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Endovascular Treatment of Aortoiliac Disease

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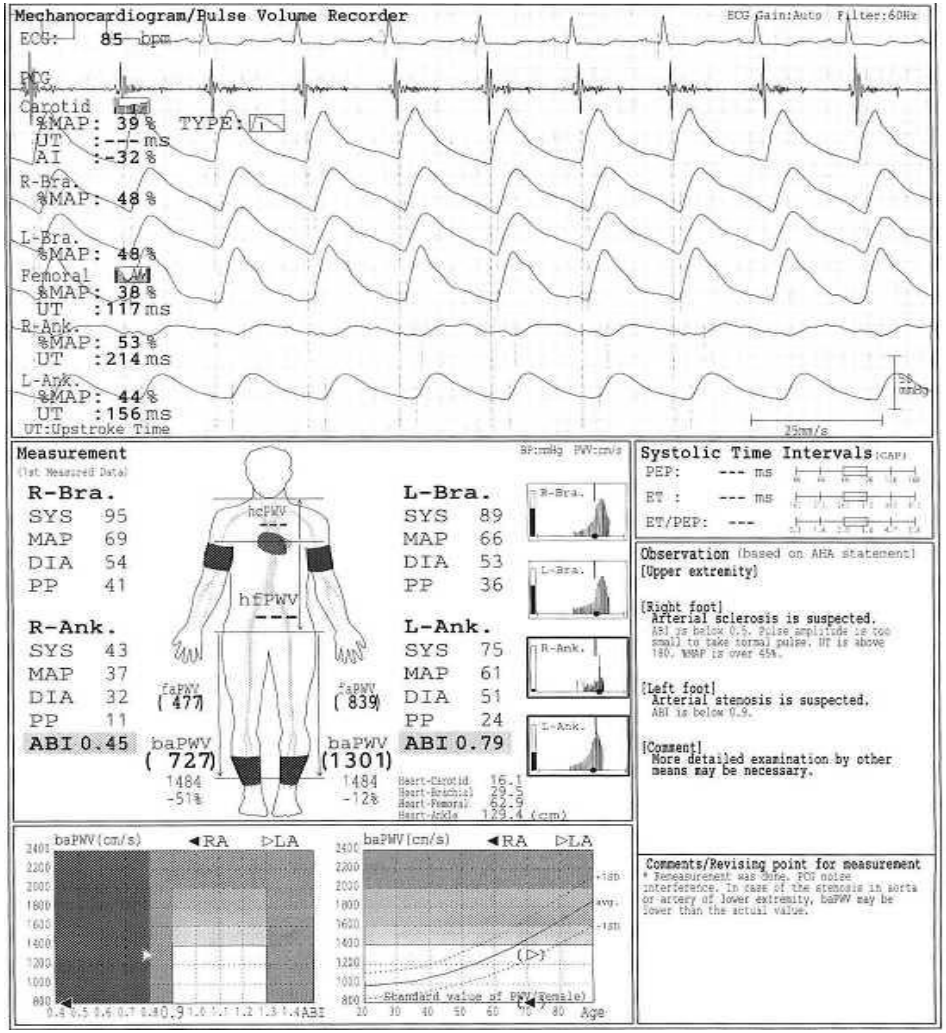
이 한 철

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
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
H
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

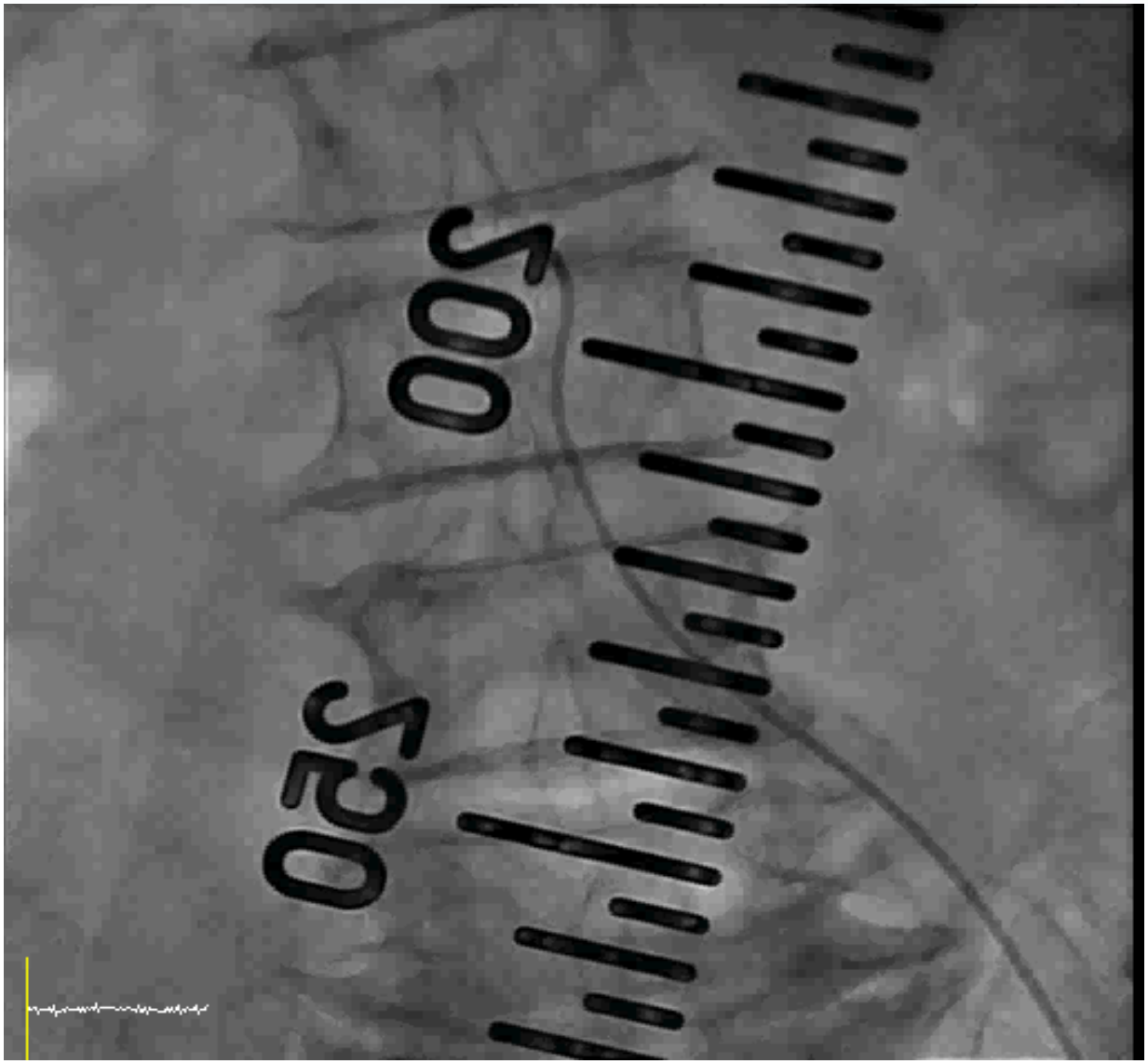
Assessment

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

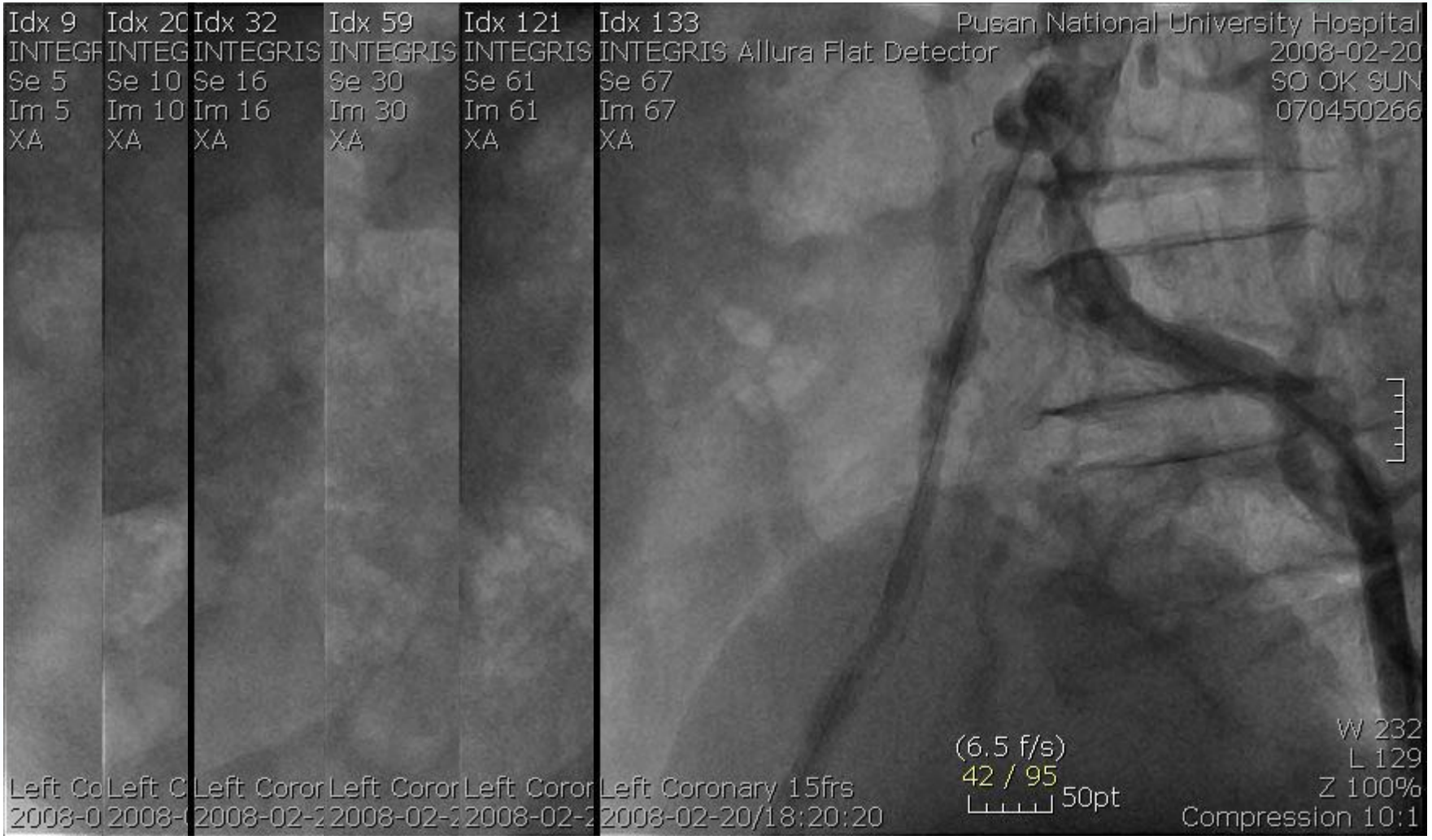
Plan

1. PTA for right CIA
2. DM control

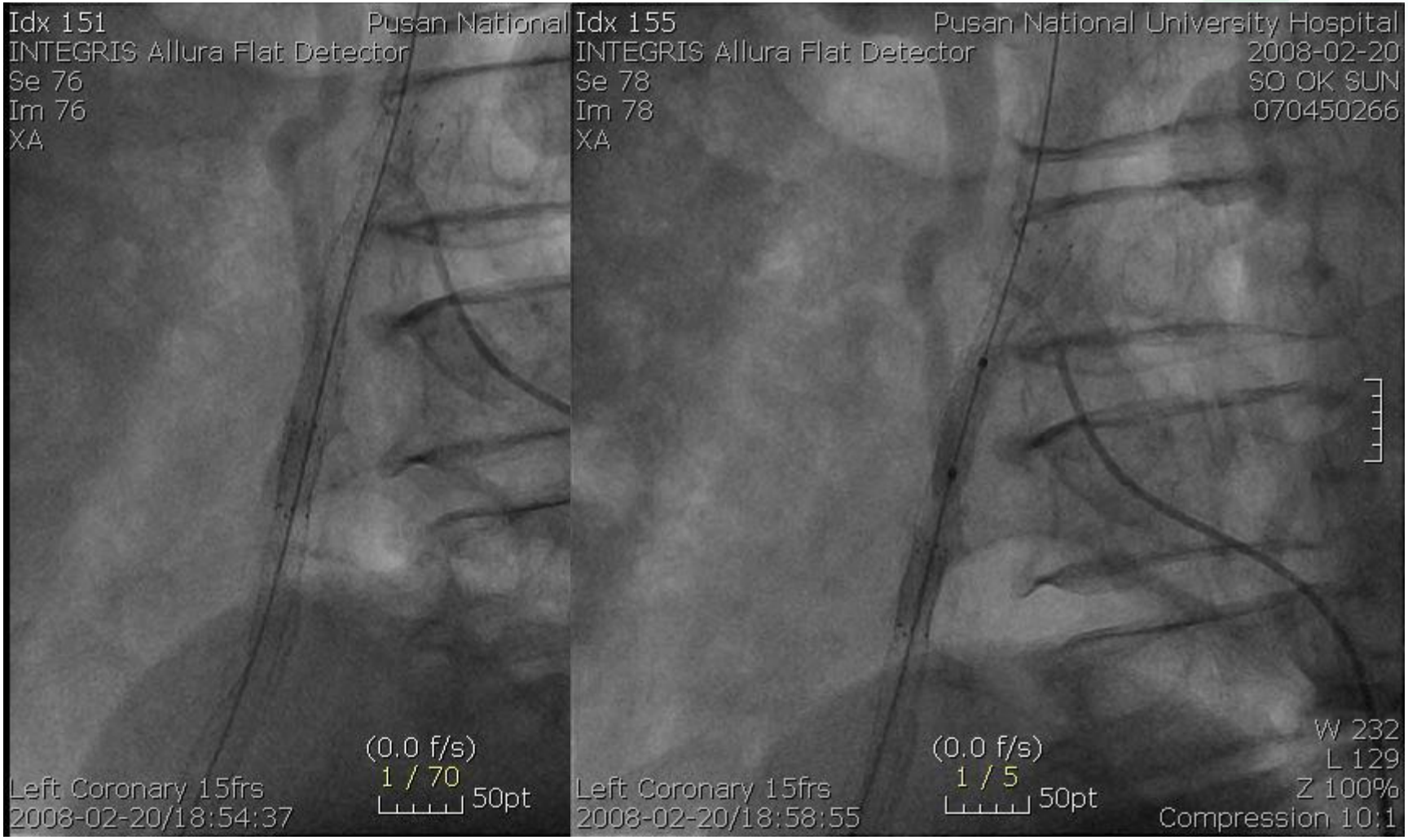
Peripheral Angiography



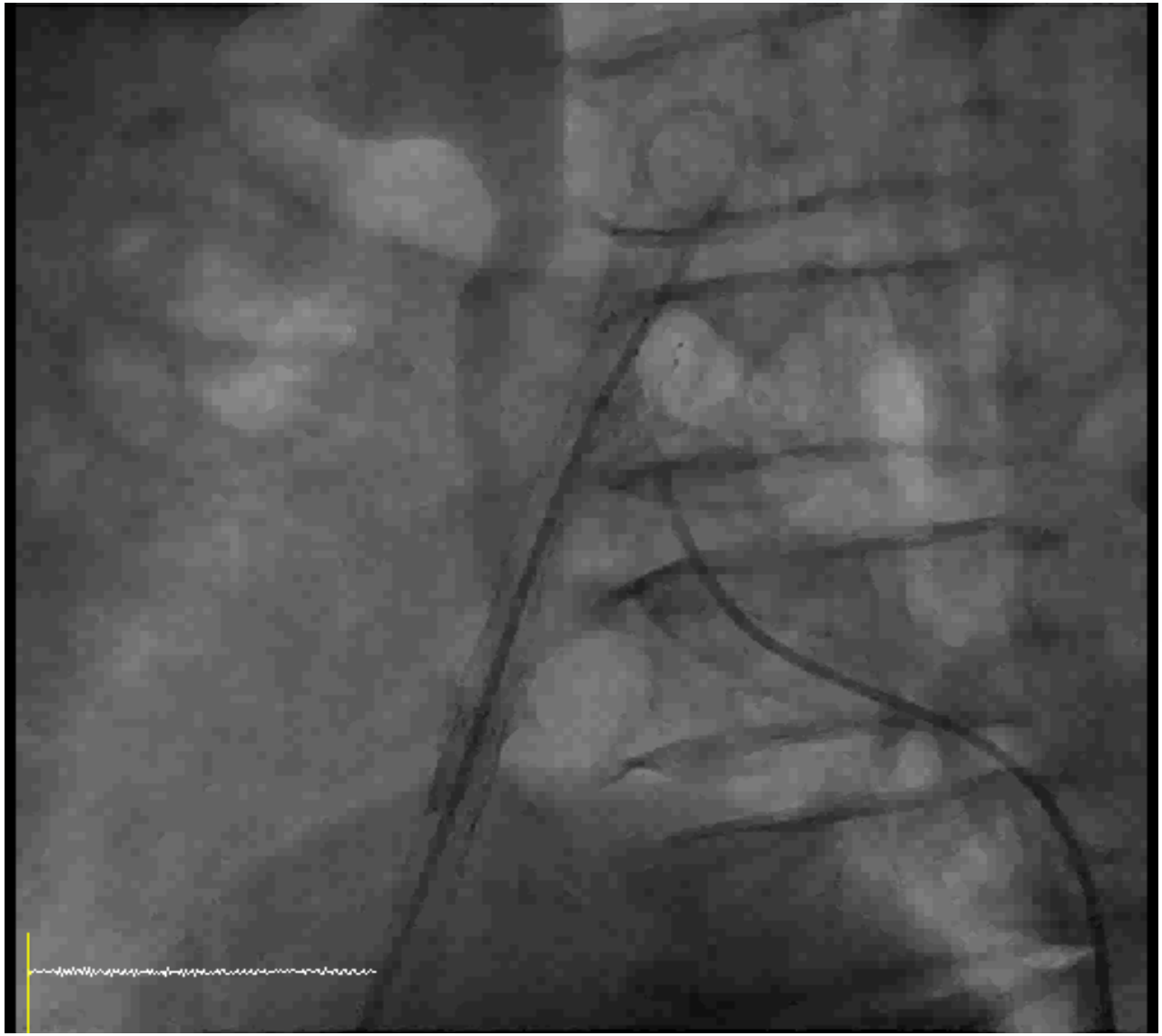
Peripheral Angiography



Peripheral Angiography



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.

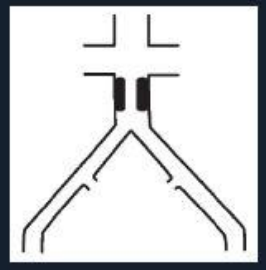
- Ankle brachial index (ABI)
- CT
- MRI
- Duplex ultrasonography
- Angiography

