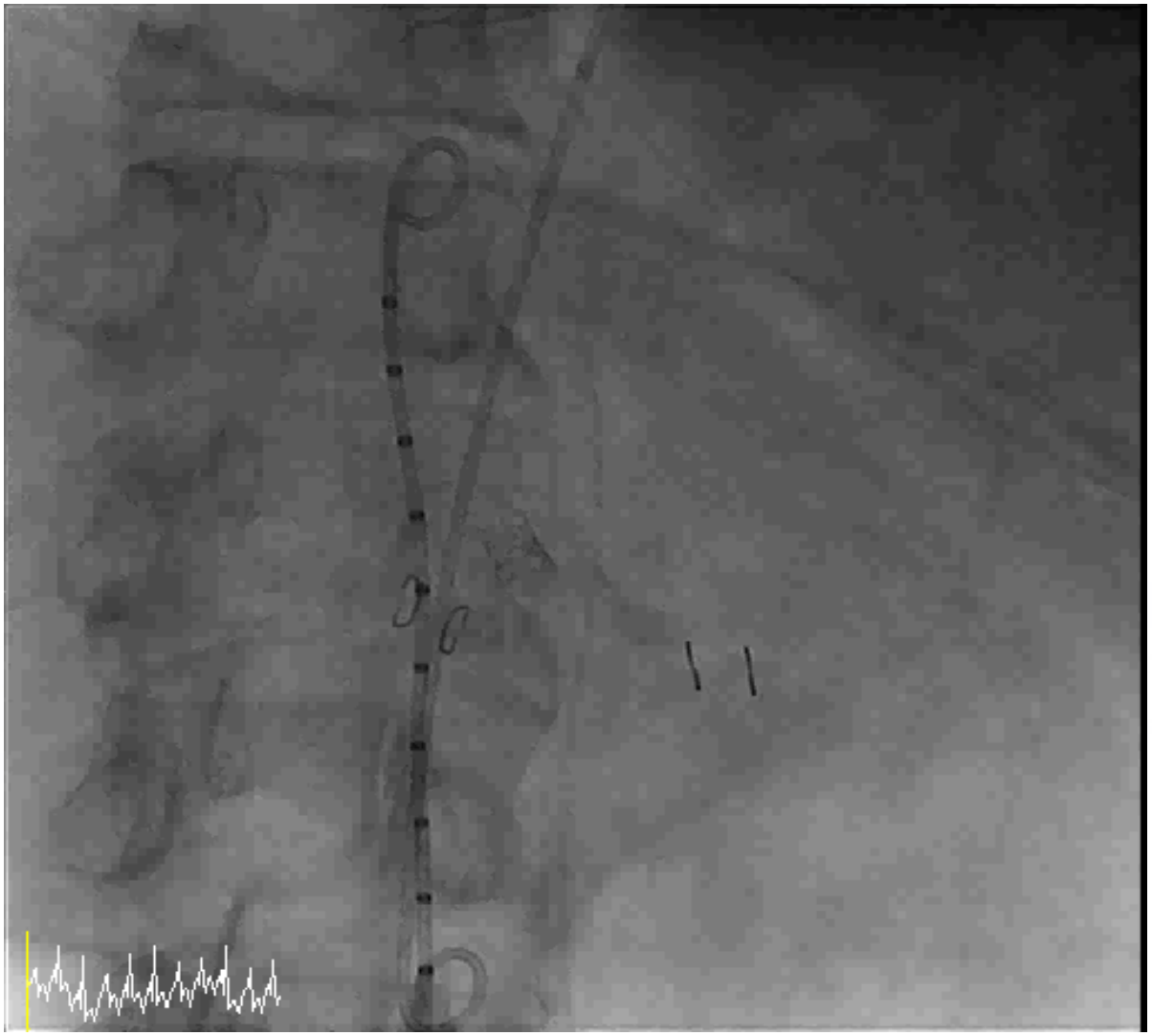
Endovascular Treatment of Malperfusion : Fenestration Cases

