M3C Academy

Percutaneous interventions in aortic coarctation

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Stratégie différente en fonction de l’âge et de la lésion

- Période néonatale

- Période de la petite enfance (<20 kg)

- Au delà (jusqu’à l’âge adulte) (nombreuses collatérales, chirurgie complexe)

- Coarctation native

- Recoarctation de l’aorte

AHA Scientific Statement

Indications for Cardiac Catheterization and Intervention in Pediatric Cardiac Disease

A Scientific Statement From the American Heart Association

Endorsed by the American Academy of Pediatrics and Society for Cardiovascular Angiography and Intervention

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Recoarctation de l'aorte

Class I

1. **Balloon angioplasty of recoarctation is indicated when associated with a transcatheter systolic coarctation gradient of >20 mm Hg and suitable anatomy, irrespective of patient age *(Level of Evidence: C)*.**
2. **Balloon angioplasty of recoarctation is indicated when associated with a transcatheter systolic coarctation gradient of <20 mm Hg and in the presence of significant collateral vessels and suitable angiographic anatomy, irrespective of patient age, as well as in patients with univentricular heart or with significant ventricular dysfunction *(Level of Evidence: C)*.**

Class I

1. **Stent placement is indicated in patients with recurrent coarctation who are of sufficient size for safe stent placement, in whom the stent can be expanded to an adult size, and who have a transcatheter systolic coarctation gradient >20 mm Hg *(Level of Evidence: B)***

Class IIa

1. **It is reasonable to consider placement of a stent that can be expanded to an adult size for the initial treatment of native or recurrent coarctation of the aorta in patients with:**
   - **a transcatheter systolic coarctation gradient of >20 mm Hg *(Level of Evidence: B)*.**
   - **a transcatheter systolic coarctation gradient of <20 mm Hg but with systemic hypertension associated with an anatomic narrowing that explains the hypertension *(Level of Evidence: C)*.**
   - **a long-segment coarctation with a transcatheter systolic coarctation gradient >20 mm Hg *(Level of Evidence: B)*.**

Recoarctation de l'aorte

Class IIb

1. **It may be reasonable to consider stent implantation for the treatment of coarctation in infants and neonates when complex aortic arch obstruction exists despite surgical or catheter-mediated attempts to relieve this obstruction and when further surgery is regarded as high risk. Implantation of a stent with less than adult-sized potential implies a commitment on the part of the surgical team to remove or enlarge this stent at a later date when the final diameter of this device is no longer adequate to maintain unobstructed aortic flow *(Level of Evidence: C)*.**

Coarctation native

Class IIa

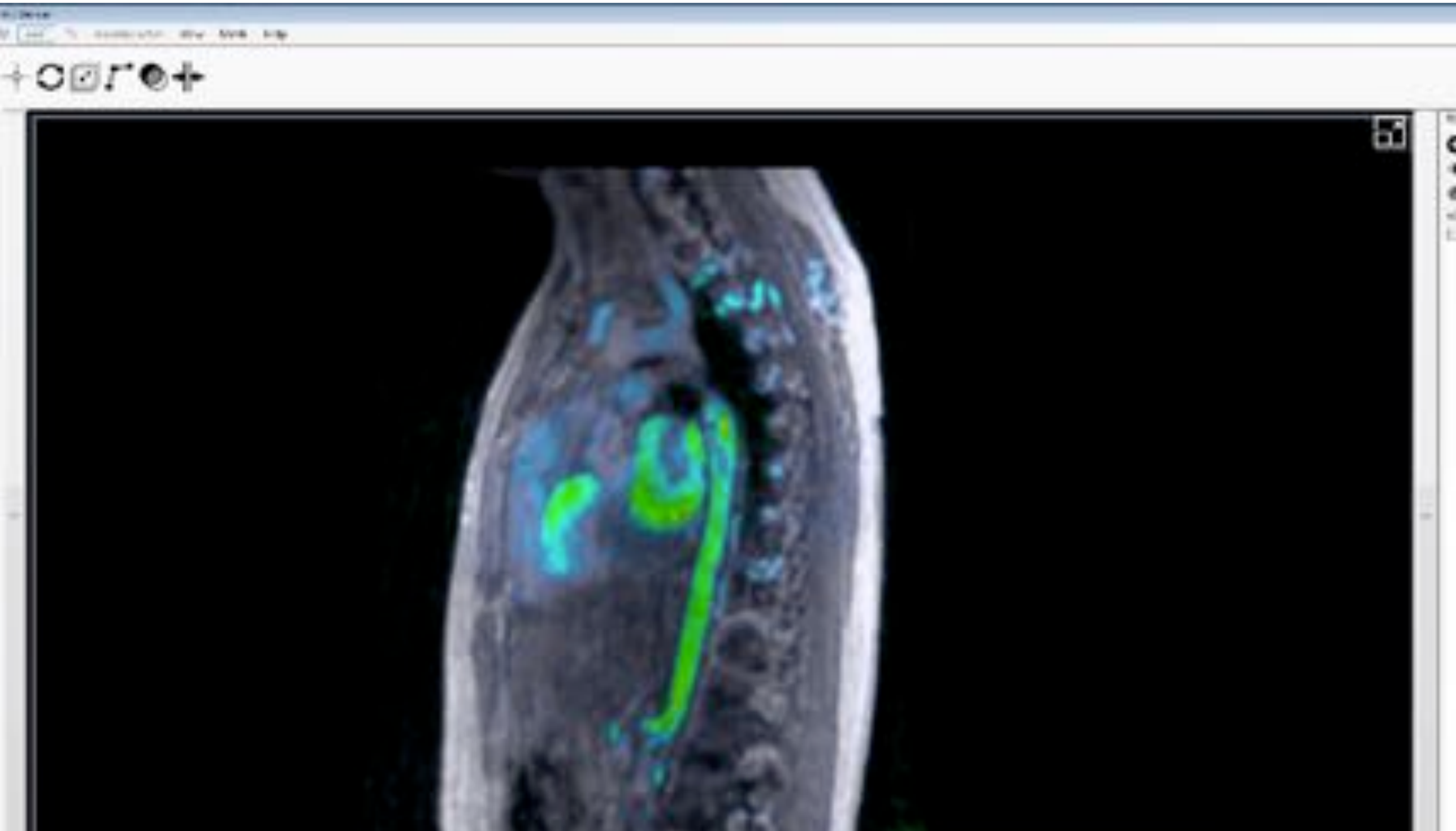
1. **It is reasonable to consider balloon angioplasty of native coarctation as a palliative measure to stabilize a patient irrespective of age when extenuating circumstances are present such as severely depressed ventricular function, severe mitral regurgitation, low cardiac output, or systemic disease affected by the cardiac condition *(Level of Evidence: C)*.**