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

Endovascular Treatment of Choice

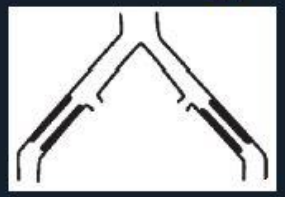
Type A

Preferred Endovascular Treatment



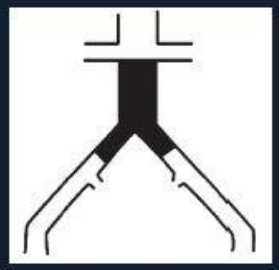
Types B

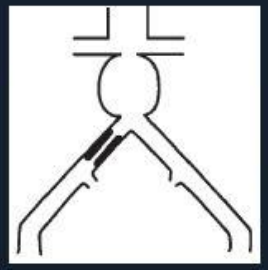
Preferred Surgical Treatment



Types C

Surgical Treatment of Choice

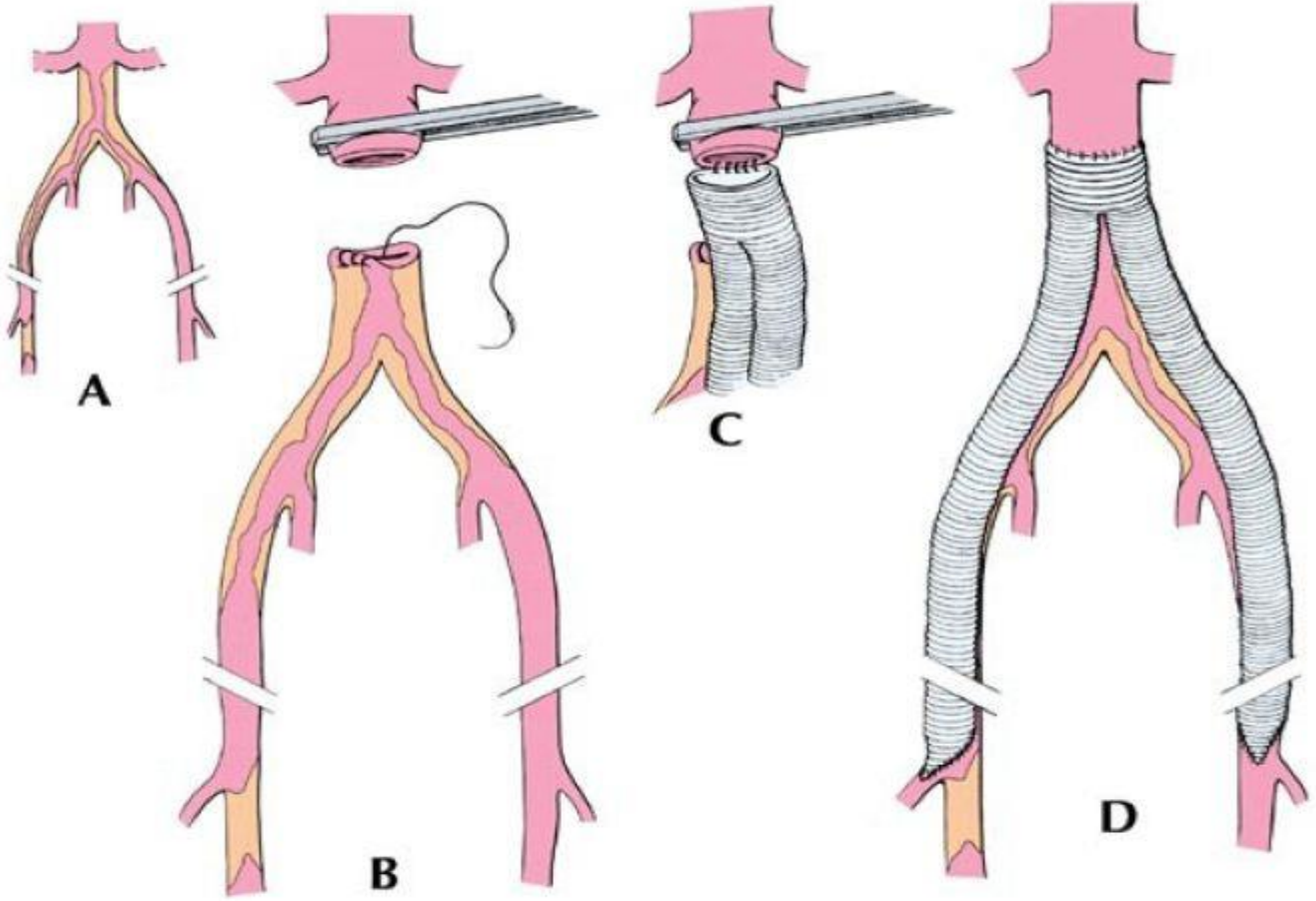




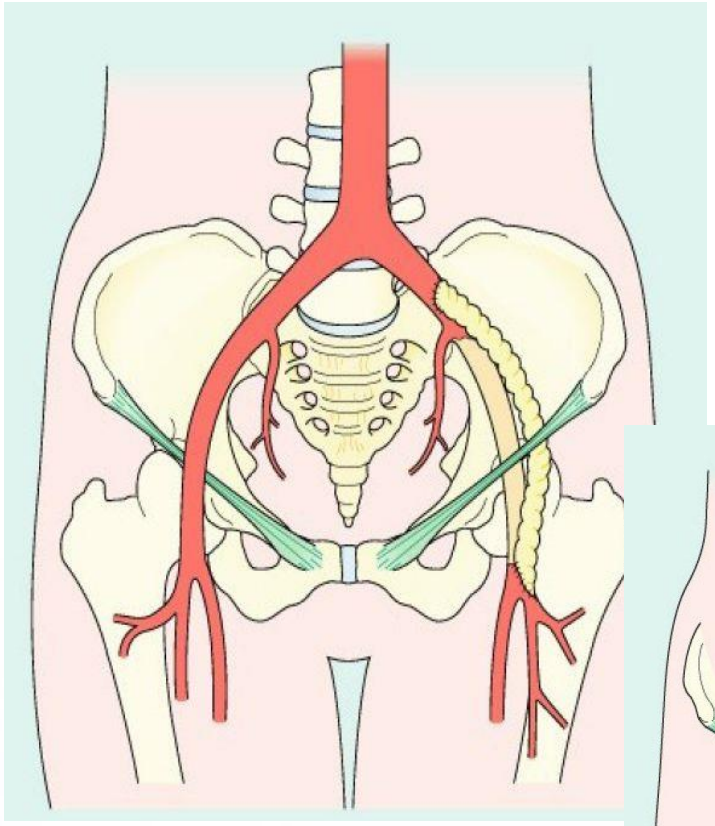
Type D

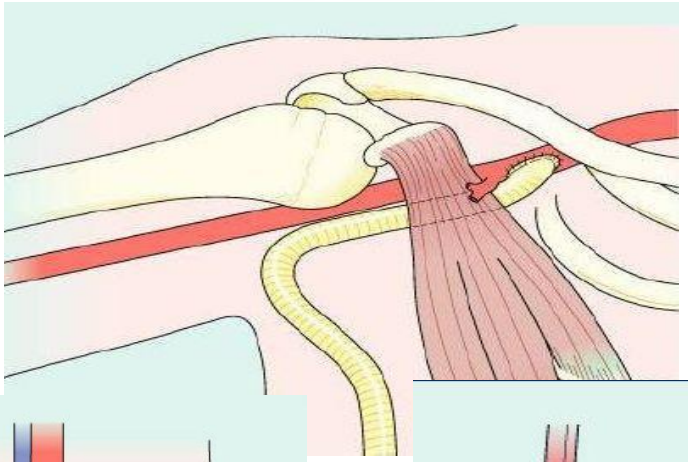
Norgren L et al. *JVS*. 2007:S5A–S67A

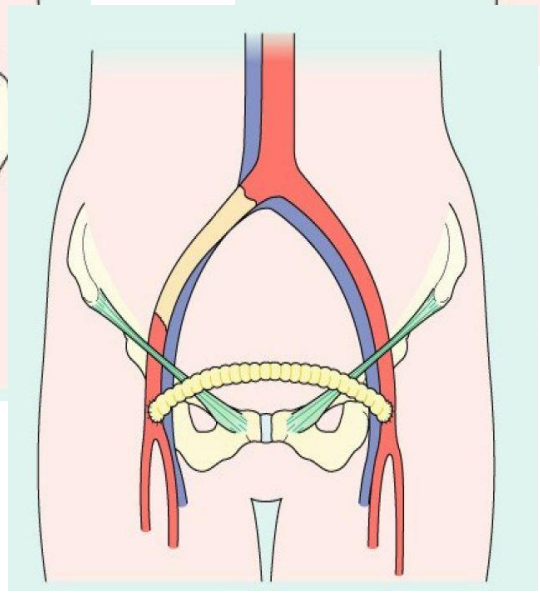
Aortoiliac Operation

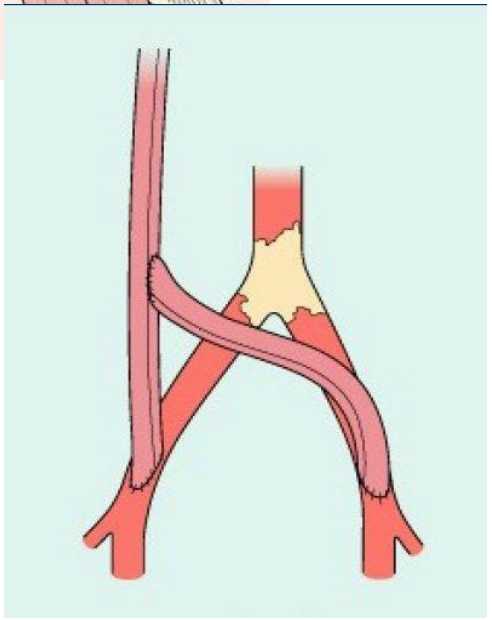


Aortoiliac Operation









Aortobifemoral Bypass Operation

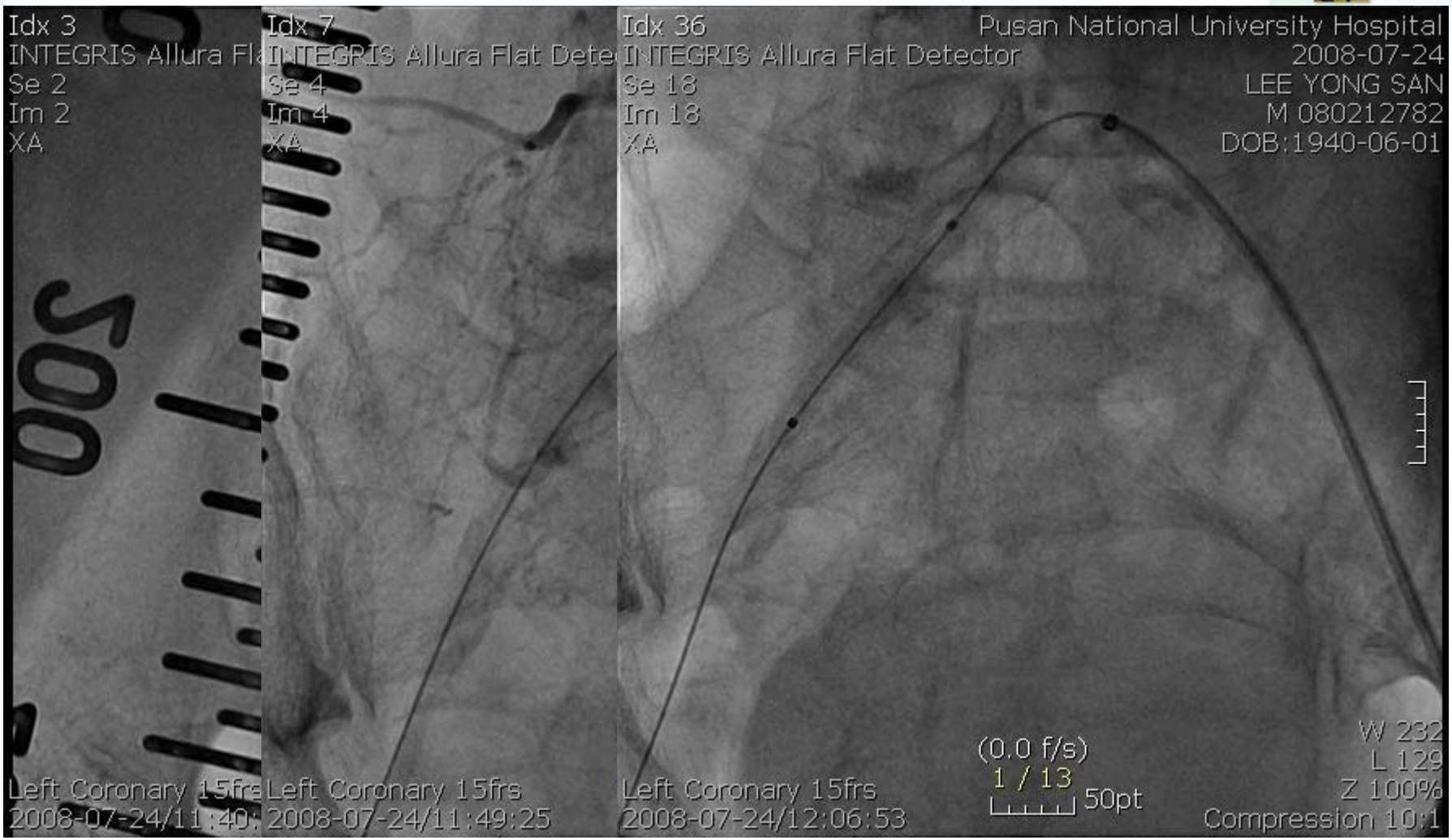
	Pre 1975	Post 1975
Mortality	4.6%	3.3%
Morbidity	13.1%	8.3%

- Patency Rates

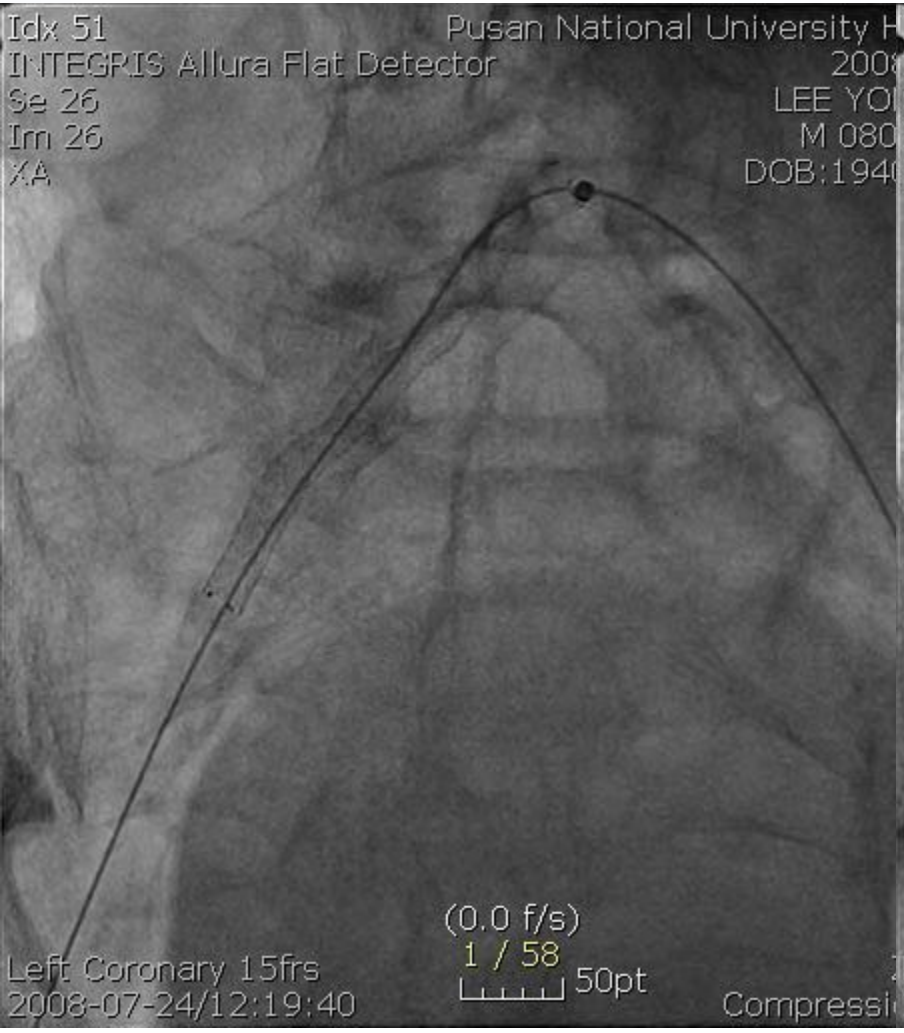
	5 yr	10 yr
Claudication	91.0%	86.8%
Limb Ischemia	87.5%	81.8%

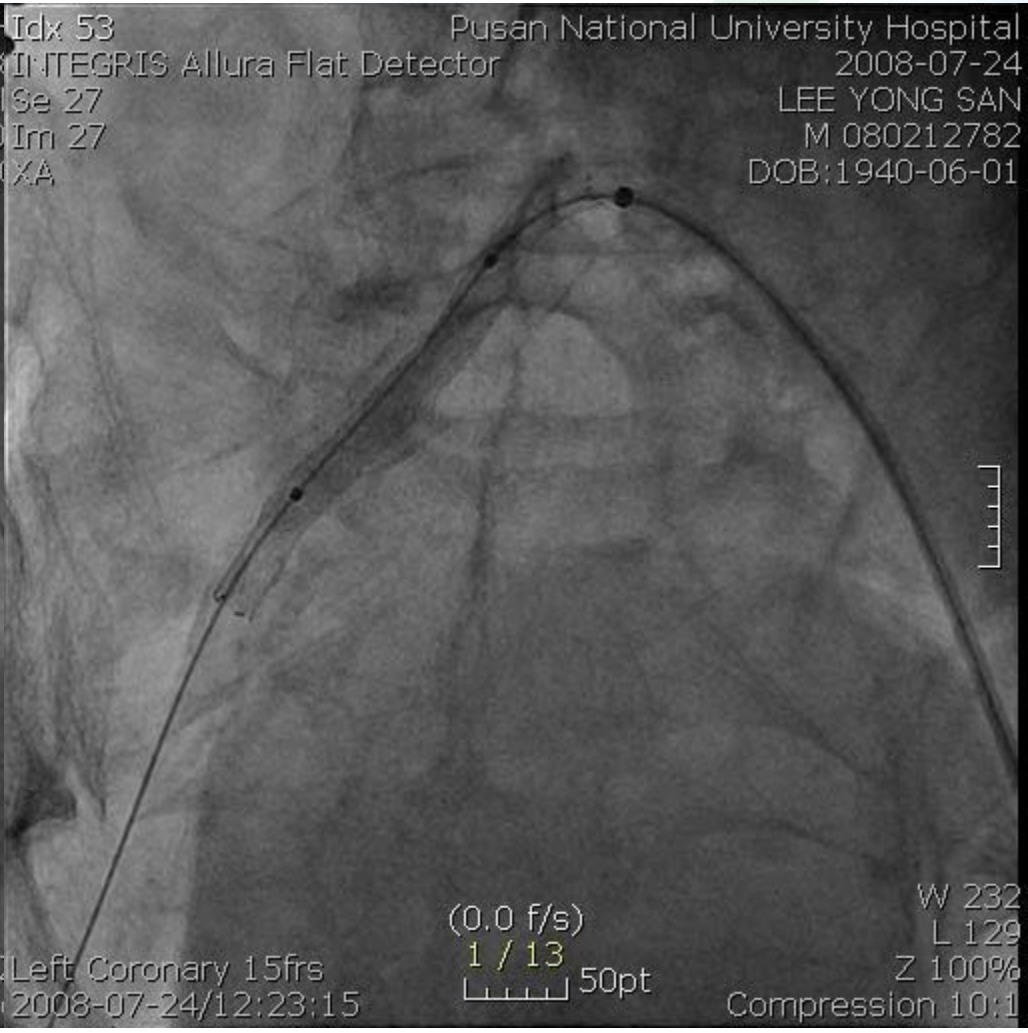
De Vries and Hunink, JVS 1997; 26:558-569.

Aortoiliac Balloon Angioplasty

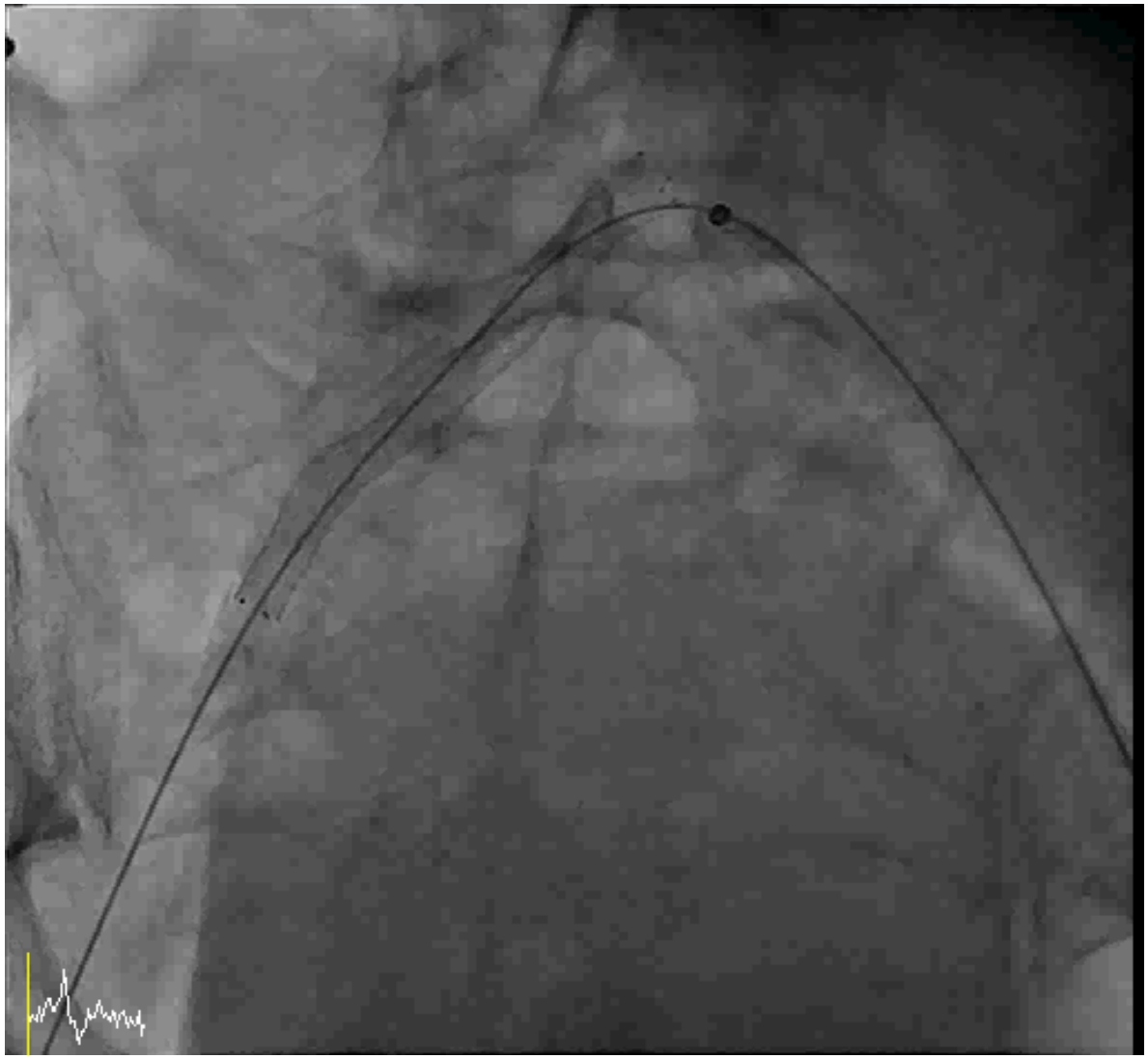


Aortoiliac Balloon Angioplasty





Aortoiliac Balloon Angioplasty

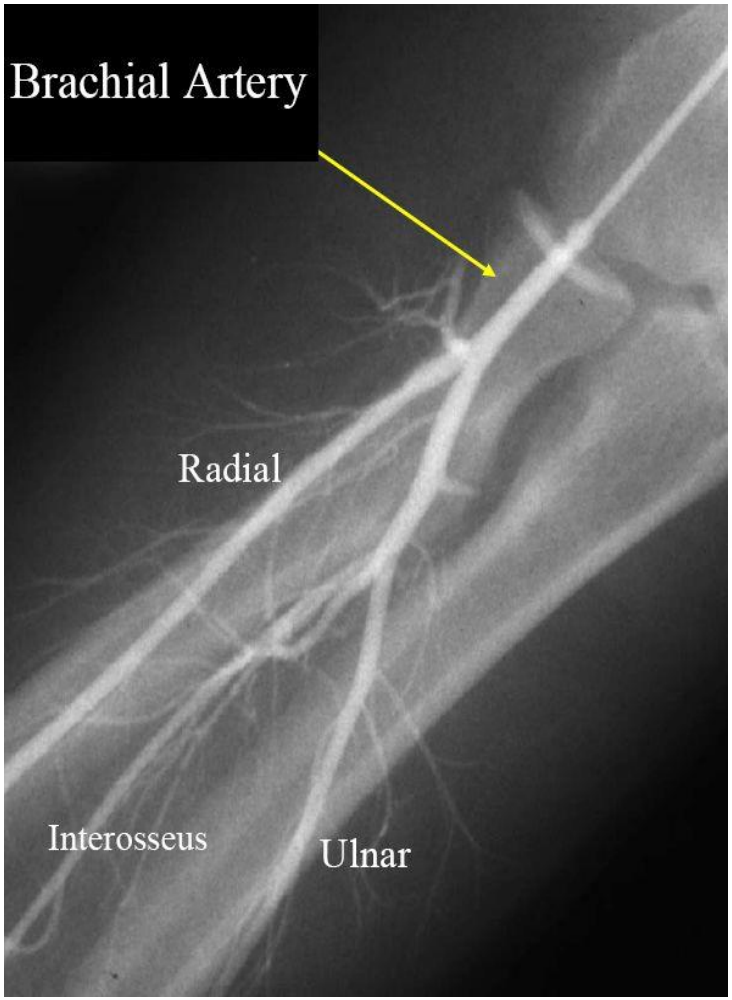


Aortoiliac Balloon Angioplasty : Access Site

- 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

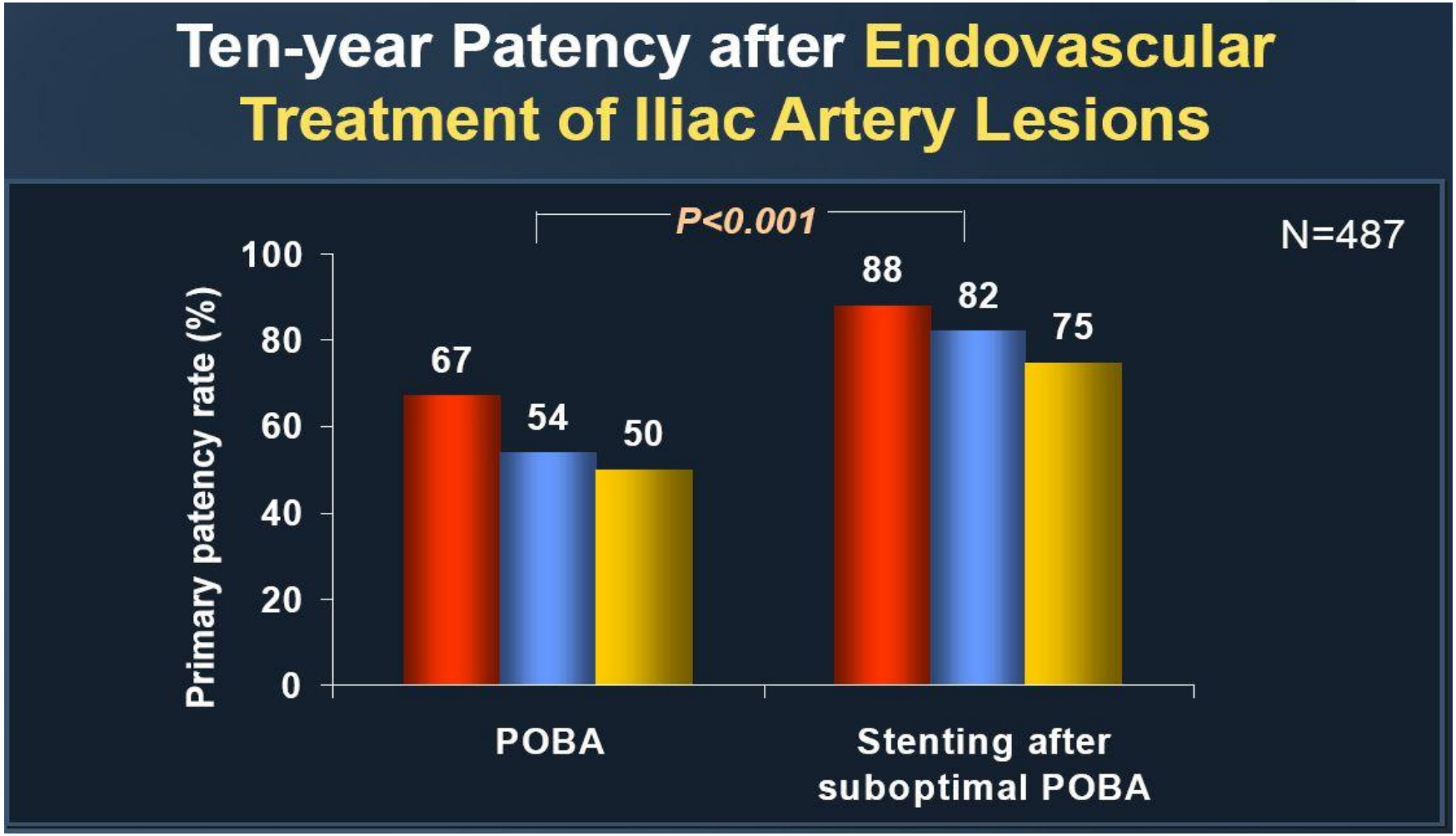
Nitinol Stents vs. Stainless Stents

Results:

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

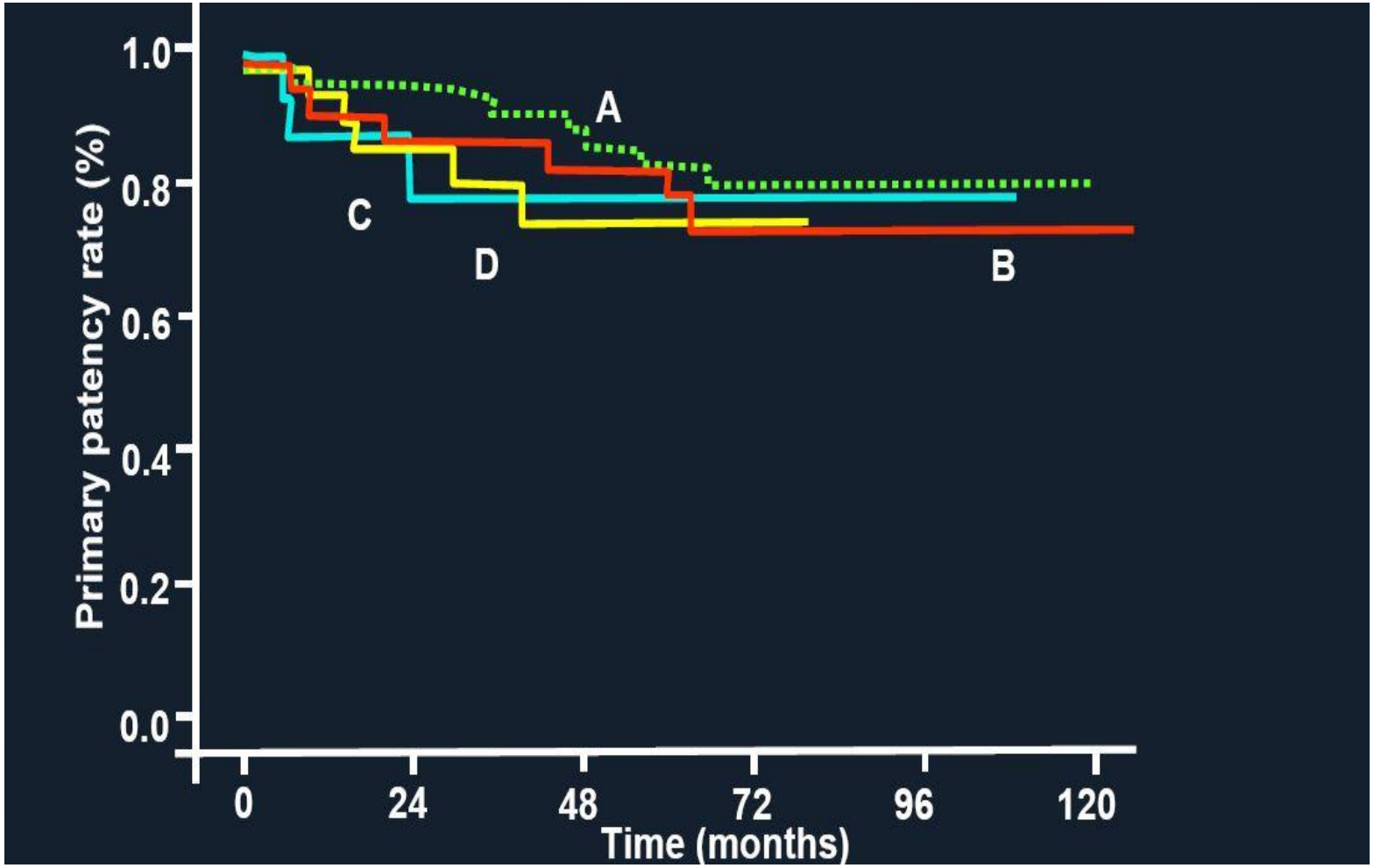
Ponec D et al; J Vasc Interv Radiol 2004; 15:911–918