Endovascular Treatment of Malperfusion : Fenestration Cases

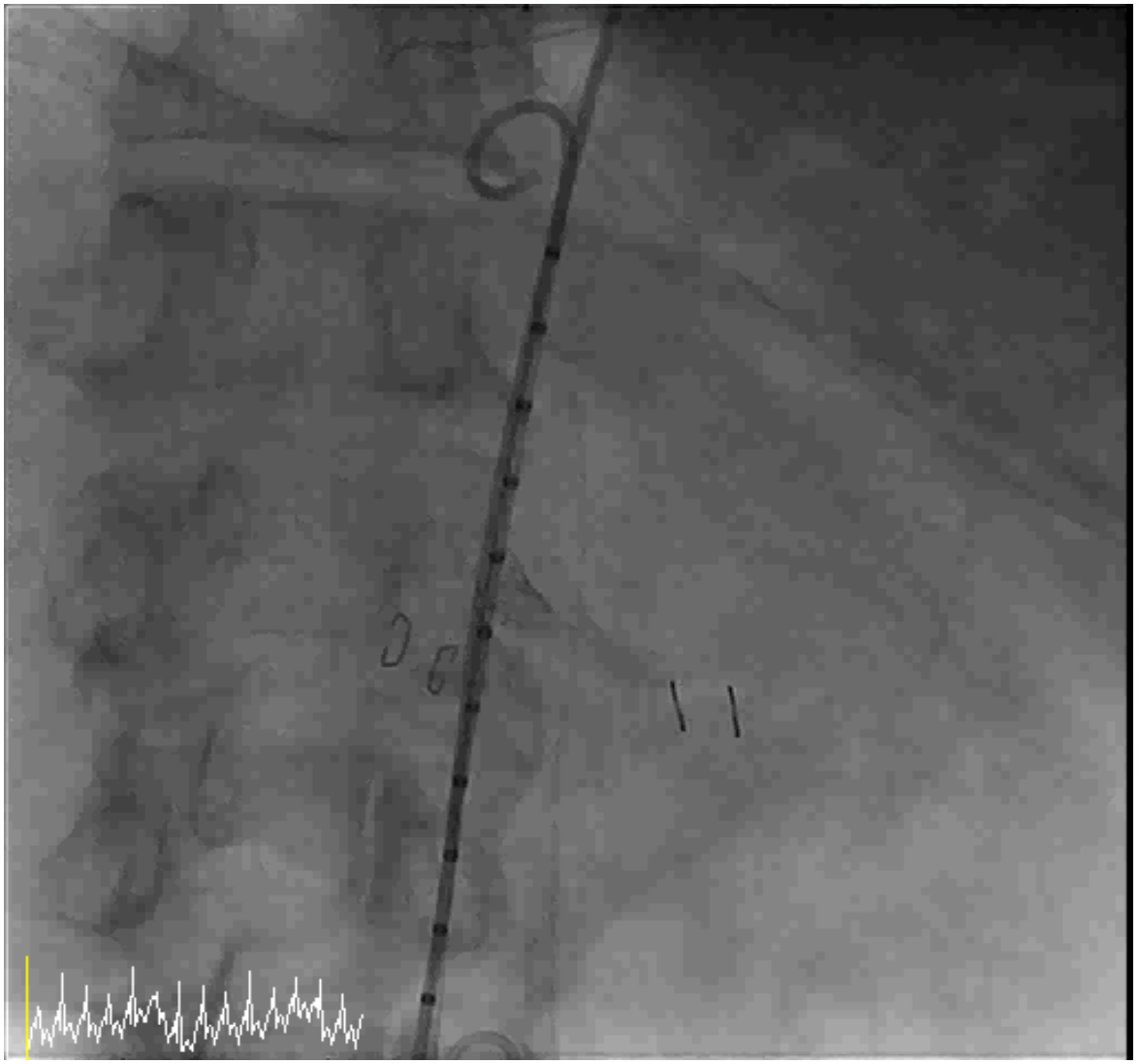


Endovascular Treatment of Malperfusion : Fenestration Cases

Endovascular Treatment of Malperfusion : Fenestration Cases