Class IIa

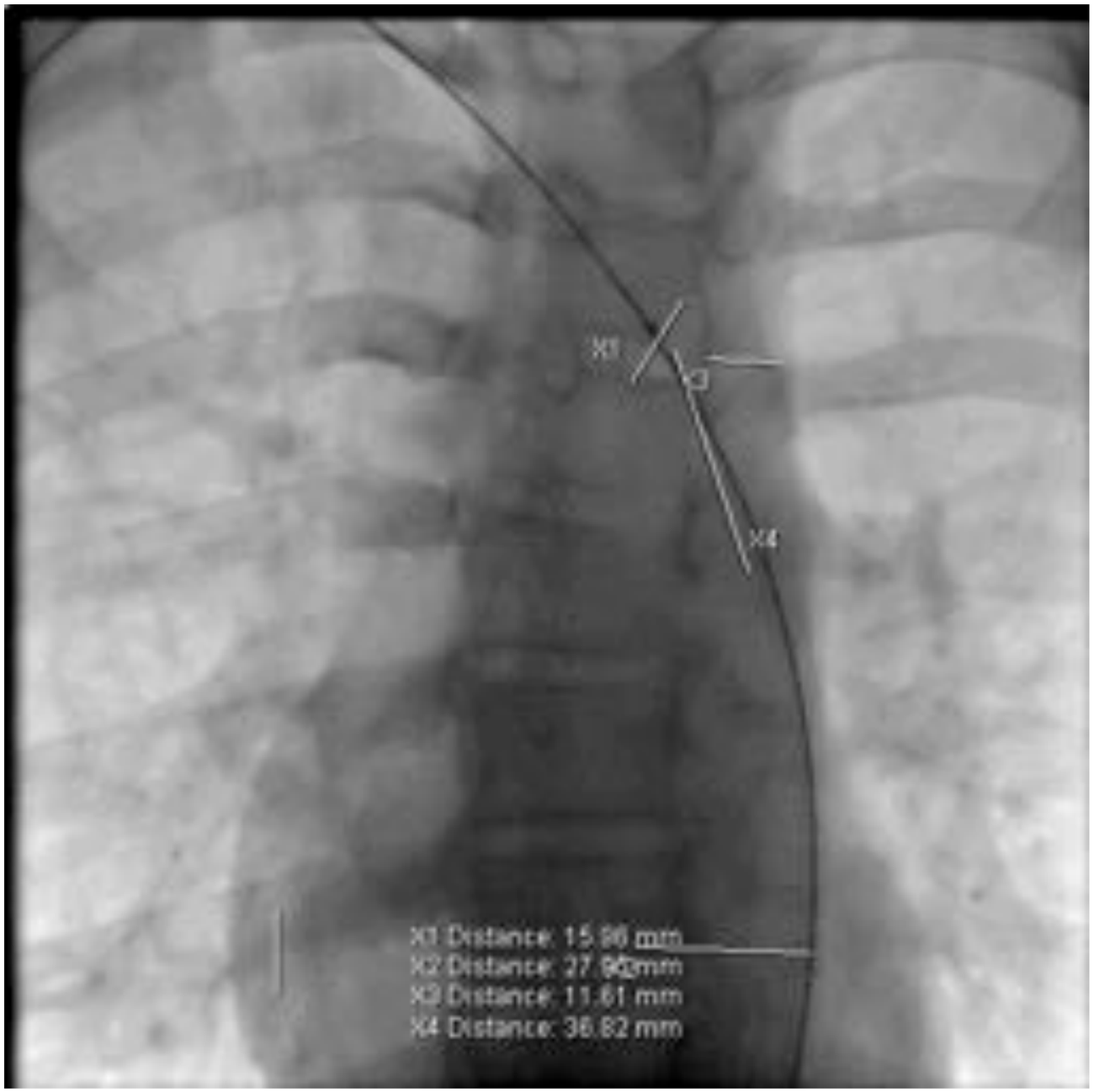
1. **It is reasonable to consider placement of a stent that can be expanded to an adult size for the initial treatment of native or recurrent coarctation of the aorta in patients with:**
   - **a transcatheter systolic coarctation gradient of >20 mm Hg *(Level of Evidence: B)*.**
   - **a transcatheter systolic coarctation gradient of <20 mm Hg but with systemic hypertension associated with an anatomic narrowing that explains the hypertension *(Level of Evidence: C)*.**
   - **a long-segment coarctation with a transcatheter systolic coarctation gradient >20 mm Hg *(Level of Evidence: B)*.**
2. **Stent implantation for the treatment of coarctation (native or recurrent) is reasonable in patients in whom balloon angioplasty has failed, as long as a stent that can be expanded to an adult size can be implanted *(Level of Evidence: B)*.**