Angioplasty vs. Stent



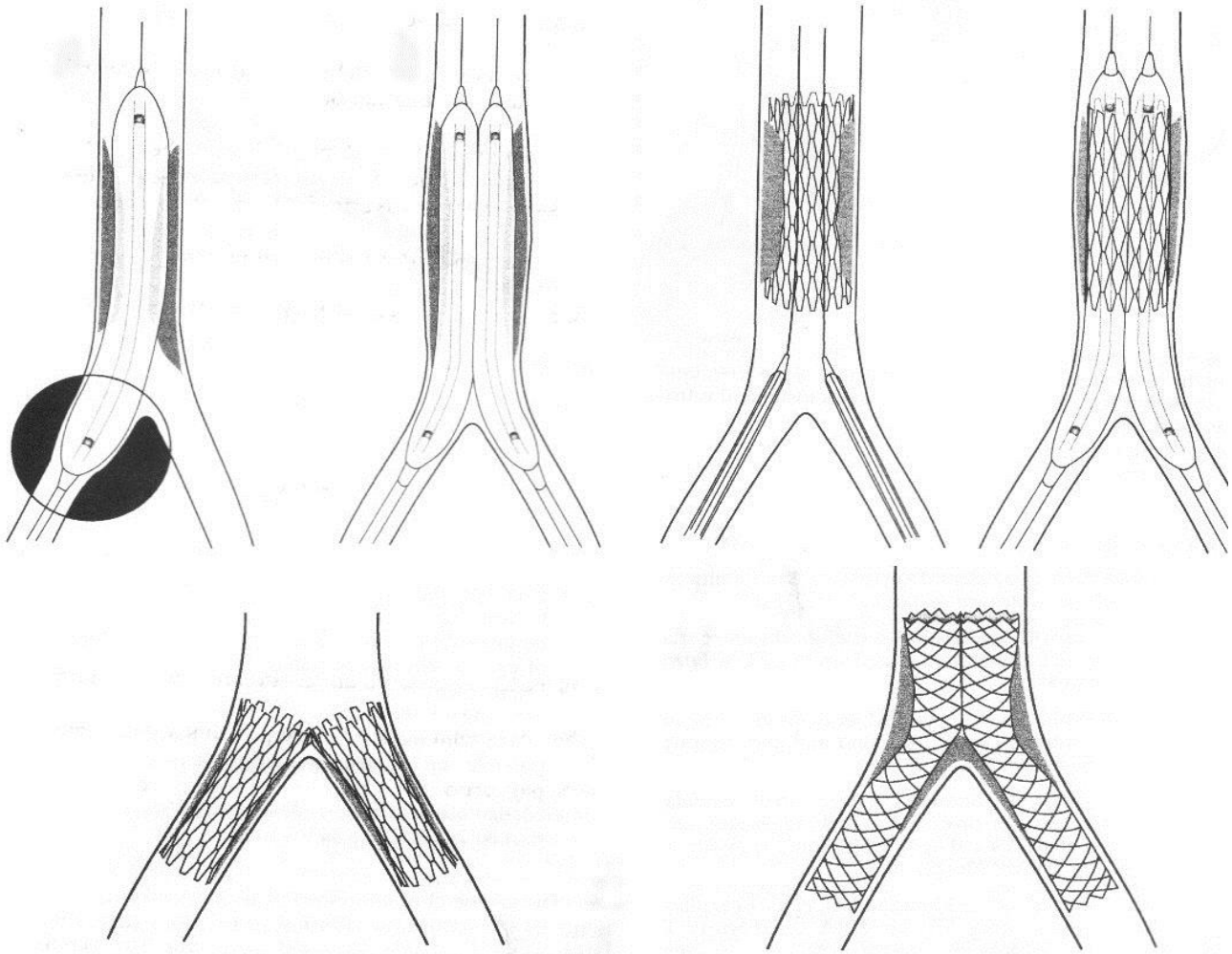
Koizumi A, et al. Circ J 2009;73(5):860-6

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



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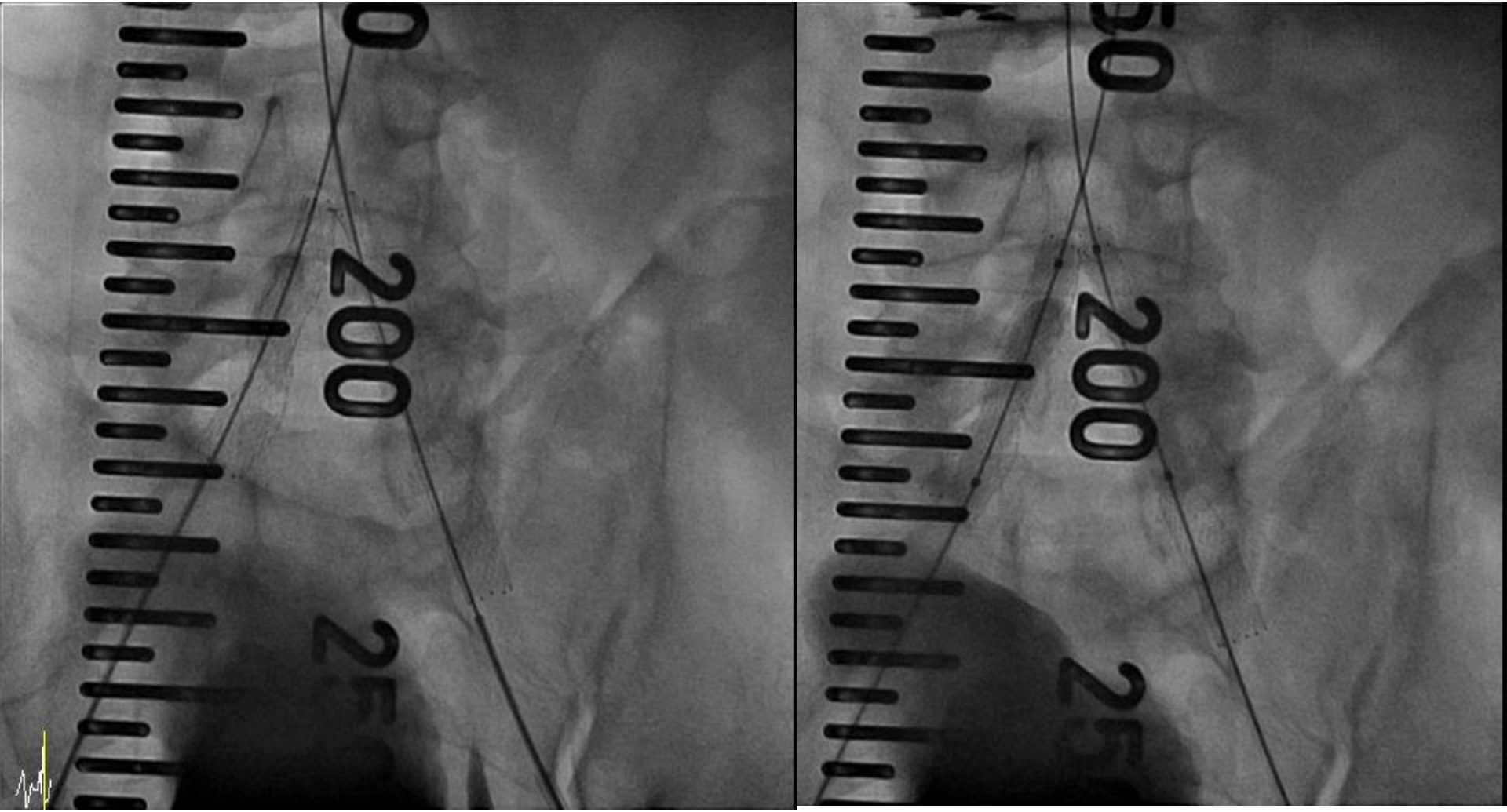
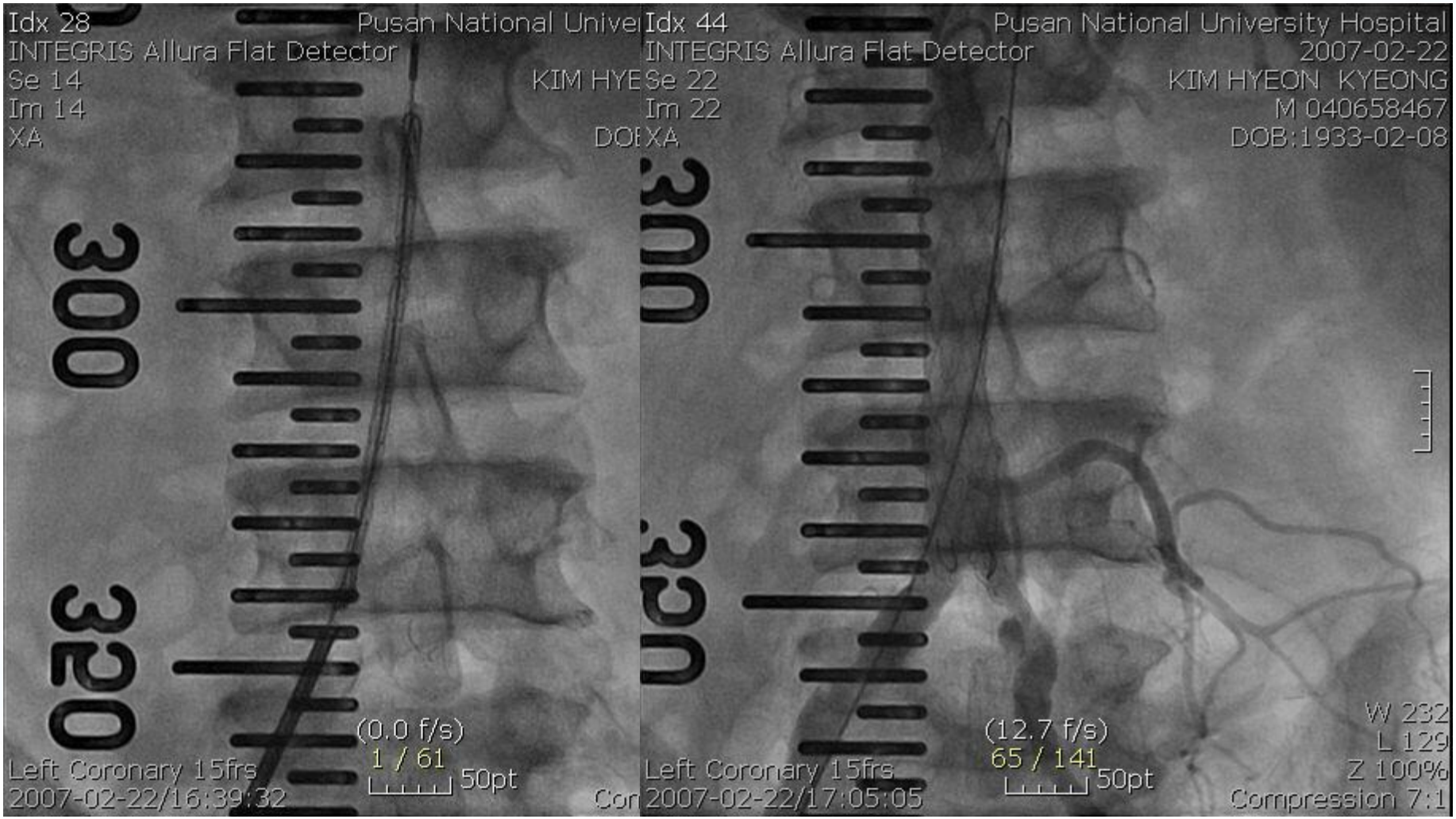
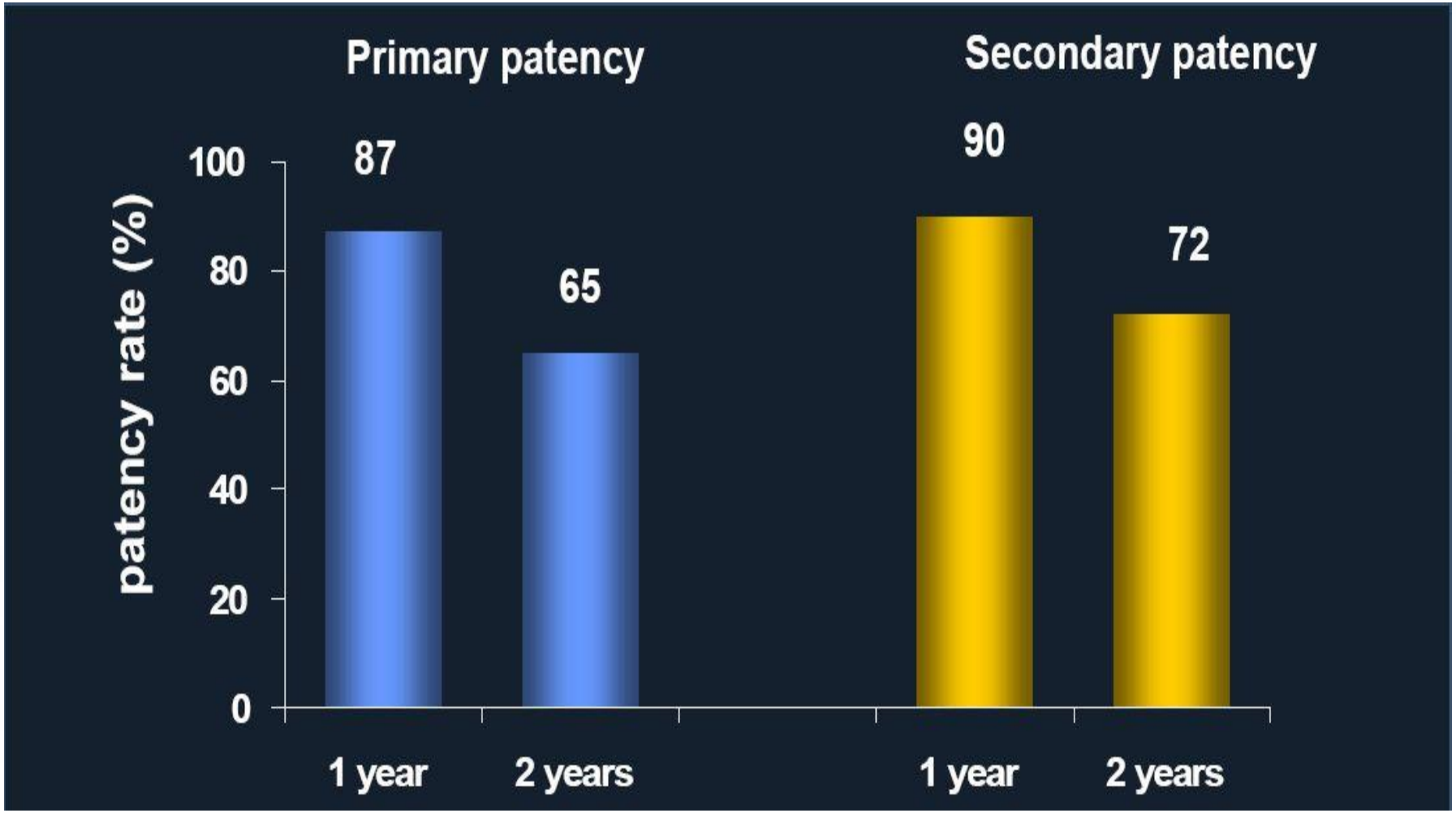


Kissing stents or Distal Aortic Stent at the Aortoiliac Bifurcation



Kissing stents or Distal Aortic Stent at the Aortoiliac Bifurcation

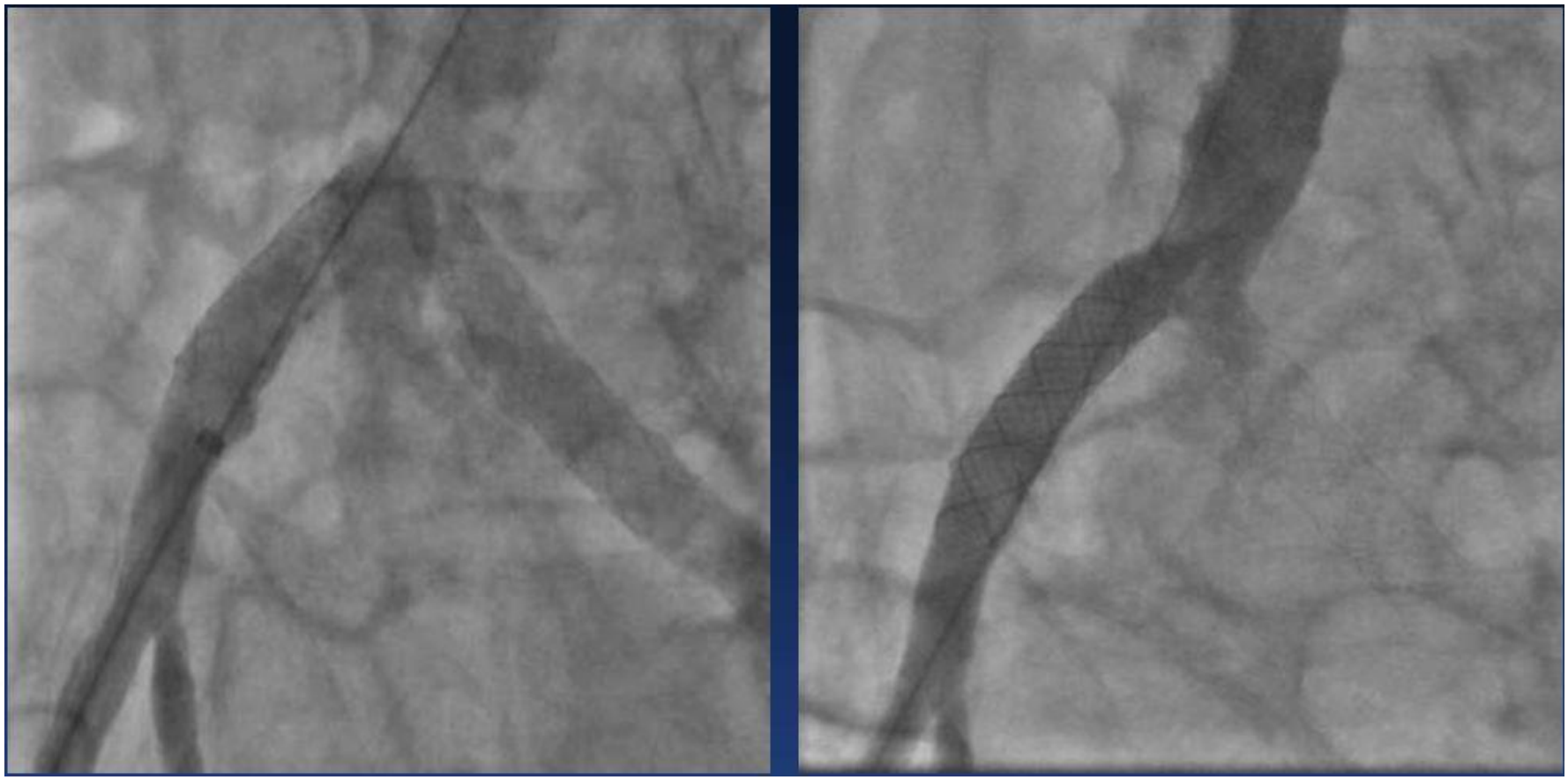


van't Riet M, et al. *J Vasc Nurs* 2008;26(3):82-5.