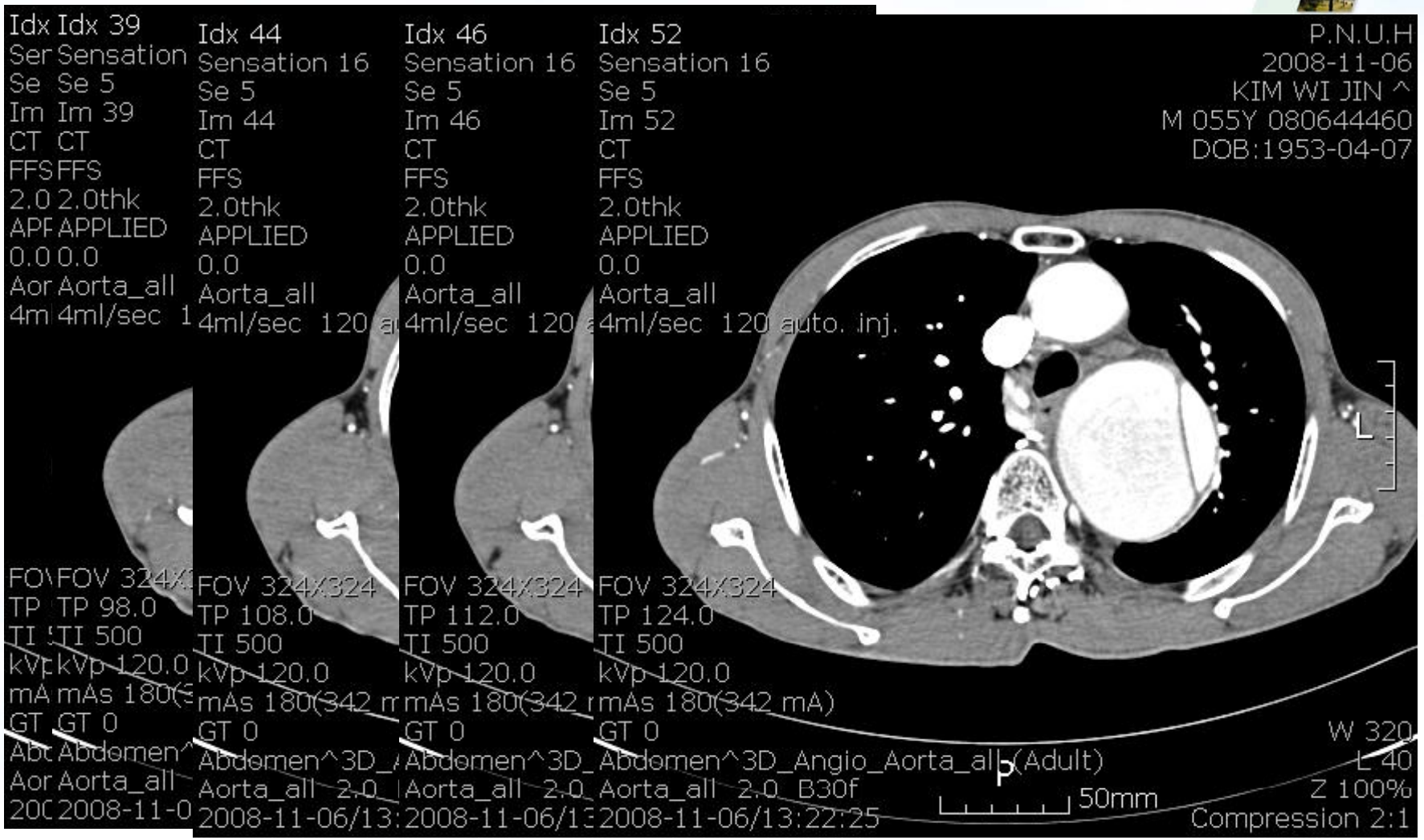


Endovascular Treatment of Malperfusion : Fenestration Cases

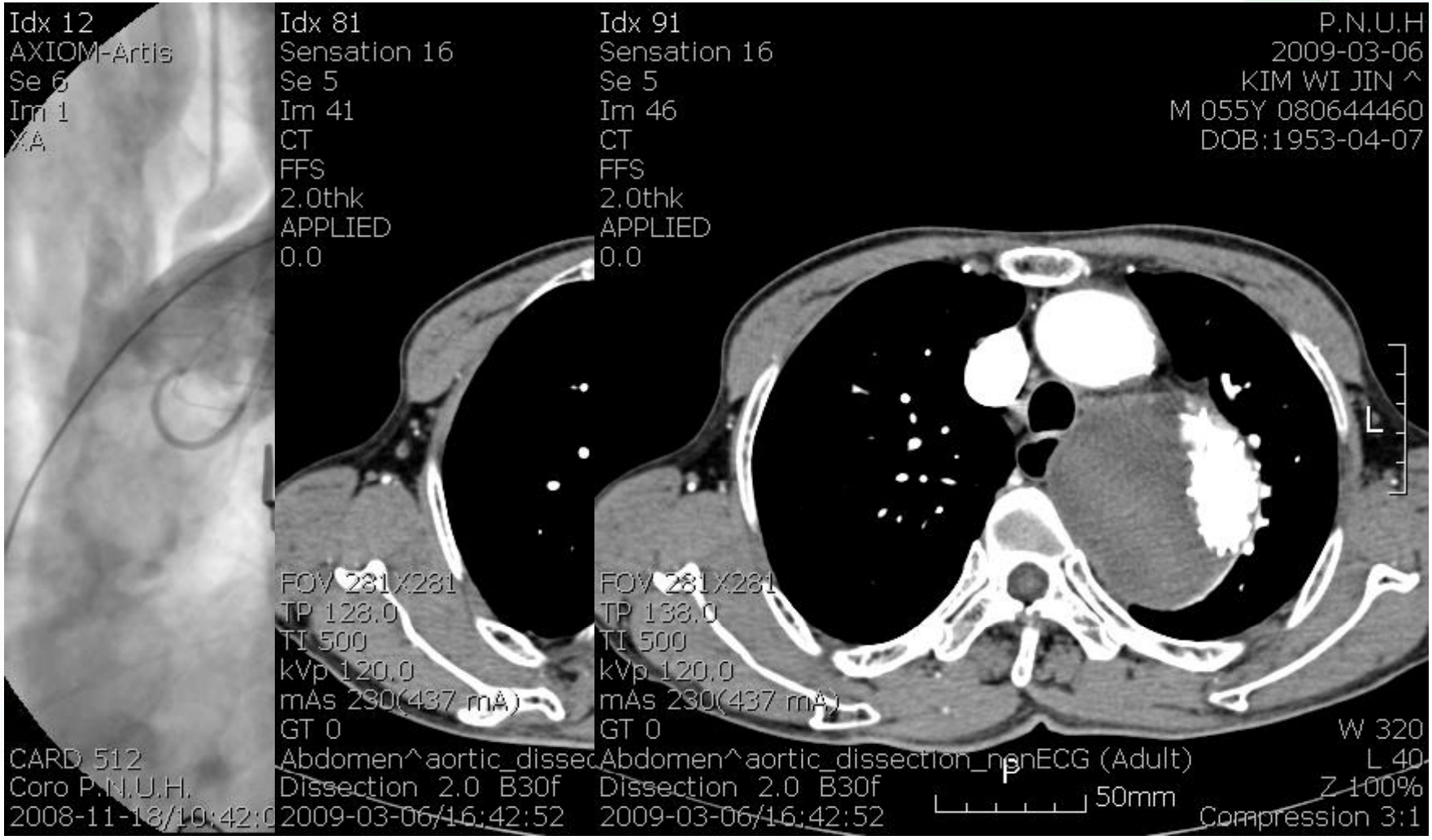


Endovascular Treatment of Chronic Aortic Dissection with Aneurysm Formation

김 O (M/57)