Bilan pré-cathétérisme

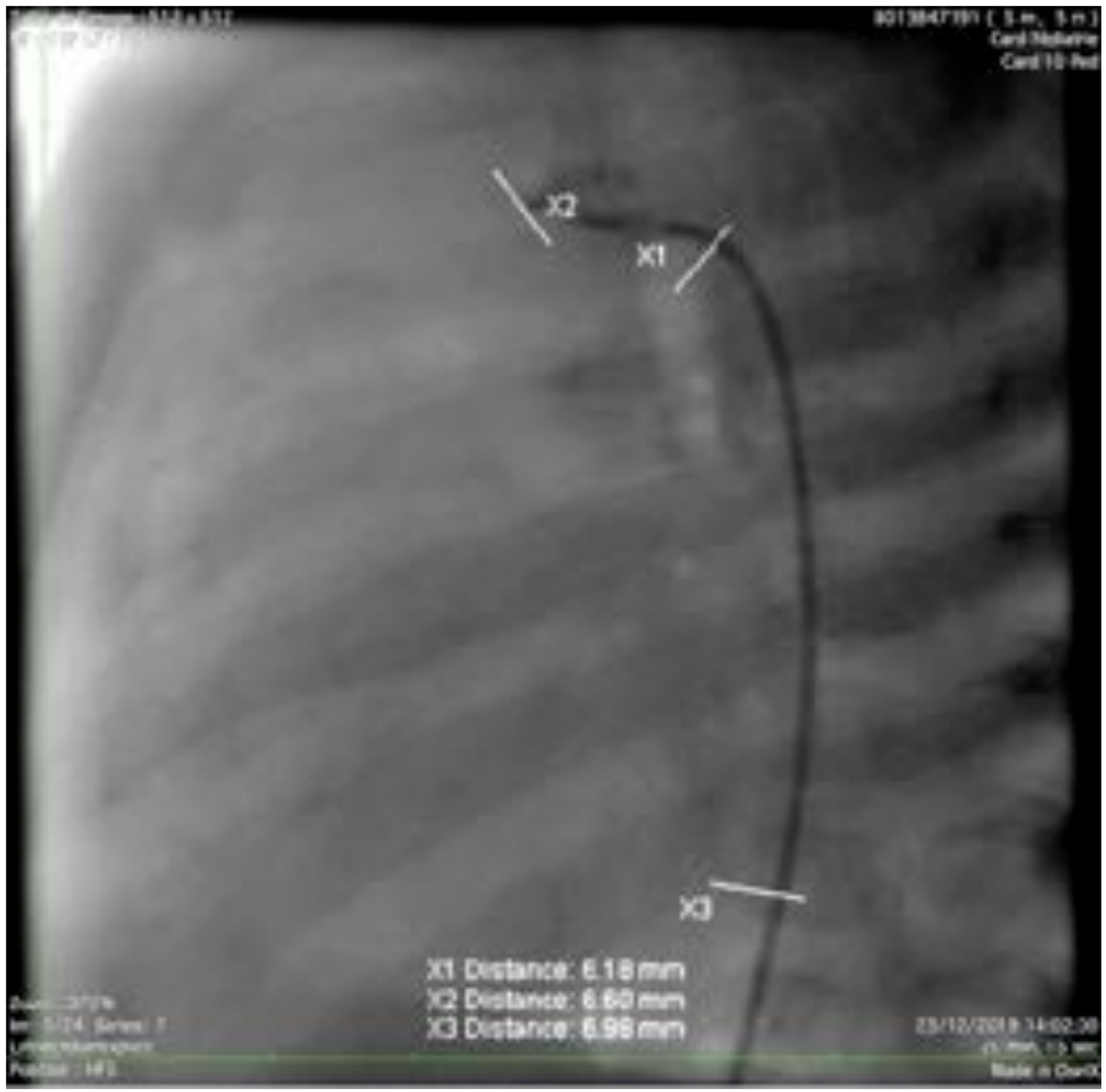
- Imagerie cérébrale (anévrismes)
- Imagerie de la crosse (IRM 4D flow; scanner)



