

# Coarctatie

Catheter behandeling

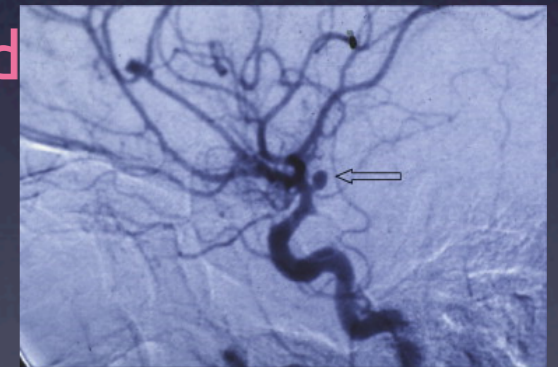


dr TJF ten Cate  
Radboudumc/ErasmusMC, Interventie cardioloog

# Achtergrond

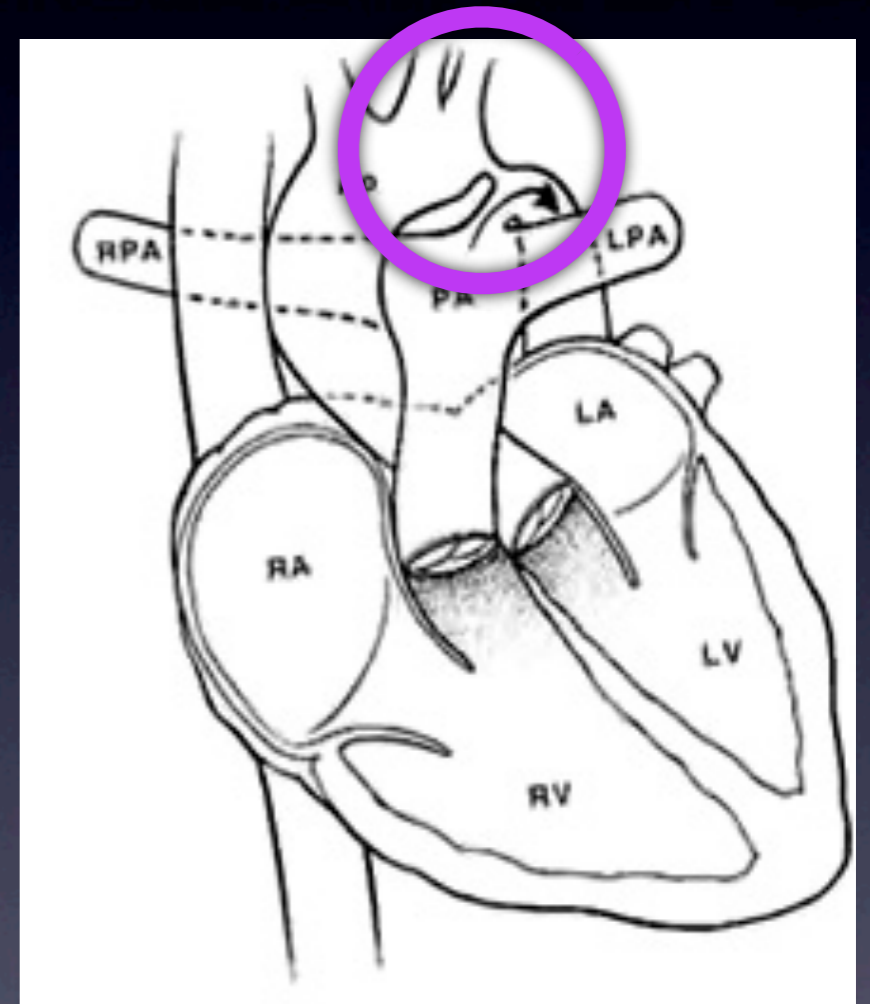
- Incidentie: 5-8% van de congenitale hart afwijkingen
- prevalentie: 4 per 10 000 levend geboren
- geïsoleerd in 83%
- man:vrouw = 1.3-1.7:1
- Dus ongeveer 50-60 nieuwe gevallen per jaar in Nederland
- Associaties

Bicuspide aorta klep  
Dilatatie van de aorta ascendens  
Mitralis klep afwijkingen (lekkage)



# Variatie in morfologie

- Stenose in de aorta
- Regio van het ligamentum arteriosum
  - Meestal preductaal gelegen, soms pareductaal
  - Ductusweefsel loopt door tot in aorta
  - Van gelokaliseerde stenose tot tubulaire hypoplasie
- zeer zelden
  - abdominale coarctatie met nierarterie betrokkenheid



# Anatomie

variatie in aortaboogvaten

aneurysma circkel van Willis 3-5%

plooi vd aorta media = posterior shelf

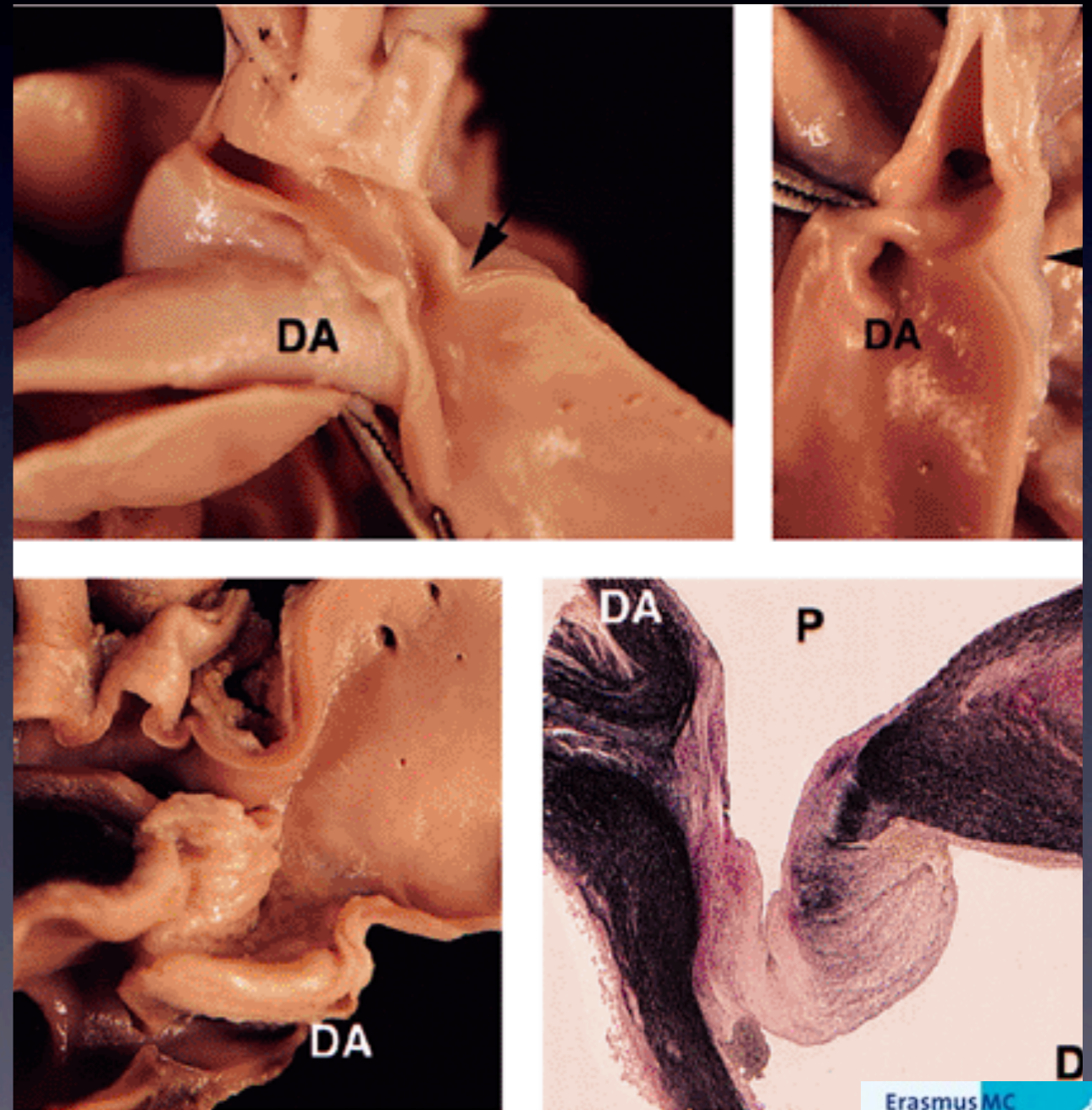
aortopathie met cystic medianecrose  
aorta ascendens dilatatie  
dissecties

collateralen

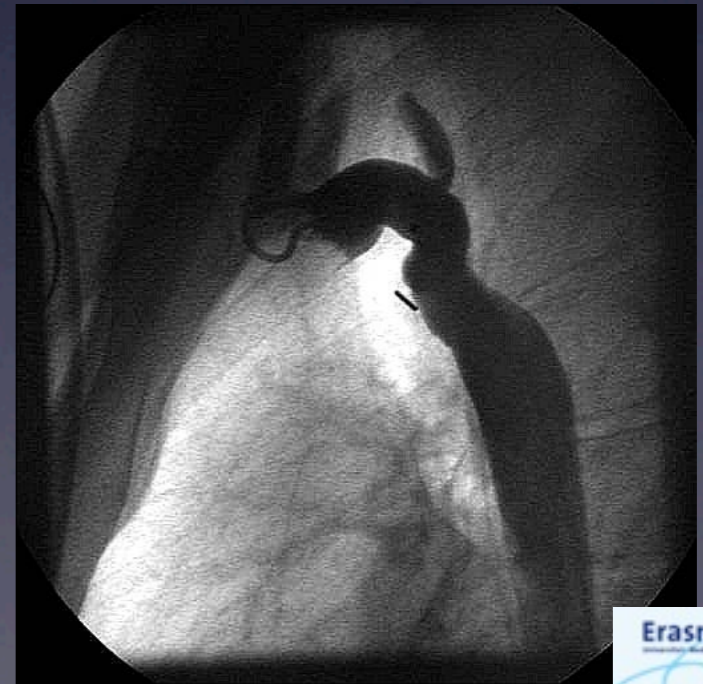
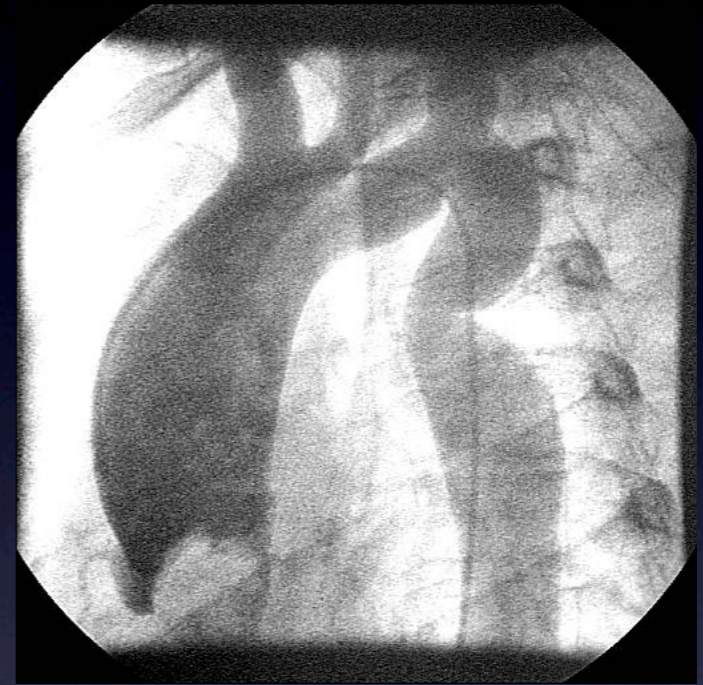
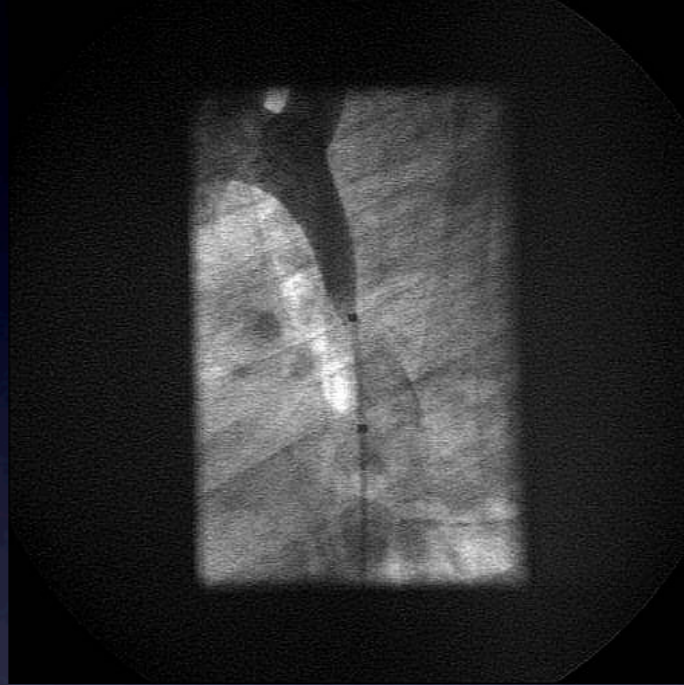
aa. intercostales

aa. mammae

ribusuren



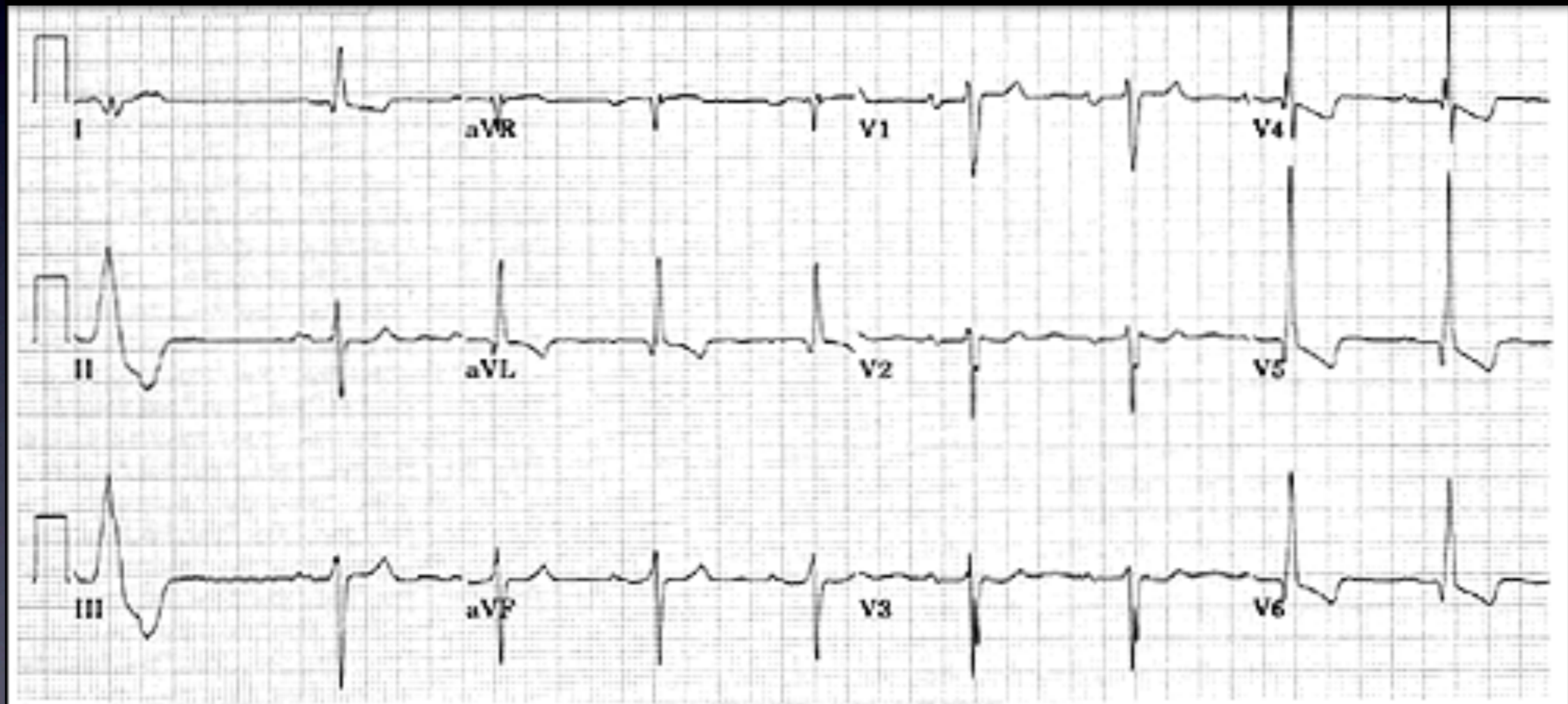
# Variaties



# Klinische presentatie

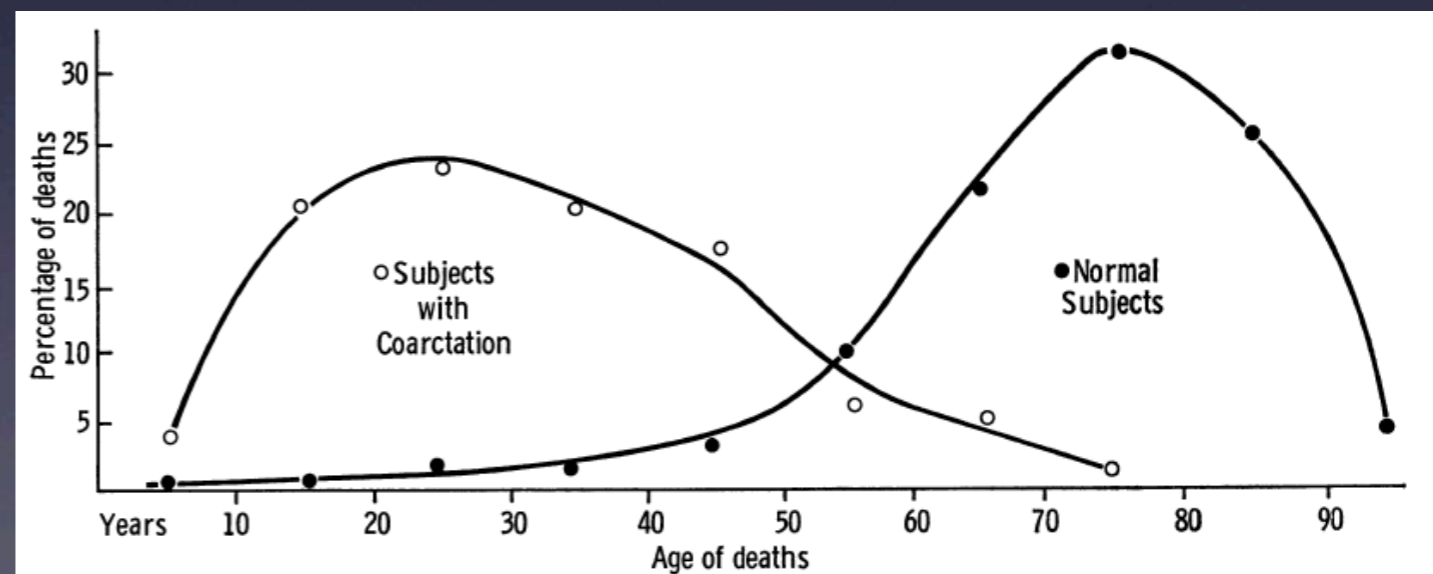
- afhankelijk van de leeftijd
- een zuigeling met hartfalen
- een kleuter, adolescent of 'jong volwassene' met een geruis
- een kind, adolescent of 'jong volwassene' met hypertensie
  - meestal asymptomatisch
  - hypertensie met een verschil in bloeddruk arm vs. been
  - zwakke vertraagde art. femoralis pulsaties
  - bevindingen van geassocieerde afwijkingen

# ECG



# Natuurlijk beloop

- Coarctaties worden frequent 'gemist'
- Oorzaken overlijden op volwassen leeftijd
  - # Congestief hartfalen (hoge afterload, hypertensie)
  - # Endocarditis
  - # Aorta dissectie
  - # Cerebrale bloedingen



Campbell M. Br Heart J. 1970;32:633-640.



# Behandeling

## Indicatie

Vermindering cardiovasculair risico  
Verbetering overleving

levenstijl aanpassen

(gewicht, roken,  
hypercholesterolemie, beweging)

opheffen

{re(st)} coarctatie:  
catheterinterventie, OK

medicamenteus

beta-blokkade, diuretica,  
ACE-remmer of ARB

**Table 1 |** Indications for intervention in coarctation of the aorta

Indications	Class <sup>a</sup>	Level <sup>b</sup>
All patients with a non-invasive pressure difference $>20$ mmHg between upper and lower limbs, regardless of symptoms but with upper limb hypertension ( $>140/90$ mmHg in adults), pathological blood pressure response during exercise, or significant LVH should have intervention	I	C
Independent of the pressure gradient, hypertensive patients with $\geq 50\%$ aortic narrowing relative to the aortic diameter at the diaphragm level (on CMR, CT, or invasive angiography) should be considered for intervention	IIa	C
Independent of the pressure gradient and presence of hypertension, patients with $\geq 50\%$ aortic narrowing relative to the aortic diameter at the diaphragm level (on CMR, CT, or invasive angiography) may be considered for intervention	IIb	C

# Behandeling

## Chirurgie

- Mortaliteit
- Vals aneurysma
- Re-coarctatie
- Beschadiging n. recurrens (stemband)
- Ischaemie ruggemerg
- ...