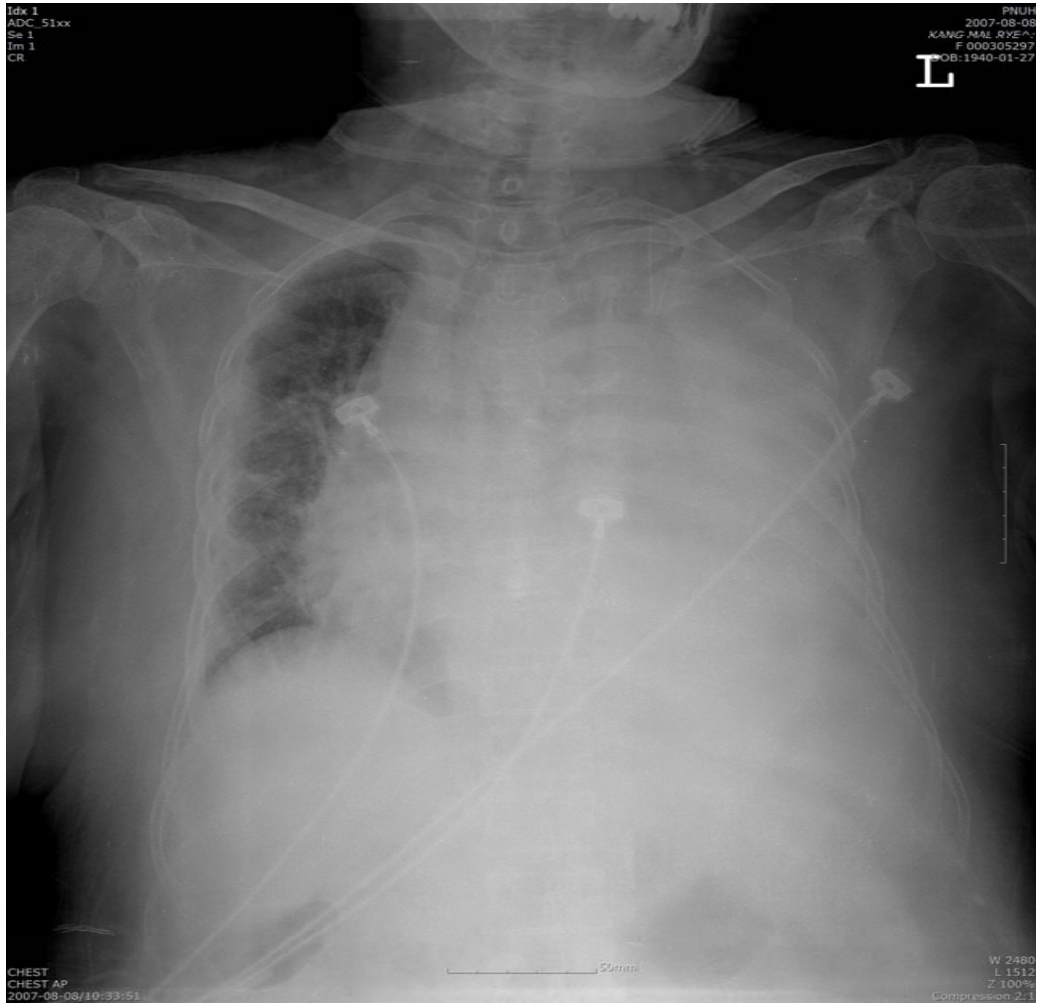


Endovascular Treatment of Chronic Aortic Dissection with Aneurysm Formation



Endovascular Treatment of Ruptured Aortic Dissection

강O(F/72)



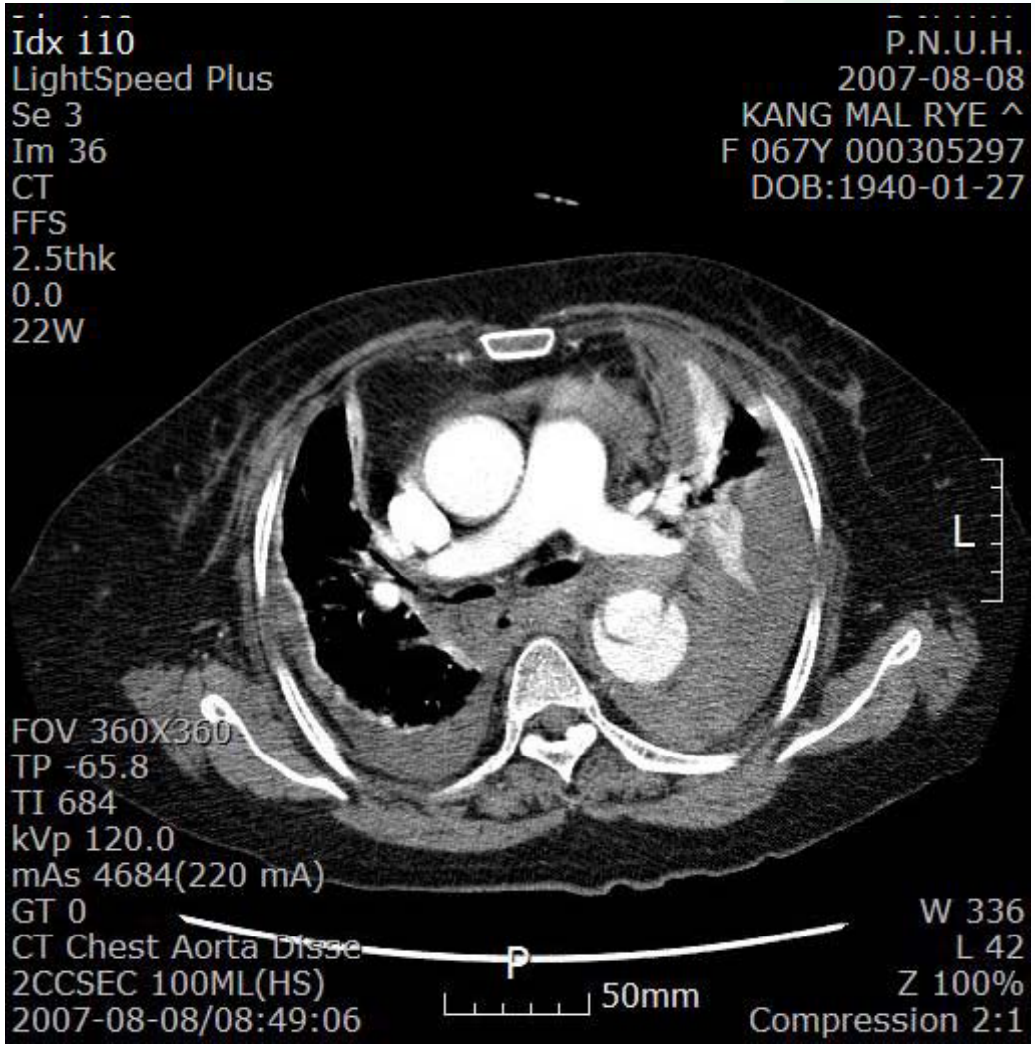
Chest PA

: hemothorax
in the left lung

Endovascular Treatment of Ruptured Aortic Dissection

Chest CT :

Ruptured retrograde aortic dissection
In the descending aorta and hemothorax
in the left lung.