Recoarctation de l’aorte

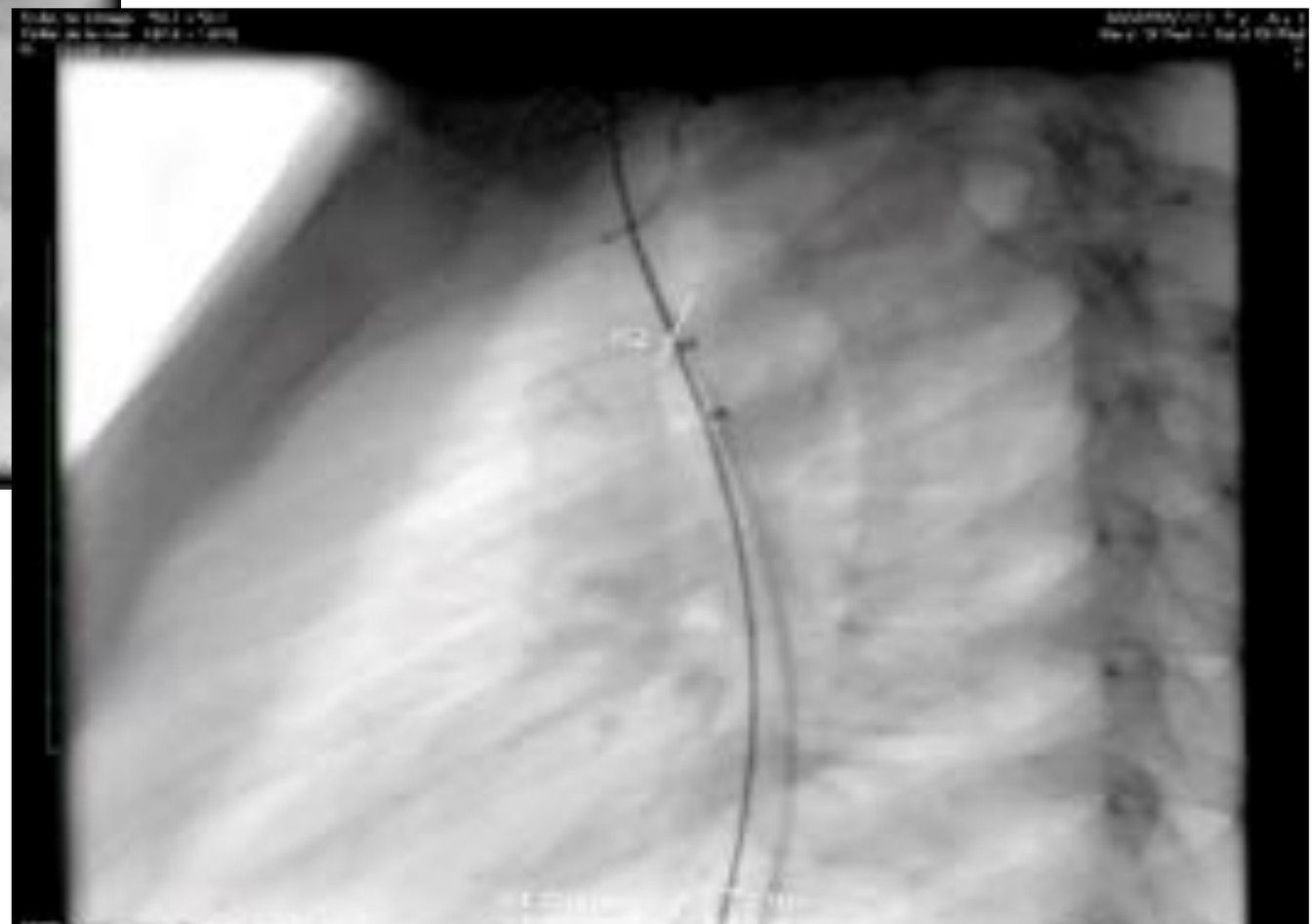


Recoarctation de l’aorte dans la petite enfance



Recoarctation de l’aorte dans la petite enfance

Coarctation native



Coarctation native

Coarctation native

Coarctation de l’aorte native traitement en 2 temps

- laisser une encoche

- revenir dans un second temps

Taille de l'image : 512 x 512
NF : 117 I.C. : 131
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Coro 10 Pod
Zoom : 372%
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Position : HFS
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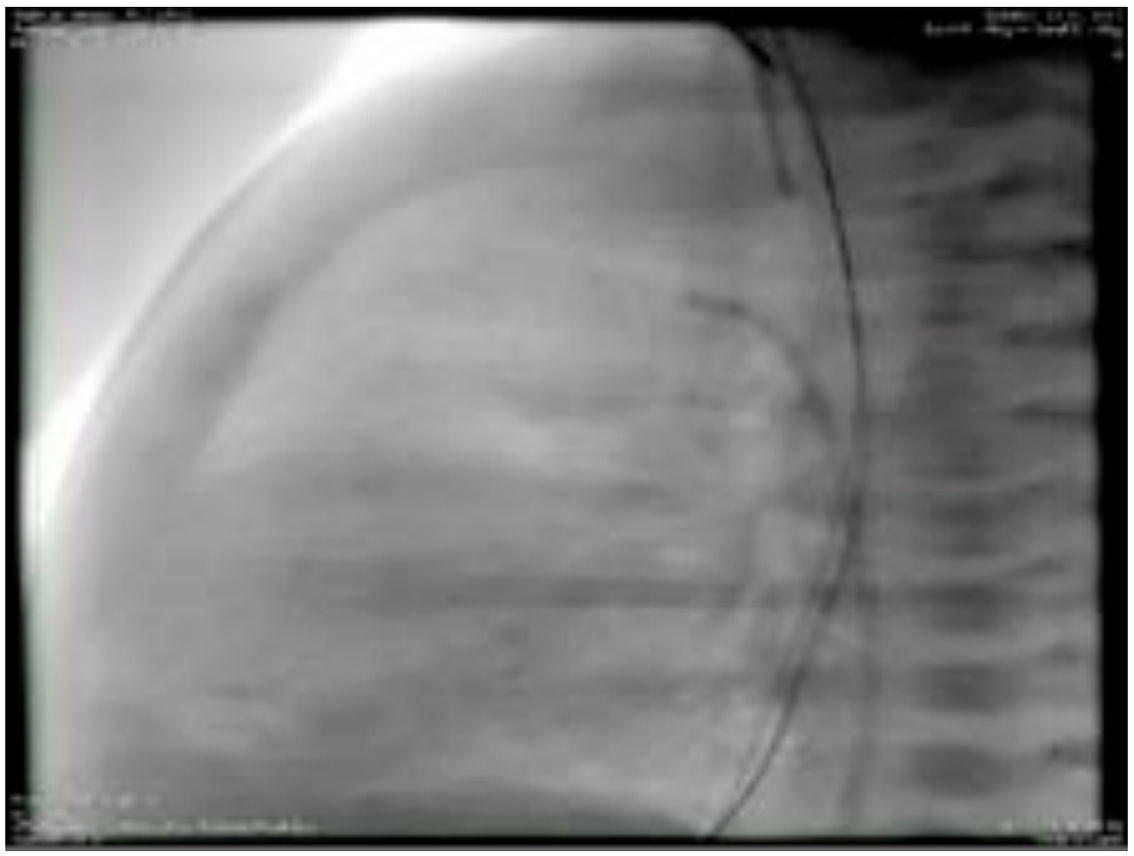
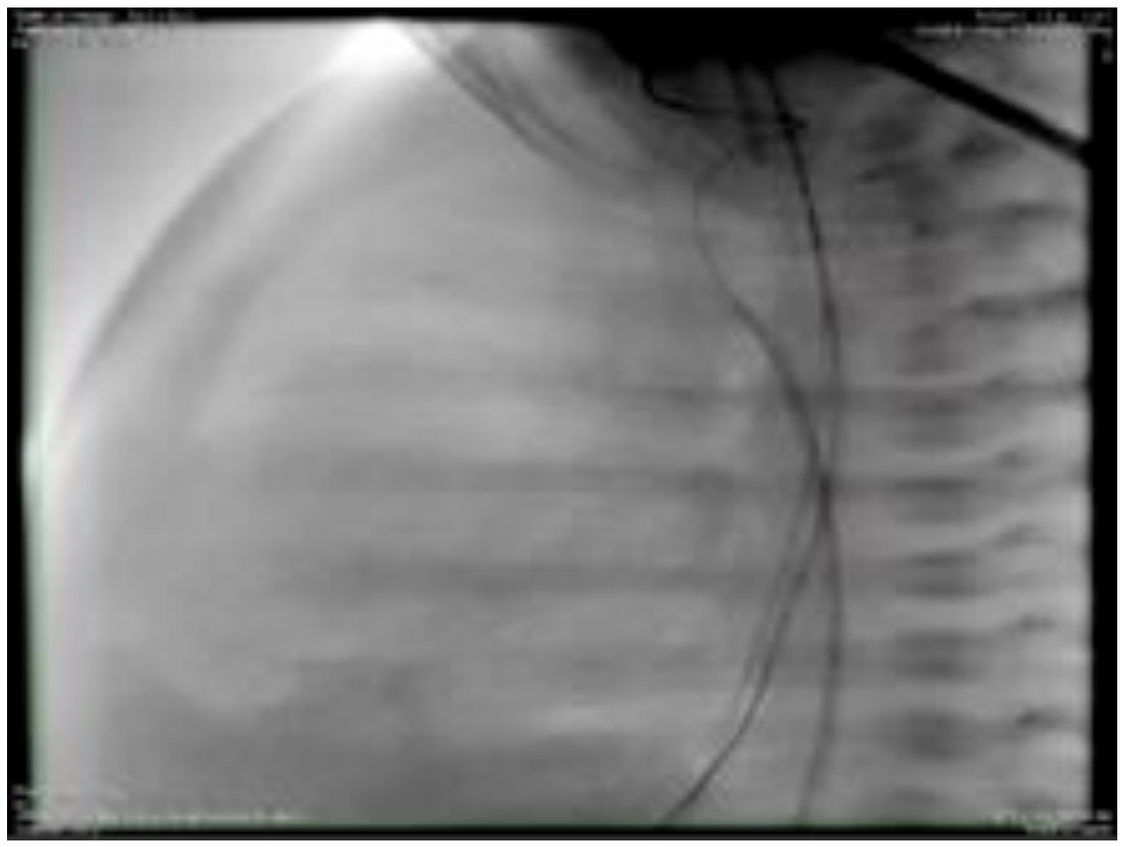
Coarctation de l’aorte native réparation en 2 temps