## Catether

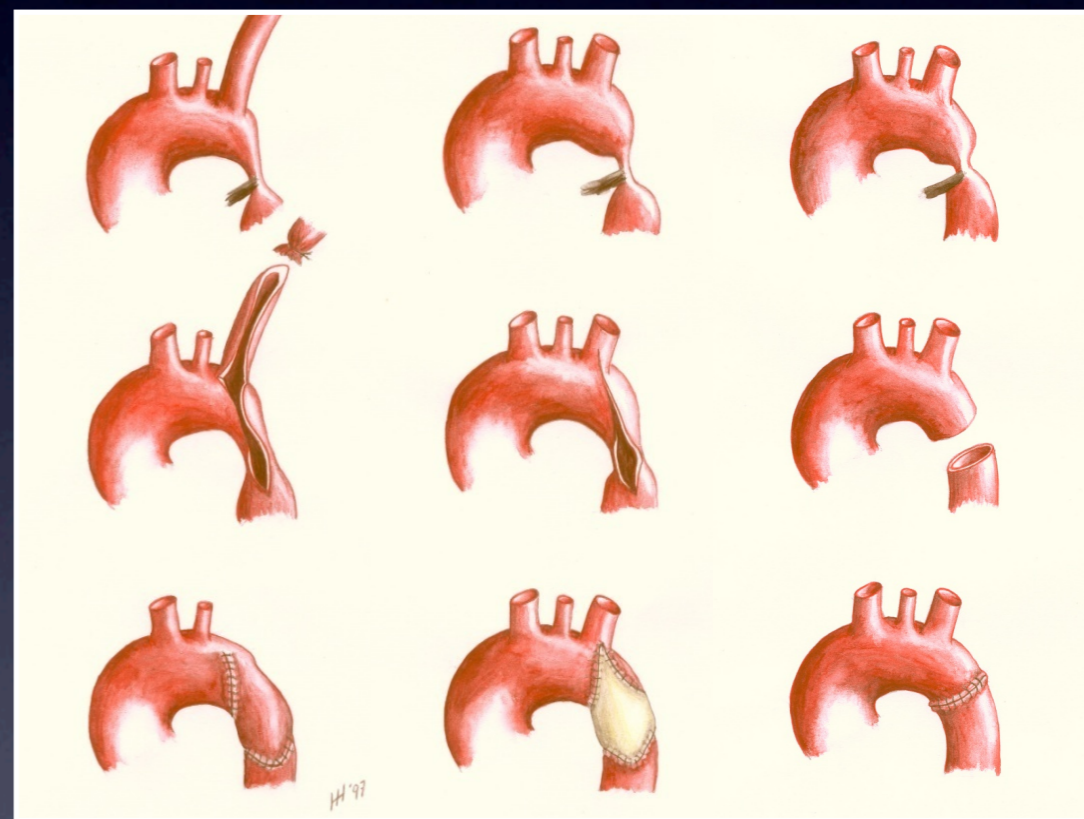
- Mortaliteit
- Dissectie/ruptuur
- Re-coarctatie (ballon)
- Vals aneurysma (ballon/stent)
- A.fem complicaties
- ....

# Chirurgie

- sinds 1944

verschillende technieken

1. subclavian flap
2. patch-plastiek
3. end-to-end anastomose



# Catheter interventies

## Ballon

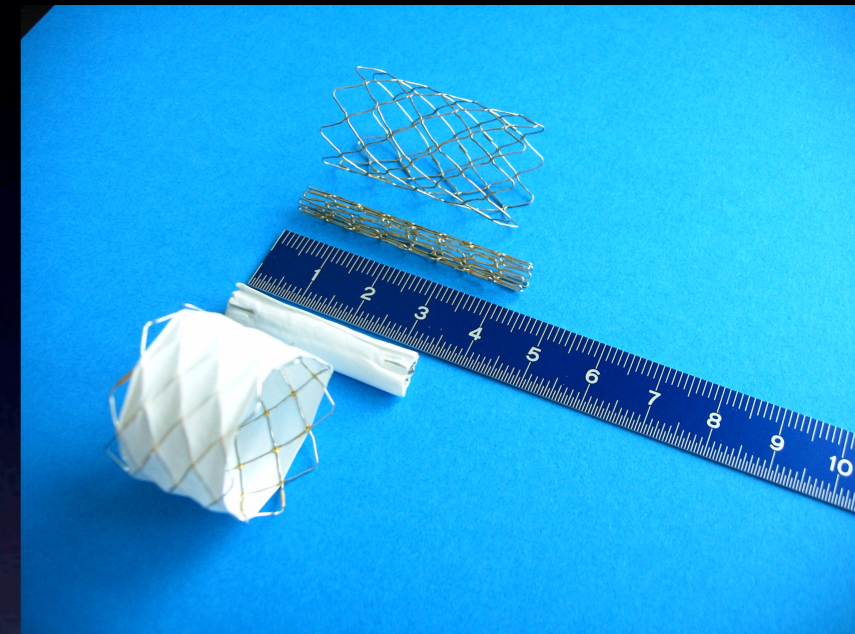
- Voor

- al op jonge leeftijd mogelijk
- effectief bij re-CoA bij kinderen
- 

- Tegen

- risico op vals aneurysma thv coarctatie
- re-CoA 10-15%
- resultaat valt tegen bij ouder kind/ volwassene

# Catheter interventie Stents



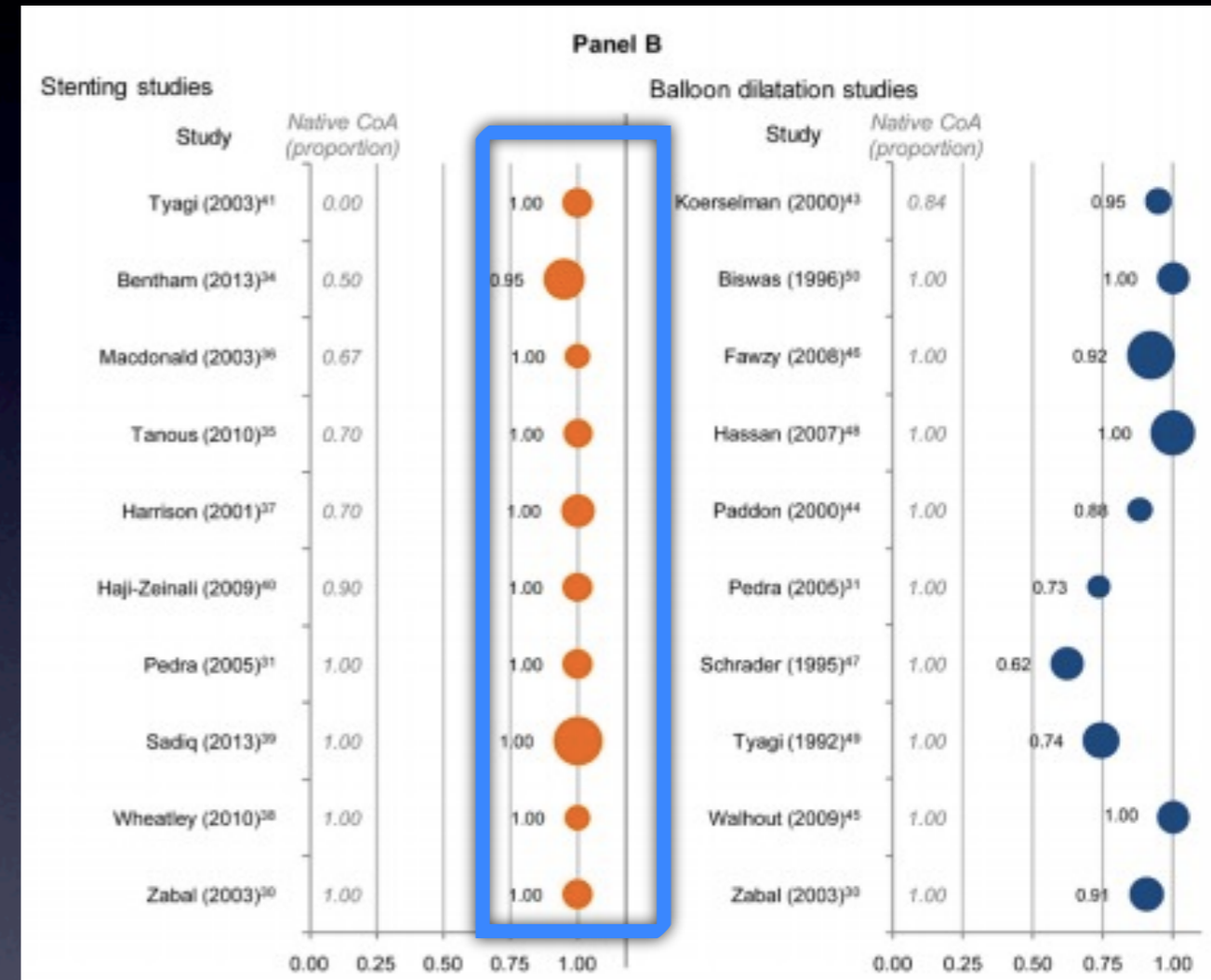
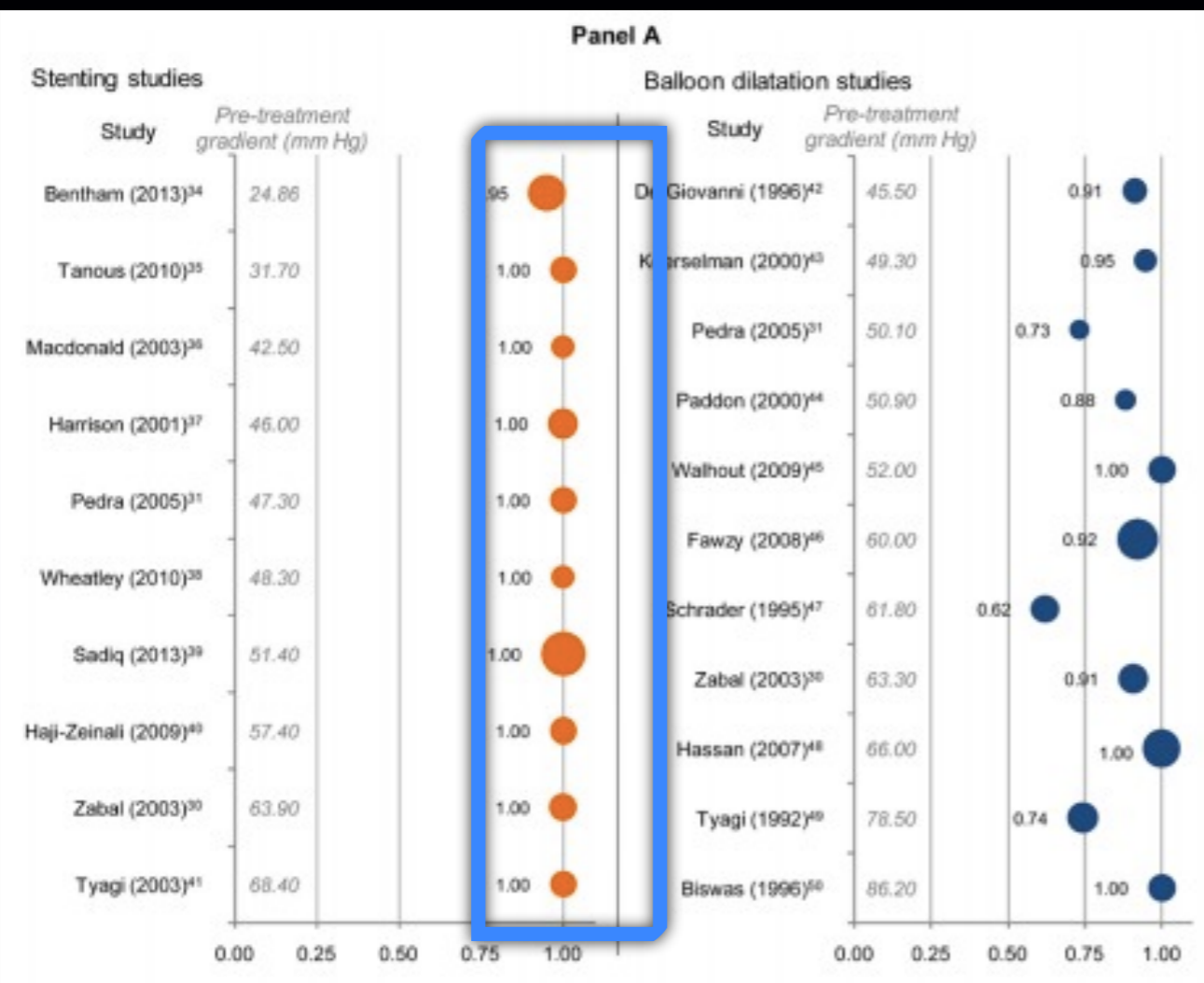
## • Voor

- voorkomen recoil, re-Co-arctatie
- mogelijk minder vals aneurysma

## • Tegen

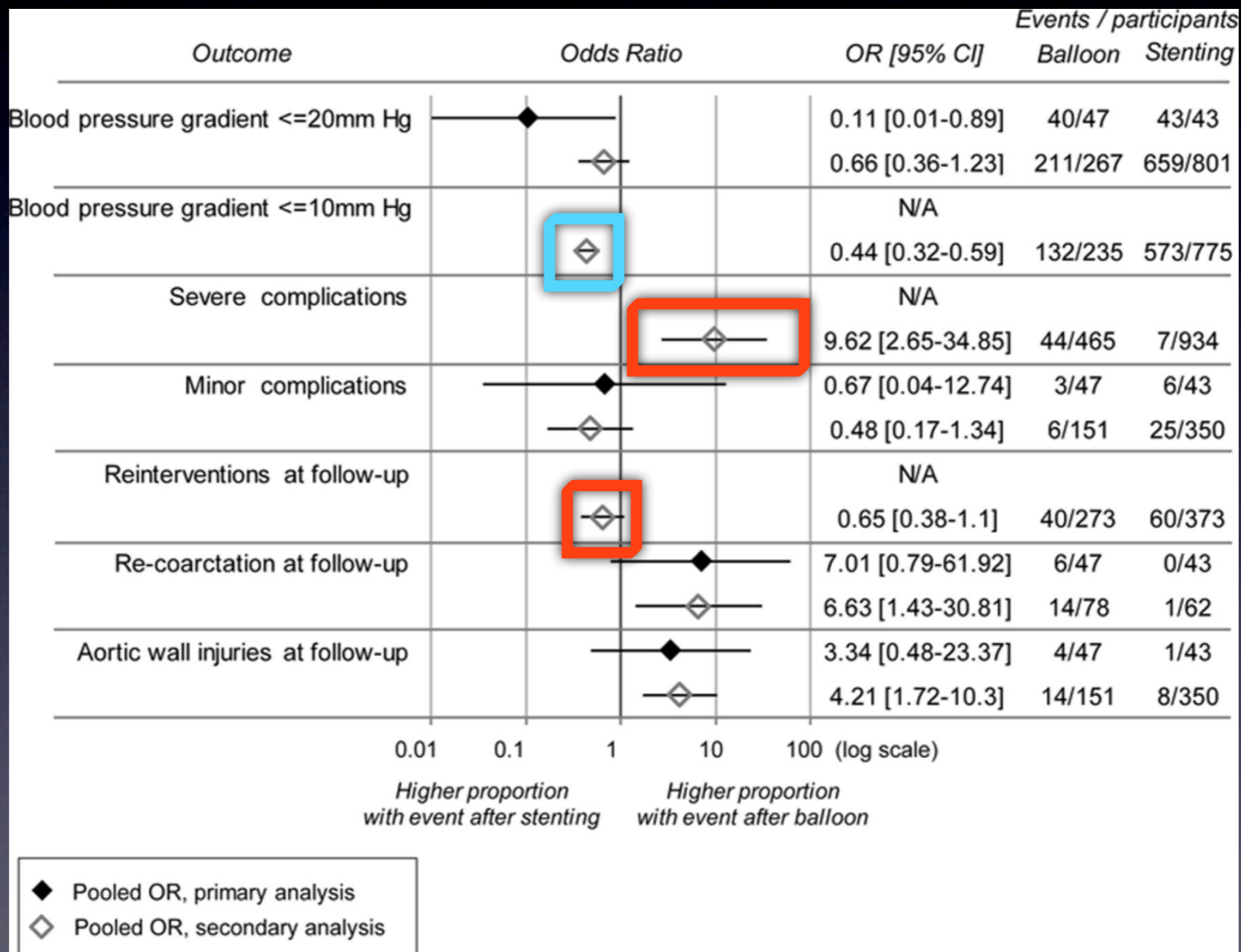
- groeit niet mee
- ongeschikt voor jonge kinderen
- overstenten van arteria subclavia
- intimaproliferatie??

# Stent vs Balloon

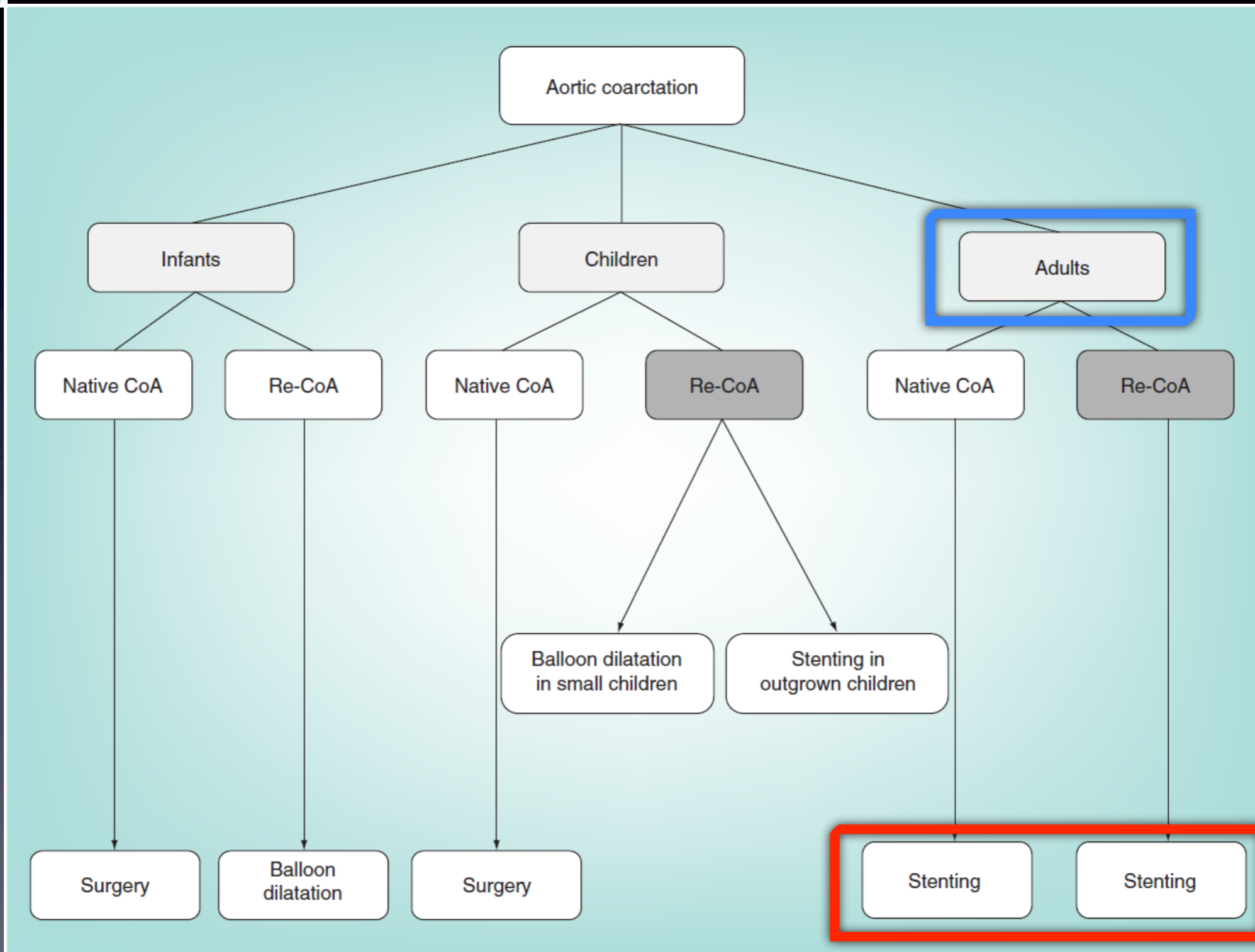


Oranje bollen: stenting; Blauwe bollen: ballon dilatatie  
% effect (RR gradient <20mm Hg)