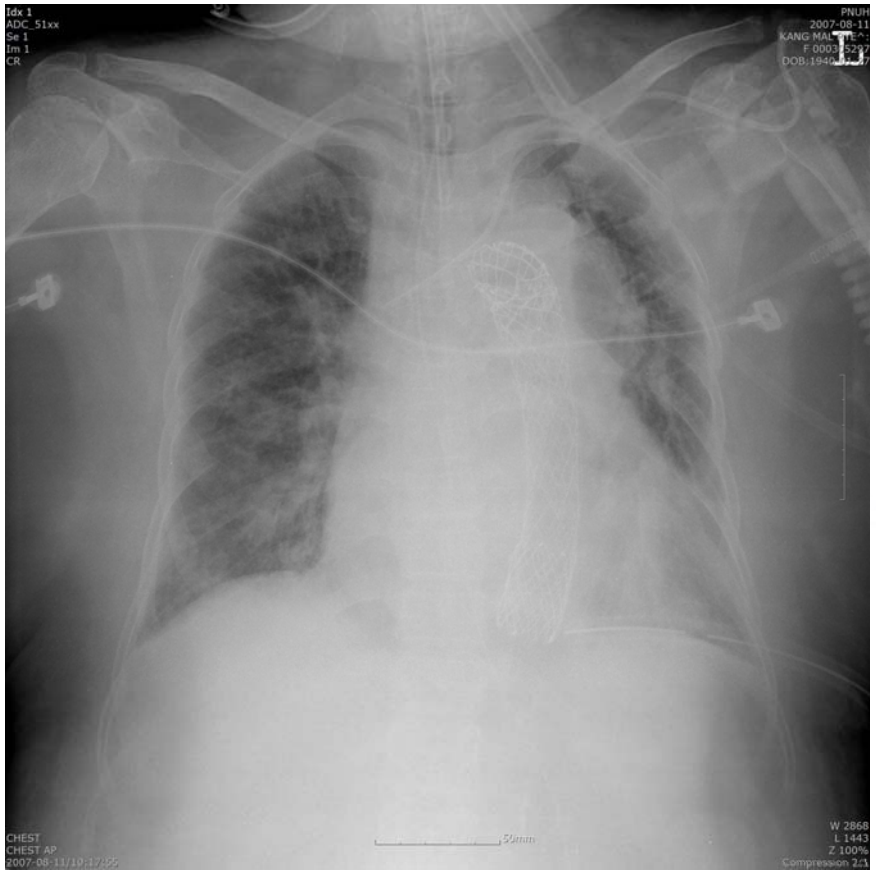
Endovascular Treatment of Ruptured Aortic Dissection

Two pieces of separated aortic stent graft (36mm x 10 cm, S&G biotech, Korea) was deployed in the descending aorta

After Chest Tubing

Chest Tube

was inserted to remove large amount blood in the left lung .Left hemothrax was improved after chest tube.



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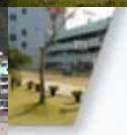
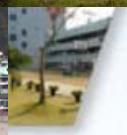