Iilac artery Perforation

Perforation

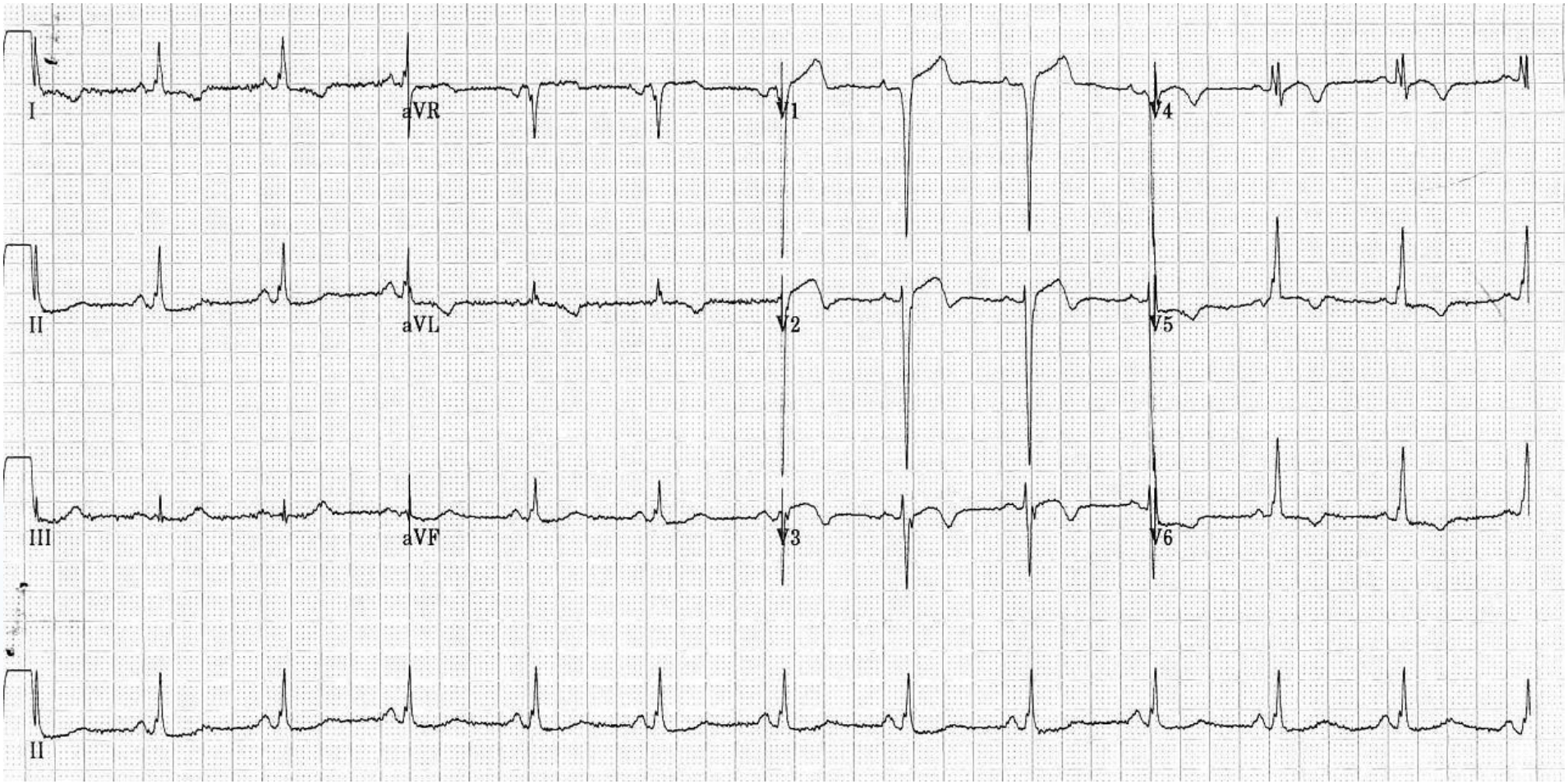
Graft stent



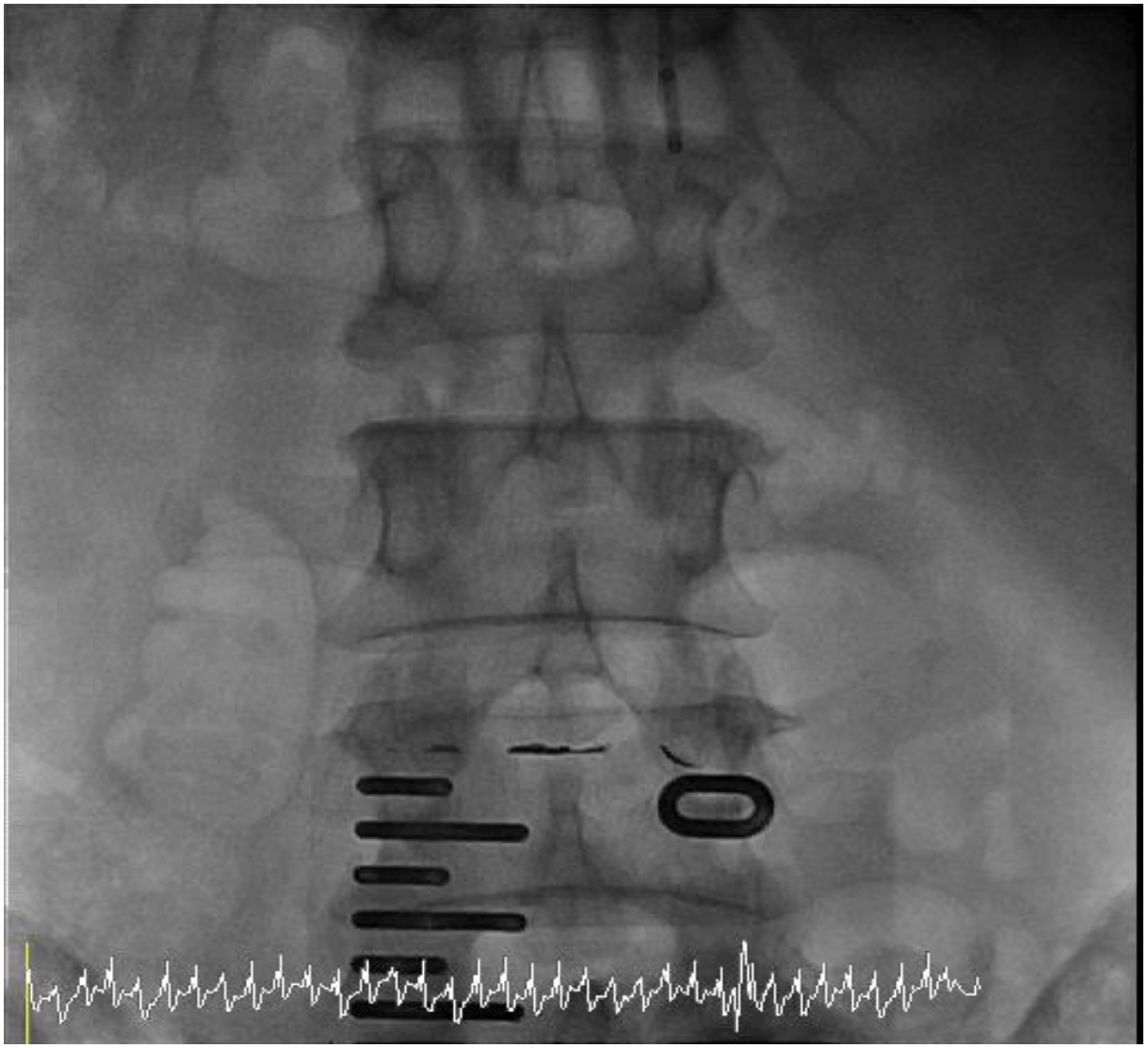
Acute Occlusion of Aorta : Case

- 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

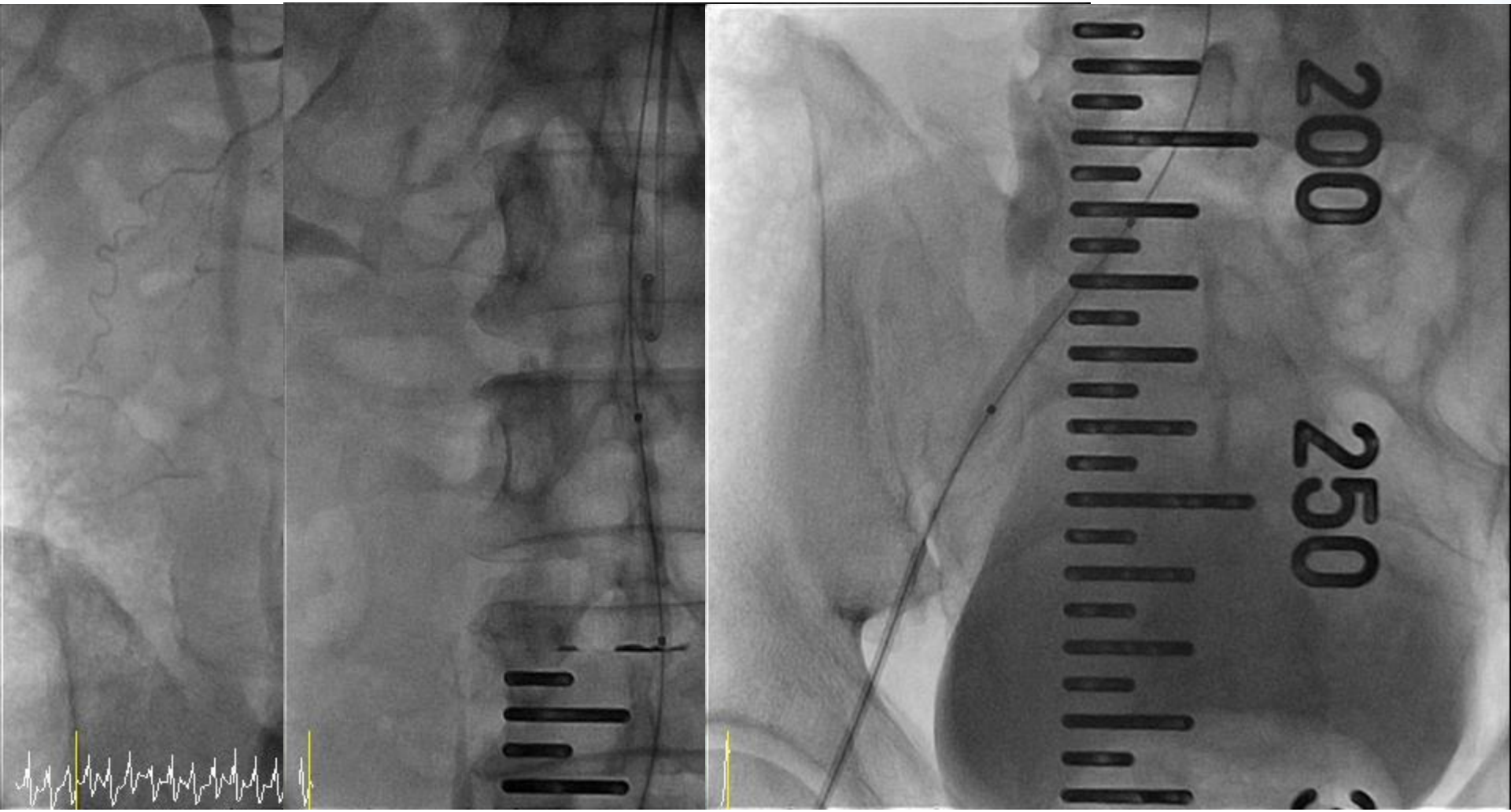
EKG



1st Angiography

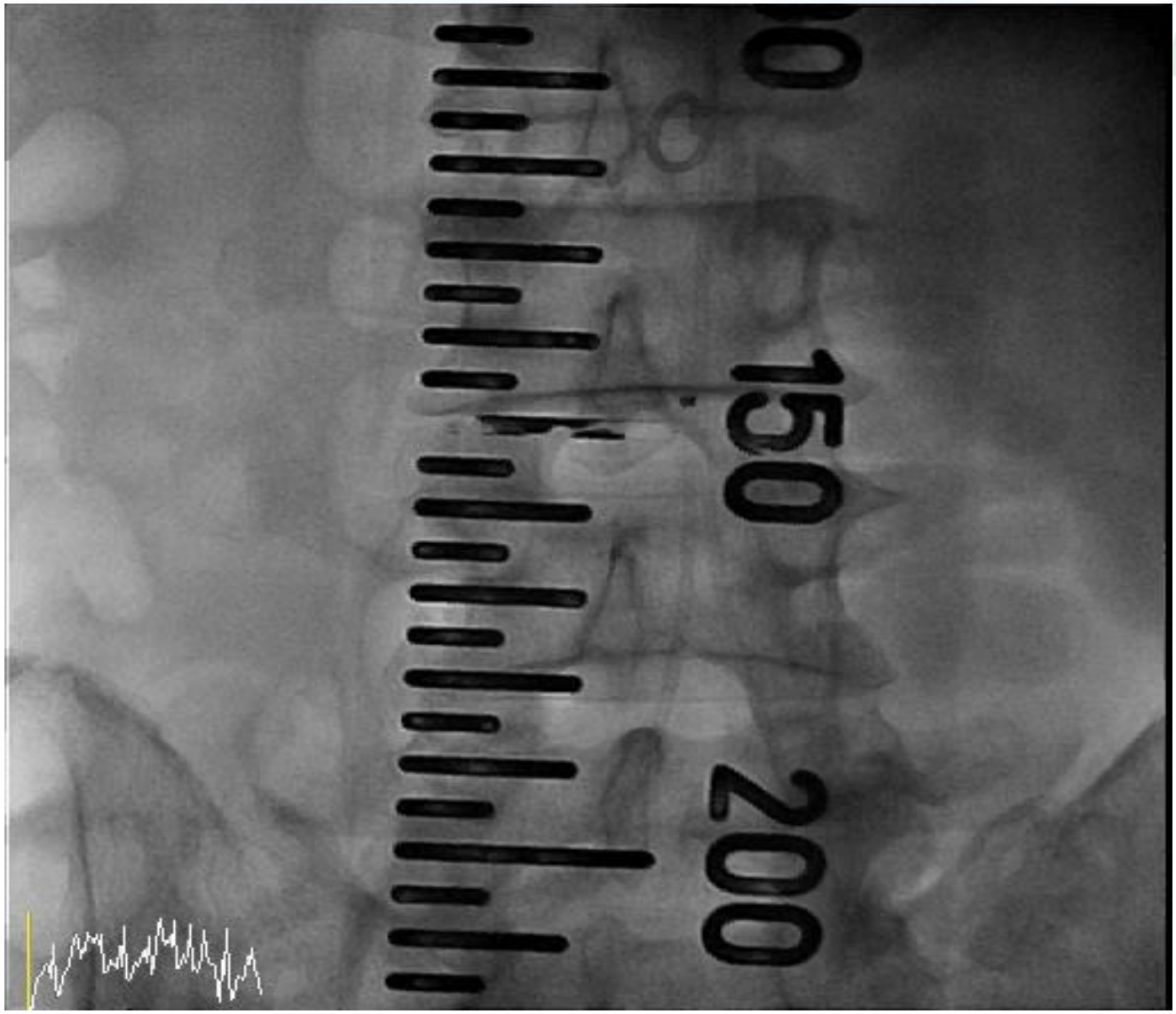


Wiring & Ballooning on Rt. Iliac Artery

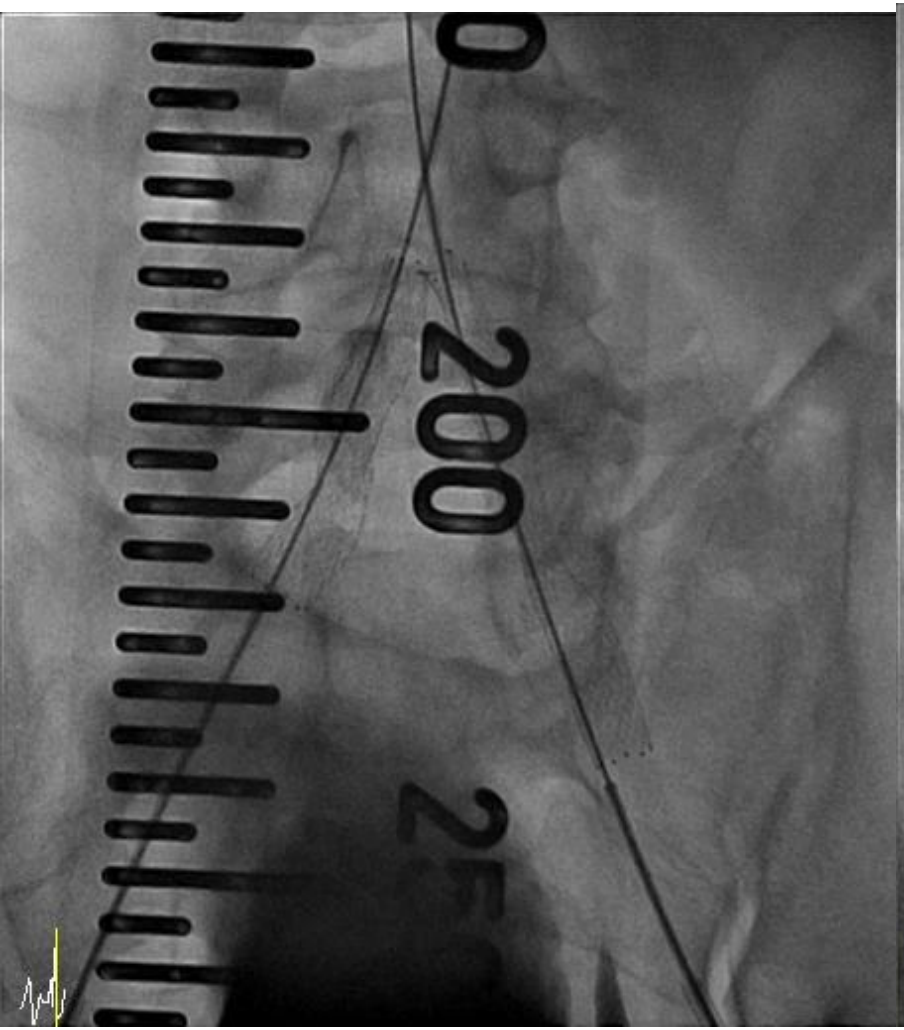


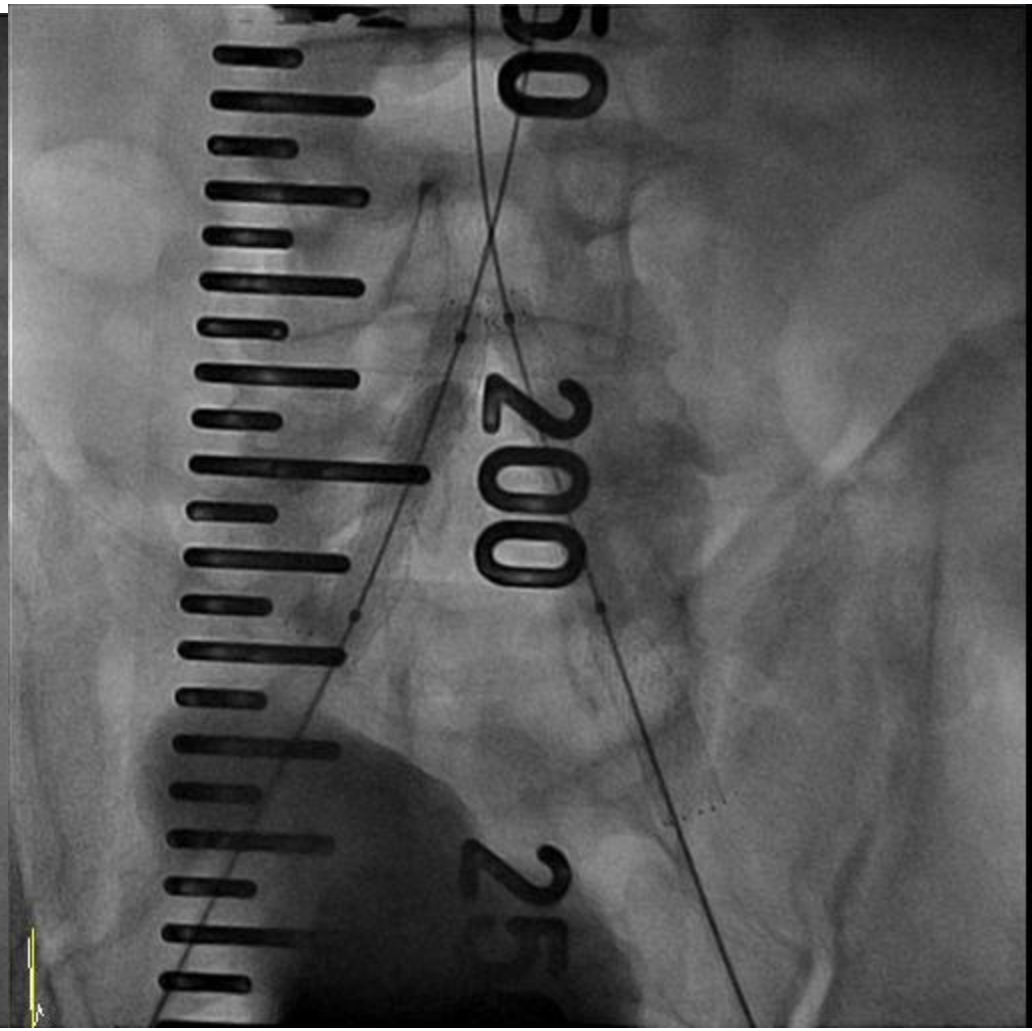
Wiring & Ballooning on Lt. Iliac Artery

3rd Angiography

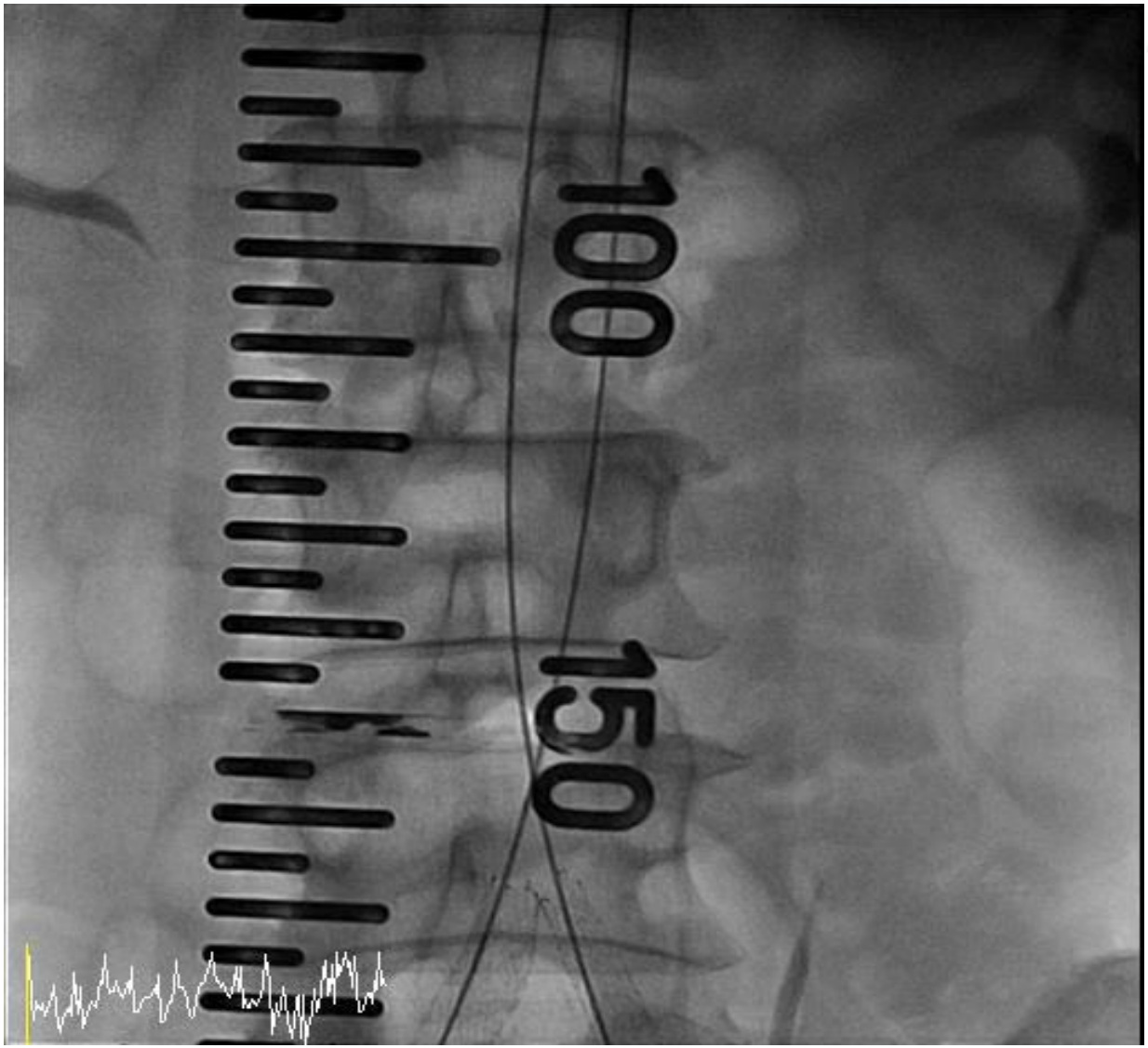


Kissing Stent insertion, Kissing ballooning on Both Ext. Iliac Artery

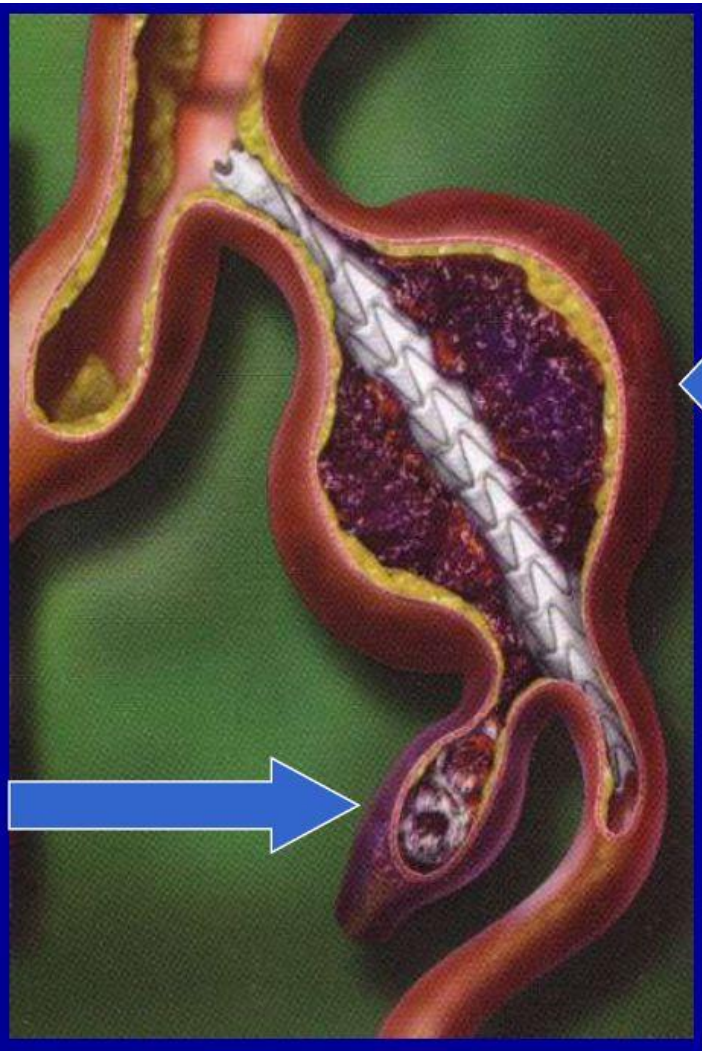




Final angiography



Common Iliac Artery Aneurysm



Common Iliac Artery Aneurysm : Endovascular Indication

3 – 3.5 cm

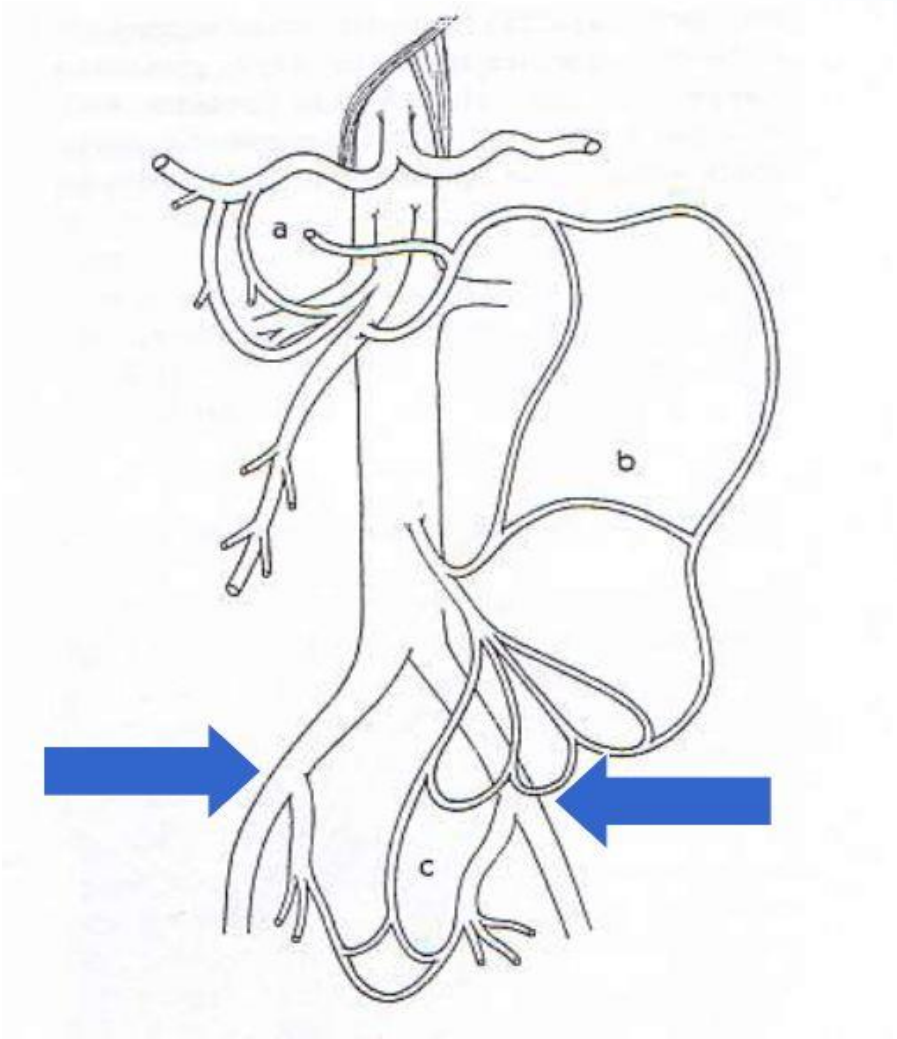
: Maxiaml external diameter

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

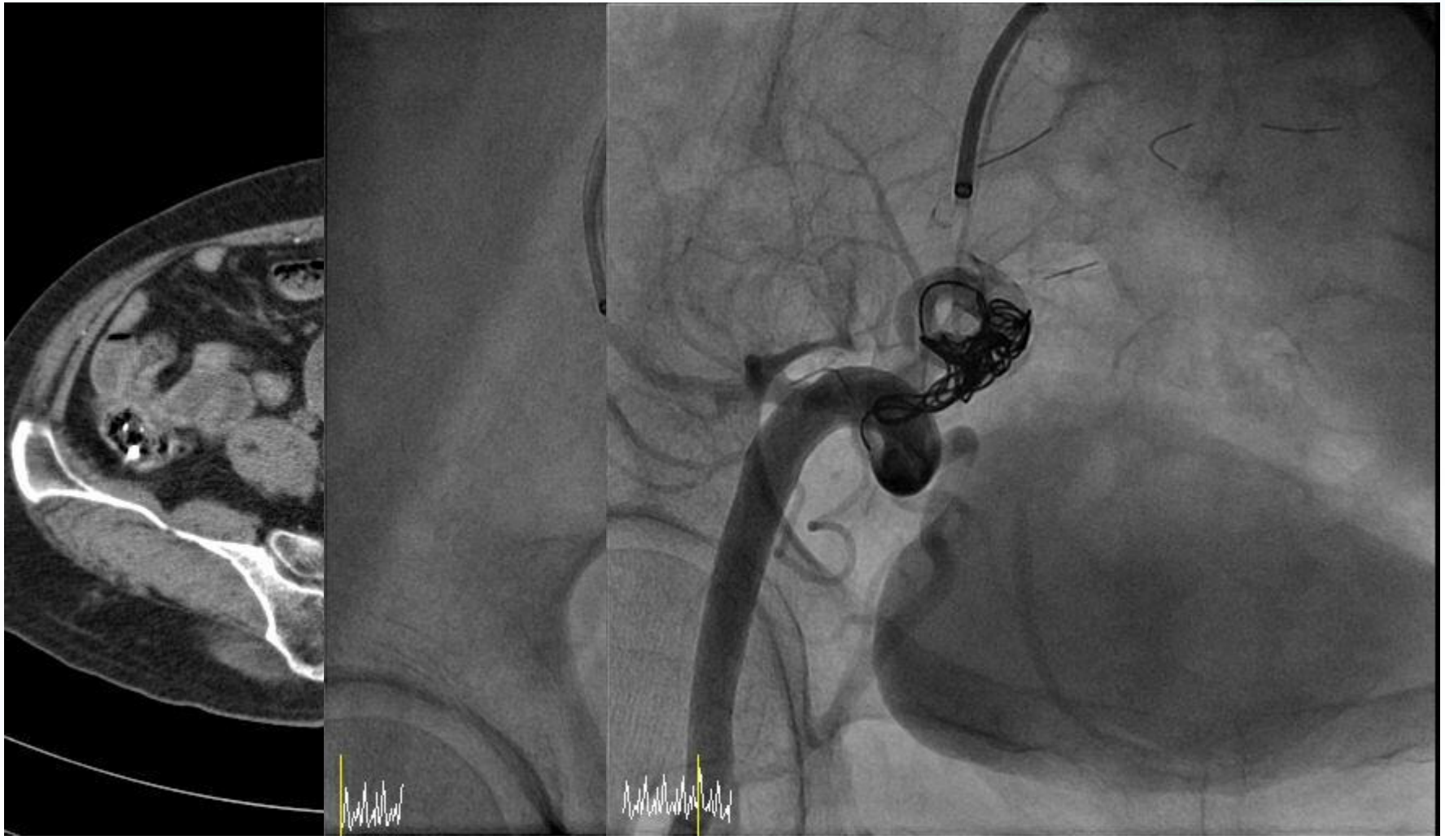
Common Iliac Artery Aneurysm : Op. vs Endovascular

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

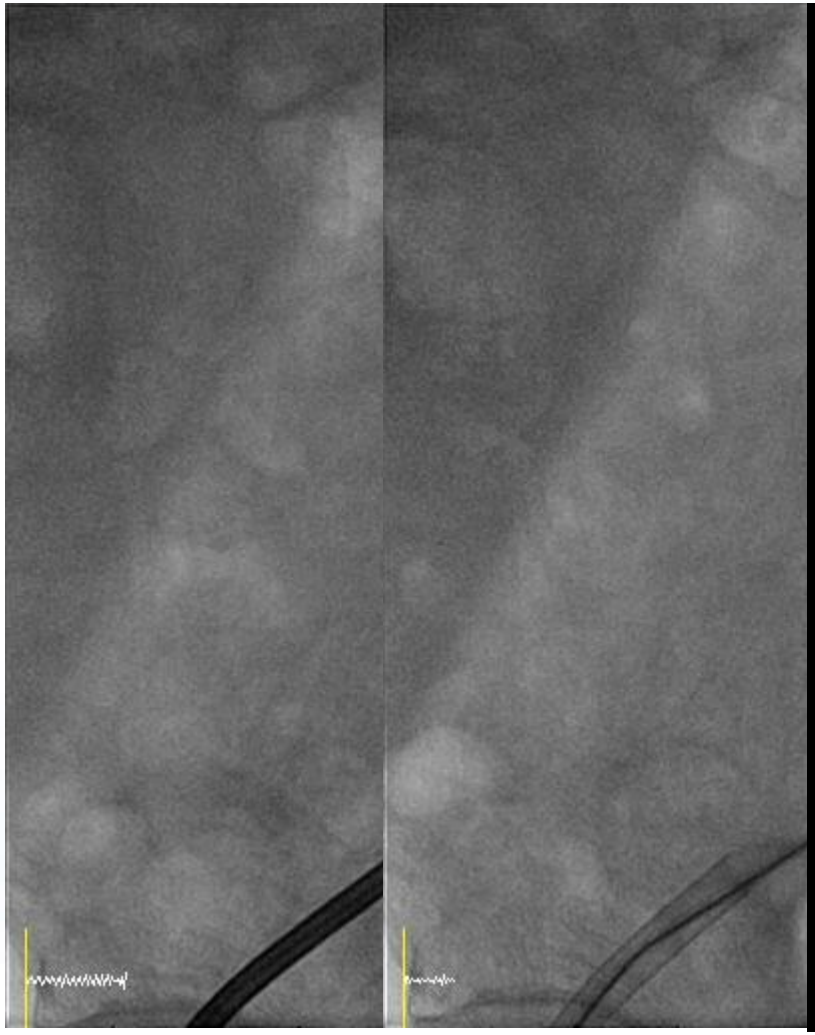
At 5 years, primary patency was 100% with open surgical repair and 96% with endovascular repair (*P* = 0.07).