# Stent vs Balloon



# Beslisboom





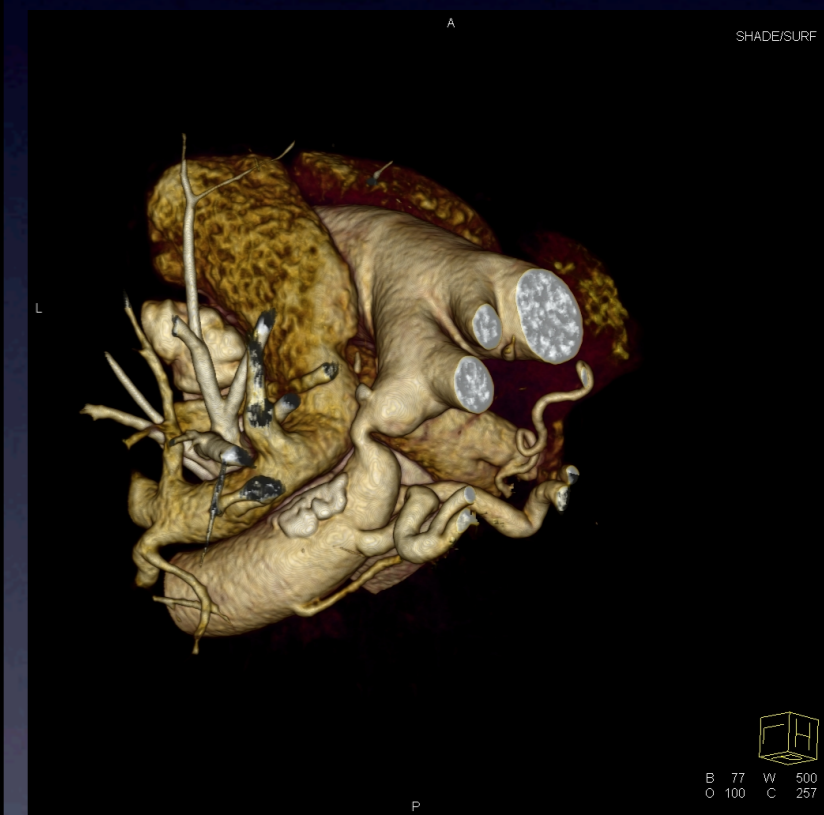
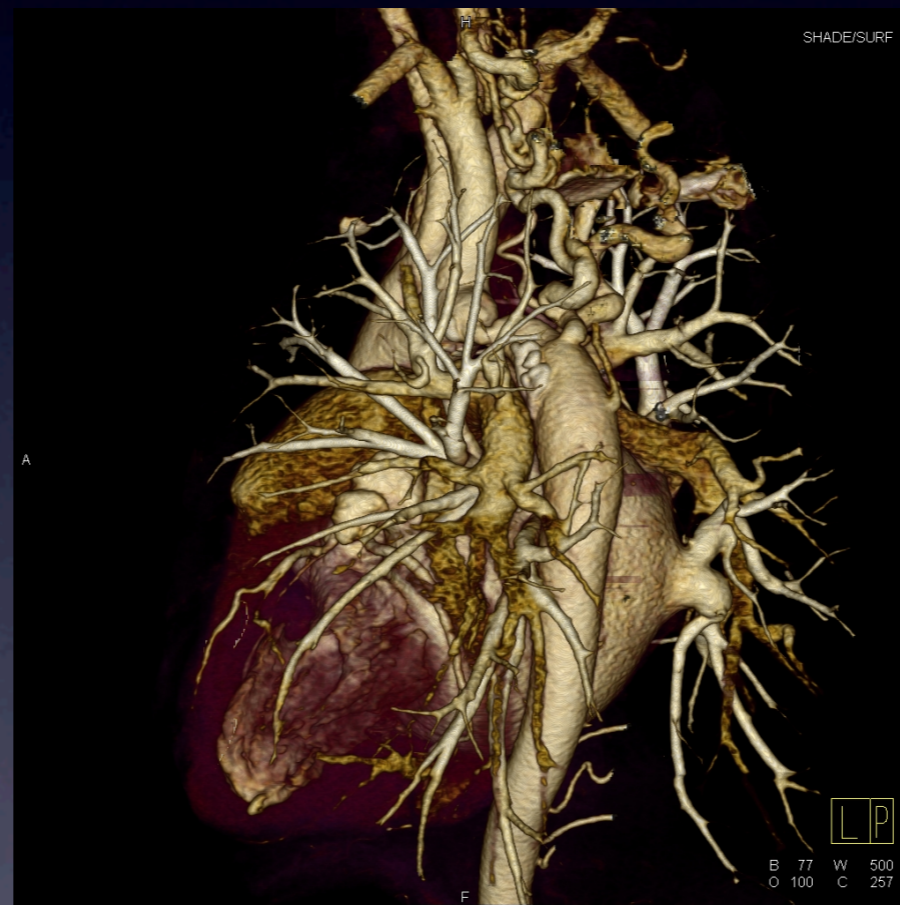
# Work-up

- Diagnose
  - Echo
  - CT/MRI
  - Angiografie met druk meting
    - collateralen

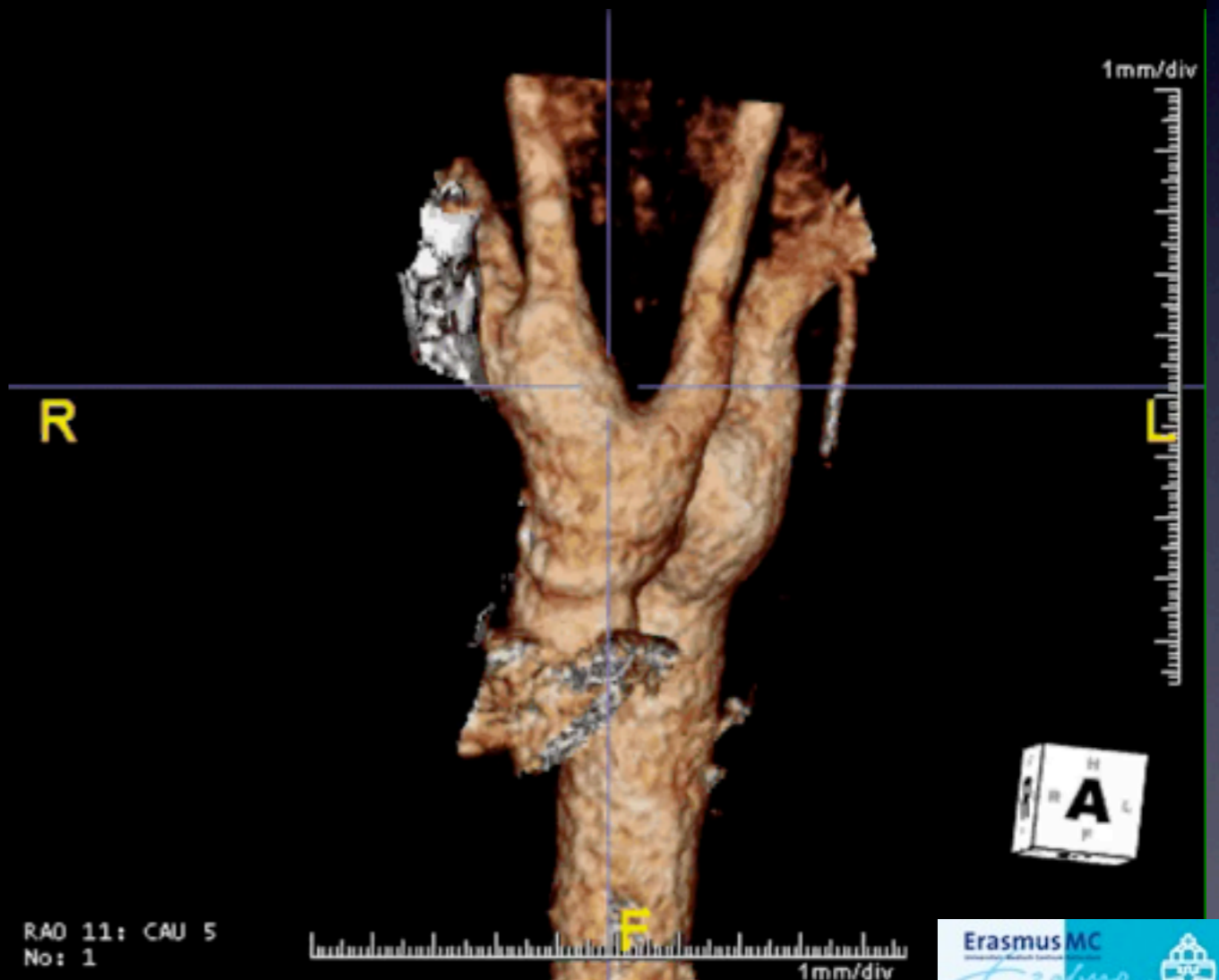
**Table 11** Indications for intervention in coarctation of the aorta

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# Beeldvorming CT / MRI



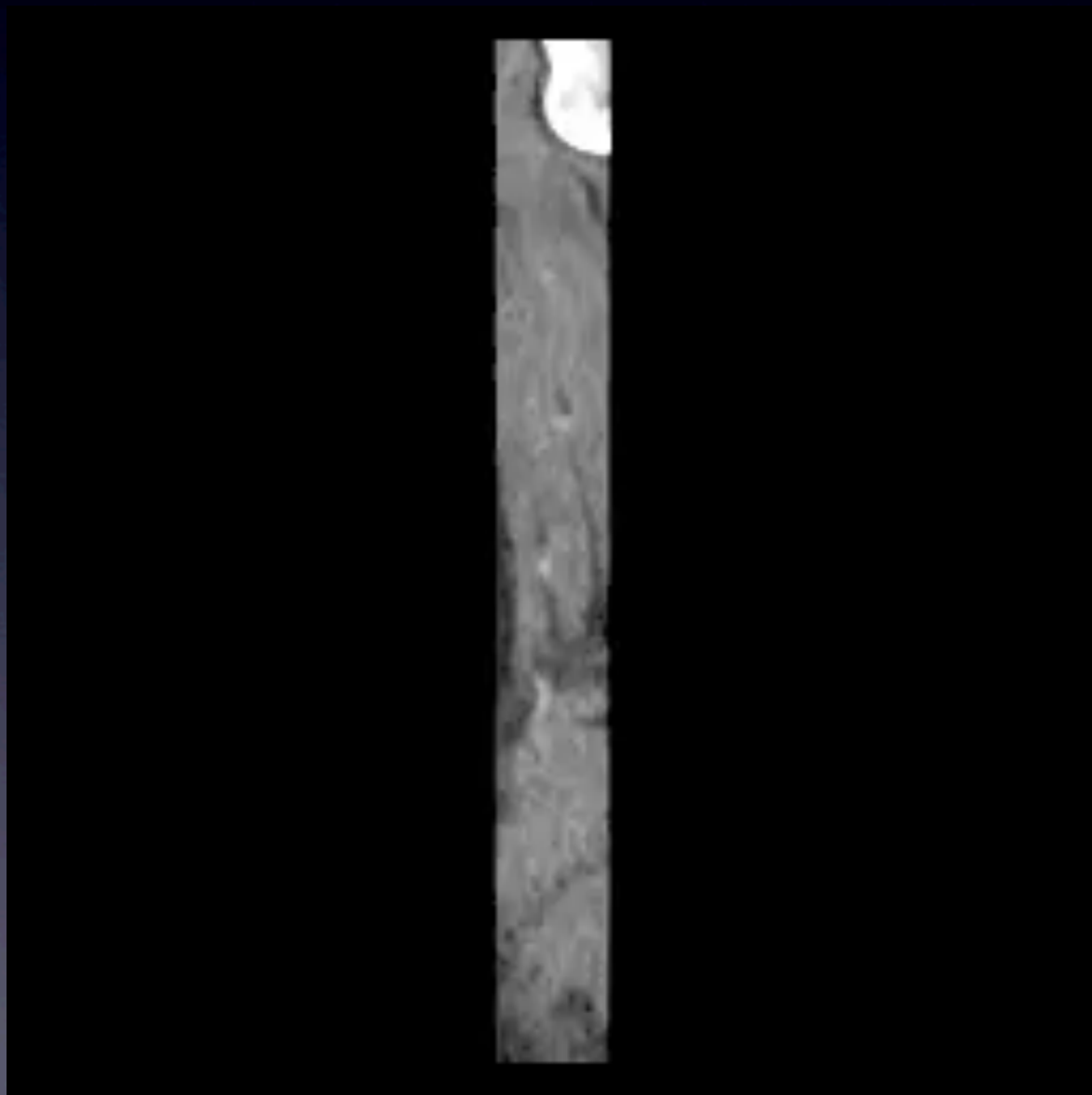
# Beeldvorming MRI / CT



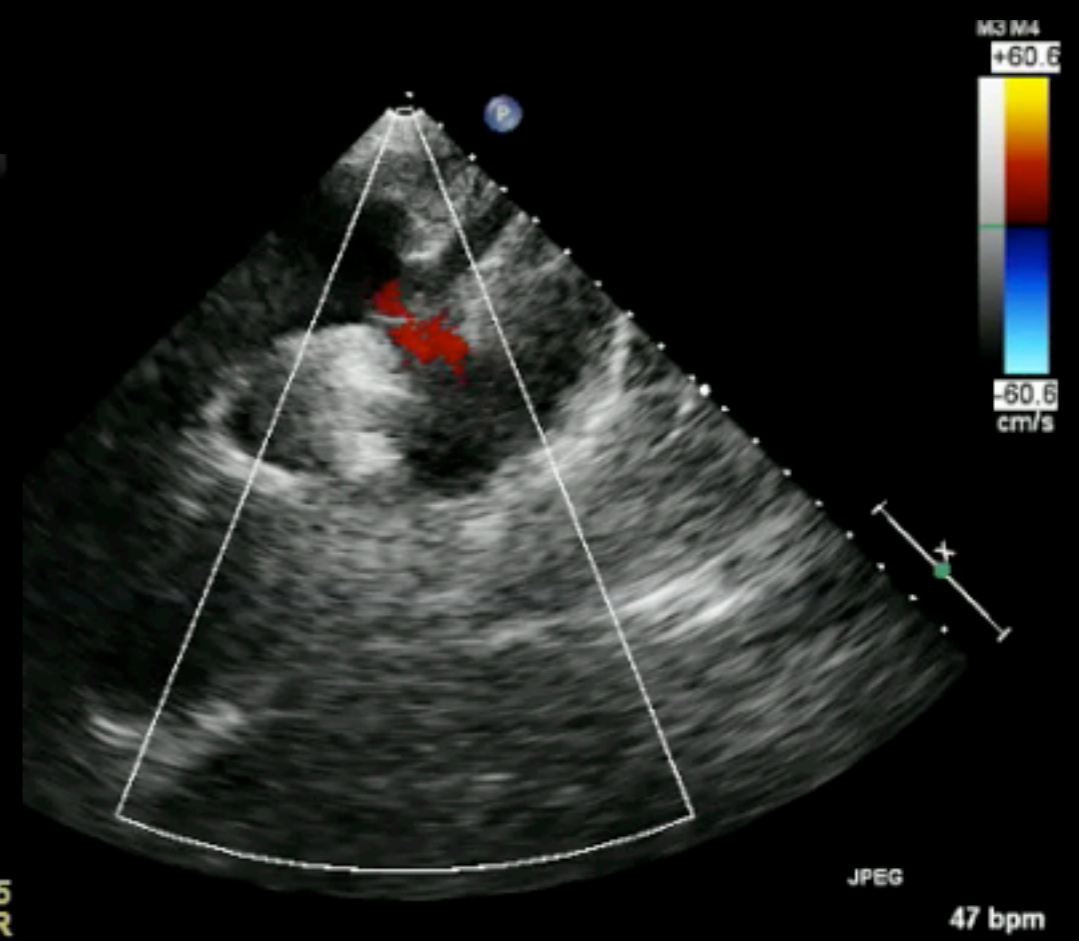
RAO 11: CAU 5  
No: 1



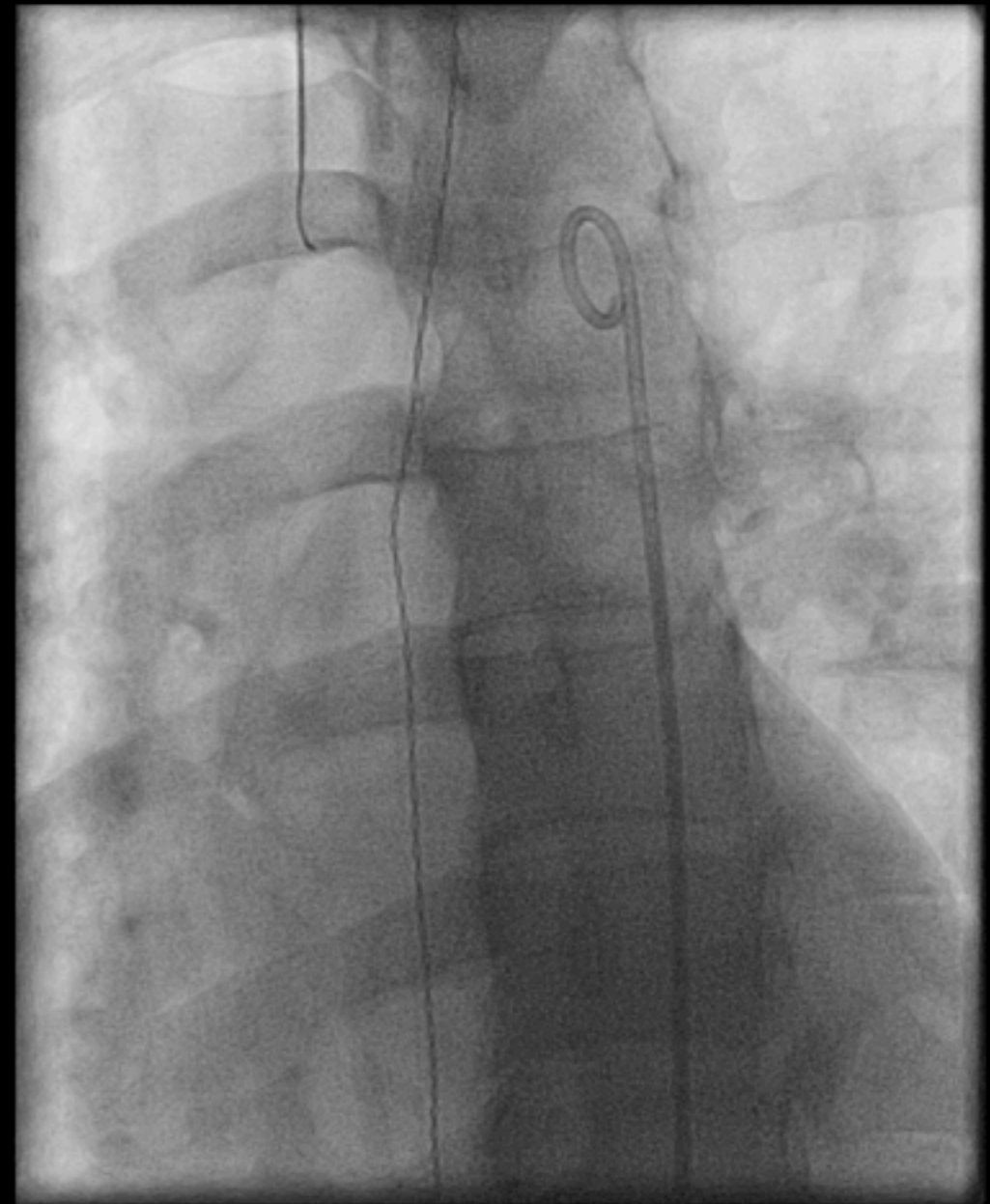
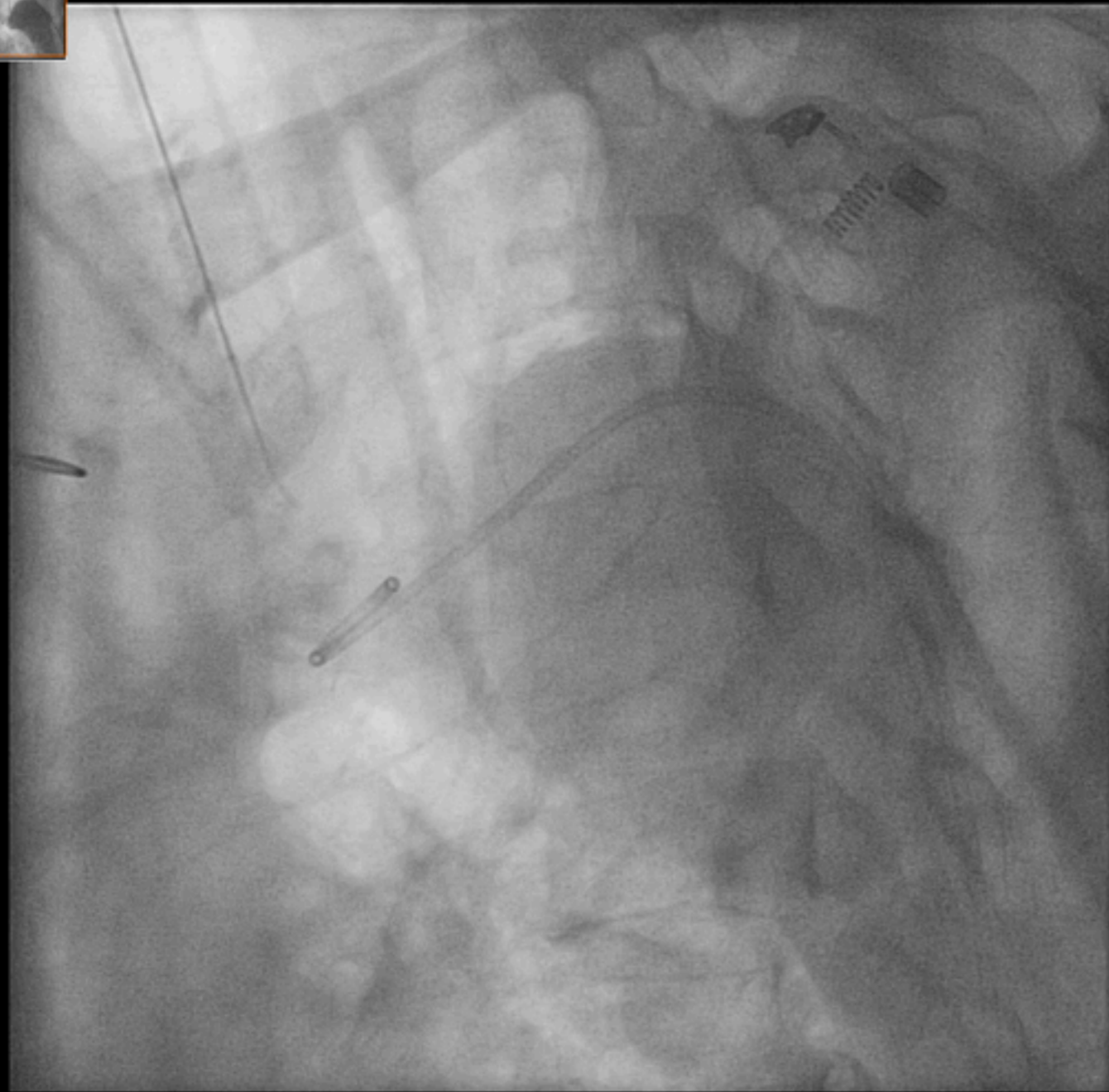
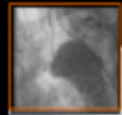
# Beeldvorming MRI / CT