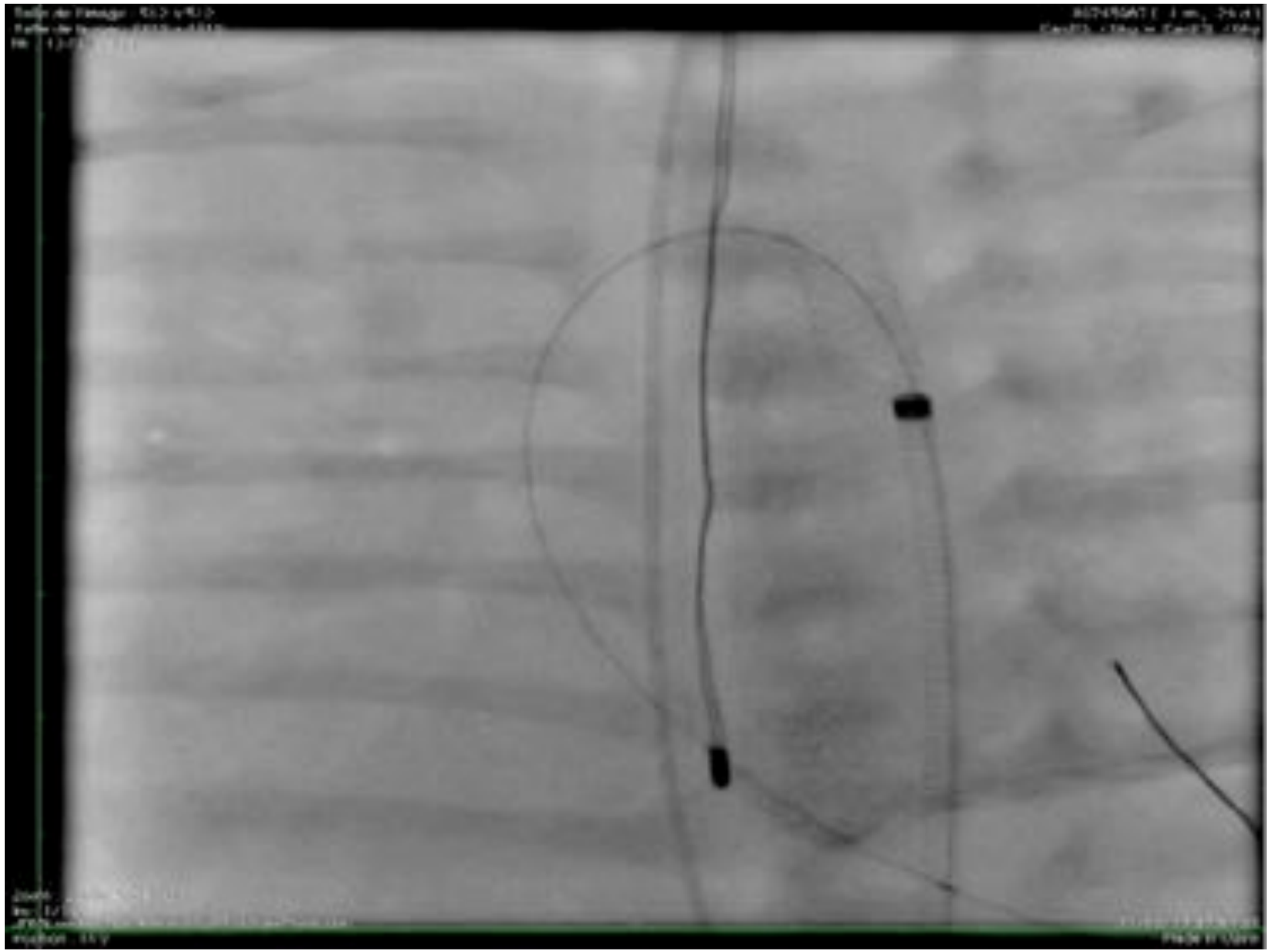
- sténose aortique
- coarctation
- traitement de la coarctation percutané
- bentall