Thank you from my heart

부산대학교병원
PUSAN NATIONAL UNIVERSITY HOSPITAL



Thank you from my heart

Common Iliac Artery Aneurysm

- 45 patients
- 61 Iliac aneurysms
- Immediate results

  1 conversion (Thrombosis)
- Long term results

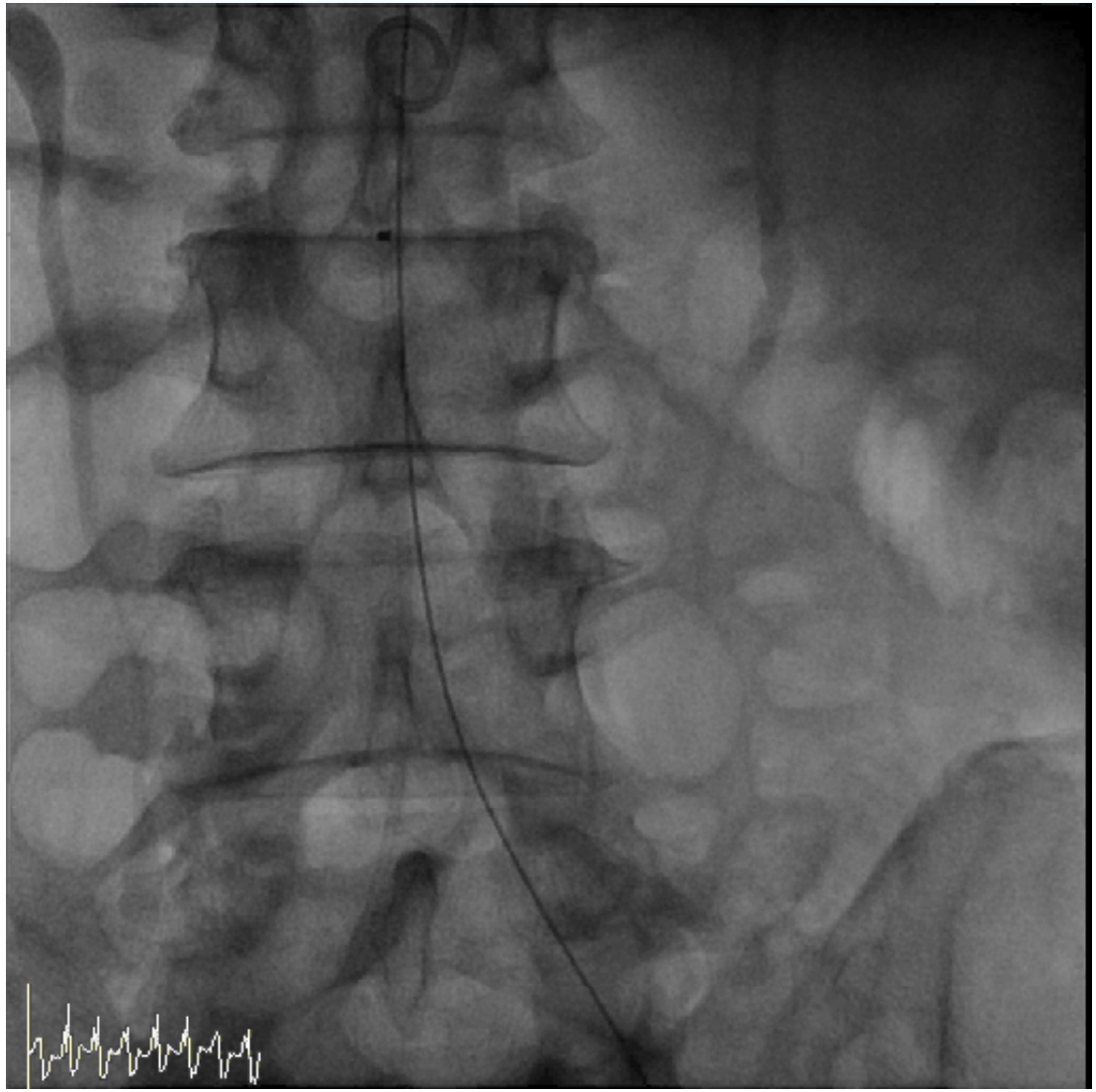
  1 thrombosis

  5 primary endoleaks

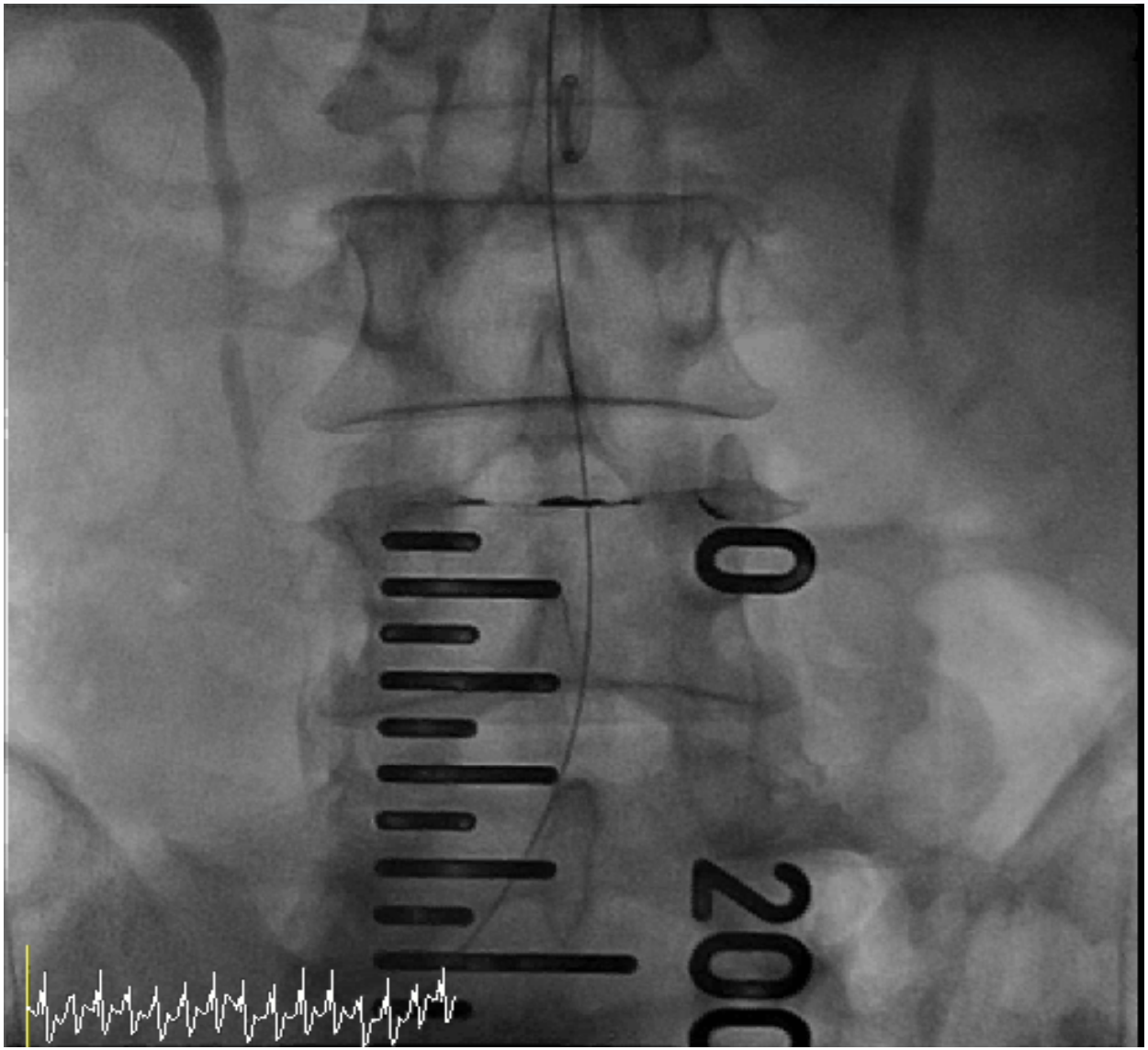
  4 secondary endoleaks
- Primary patency: 95 %
- Secondary intervention: 12%