# Beeldvorming Echo



# Beeldvorming Angio



# Problemen

- Coronairlijden?
- Persisteren hypertensie
- Re-coarctatie
- (Vals) - aneurysmavorming
- Hartfalen
  - LV druk belasting
  - Hypertensie
  - LVH

# Coronairlijden

## Congenital Heart Disease

### Coarctation of the Aorta and Coronary Artery Disease Fact or Fiction?

Idan Roifman, MD; Judith Therrien, MD; Raluca Ionescu-Ittu, PhD; Louise Pilote, MD, PhD, MPH;  
Liming Guo, MSc; Mark A. Kotowycz, MD, MBA; Giuseppe Martucci, MD; Ariane J. Marelli, MD, MPH

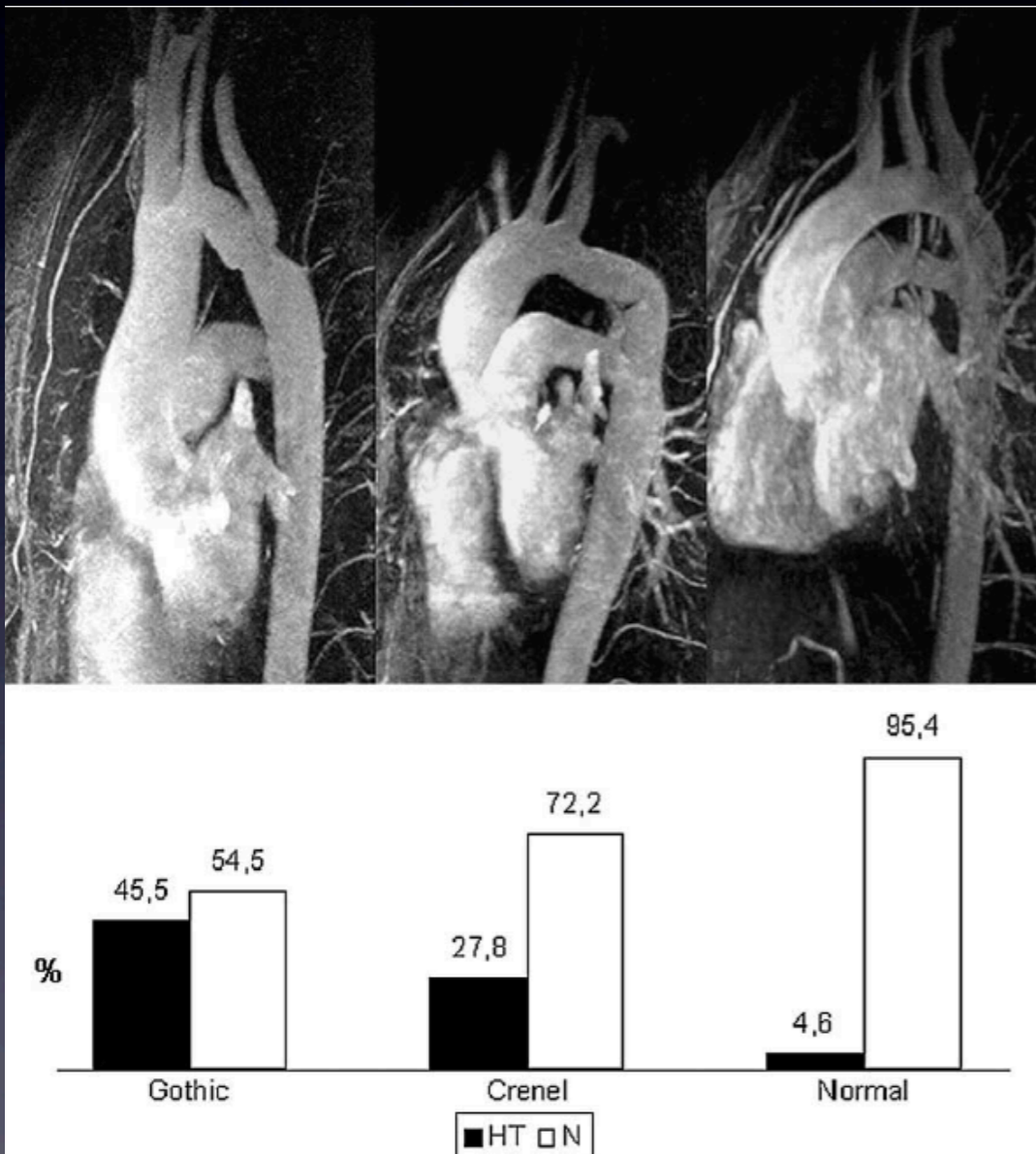
- Retrospectief database Quebec
- 37/756 (4.9%) CoA ptn vs 224/6481 (3.5%) VSD ptn ( $p=0.04$ )
- CoA : geen onafhankelijke voorpeller voor coronairlijden
- Wel de bekende risicofactoren:
  - Leeftijd, mannelijk geslacht, hypertensie, hyperlipidemie, diabetes



# Hypertensie

- Vaak persisterende hypertensie
- Vooral bij volwassenen
  - 20-40%
- mechanische obstructie
- vasculaire disfunctie compliance
- baroreceptor gevoeligheid
  - (renin-angiotensine systeem)

# Hypertensie



105 patiënten 15 ± 6 jaar, post coarctatie

Ou et al, Eur Heart J 2004 25, 1853-1859

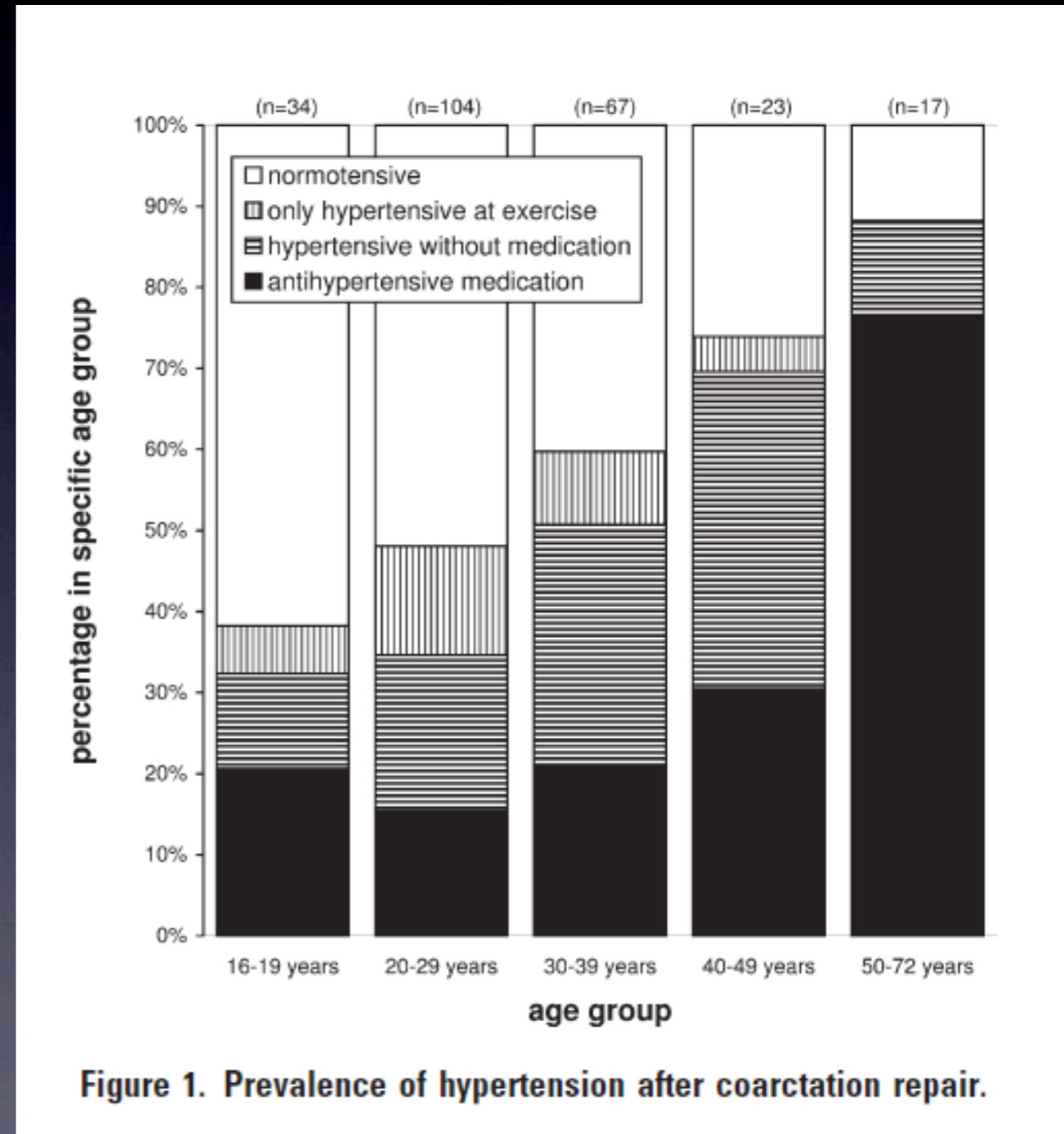


Figure 1. Prevalence of hypertension after coarctation repair.

Hager J Th Cardio Surg 2007

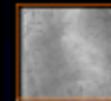
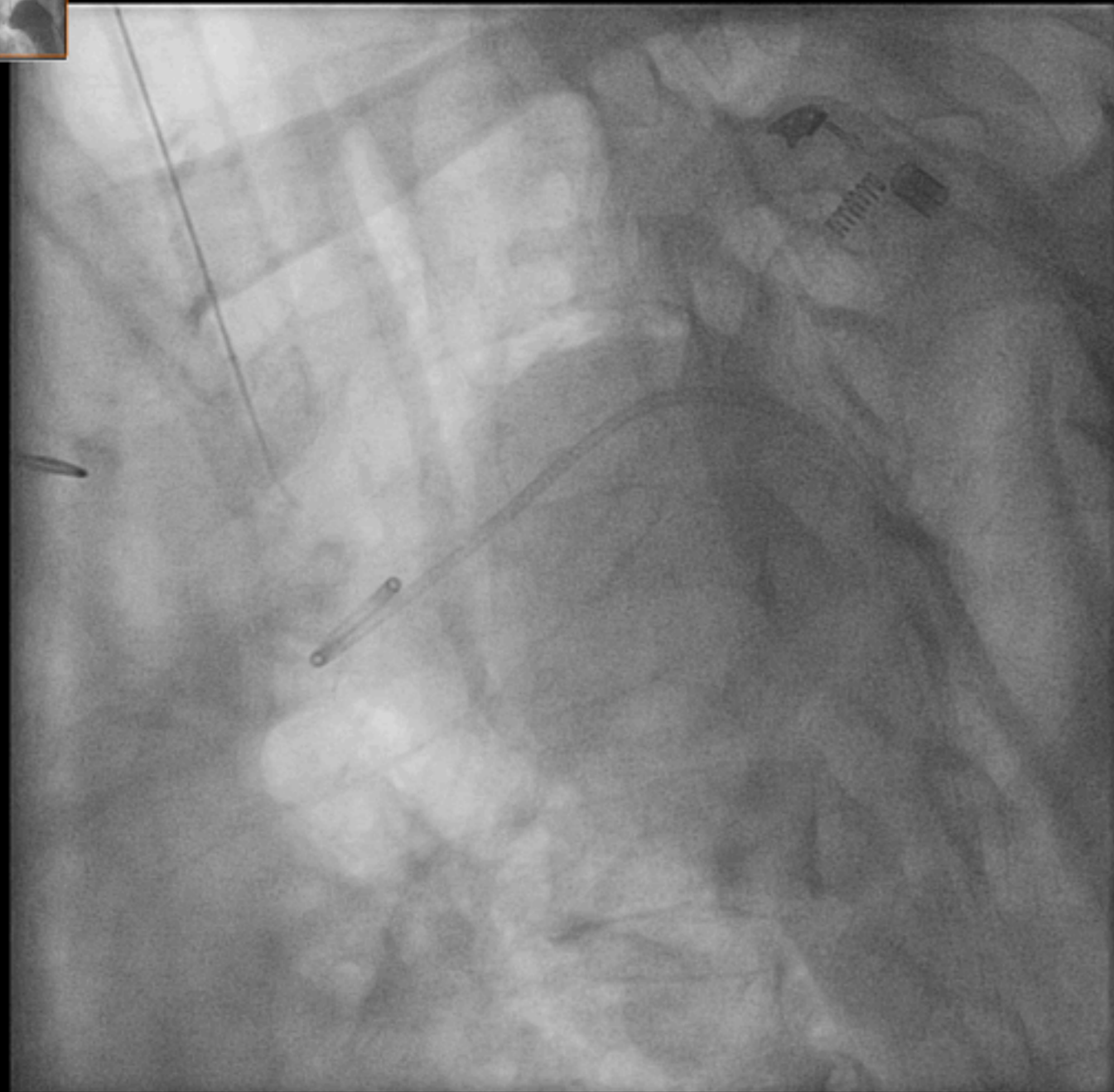
# Aorta afwijkingen

## rest- of re-coarctatie

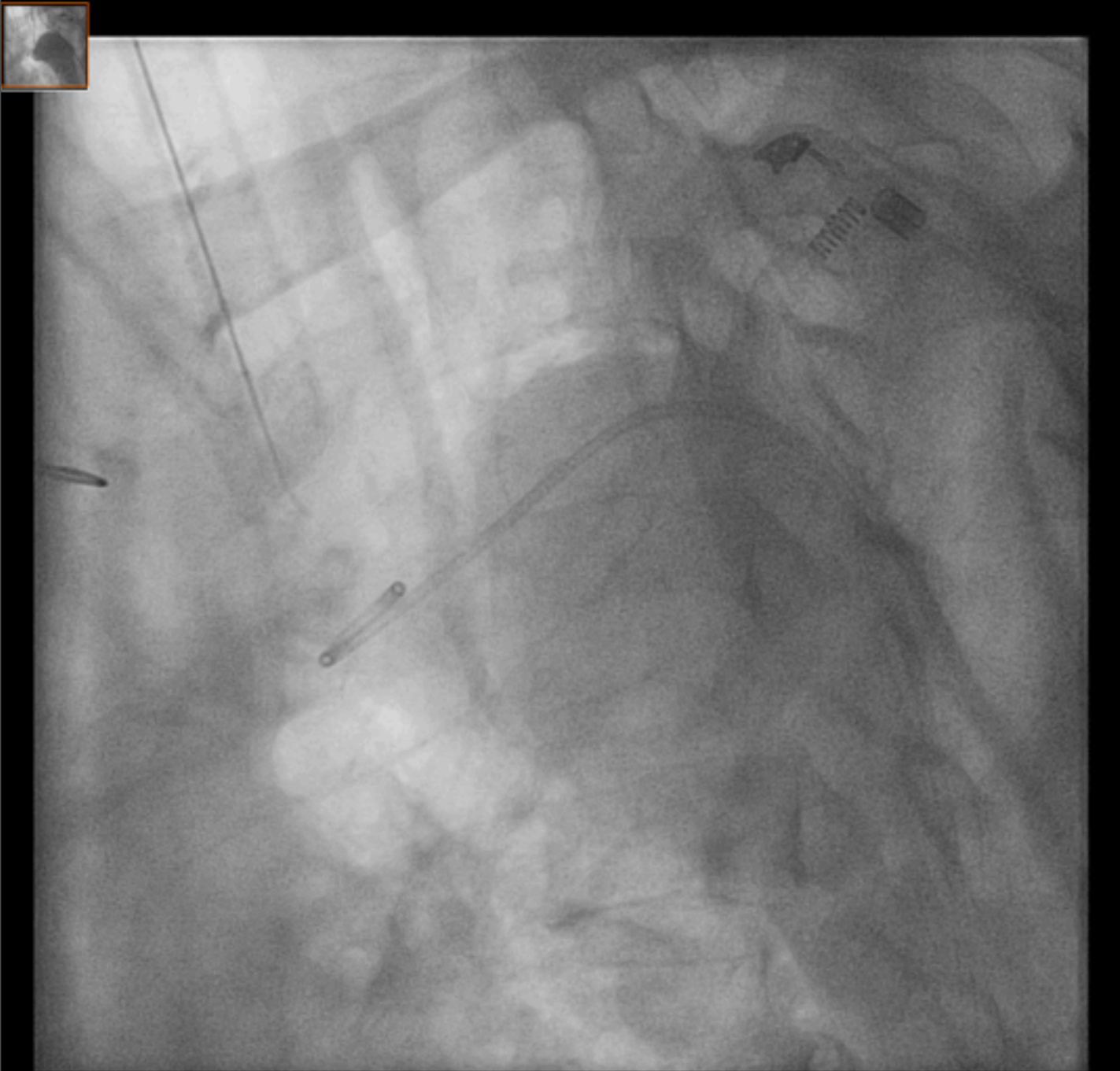
- 15% na 5 jaar en 30% na 10 jaar bij neonatale correctie
- 11% bij correctie bij kinderen en 0-9% bij volwassenen
- na ballondilatatie in oudere kinderen 7-8%

- Follow up noodzakelijk
- CT of MRI met ruim interval (5 jaar)
- Inspanningsonderzoek voor hypertensie?
- Aandacht voor/behandeling van risicofactoren CAD