Coarctation néonatale native: dilatation



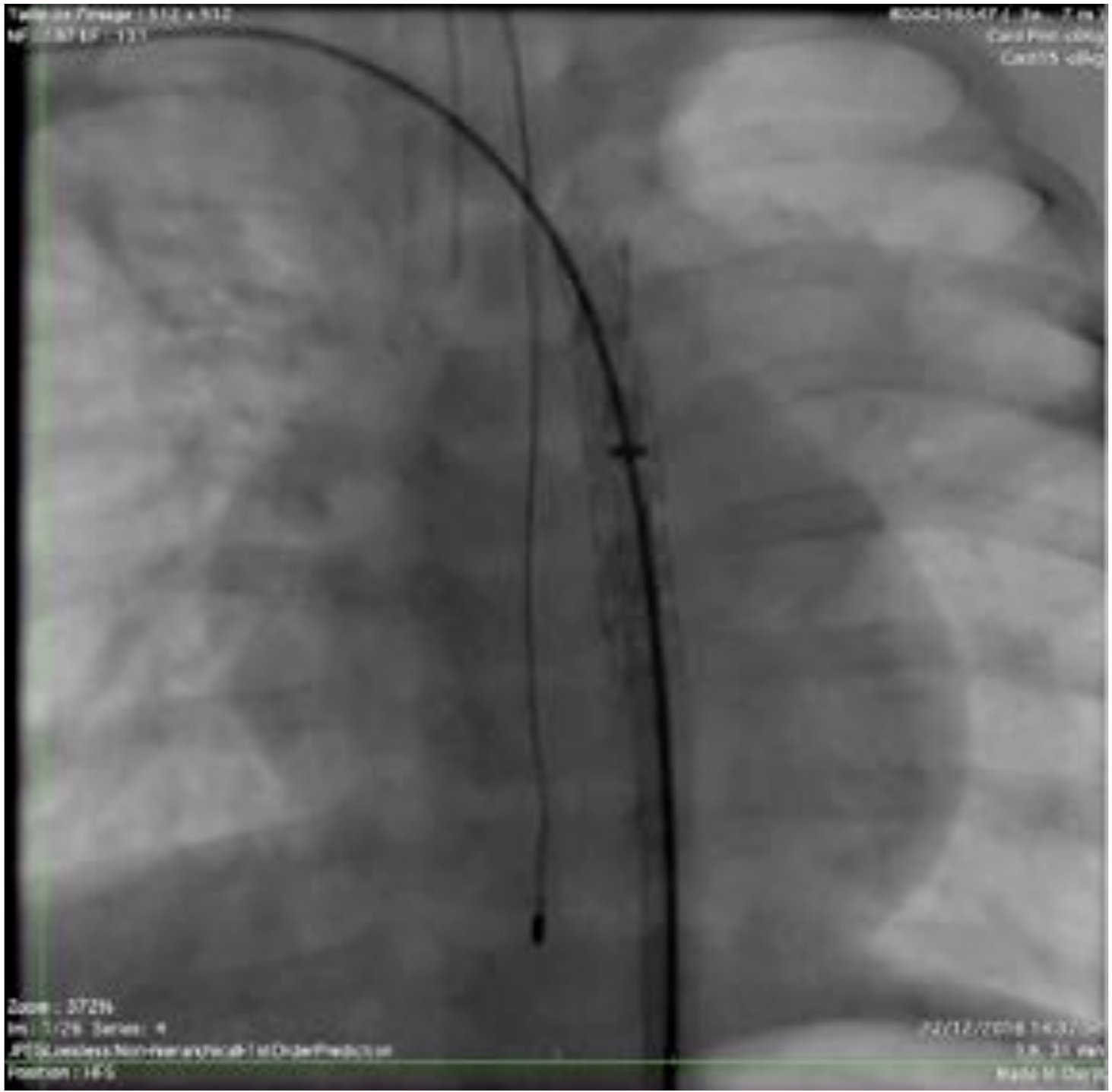


Coarctation néonatale: sauvetage par stenting



Surprise… une recoarctation inhabituelle

Surprise… une recoarctation inhabituelle



Complications

- Locale: dissection, rupture de l’aorte
- Accès: thrombose, dissection, faux anévrisme; attention chez le petit enfant
- Générale: AVC; héparinothérapie durant la procédure