Boules TN JVS 2006;; 44:: 29

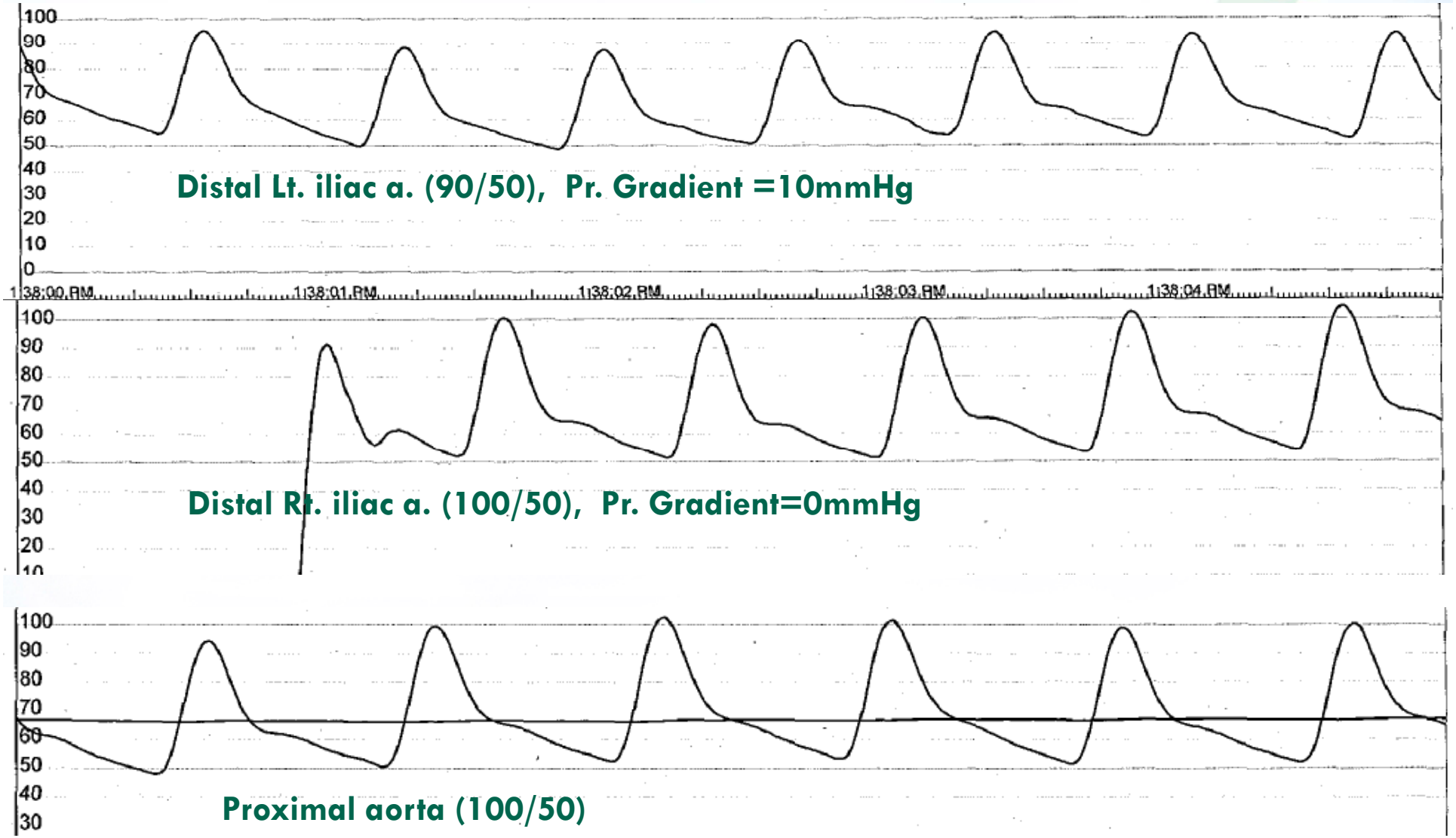
Post Ballooning Angiography



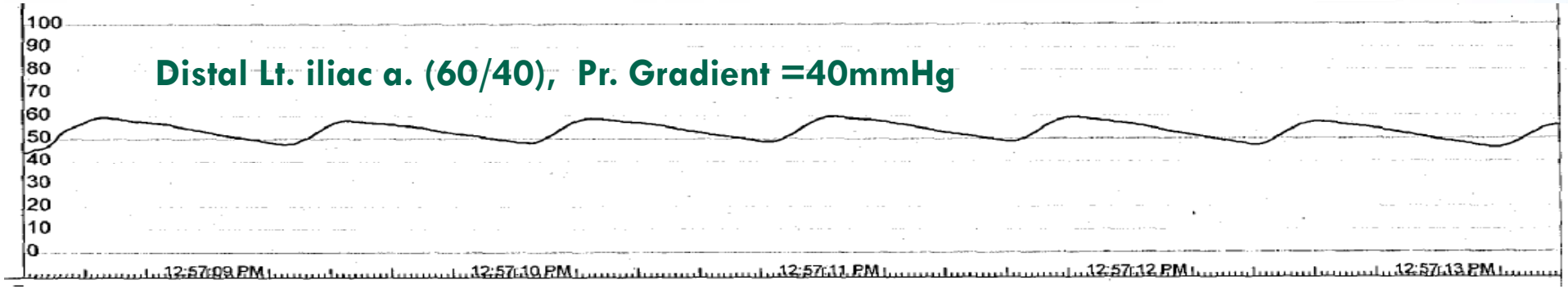
Post Ballooning Angiography

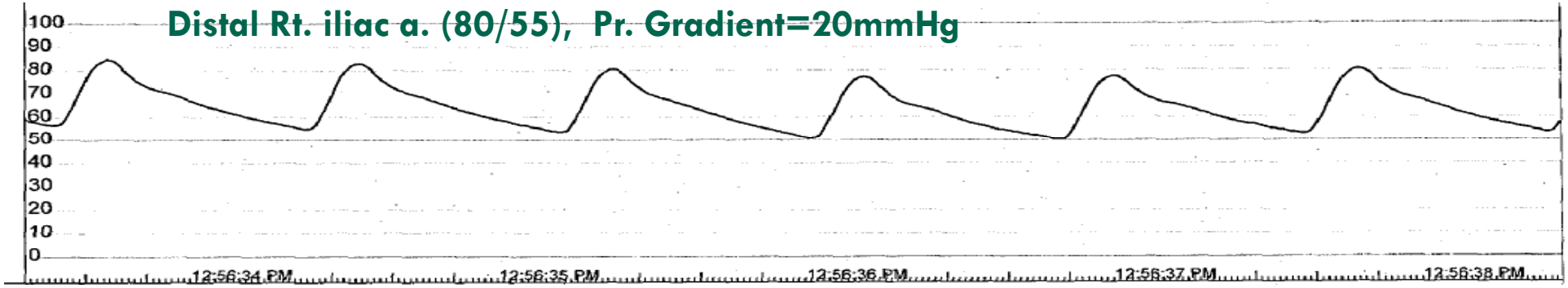