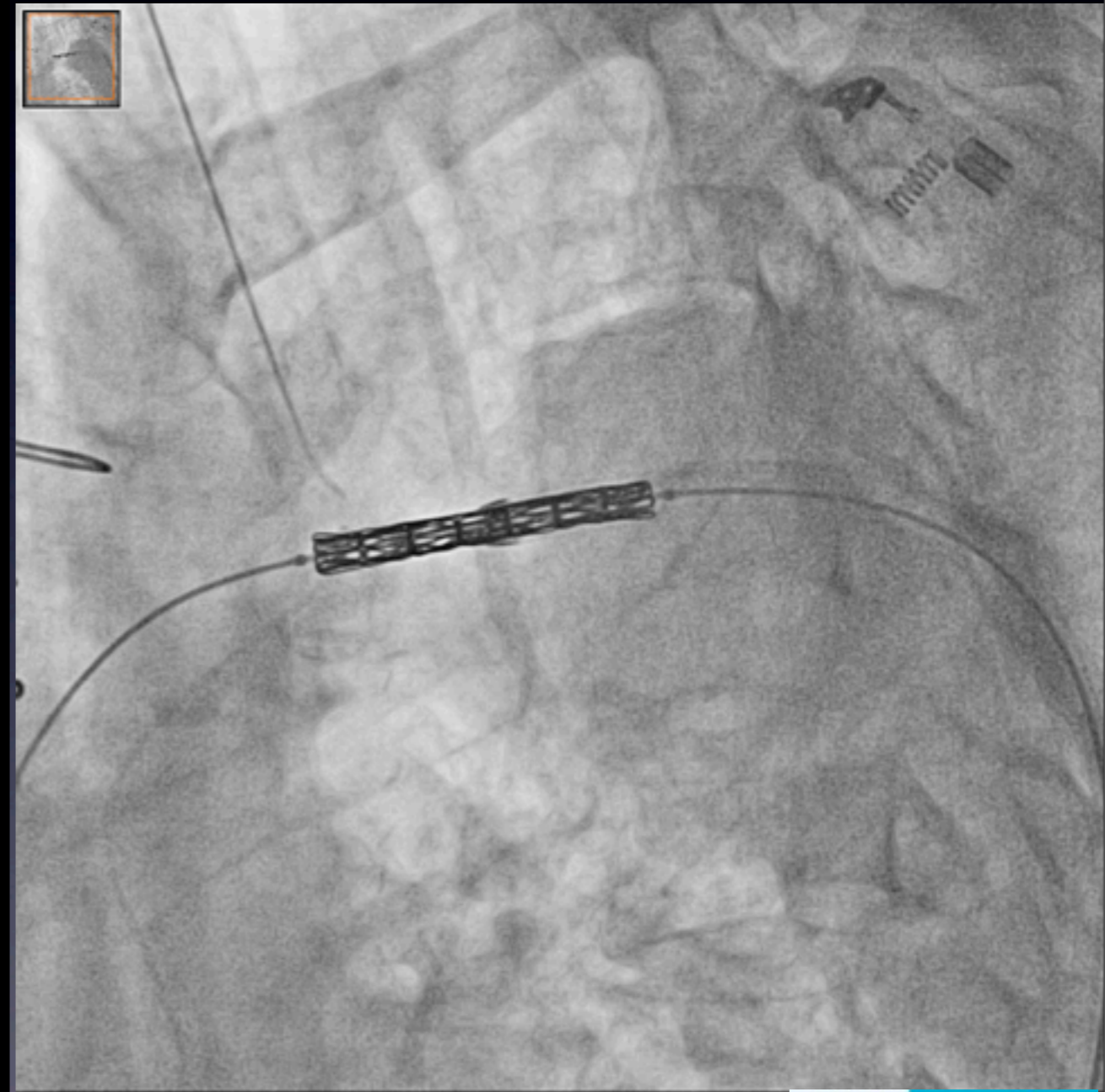
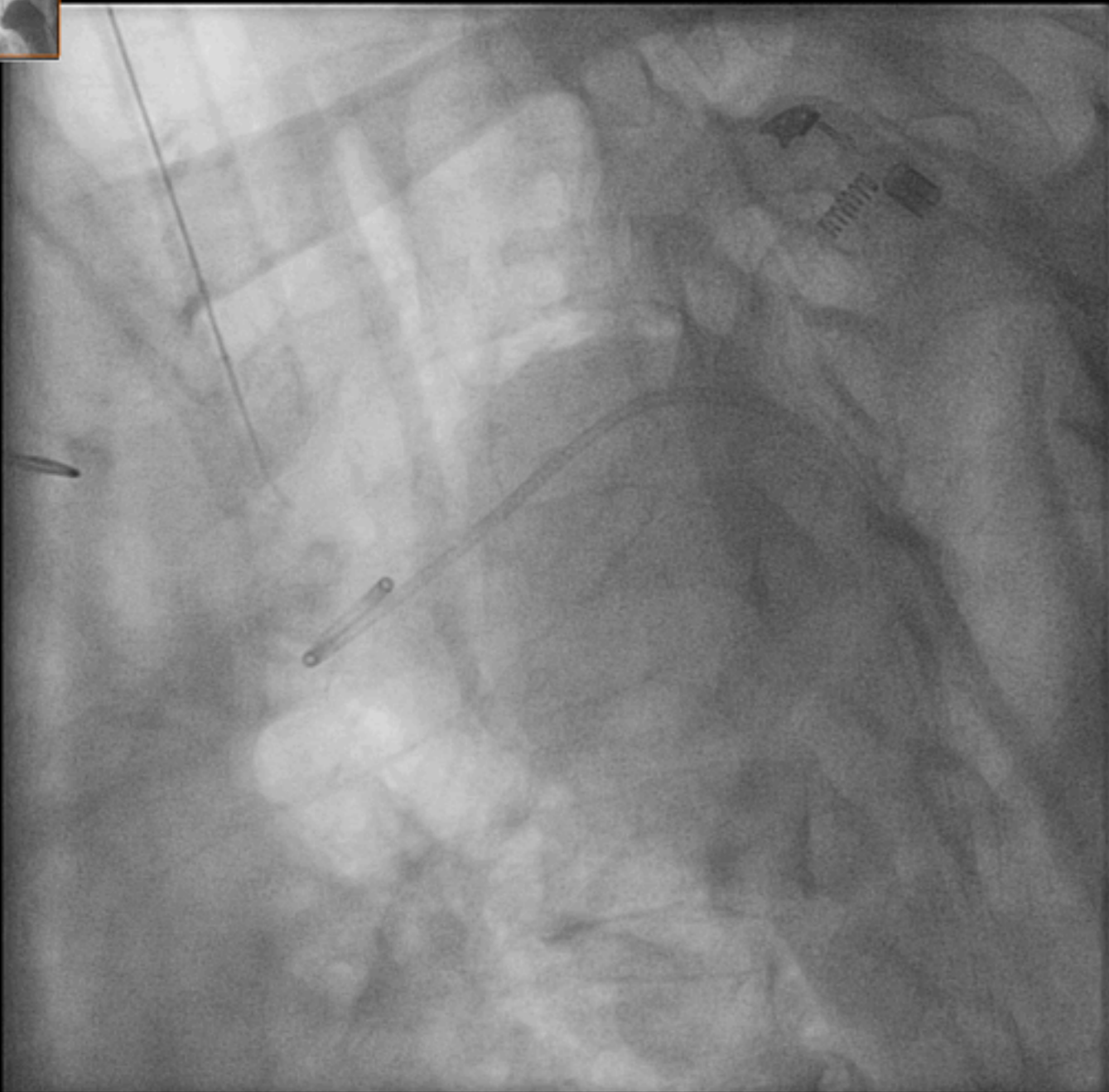
# Procedure



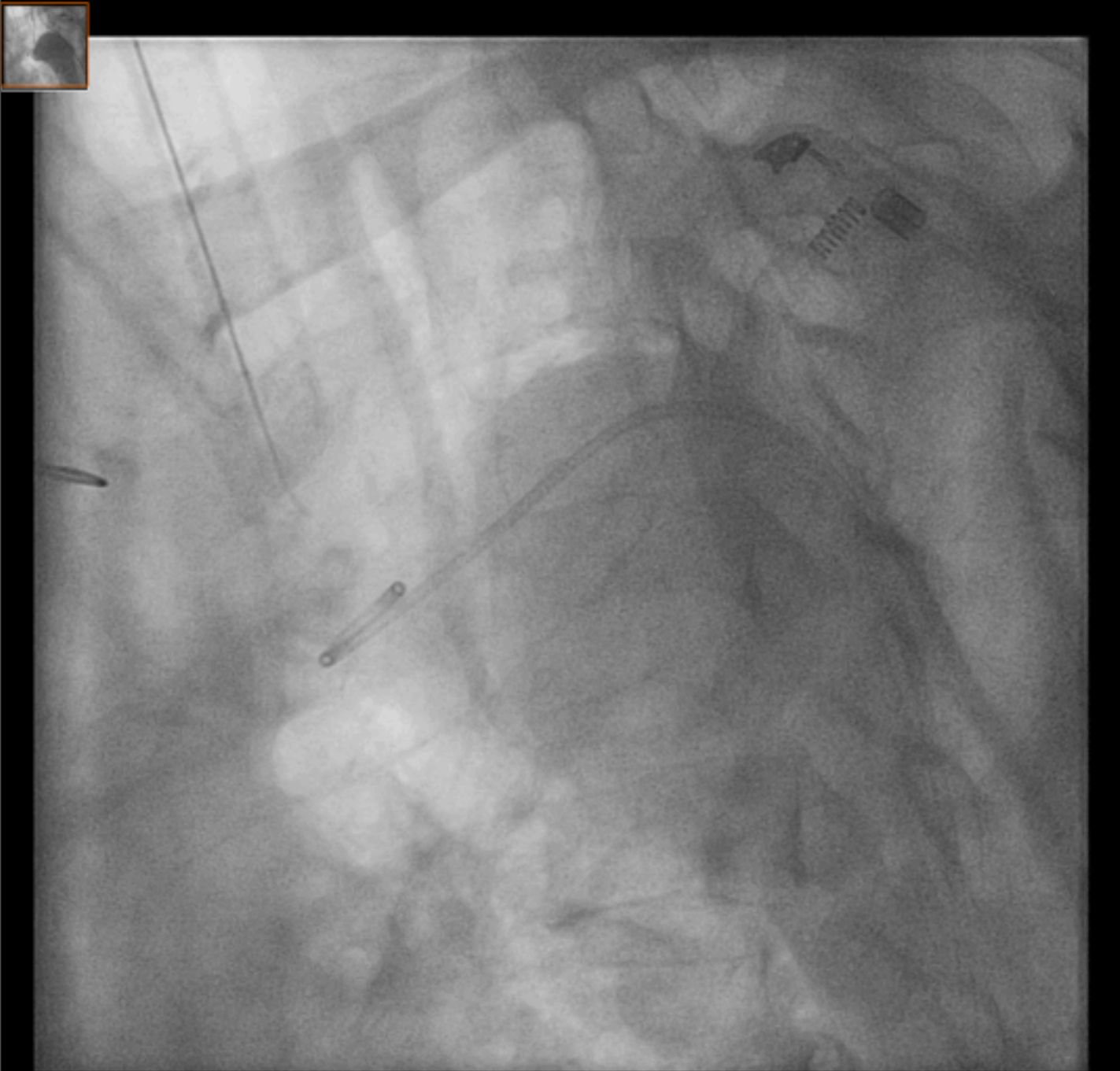
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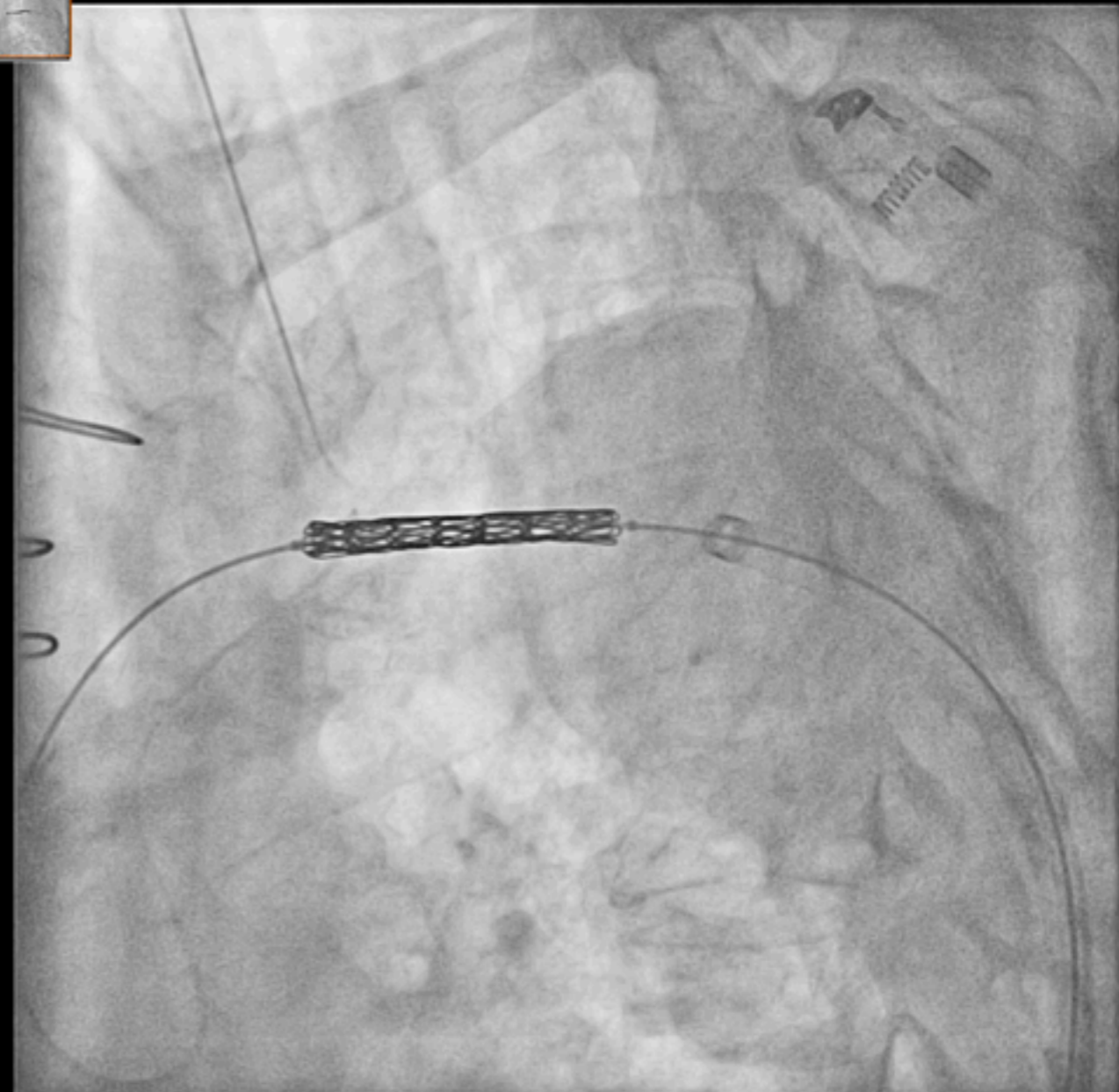
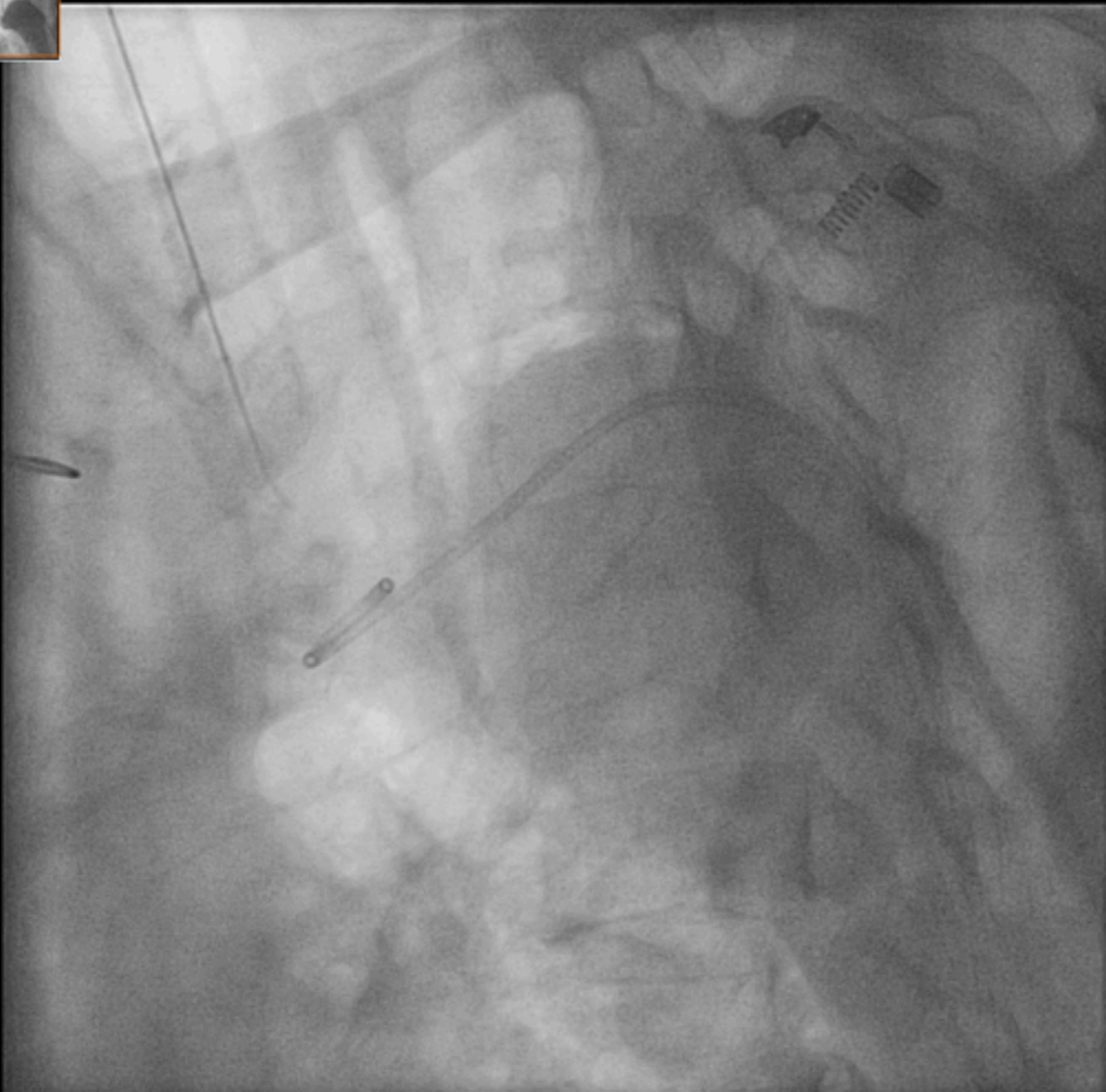
# Procedure



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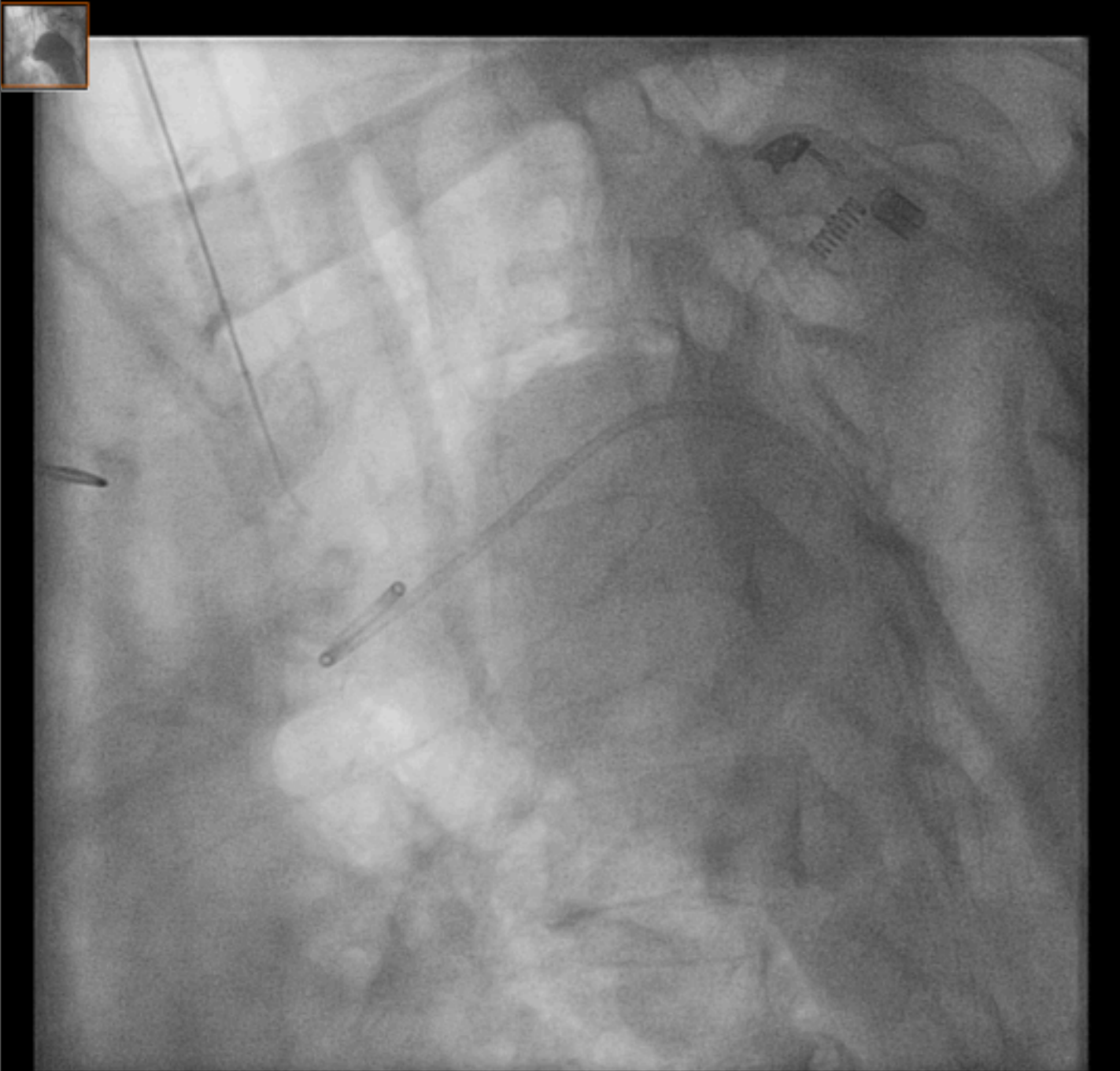