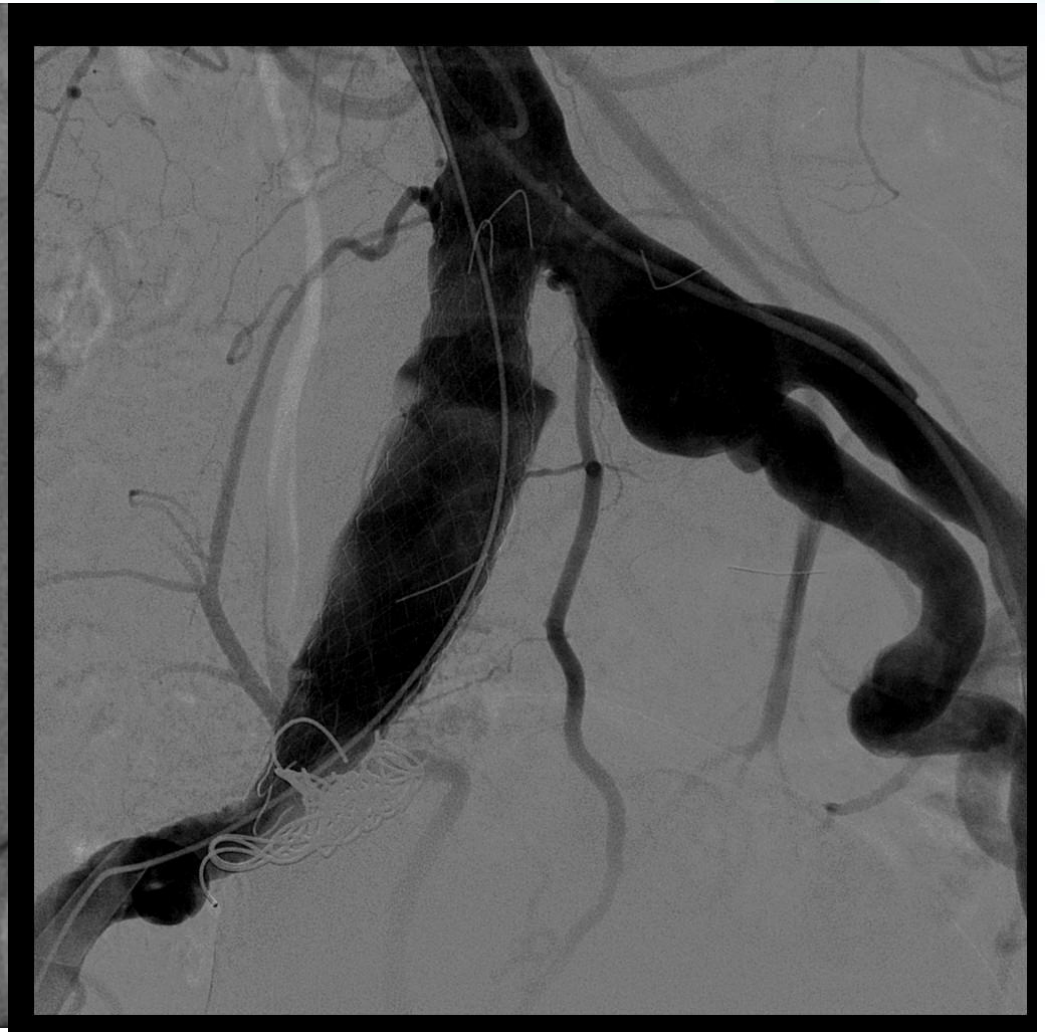
Patel NV, et al. J Vasc Surg.2009 Feb 21.

Common Iliac Artery Aneurysm : Case

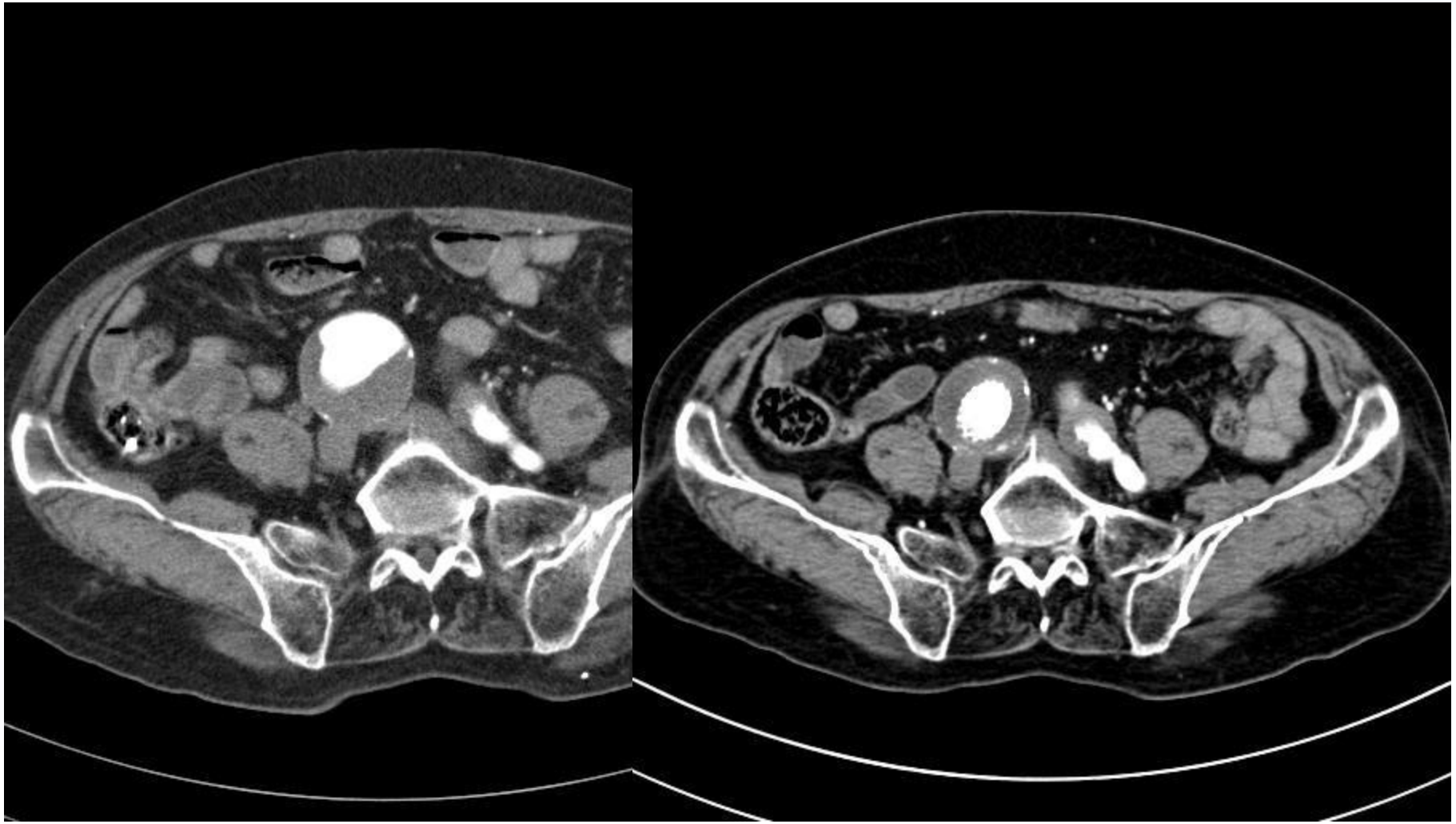


Common Iliac Artery Aneurysm : Case

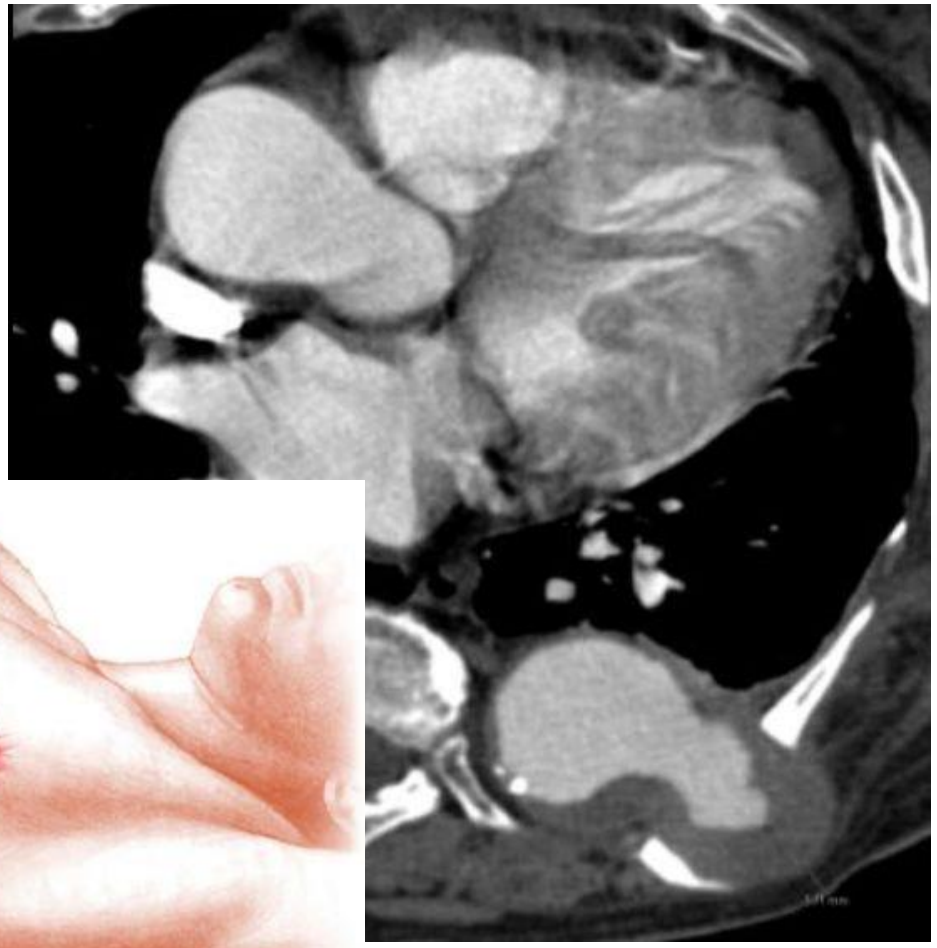


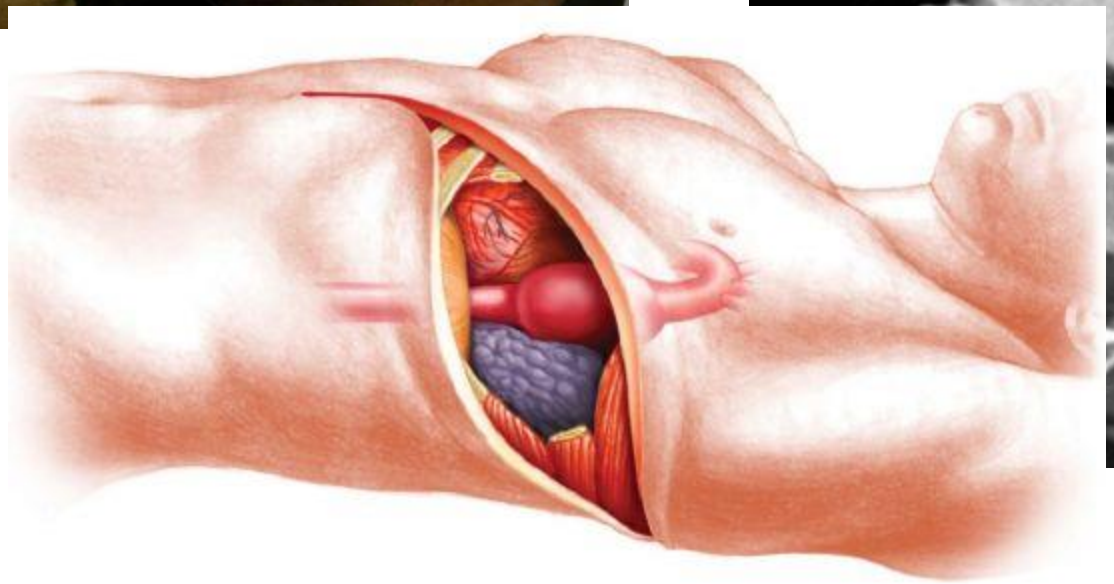


Common Iliac Artery Aneurysm : Case



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

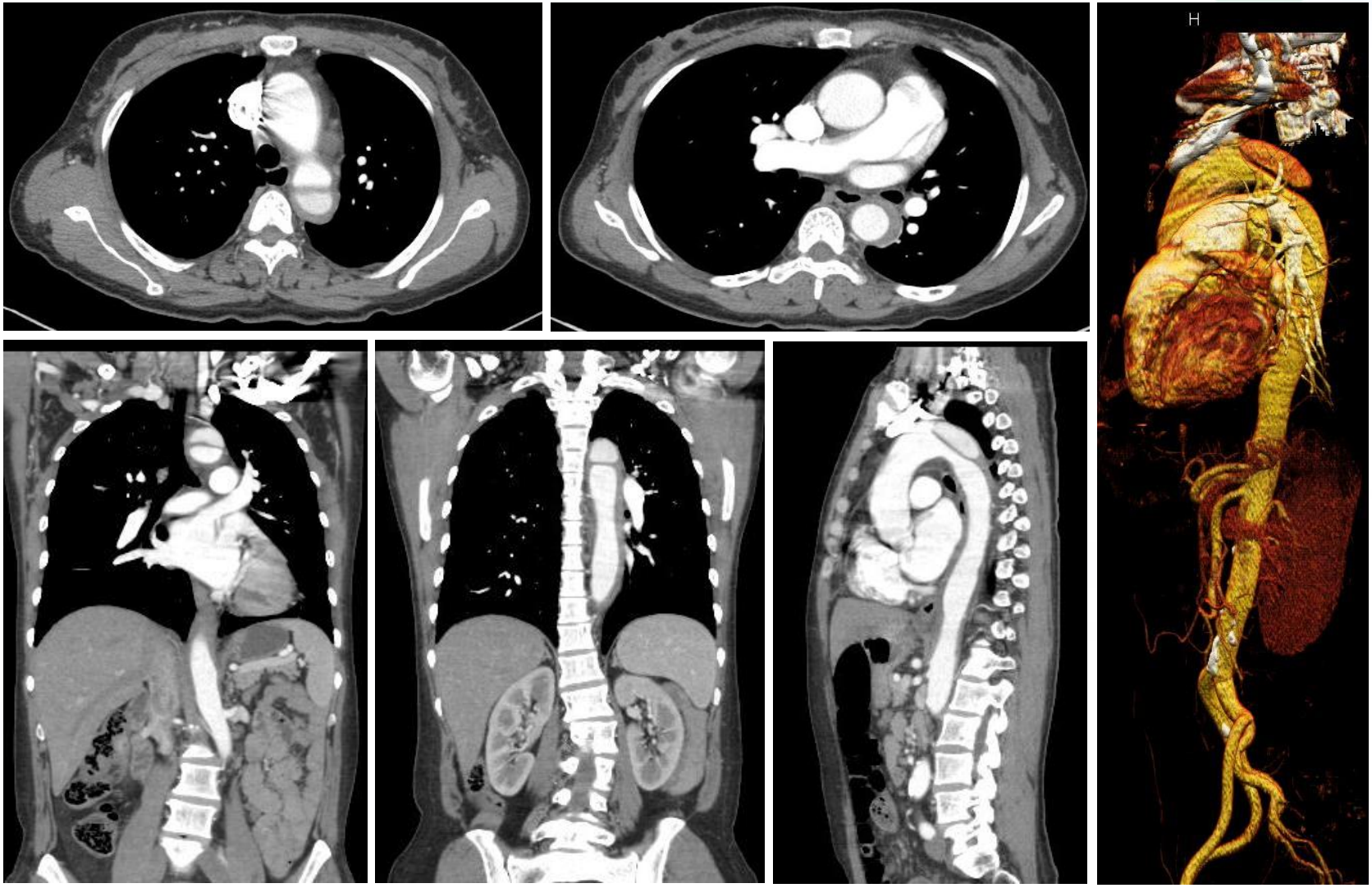
Endovascular Treatment of Malperfusion : Aortic Stent Graft Cases

- 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

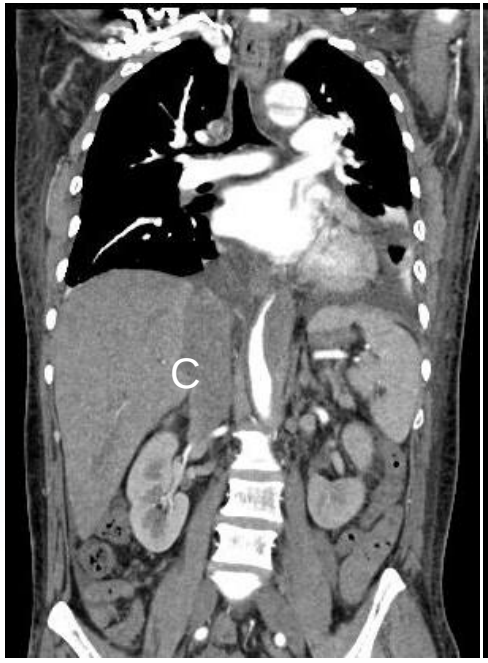
Endovascular Treatment of Malperfusion : Aortic Stent Graft Cases

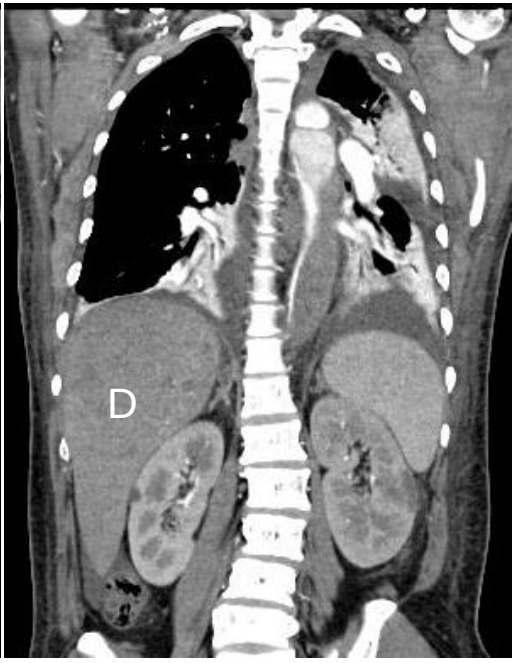


Admission day #4

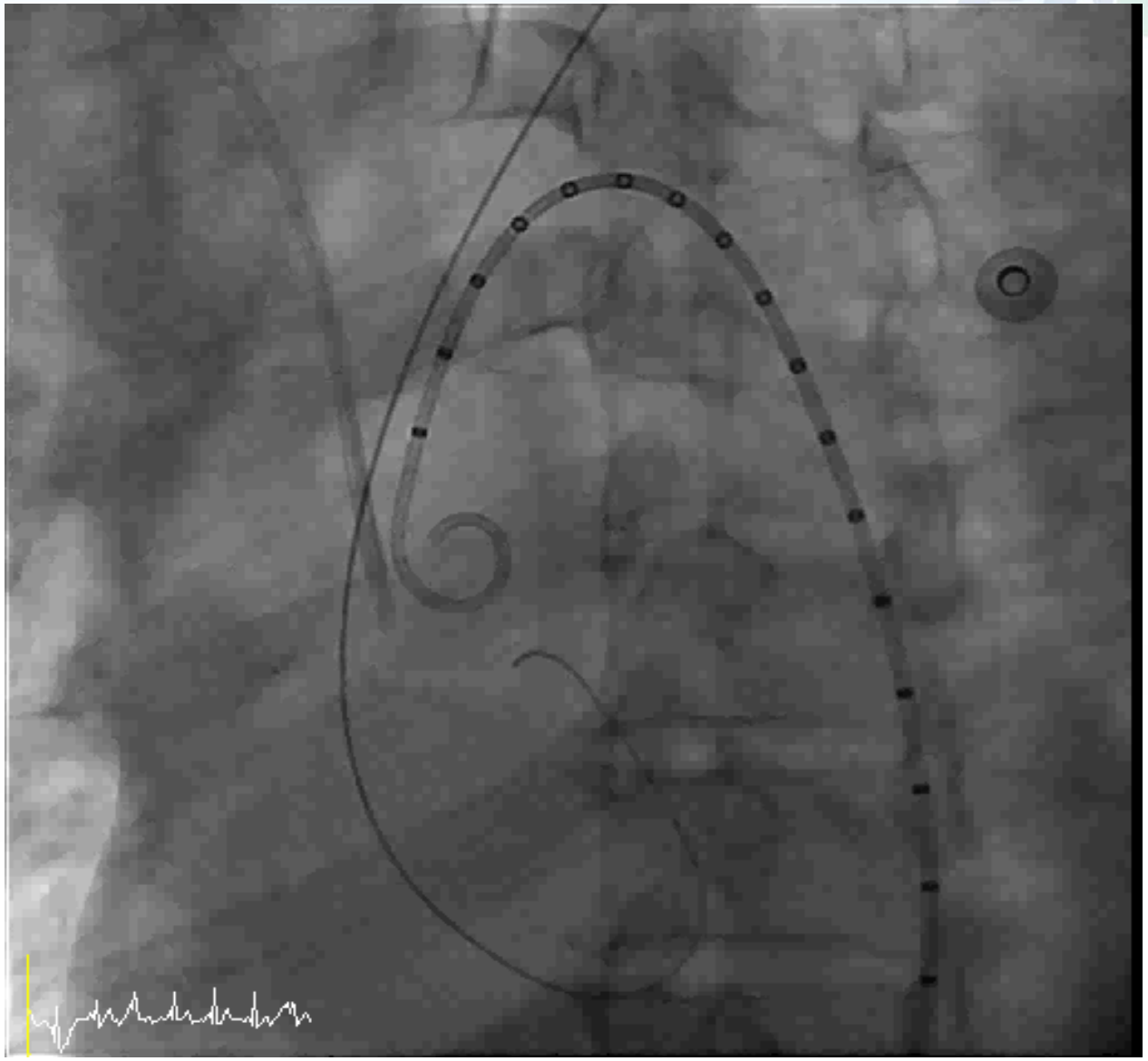
- Stabbing chest and back pain
- V/S : 183/81 mmHg & 56 bpm
- Pulse deficits at lower extrimities
- Decreased urine output (< 30 cc/hour)

F/U CT chest (day 4)





Emergent TEVAR



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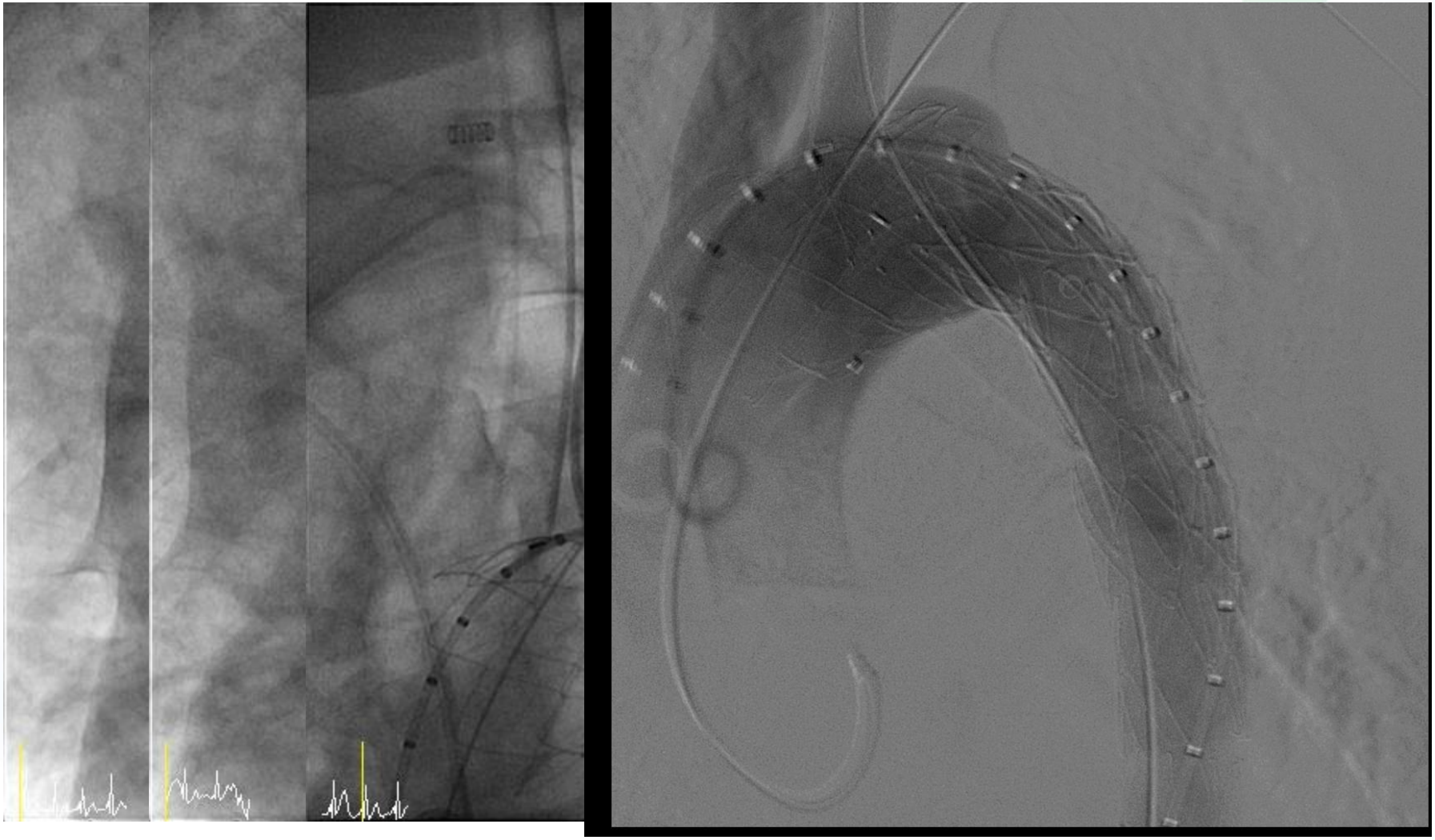