Complications

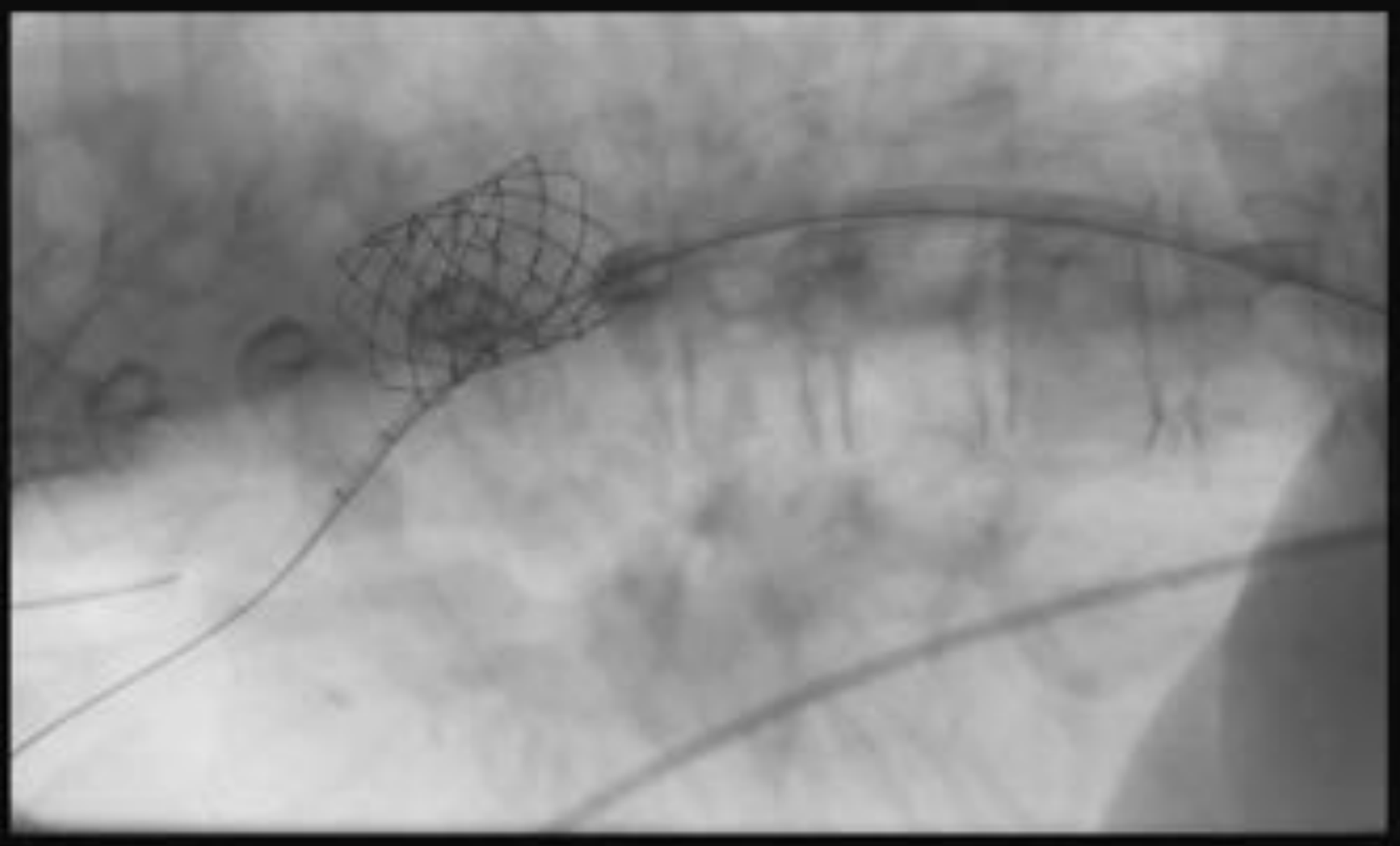
Table 3. Periprocedural and follow-up complications.

	Number of complications	Studies mentioning complication occurrence	Total of patients in these studies	%
Complications during procedure				
Stent migration	32	37	1,352	2.4
Aneurysm formation	12	24	805	1.5
Aortic dissection	11	31	1,287	0.9
Aortic rupture	6	32	1,311	0.5
Embolic event	8	30	1,265	0.6
Deaths	4	27	1,157	0.4
Complications during follow-up				
Stent redilatation	132	30	1,198	
Aneurysm	18	28	1,165	
Stent fracture	14	25	898	

- Locale: dissection, rupture de l'aorte
- Accès: thrombose, dissection, faux anévrisme
- Générale: AVC; héparinothérapie durant la procédure

Hartman Eurointervention 2015; 11: 660-668

Coarctation native vieillie chez une malade Turner



Suivi à vie

- accès
- hypertension artérielle persistante
- dilatation aorte ascendante (biscuspidie)
- anévrismes (suivi échographique insuffisant)
- épreuve d’effort
- recoarctation, fracture de stent
- Croissance, recoarctation

Série multicentrique rétrospective française

Background

- peu de larges séries sur traitement par cathétérisme de la coarctation de l’aorte native chez l’enfant
- résultats immédiats
- complications
- hypertension artérielle
- réinterventions (indications, résultats)

Matériel et méthodes

- Tous les patients pédiatriques (> 1 an et < 18 ans) ayant eu un traitement par cathétérisme de coarctation de l'aorte native; démographie- données procédures- résultats immédiats et complications - follow-up

- facteurs de risques de réintervention

- facteurs de risques d'hypertension artérielle post-procédure

Résultats

- 9 centres
- 133 patients
- Age moyen au diagnostic: 9,3 ans (1-18 ans)
- Anomalies associées: 59 bicuspidies aortiques
- Indication de traitement: HTA 109; HTA effort: 8; autre 16 (anévrisme cérébral, CMD…)

Résultats

- Age moyen au Kt: 11,5 +/-3,9 ans

- Poids moyen au Kt: 41 +/-18 kg

Résultats - procédure

- Gradient pré: 28 mmHg pic à pic
- Gradient post: 3 mmHg pic à pic
- Dilatation seule 5
- Dilatation puis stenting 8 (résultat insuffisant ou lésion intimale)
- Stenting: couvert 37% / non couvert 63%
- Traitement de lésions associées 1 PDA, 1 VCSG, 1 sténose aortique
- Complications locales: non

Résultats: follow-up

- Durée moyenne du follow-up 4,9 ans
- Taux de réintervention: 22% (dilatation 14; stenting 14, chirurgie 2)
- Hypertension artérielle 25%
- Imagerie: FU assez variable selon les centres
- Lésions artérielles: 9/133: 3 pseudoanévrismes; 2 dissections, 2 sténoses et 2 occlusions; 2 chirurgies

Facteurs de risques de réintervention

- Analyse multivariée, modèle mixte
- poids, gradient post dilatation, type d’intervention,
- gradient résiduel