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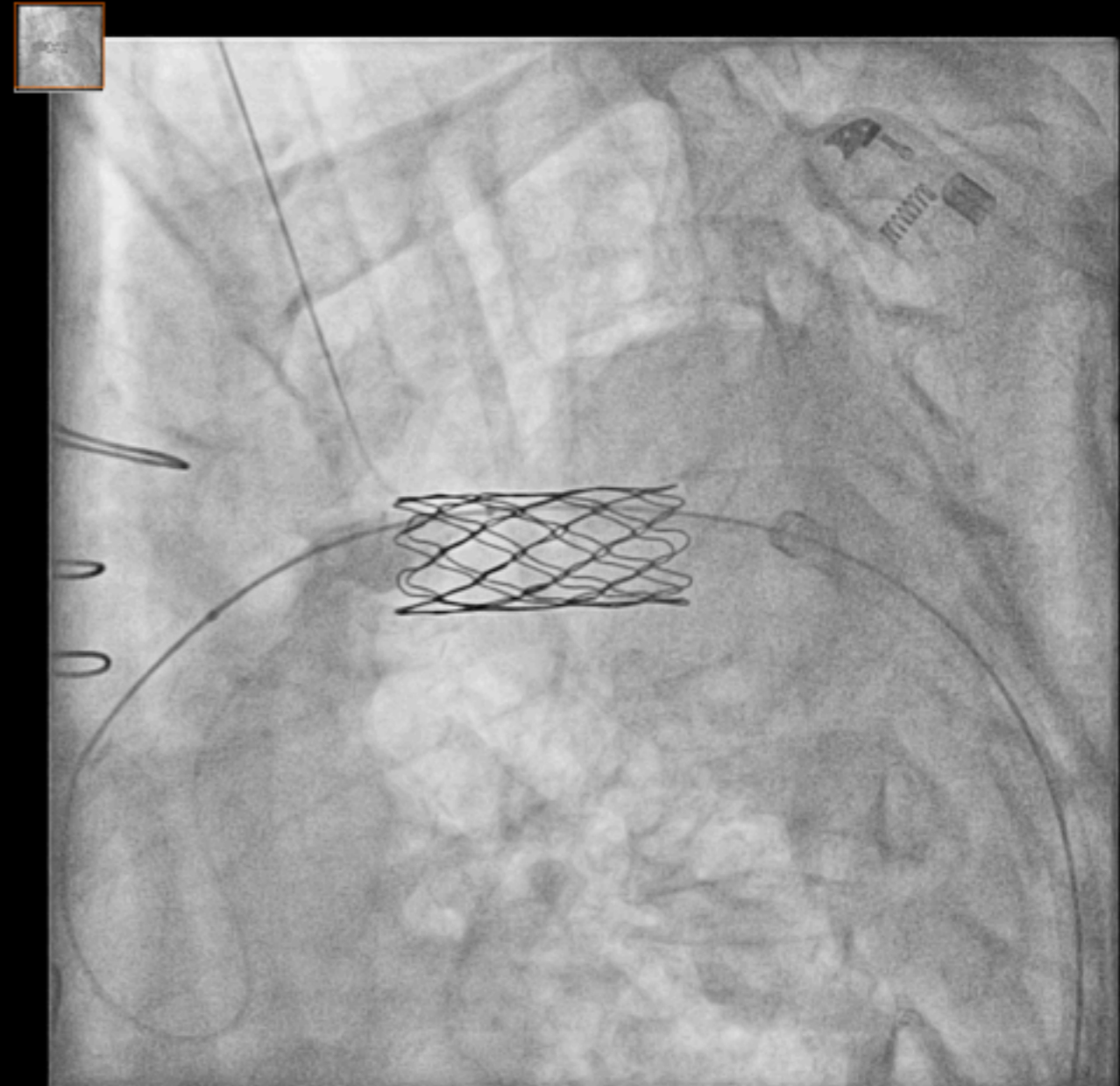
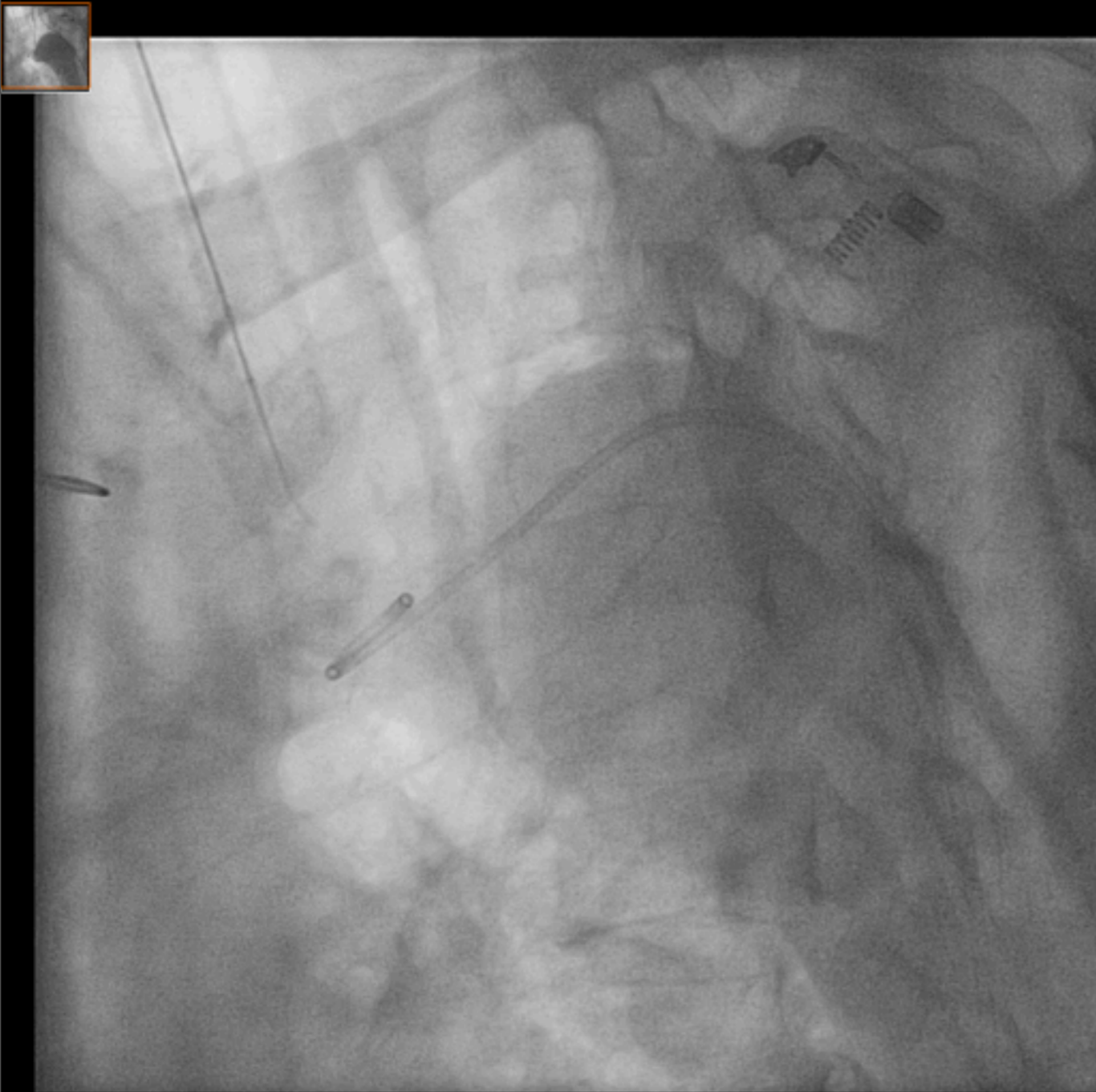