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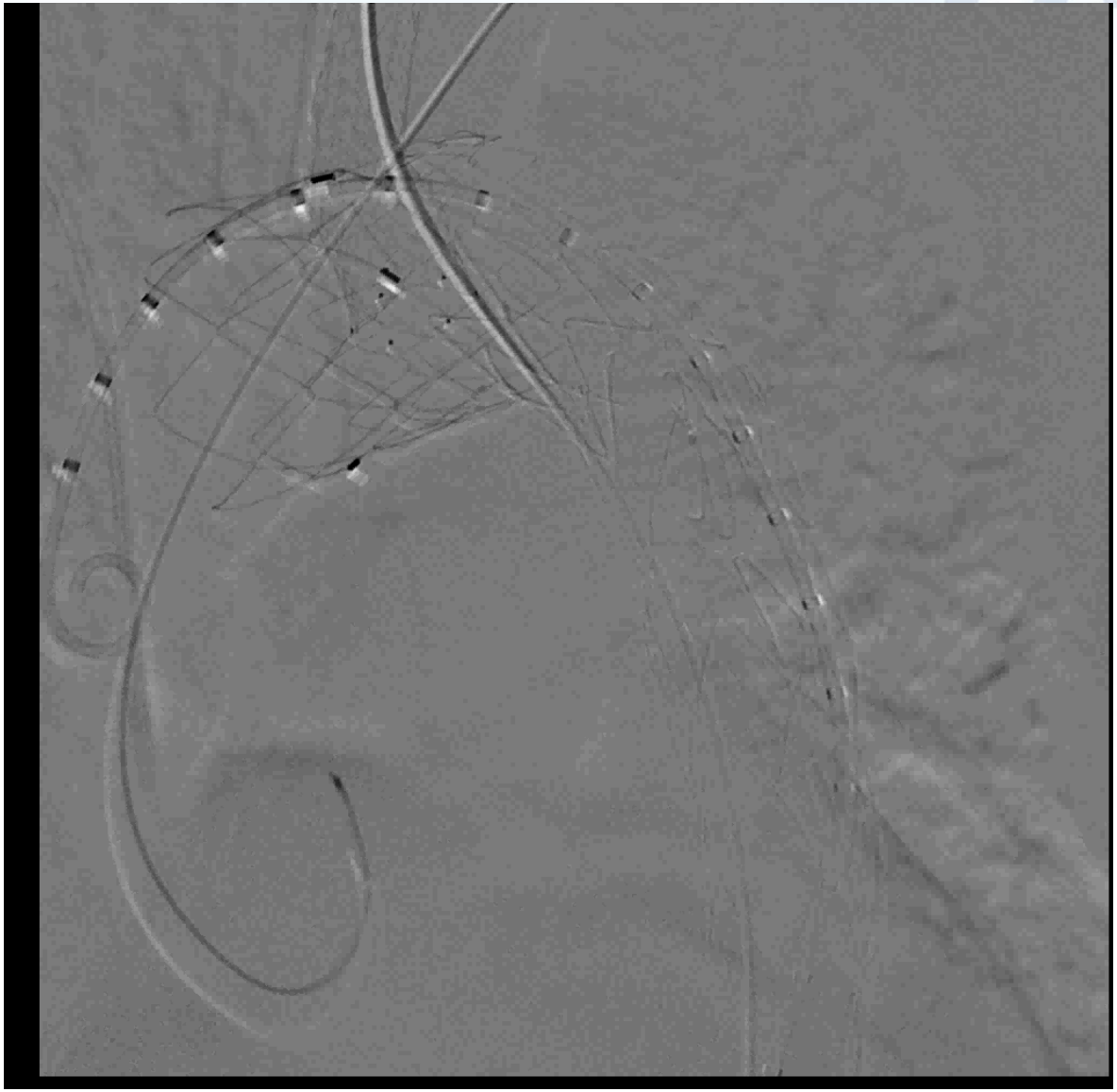

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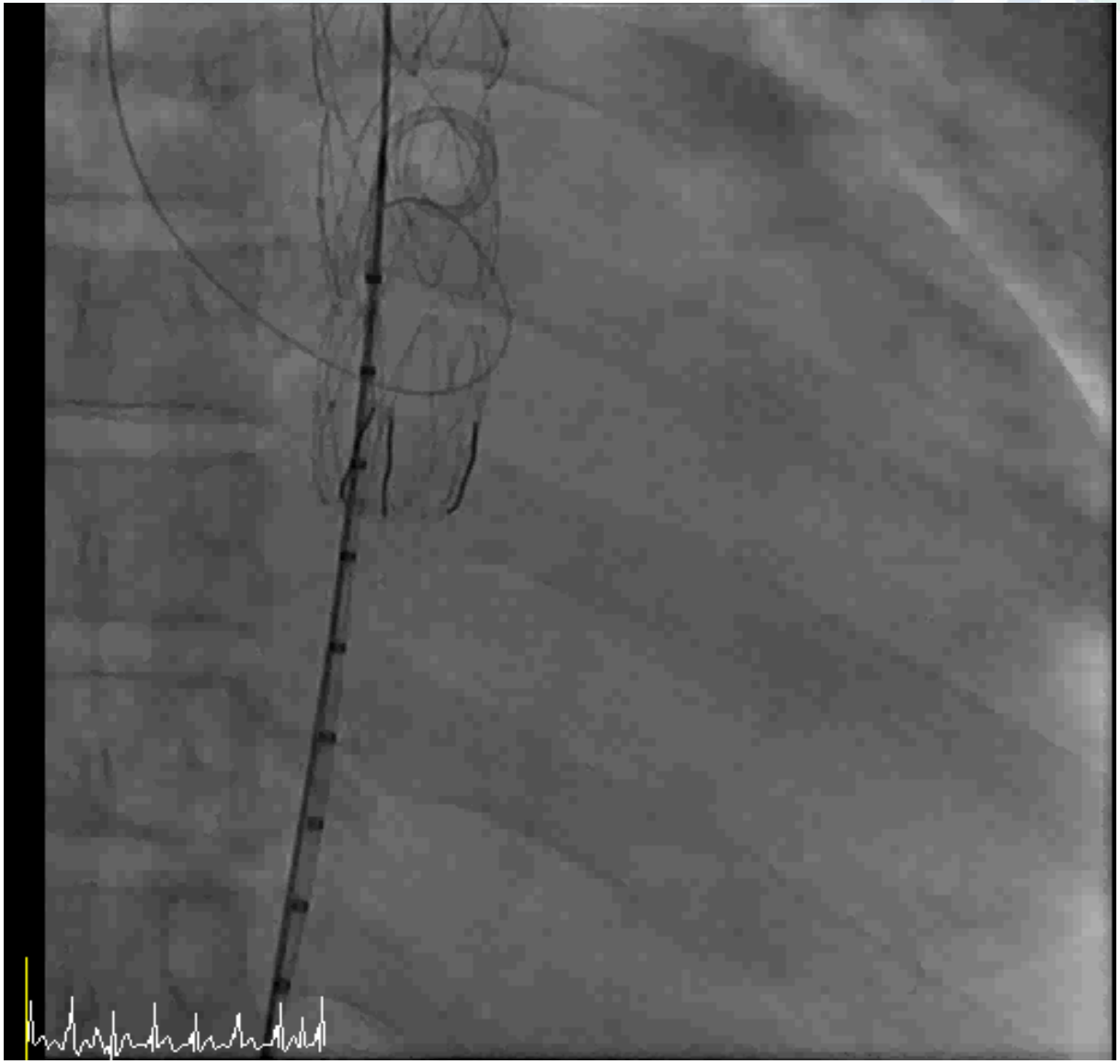
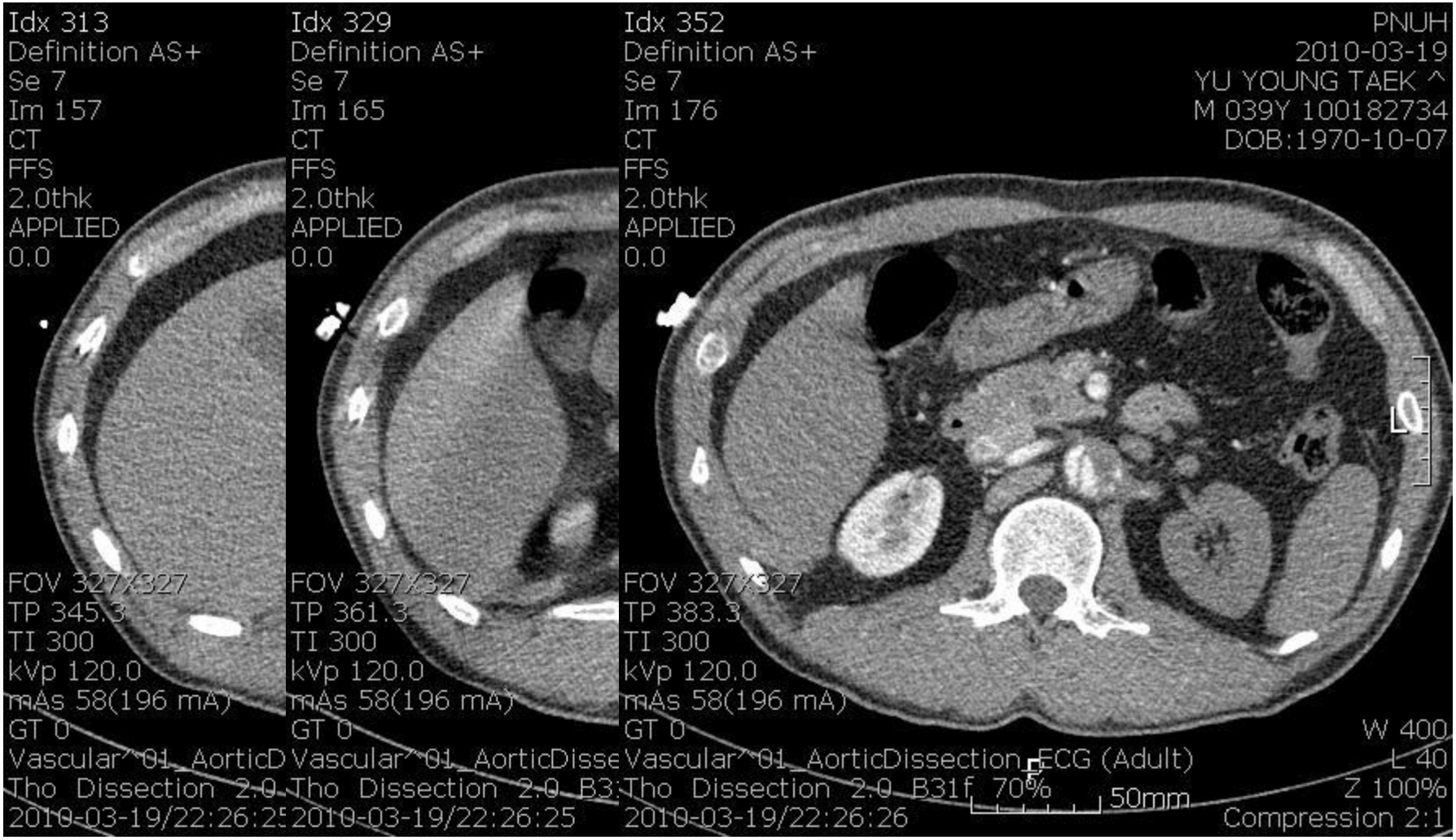
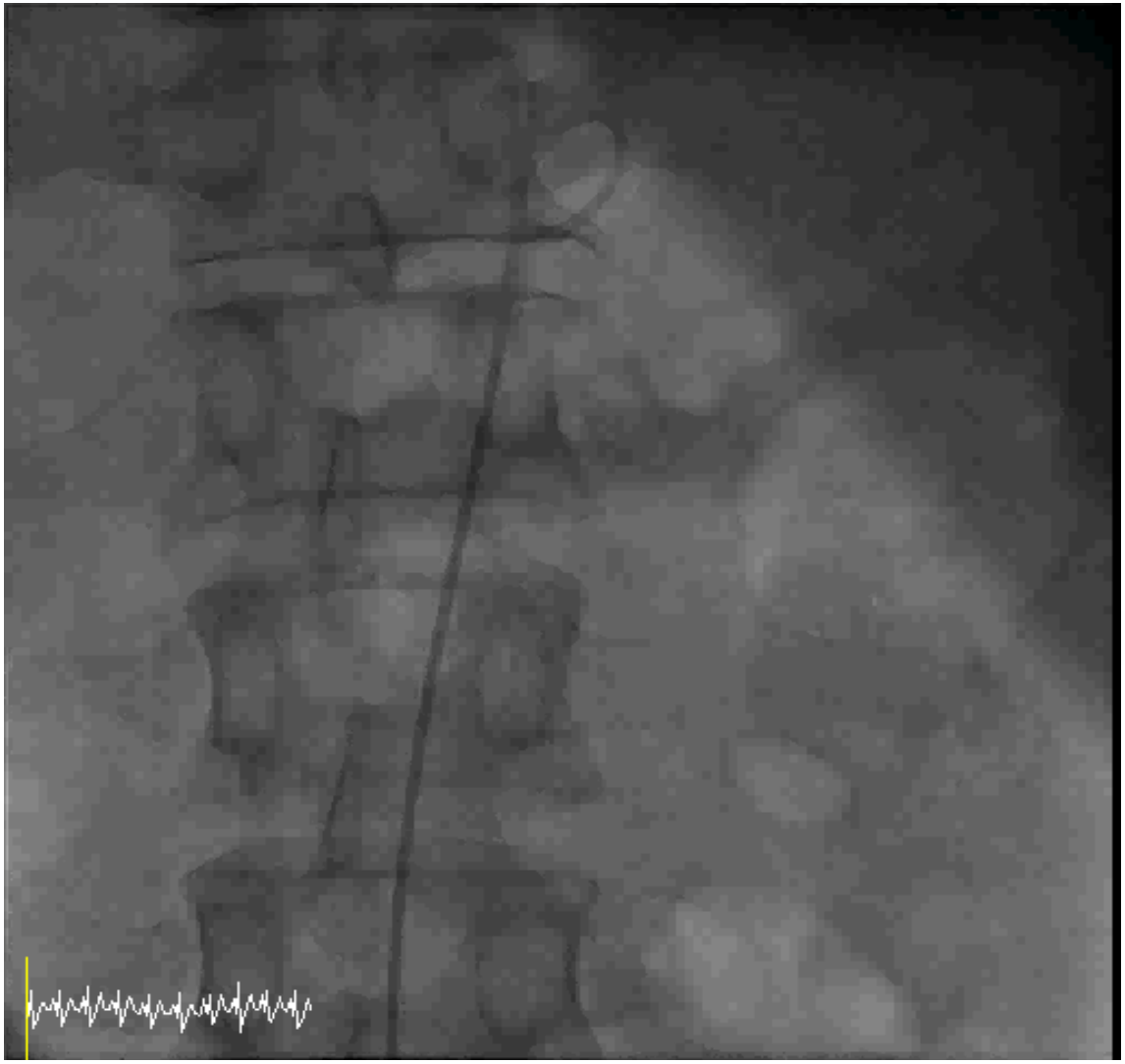


Endovascular Treatment of Malperfusion : Selective Stents Cases

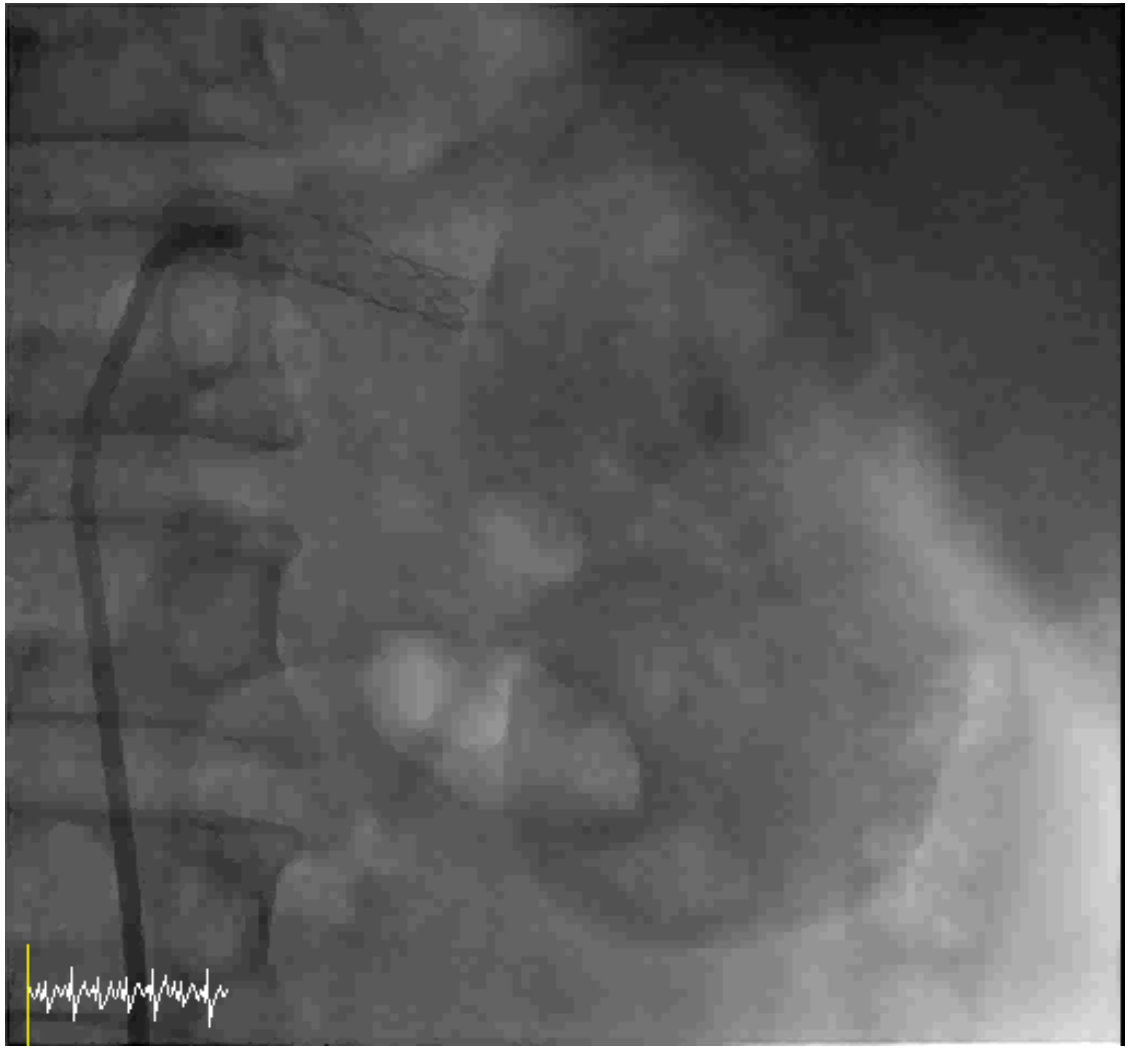
유 O (M/39)



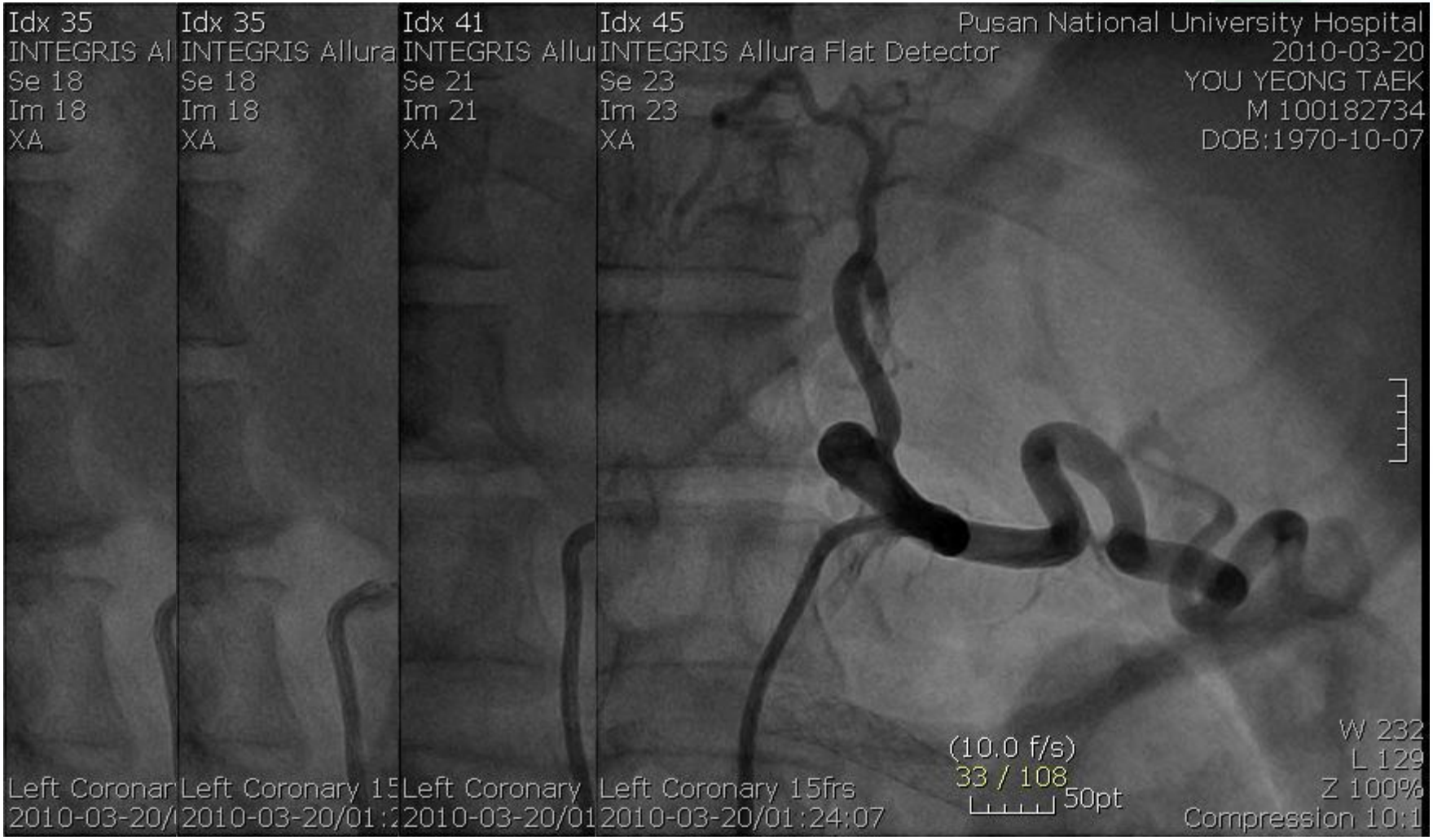
Endovascular Treatment of Malperfusion : Selective Stents Cases 2



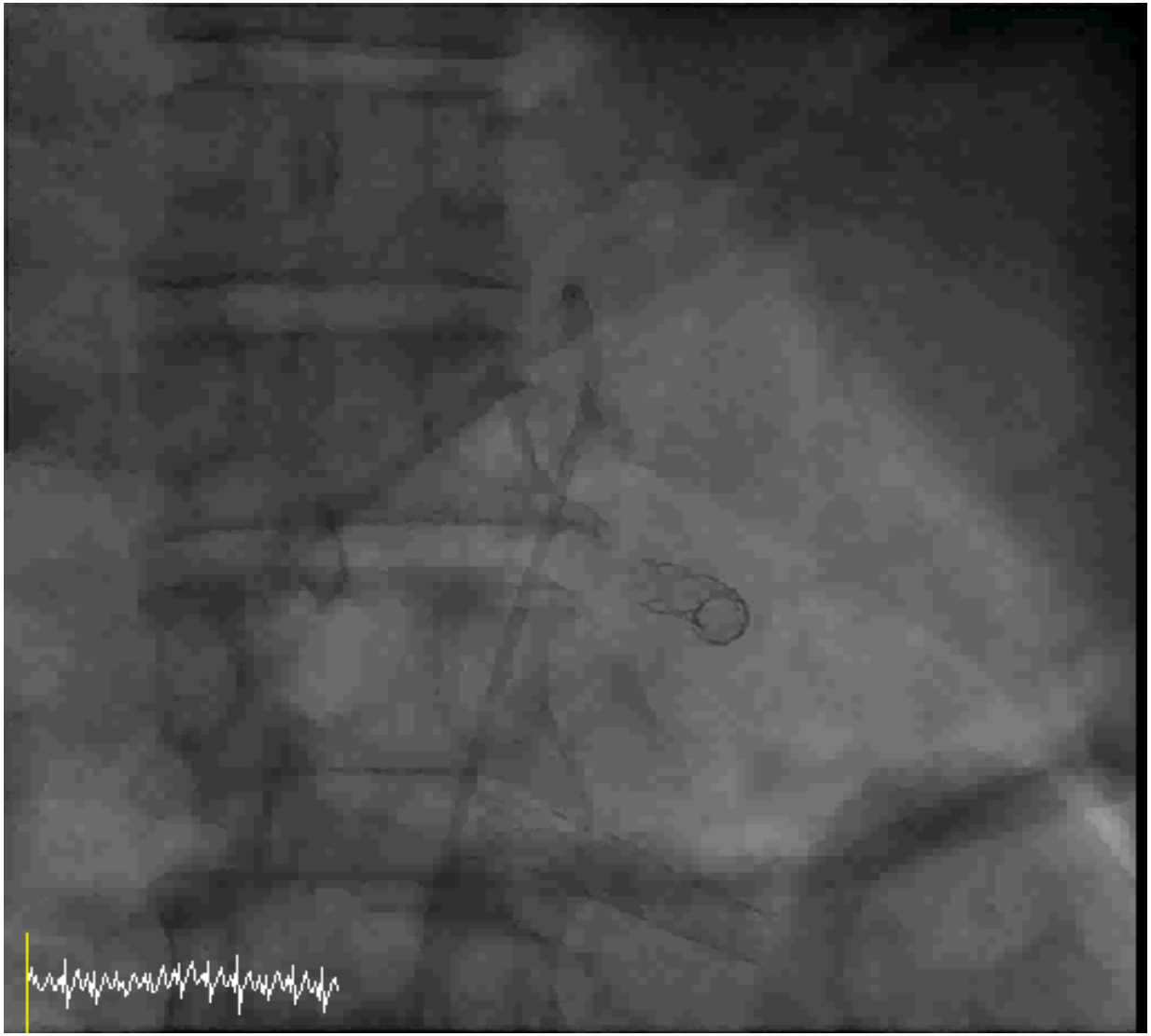
Endovascular Treatment of Malperfusion : Selective Stents Cases