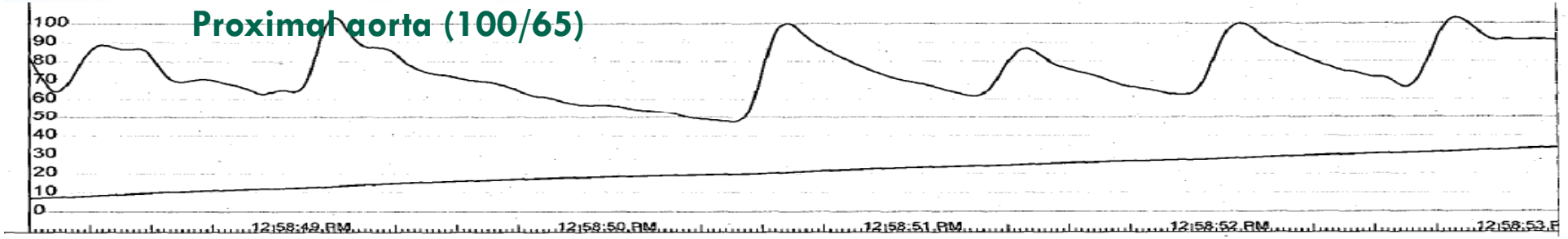
Pressure Gradient : Post-stenting



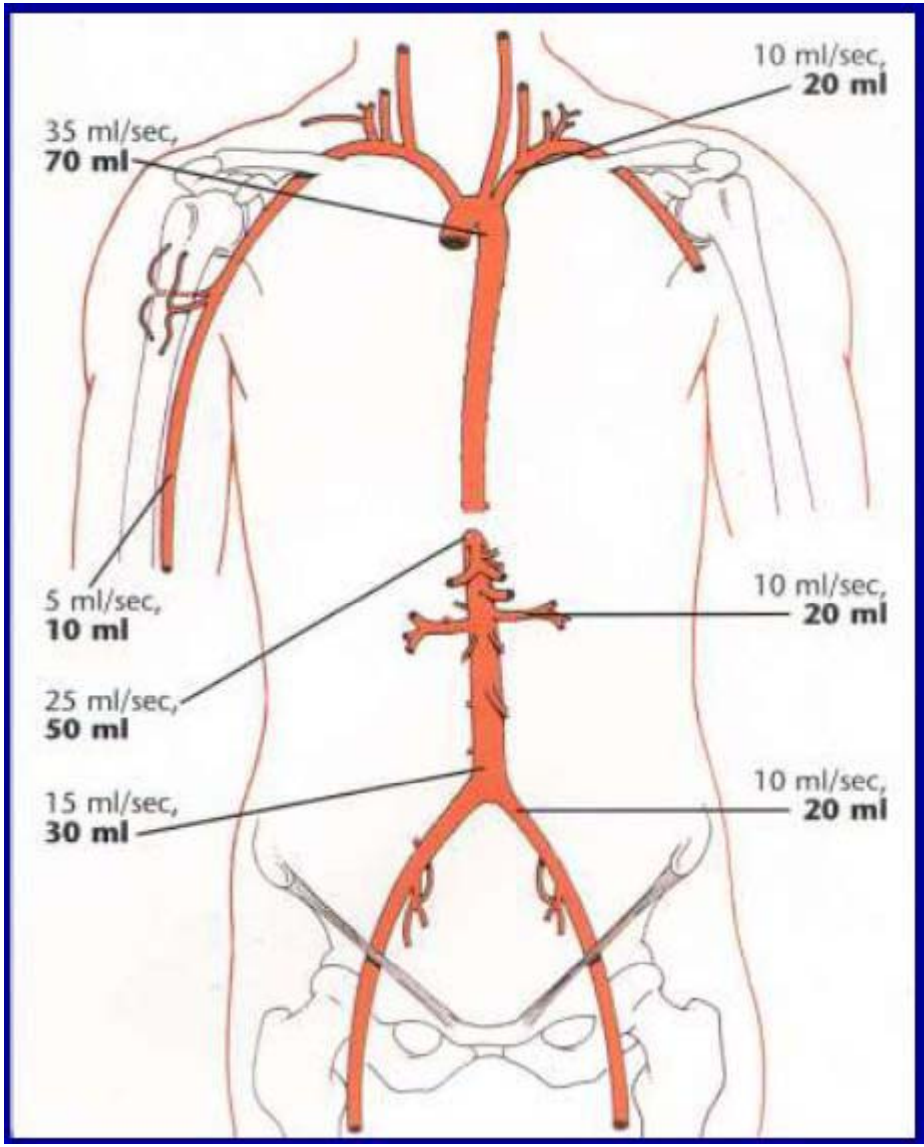
Pressure Gradient : Pre-stenting







Aortoiliac Angiography



Aortoiliac Angiography

Aortoiliac Angiography