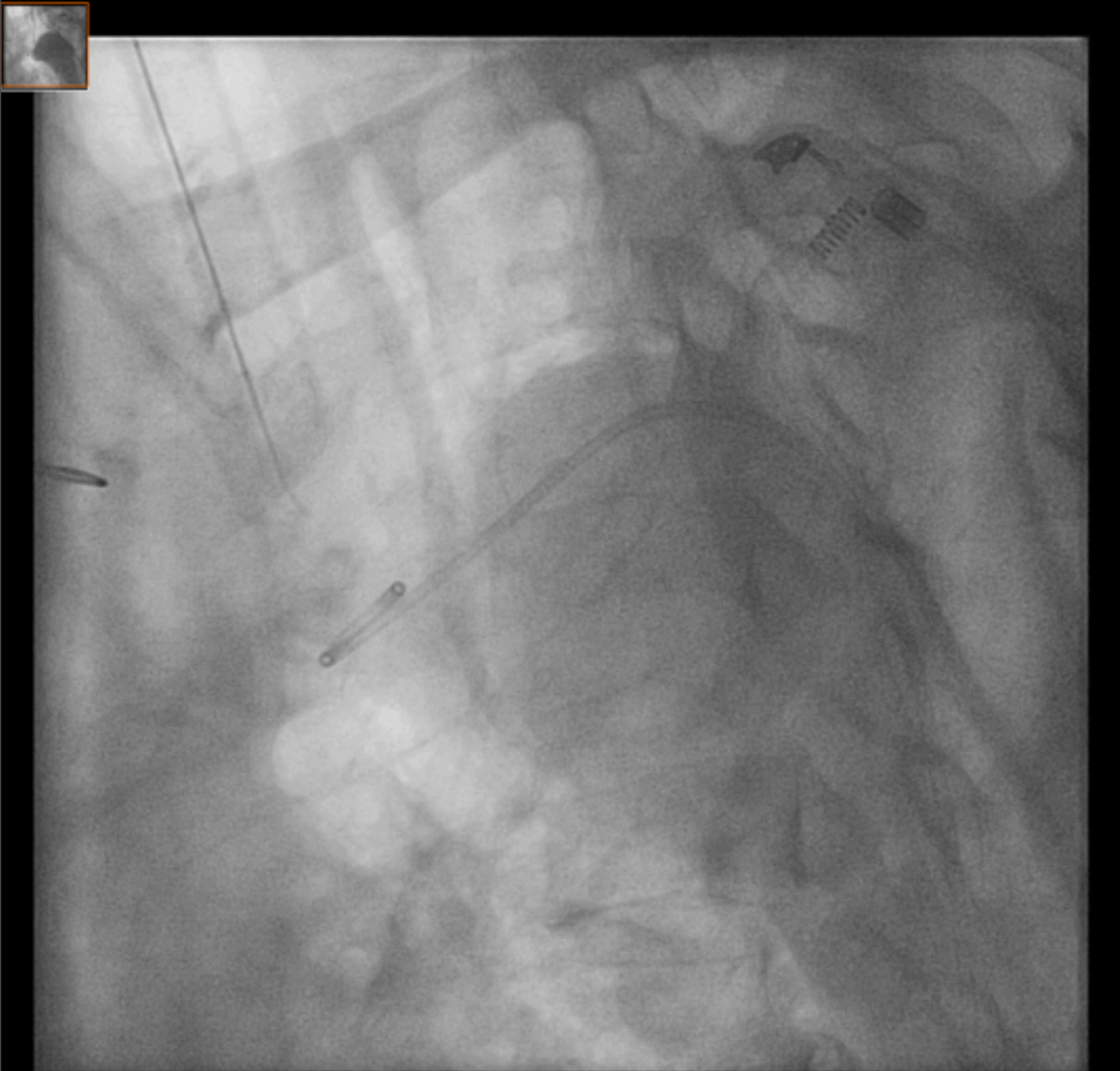
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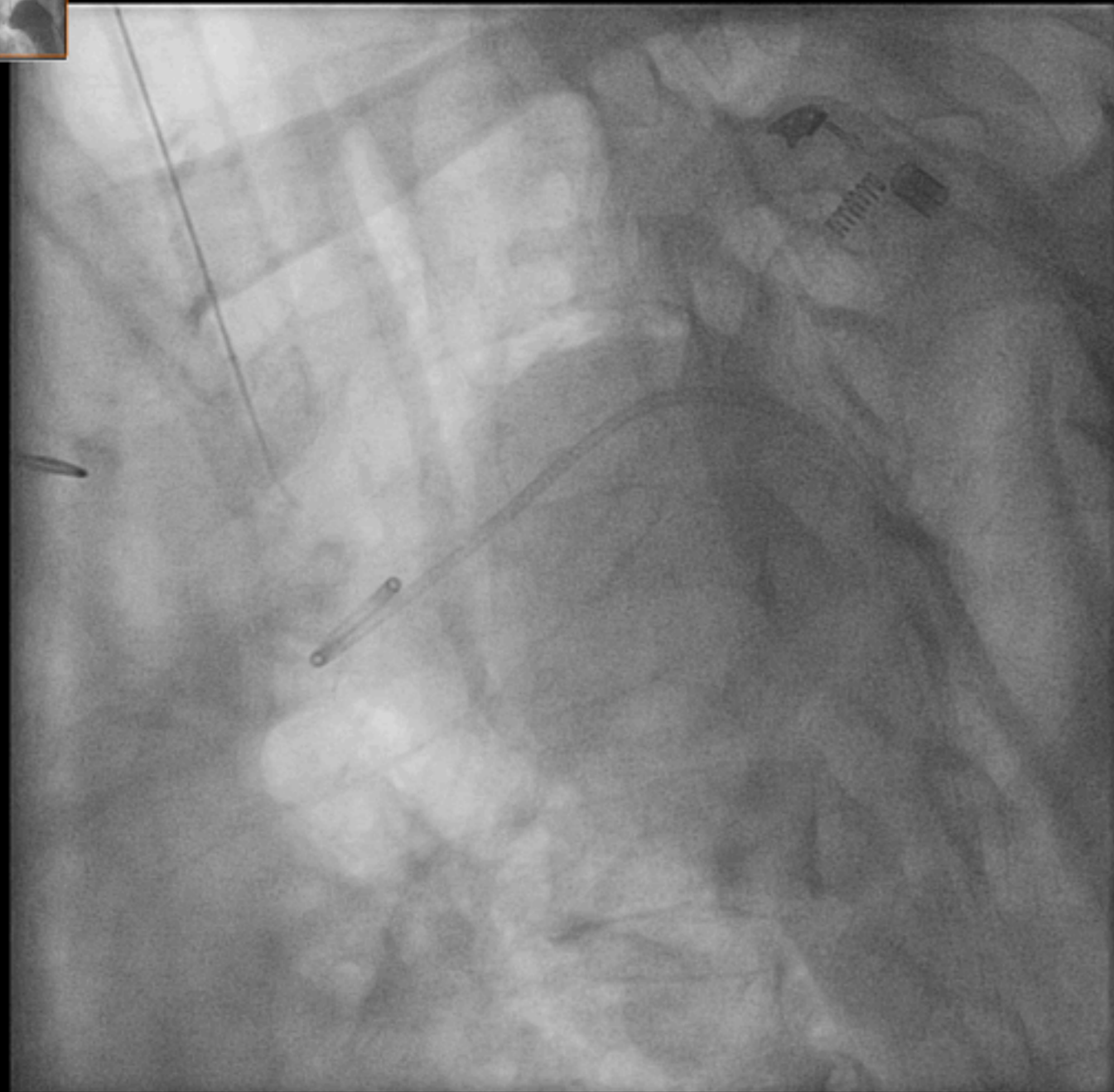
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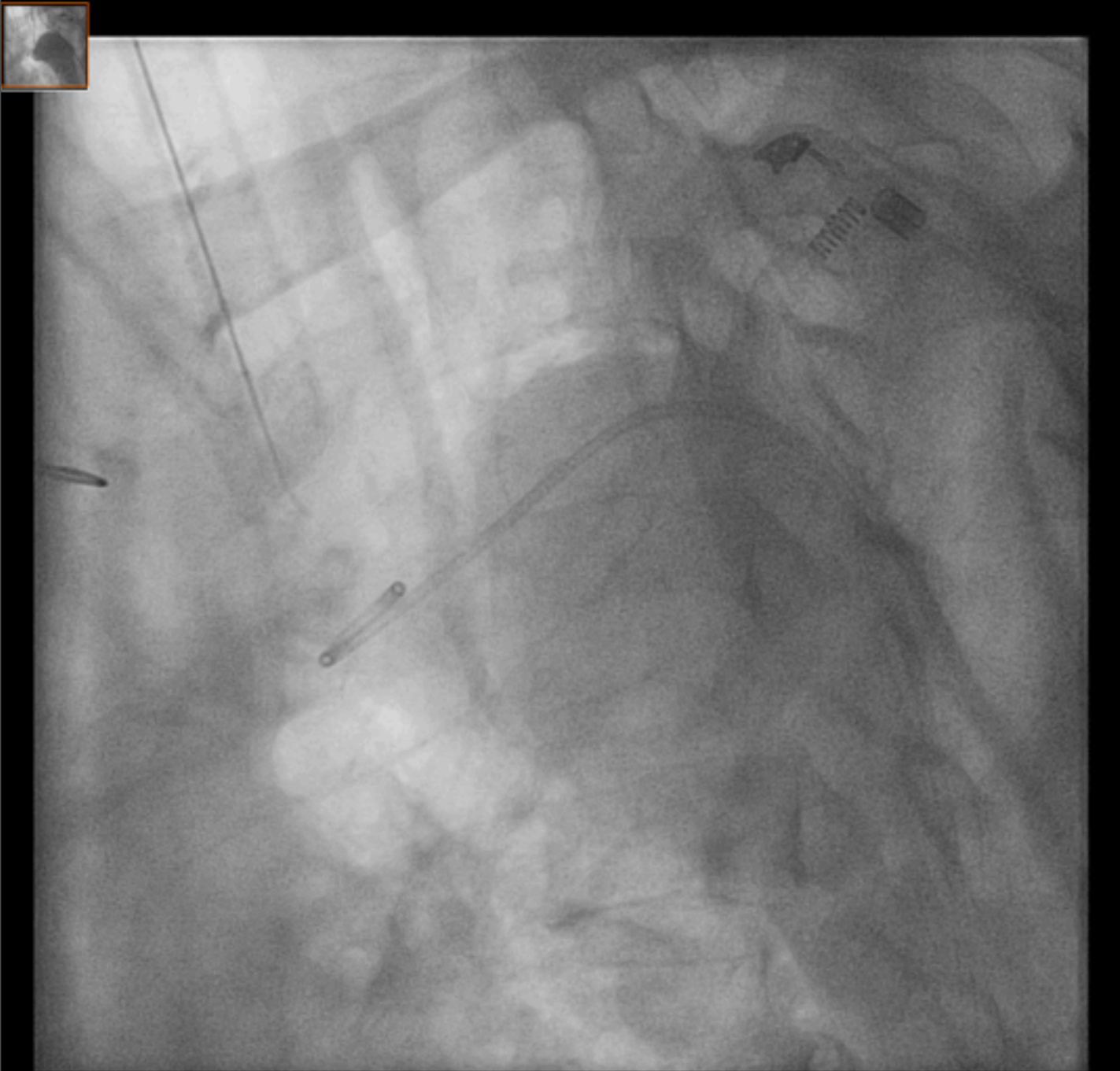
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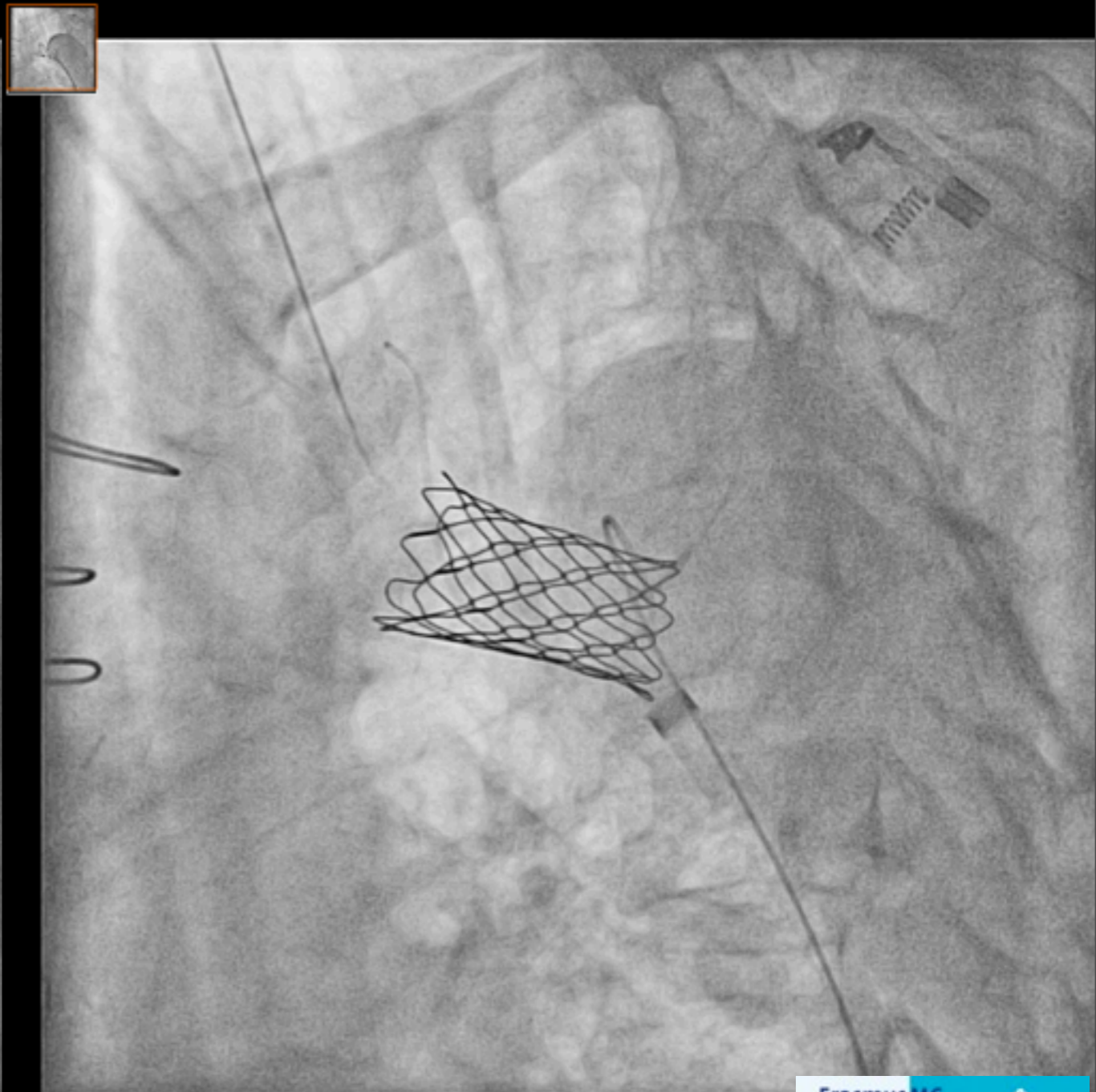
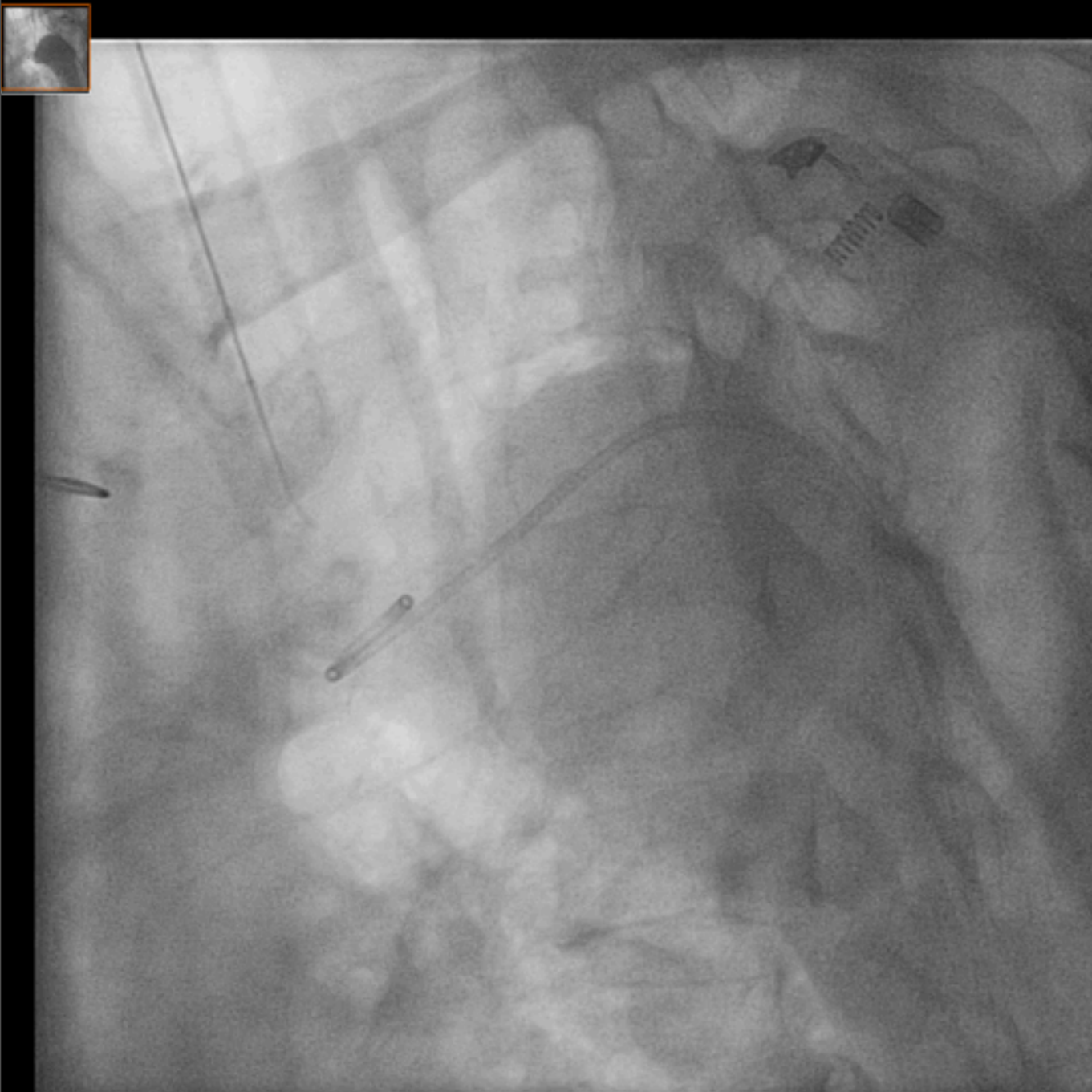
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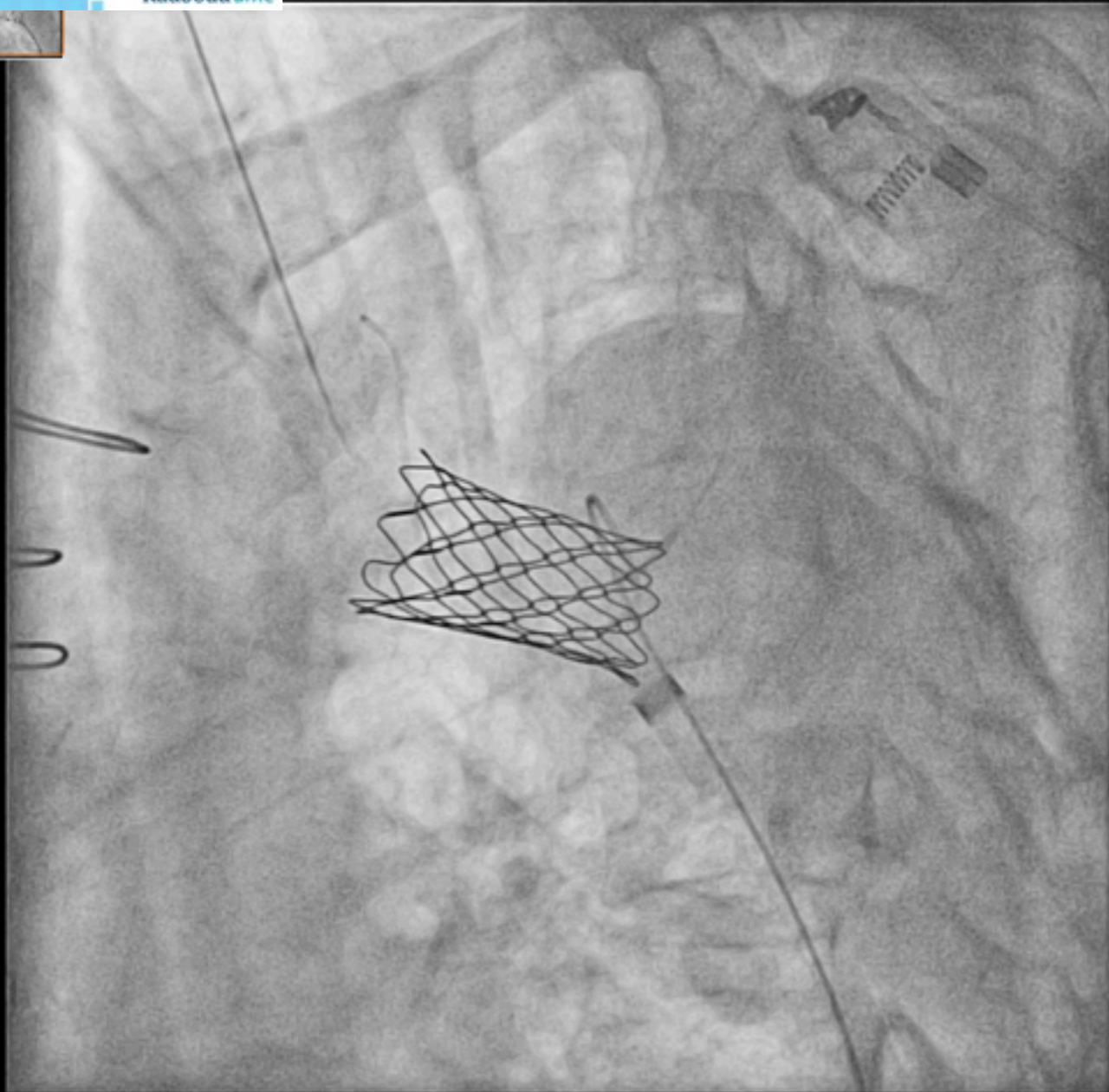
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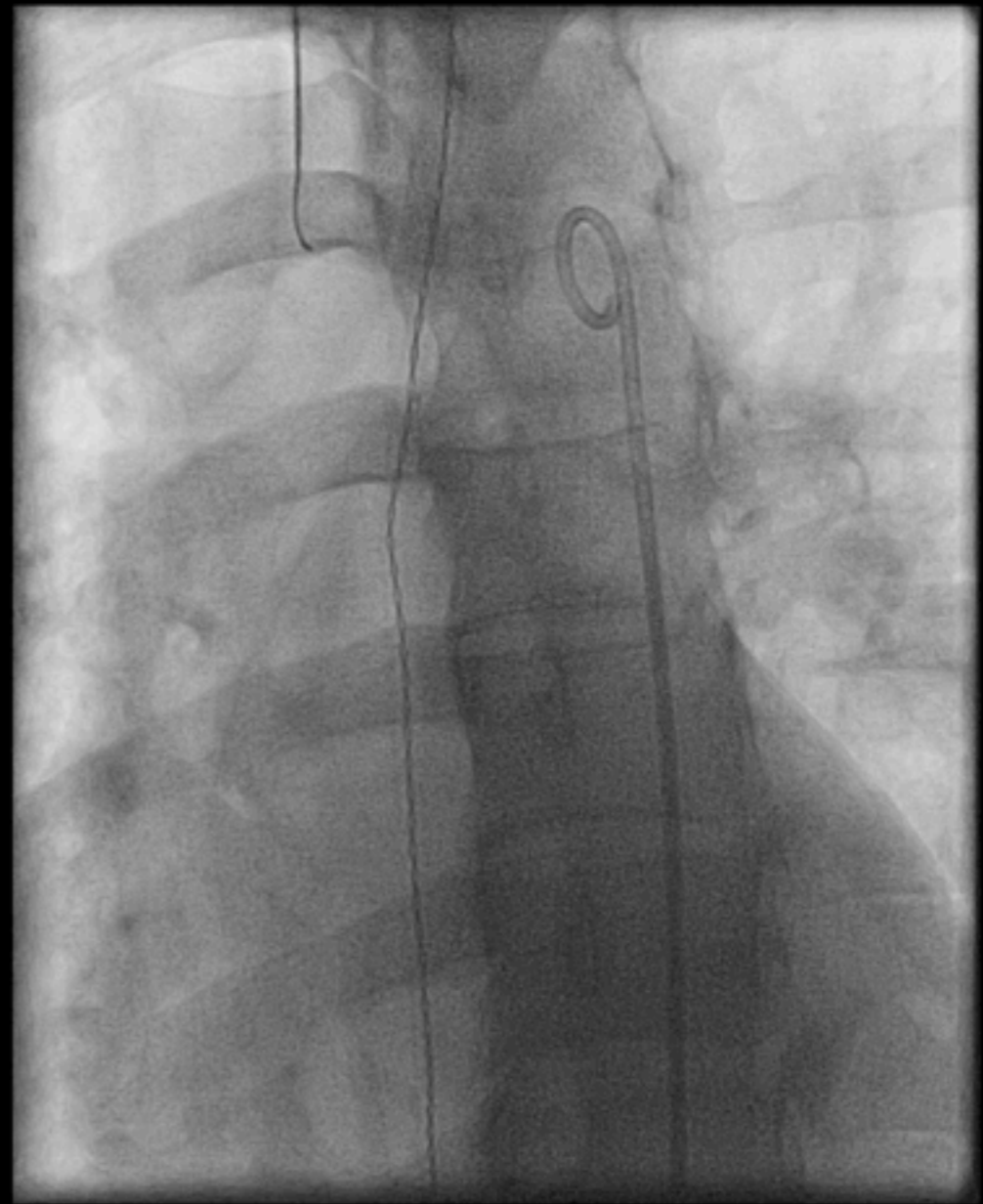
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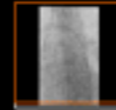
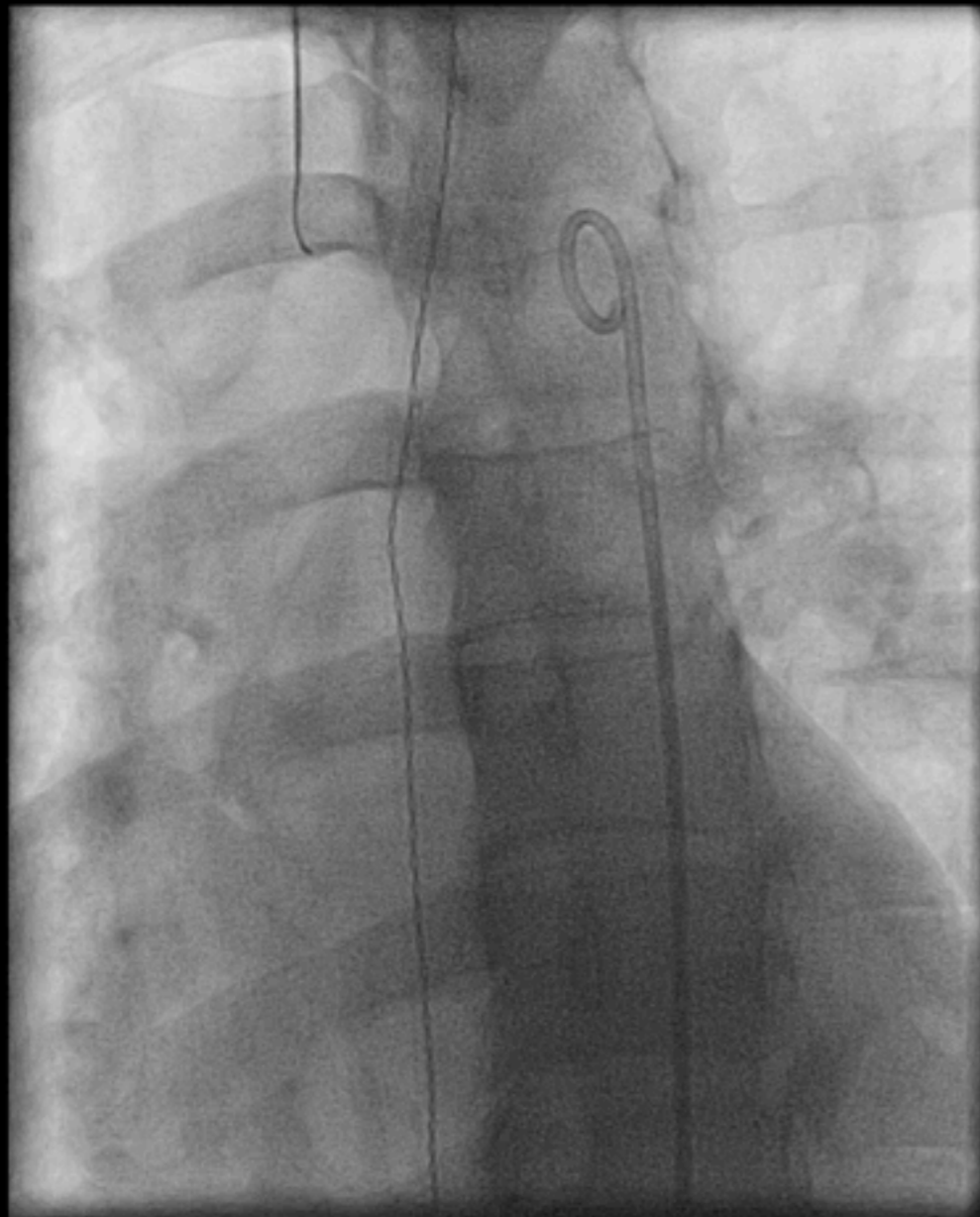