Endovascular Treatment of Malperfusion : Selective Stents Cases



Endovascular Treatment of Malperfusion : Selective Stents Cases

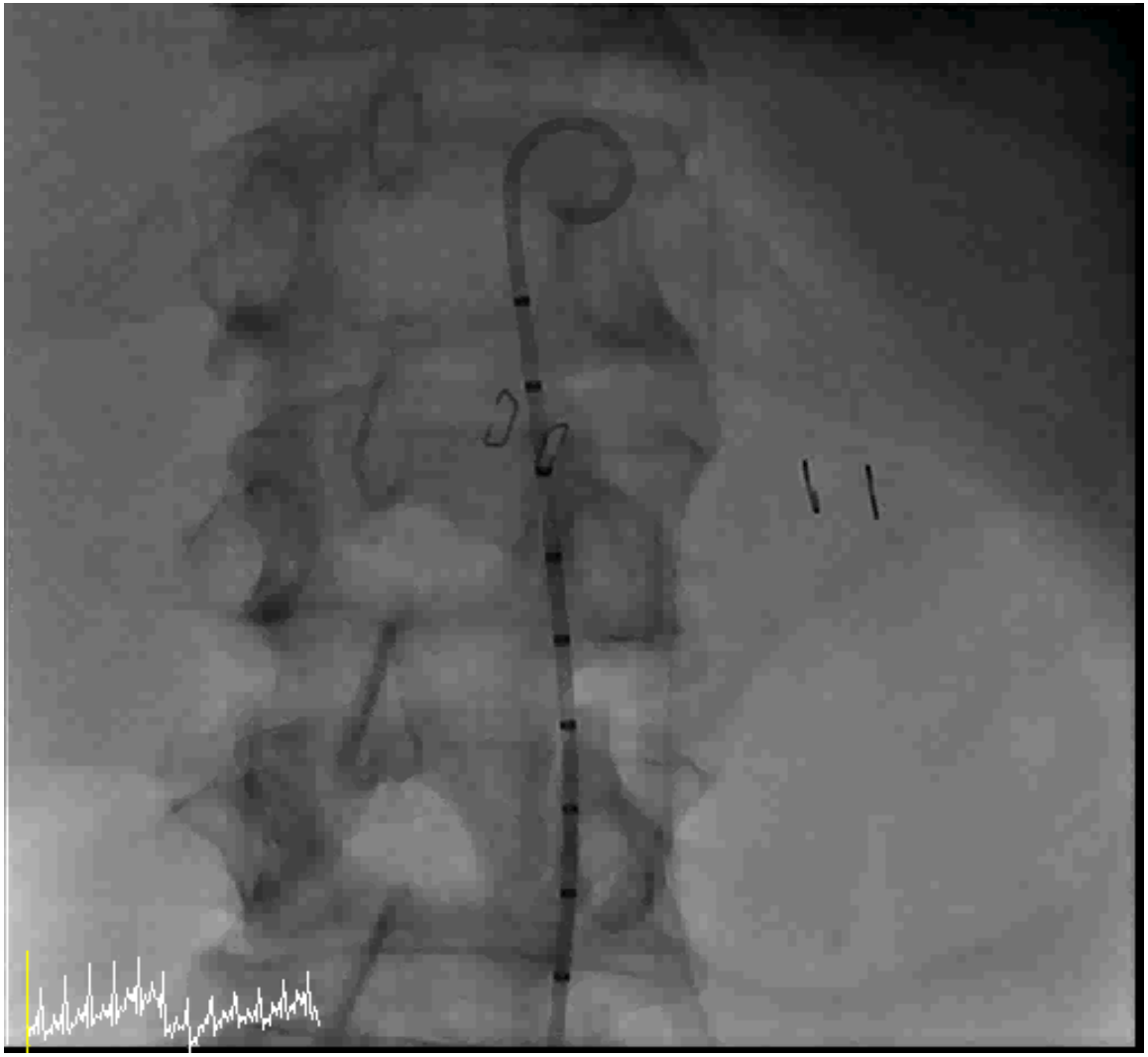


Endovascular Treatment of Malperfusion : Selecive Stents Cases

Endovascular Treatment of Malperfusion : Fenestration Cases

김 O (M/ 50)

Endovascular Treatment of Malperfusion : Fenestration Cases



Endovascular Treatment of Malperfusion : Fenestration Cases

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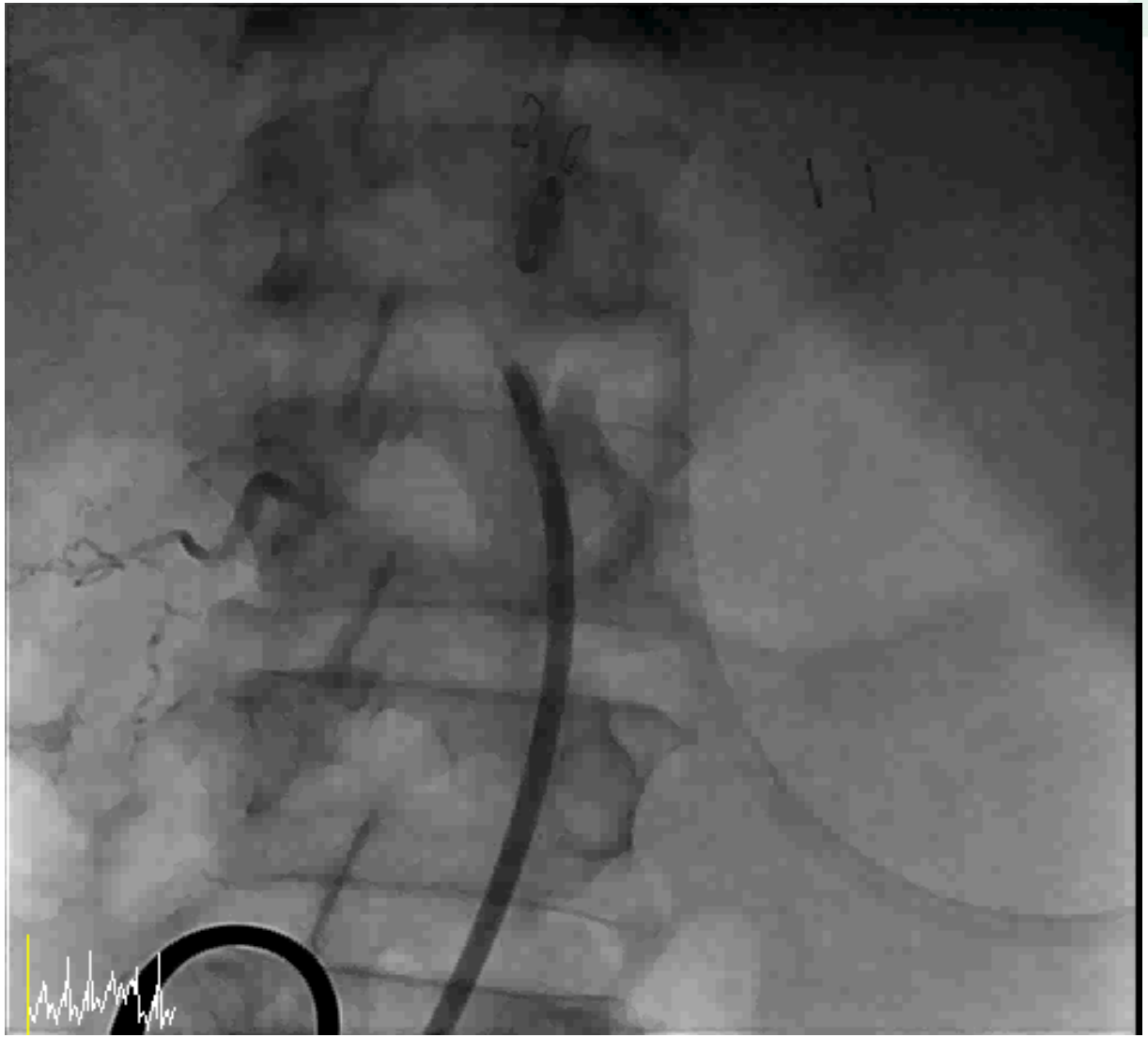

Endovascular Treatment of Malperfusion : Fenestration Cases

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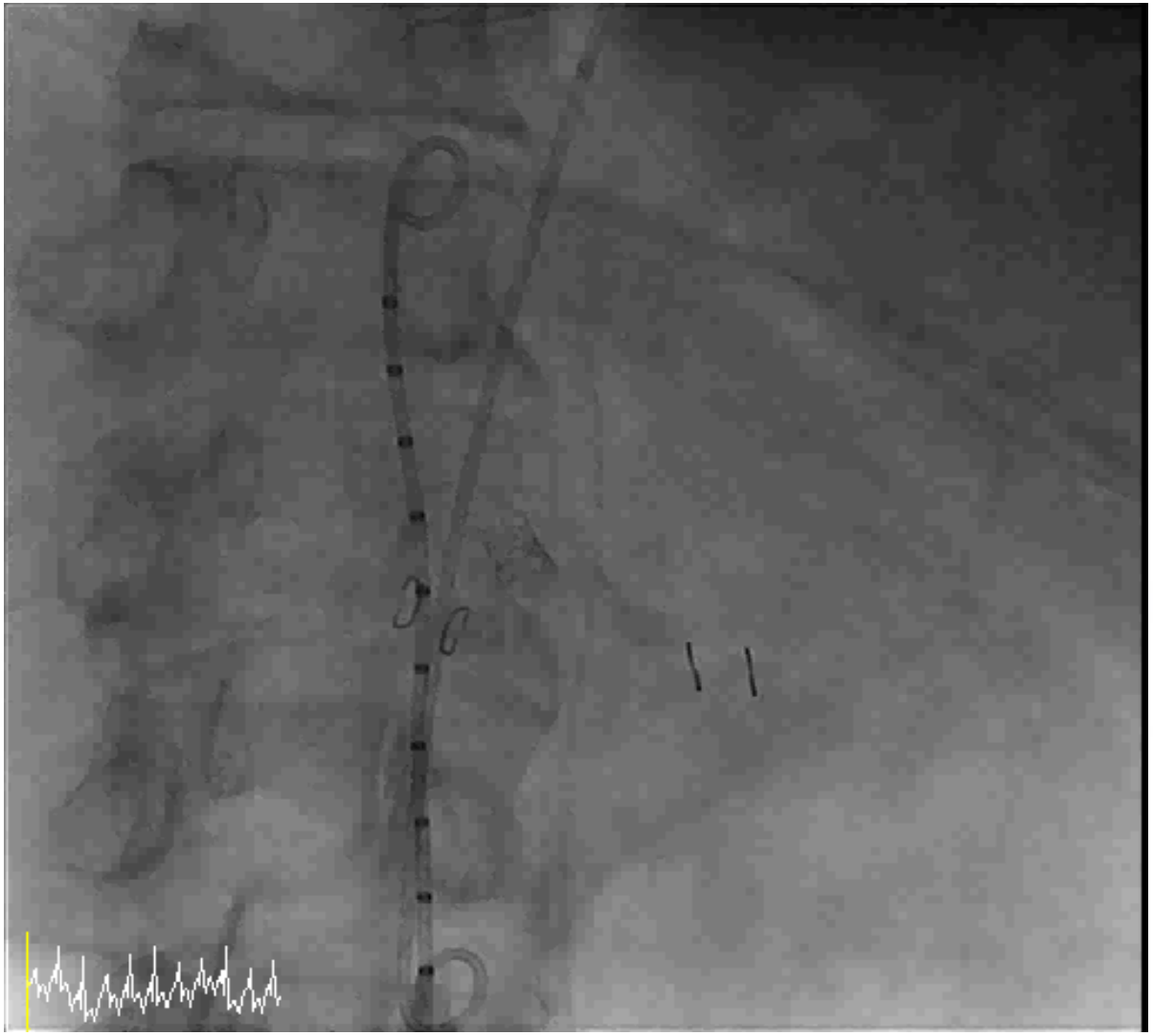
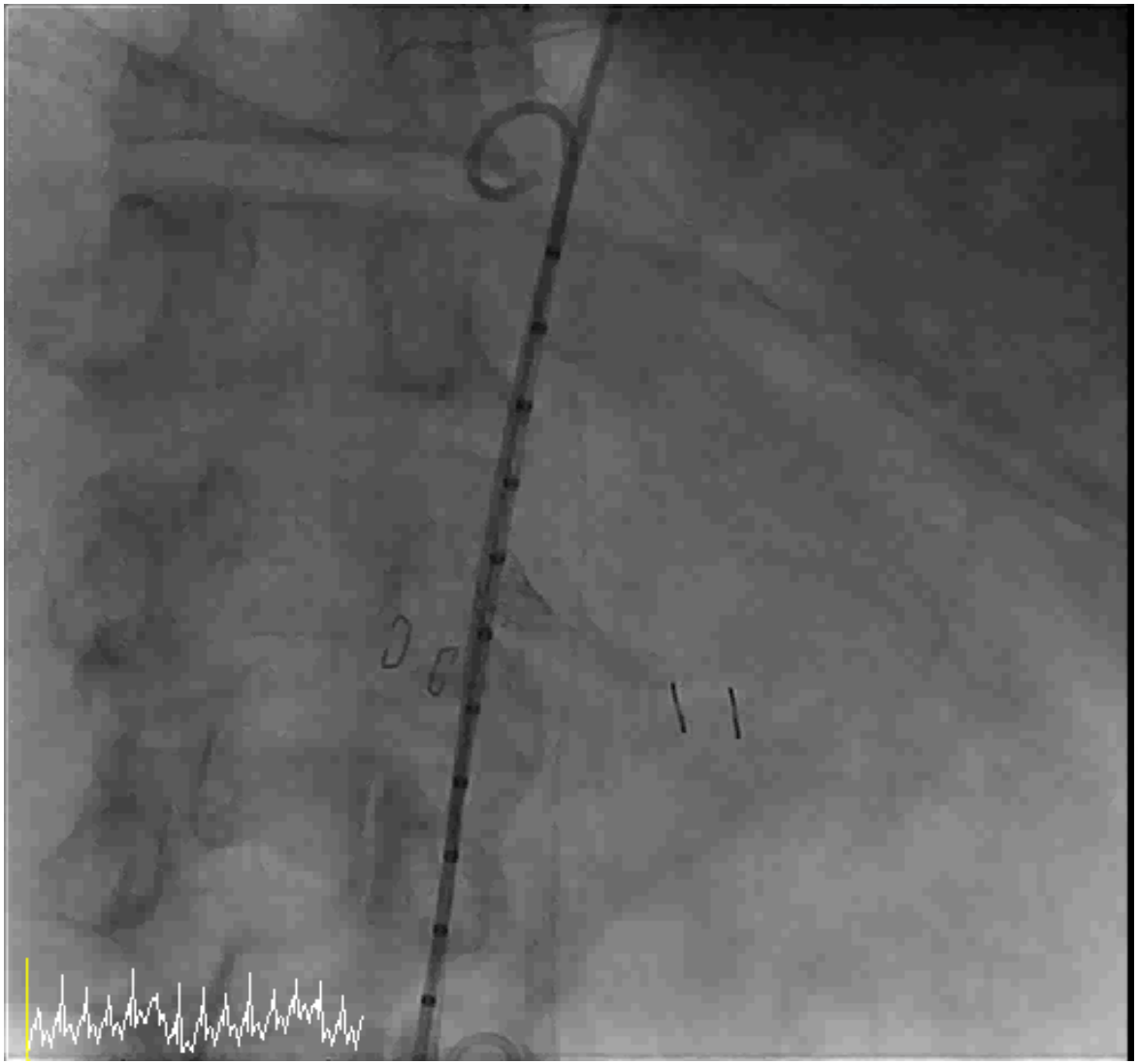
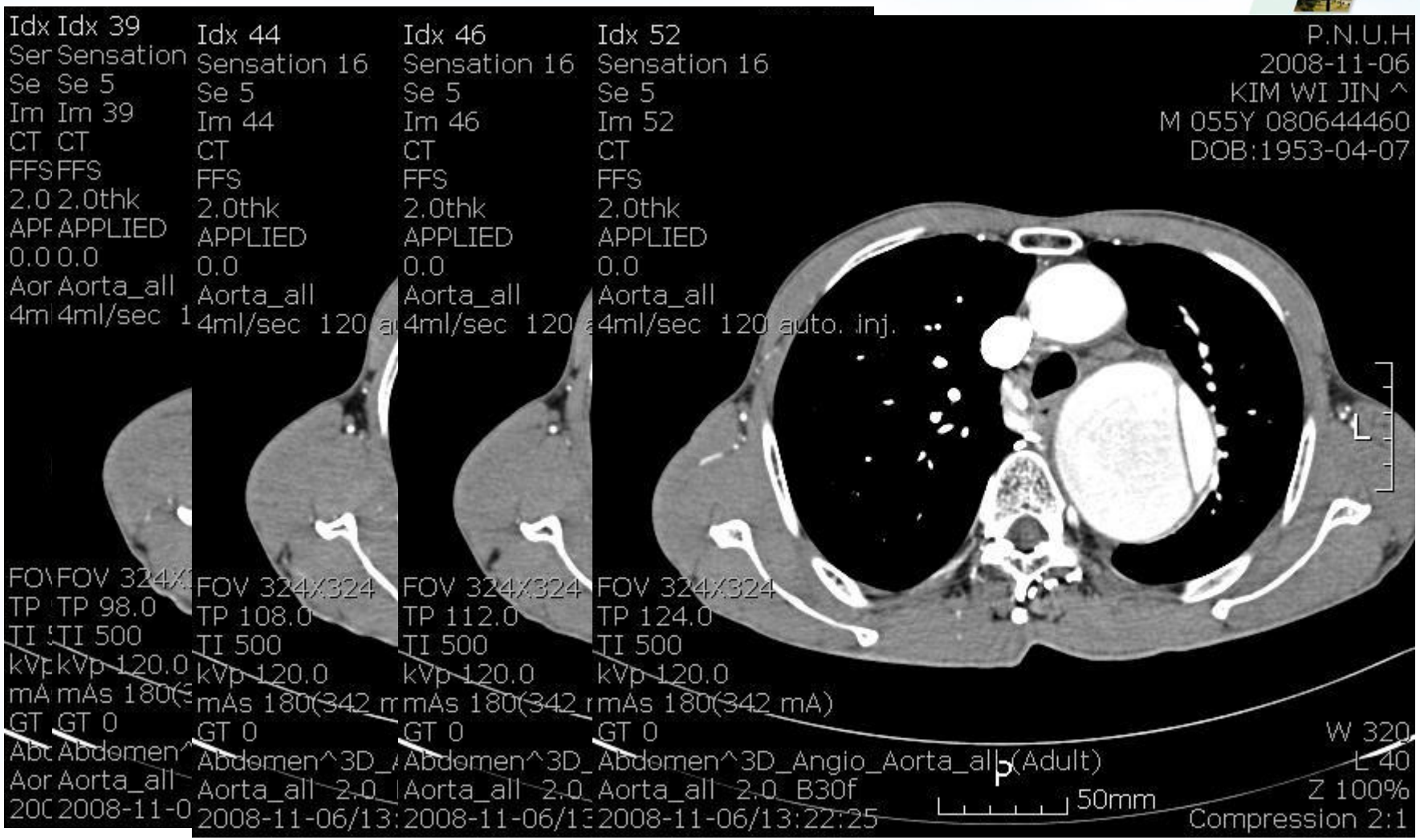


Endovascular Treatment of Malperfusion : Fenestration Cases

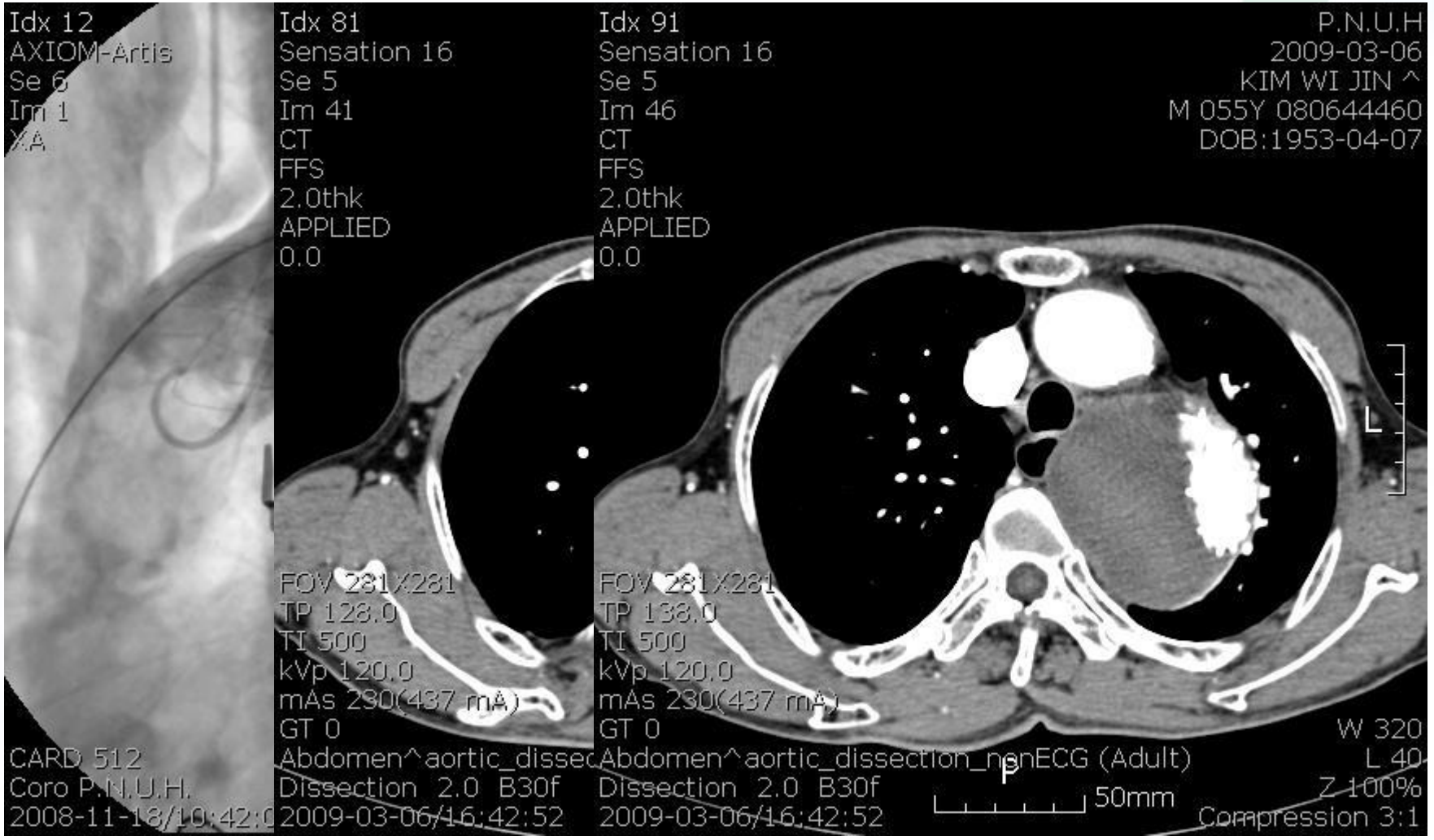


Endovascular Treatment of Chronic Aortic Dissection with Aneurysm Formation

김 O (M/57)

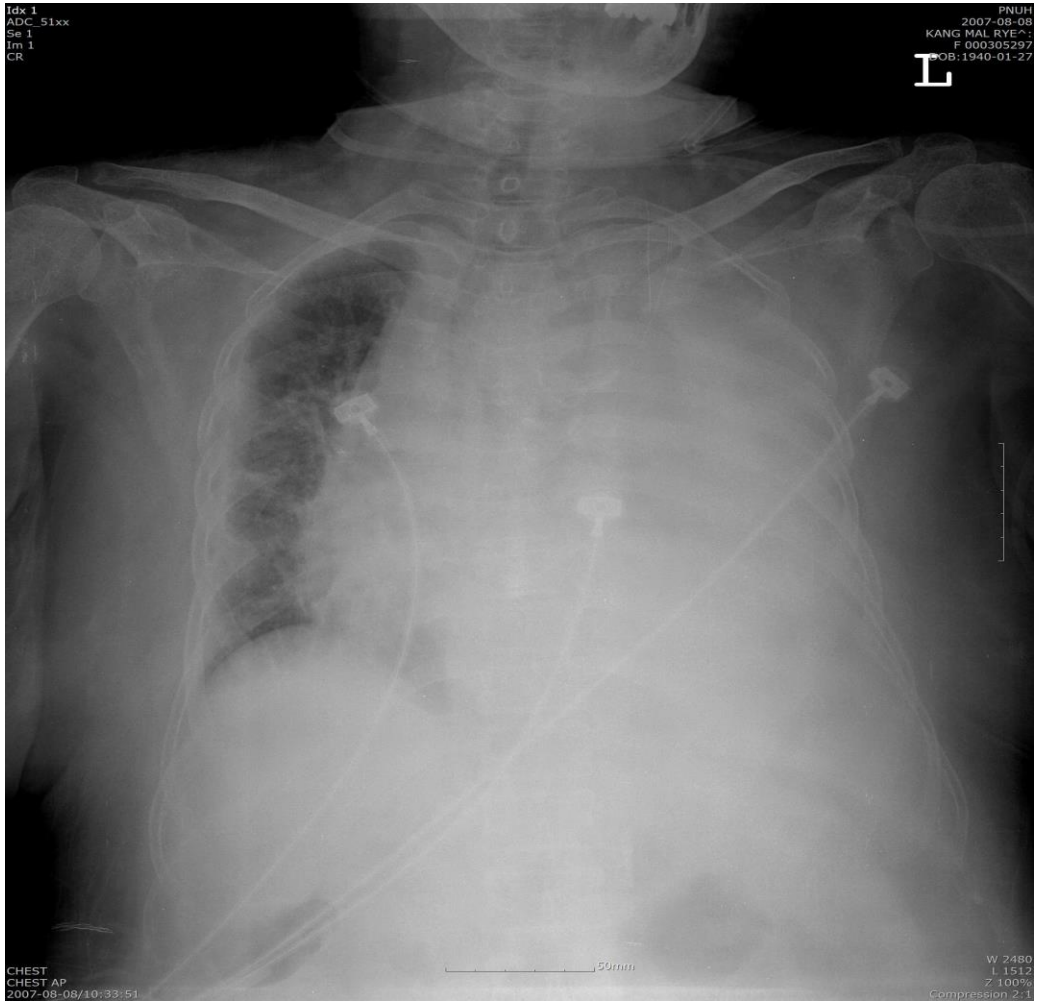


Endovascular Treatment of Chronic Aortic Dissection with Aneurysm Formation



Endovascular Treatment of Ruptured Aortic Dissection

강O(F/72)



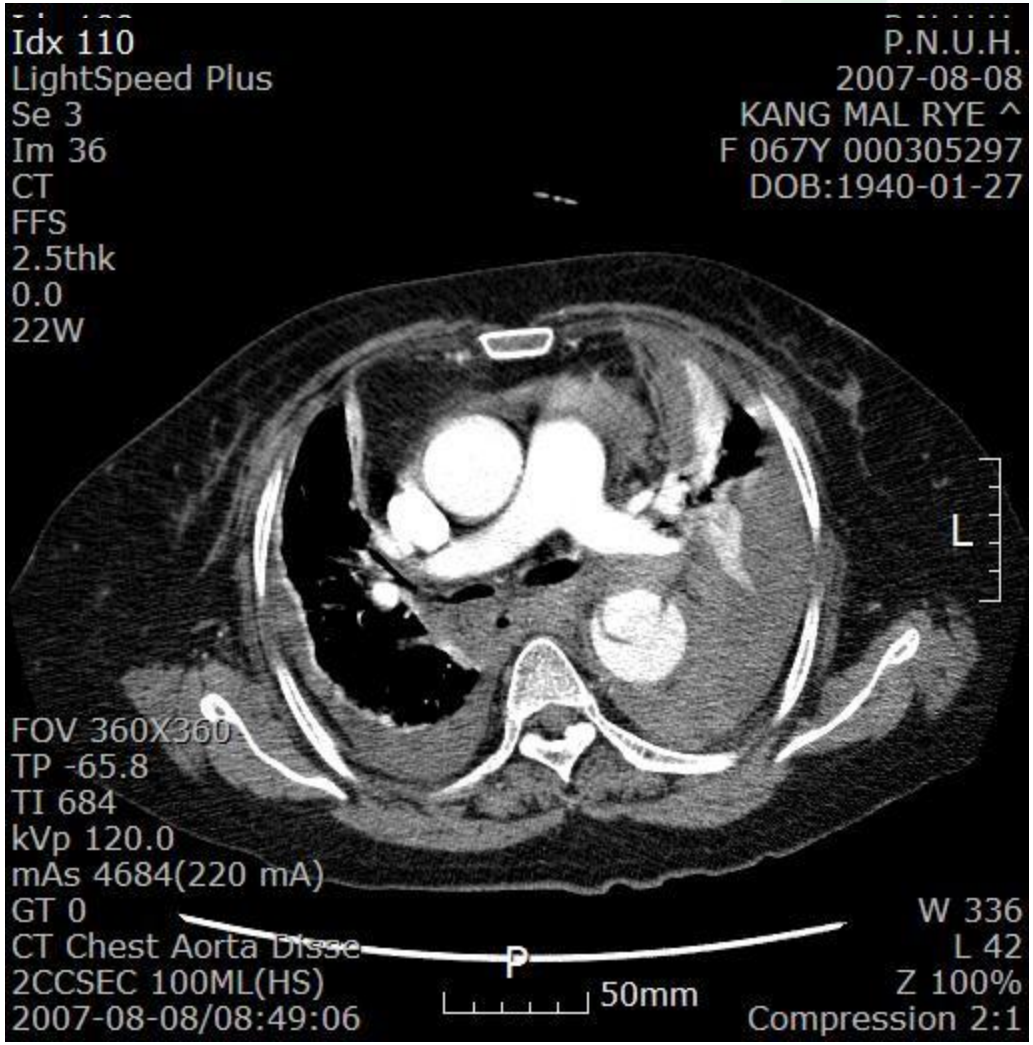
Chest PA

: 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.



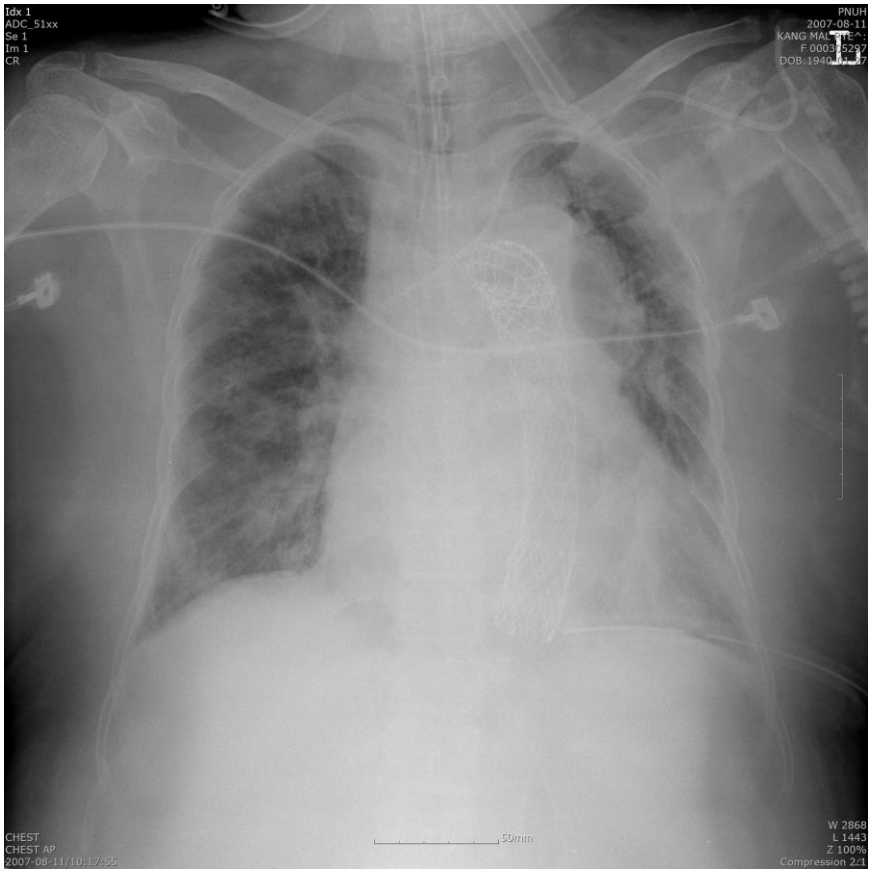
Endovascular Treatment of Ruptured Aortic Dissection

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.



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

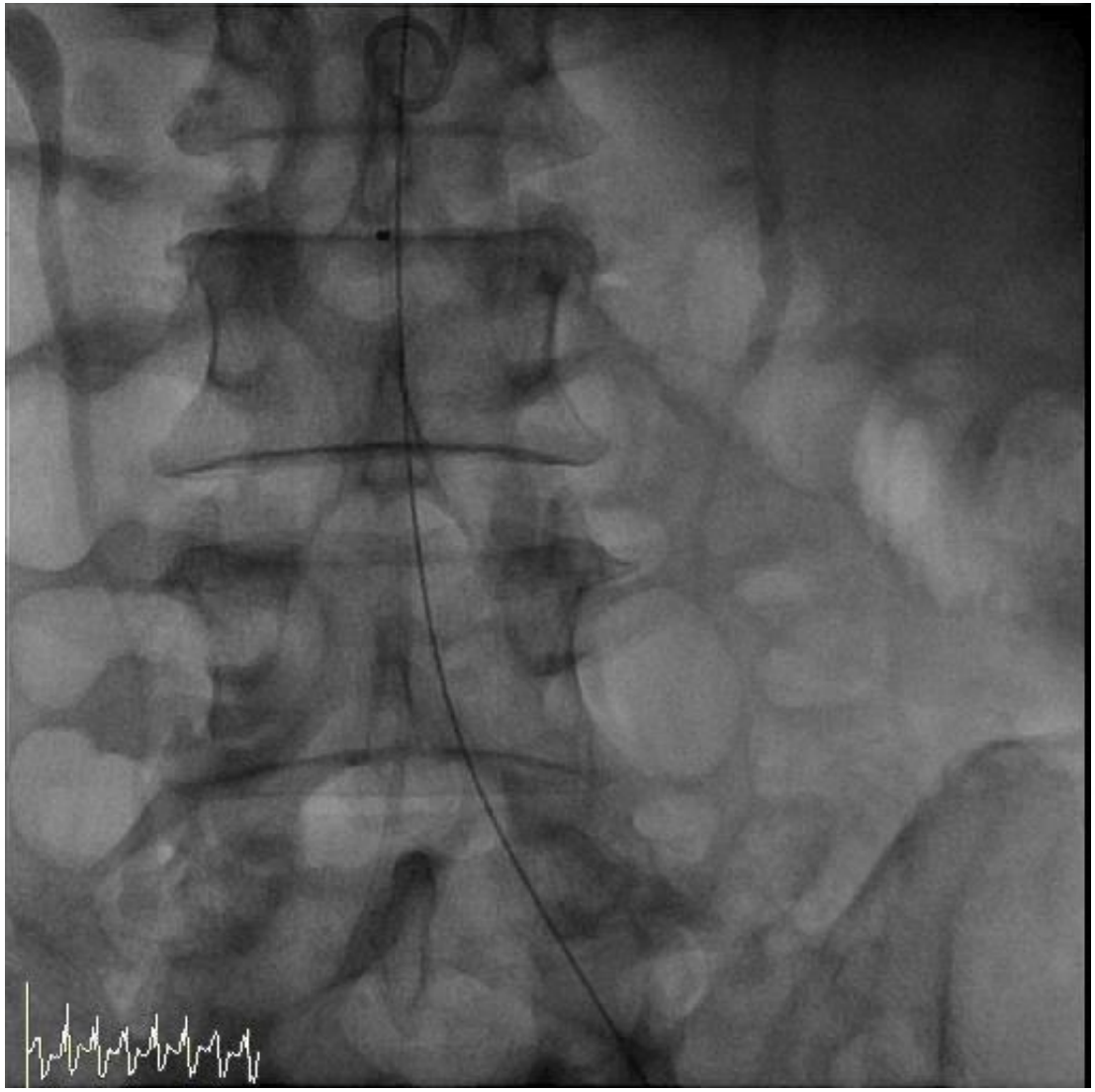
  1 thrombosis

  5 primary endoleaks

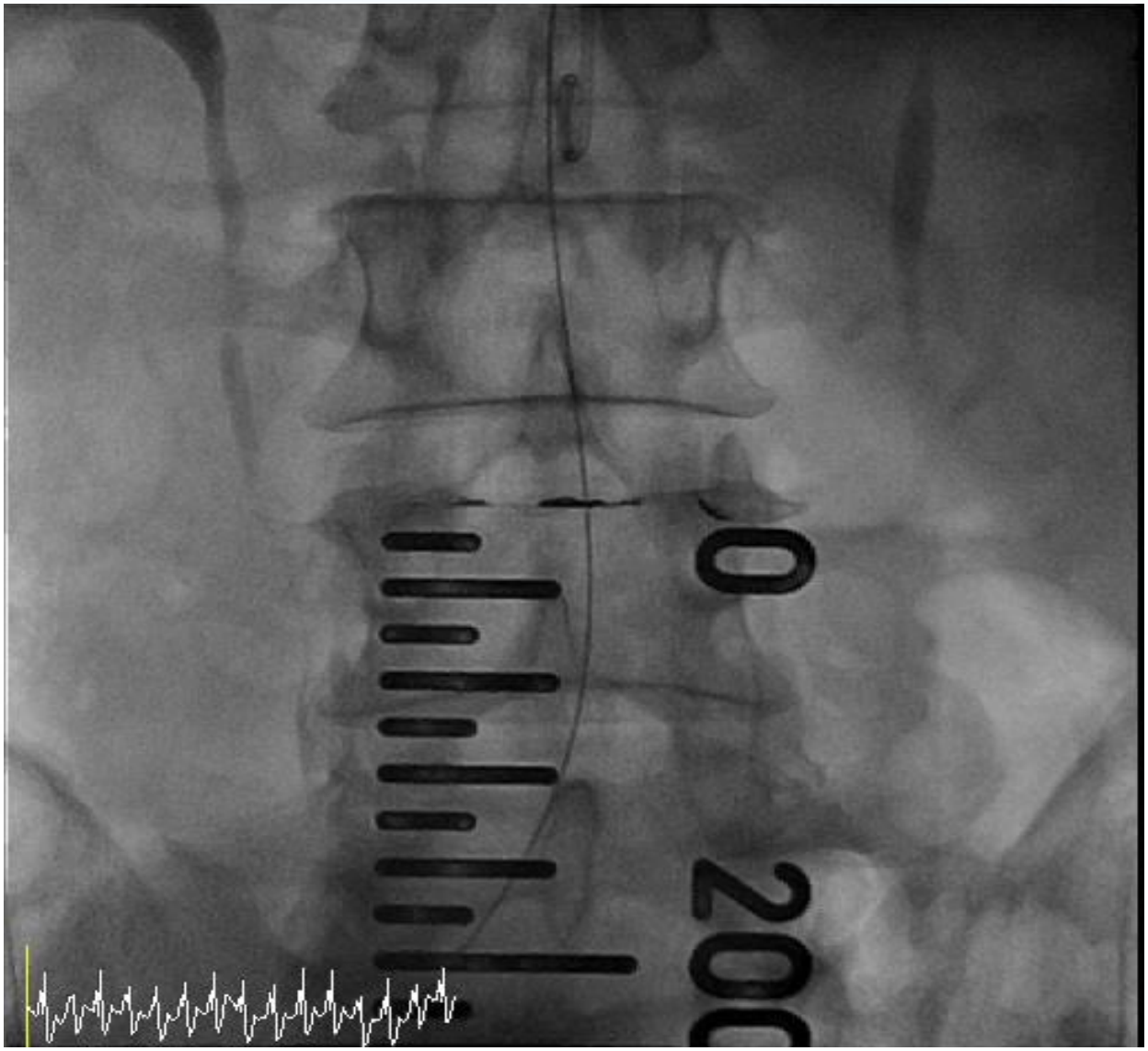
  4 secondary endoleaks
- Primary patency: 95 %
- Secondary intervention: 12%

Boules TN JVS 2006;; 44:: 29

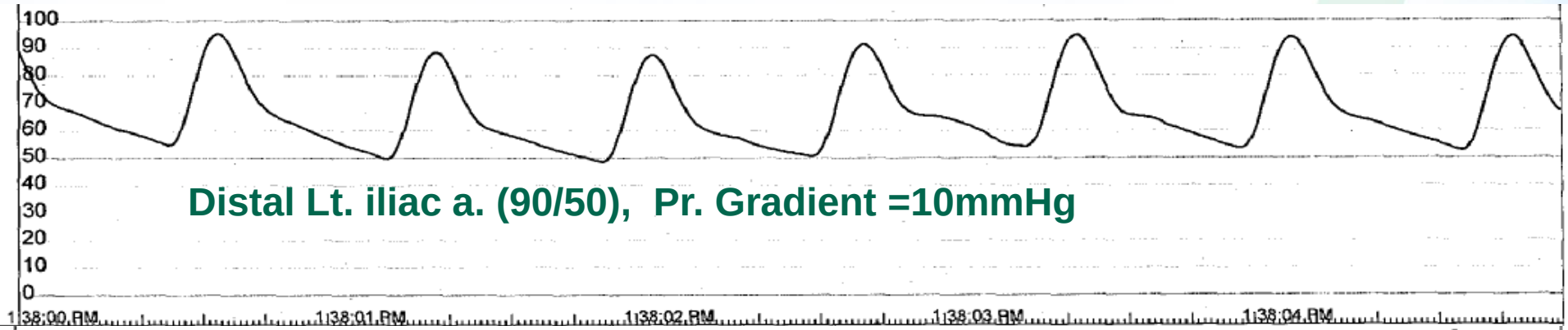
Post Ballooning Angiography



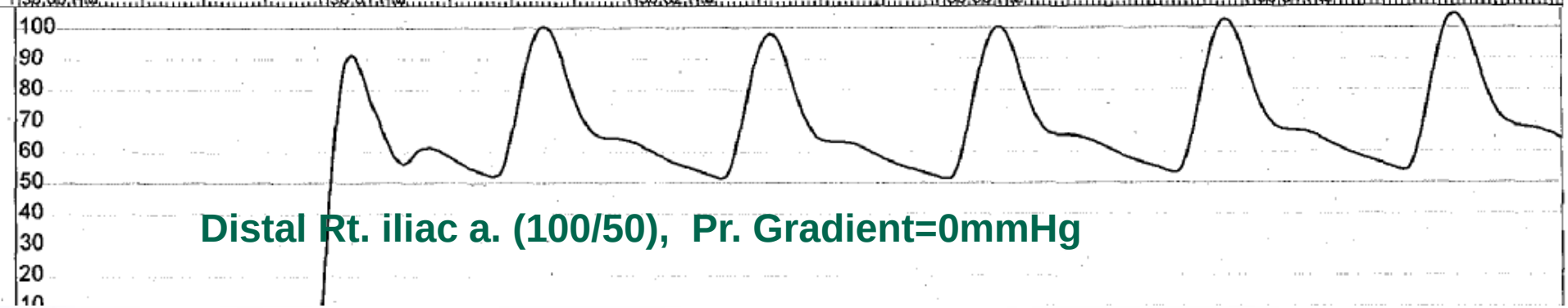
Post Ballooning Angiography



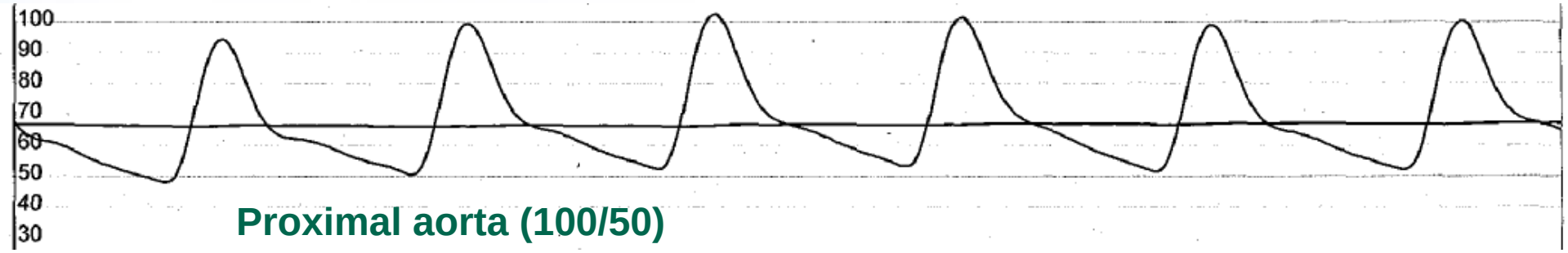
Pressure Gradient : Post-stenting



Distal Lt. iliac a. (90/50), Pr. Gradient =10mmHg

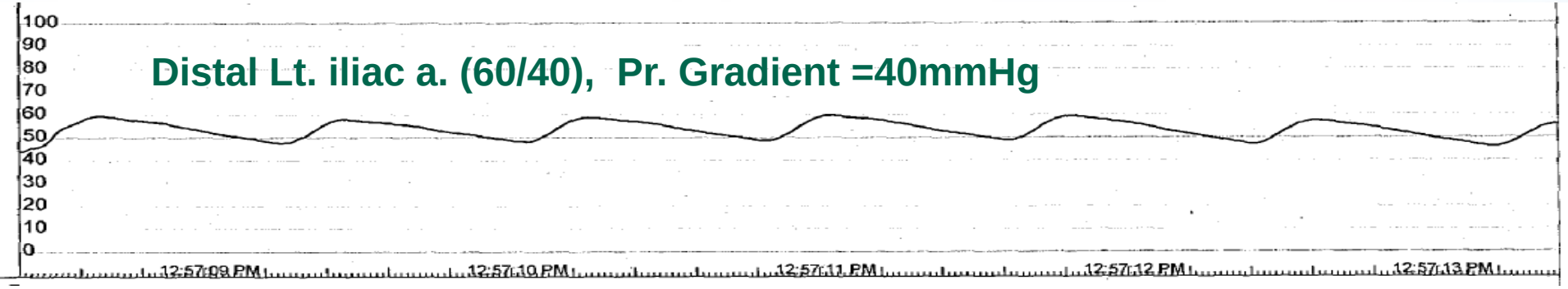


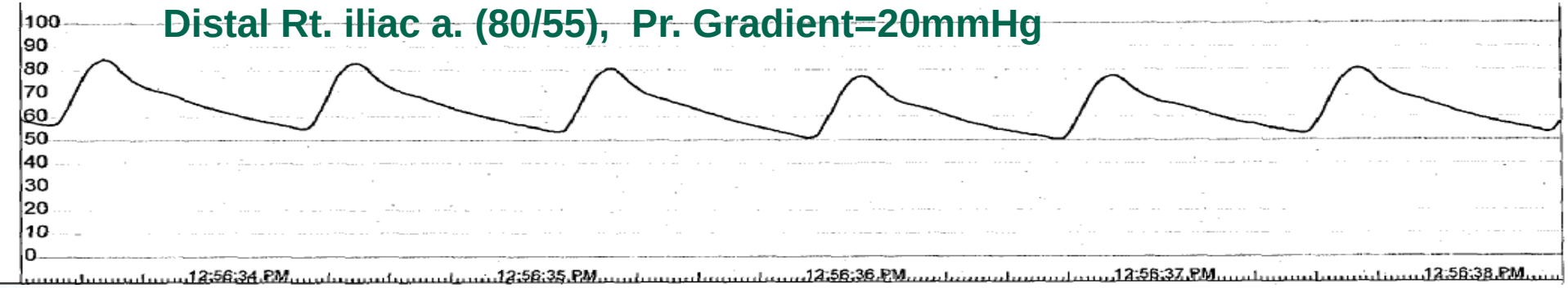
Distal Rt. iliac a. (100/50), Pr. Gradient=0mmHg

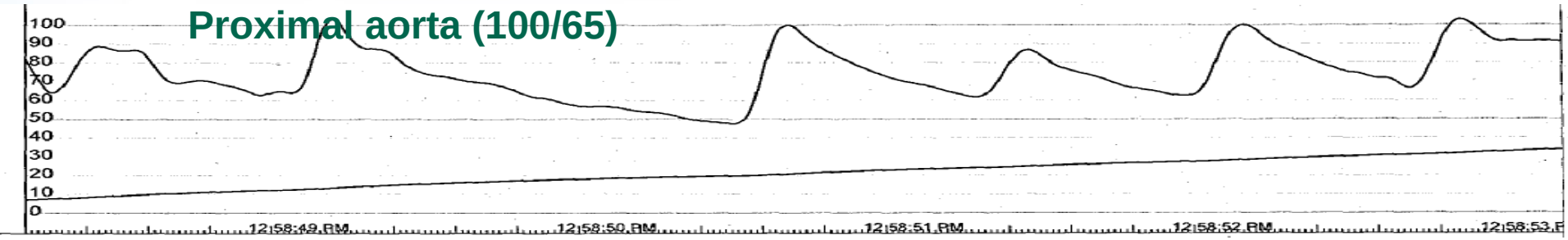


Proximal aorta (100/50)

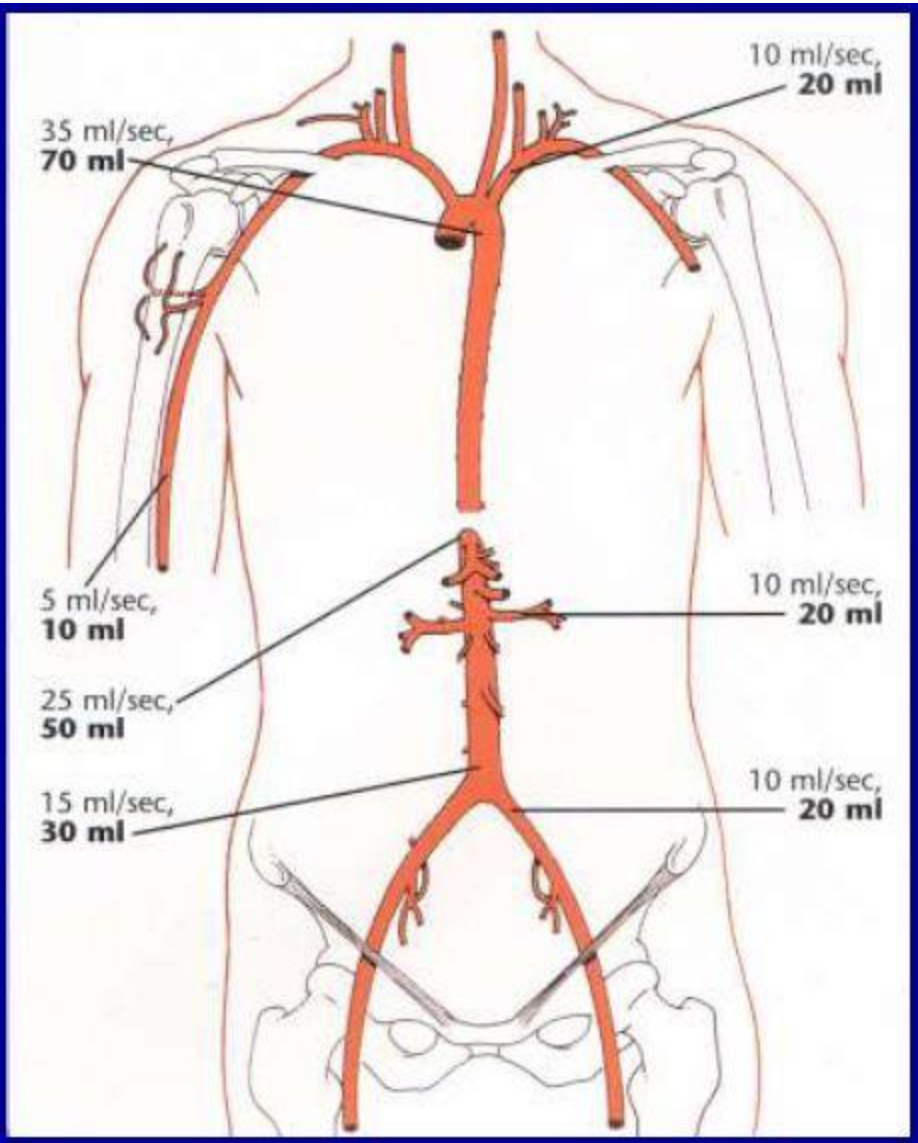
Pressure Gradient : Pre-stenting







Aortoiliac Angiography



Aortoiliac Angiography

Aortoiliac Angiography