# Case

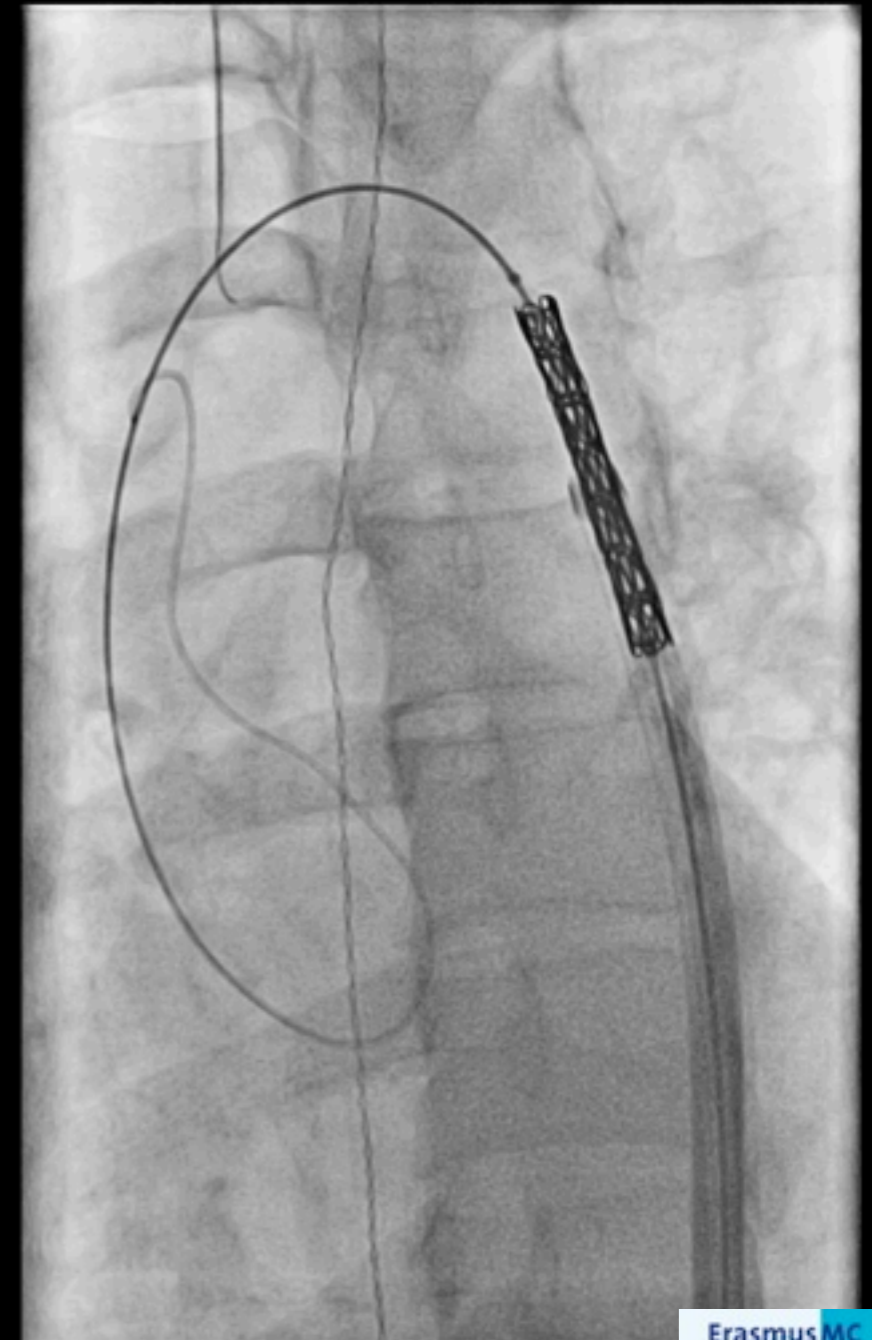
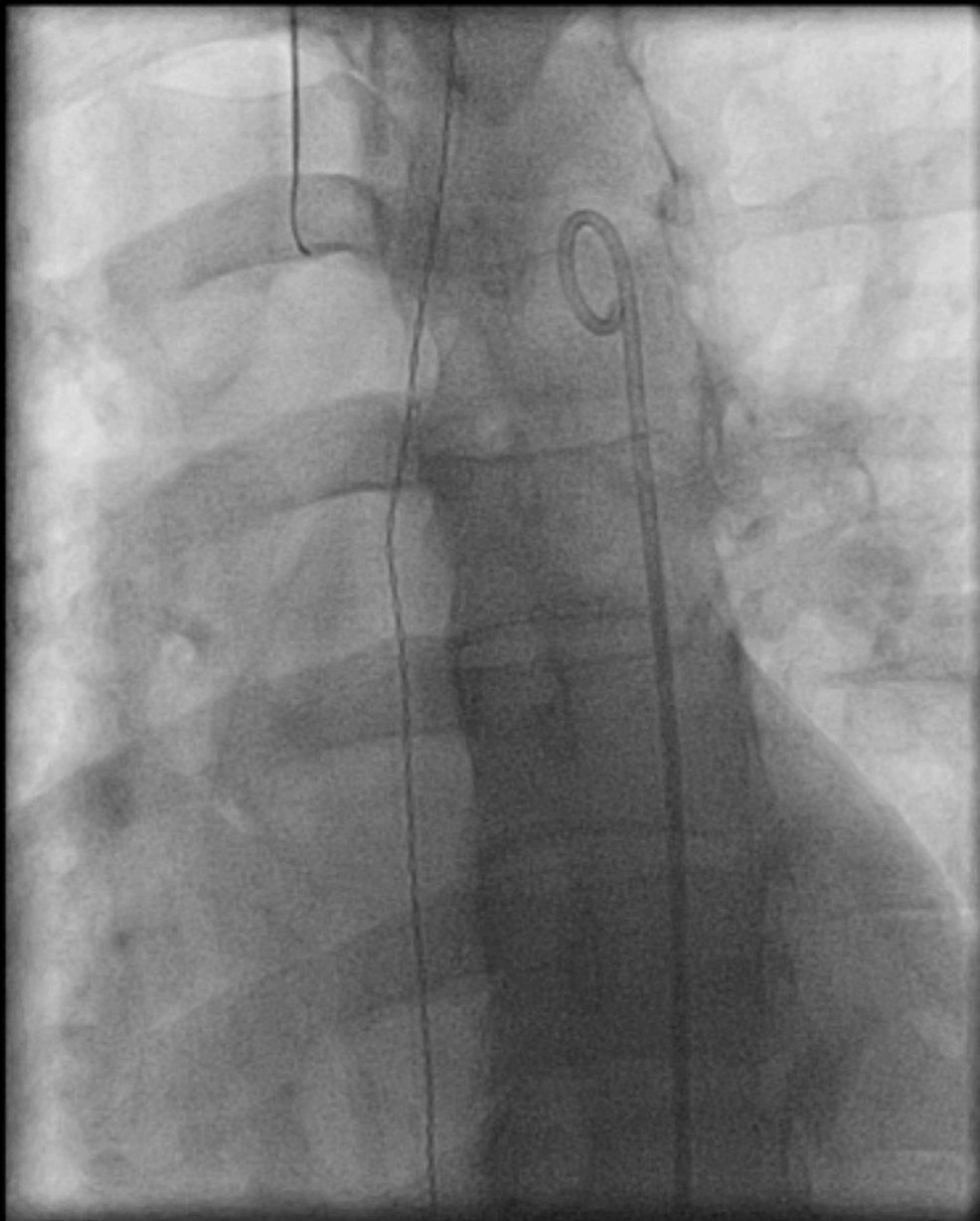




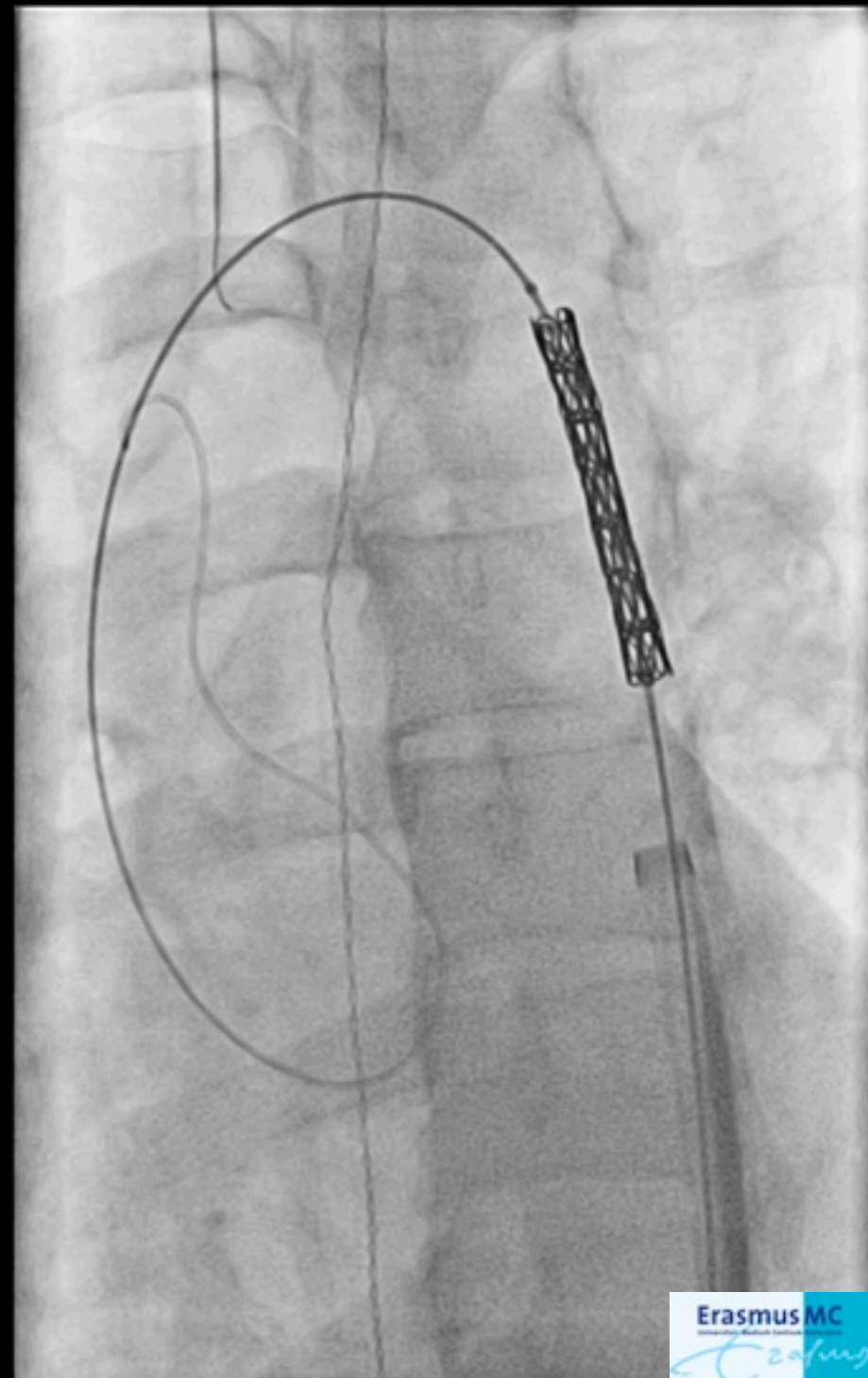
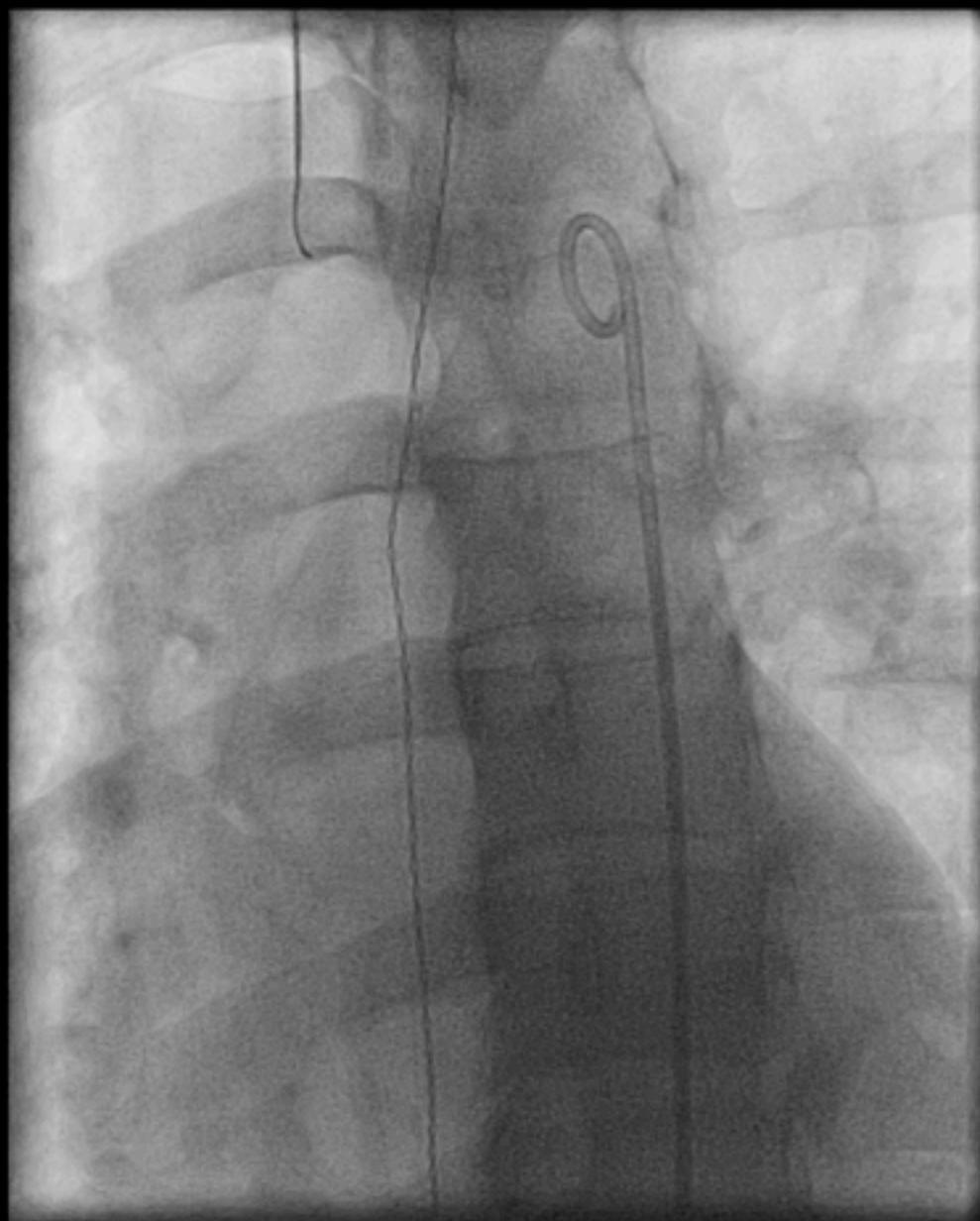
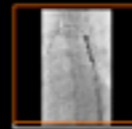
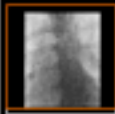
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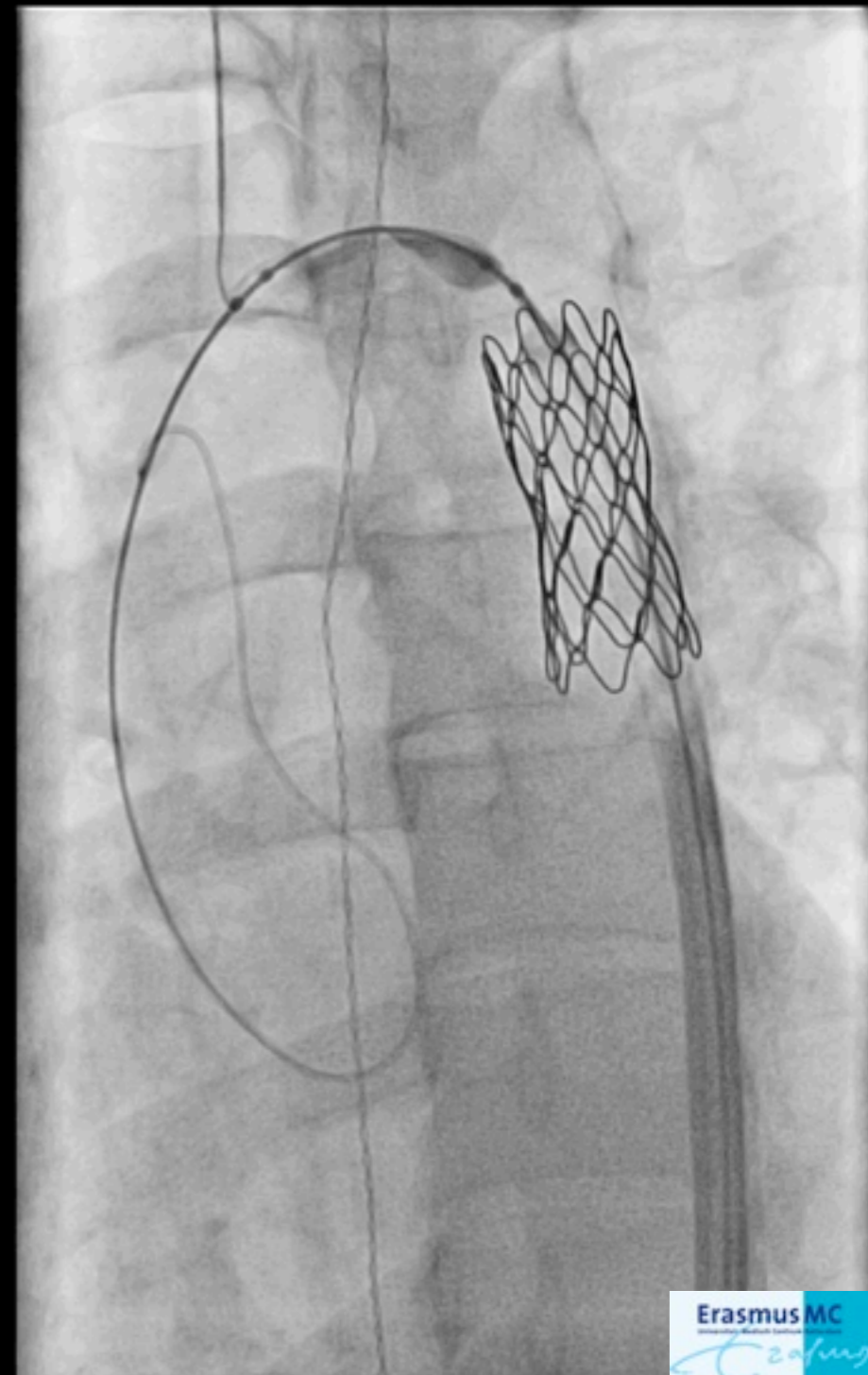
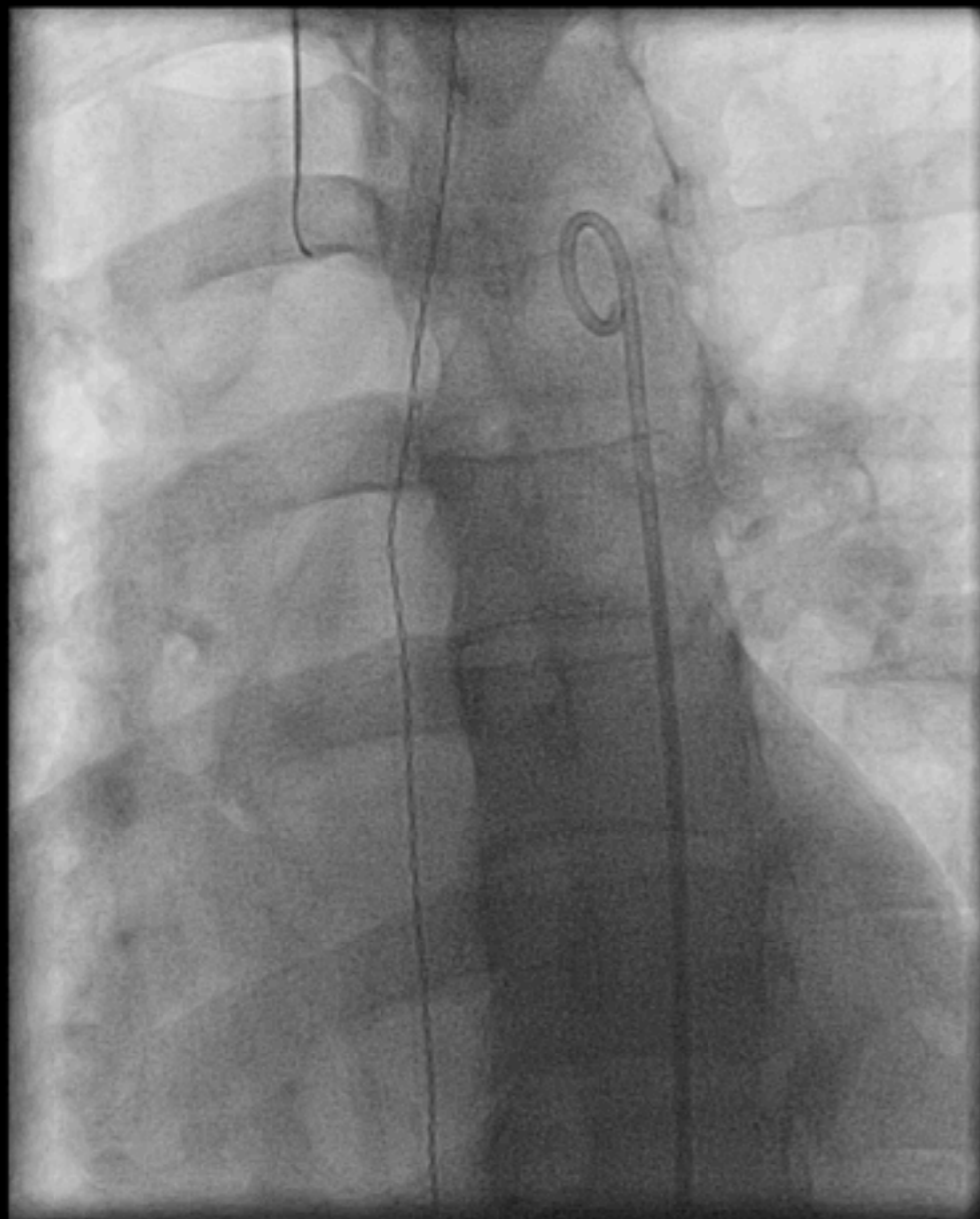
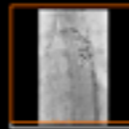
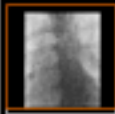
# Procedure



# Procedure



# Procedure



# Conclusie

- Coarctatio aortae 2-6 op 10.000 levendgeborenen
- Tijdige herkenning belangrijk
  - Coarctatio aortae behoort in de DD van hypertensie te staan
  - **DUS** bloeddruk aan beide armen én een been
- Overleving sterk verbeterd (maar nog niet normaal)
- Late complicaties
  - (Inspannings) Hypertensie,
  - Aorta aneurysmata
  - [Re(st)]-coarctatie

# Conclusie

- Behandeling van co-arctatie goed mogelijk
- Keuze van behandeling team beslissing
  - Chirurg, congenitaal cardioloog, interventiecardioloog
  - Leeftijd, co-morbiditeit, morfologie
- Levenslange follow-up aanbevolen
- Ook NA correctie levenslang nodig
- Minimaal in shared care met congenitaal hartcentrum
- Gerandomiseerde studie (chirurgie/stent) als antwoord op beste keus is wenselijk maar onwaarschijnlijk

# Take home



elke  
patiënt  
met hypertensie  
verdient bloeddrukmeting  
aan beide armen en een been

# Vragen