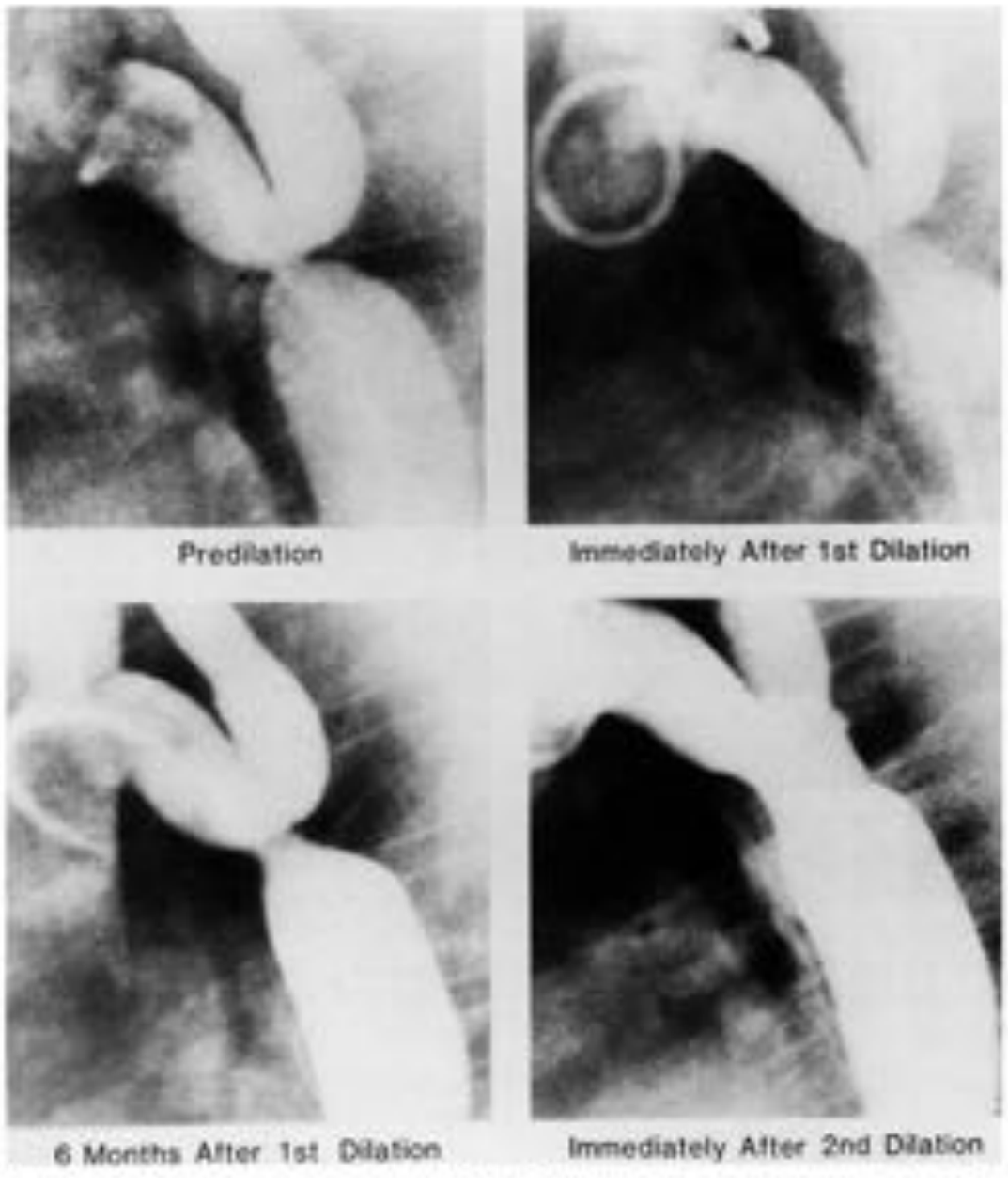
Facteurs de risque d’hypertension artérielle

- Analyse multivariée, modèle mixte
- poids, gradient post dilatation, type d’intervention
- gradient résiduel

Balloon dilation angioplasty of aortic coarctations in infants and children

James E. Lock, M.D., John L. Bass, M.D., Kurt Amplatz, M.D., Bradley P. Fuhrman, M.D., and Wilfredo Castaneda-Zuniga, M.D.

Circulation 1983



Faisabilité de la technique
Résultats meilleurs dans les reCoa

Coarctation Long-term Assessment (COALA): Significance of arterial hypertension in a cohort of 404 patients up to 27 years after surgical repair of isolated coarctation of the aorta, even in the absence of restenosis and prosthetic material

Alfred Hager, MD,[a] Simone Kanz, MD,[a] Harald Kaemmerer, MD, VMD, FESC,[a] Christian Schreiber, MD,[b] and John Hess, MD, FESC[a]

The Journal of Thoracic and Cardiovascular Surgery • September 2007

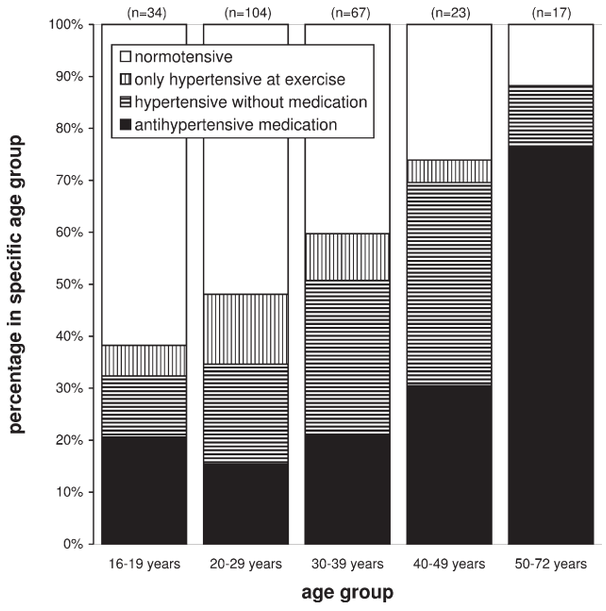


Figure 1. Prevalence of hypertension after coarctation repair.

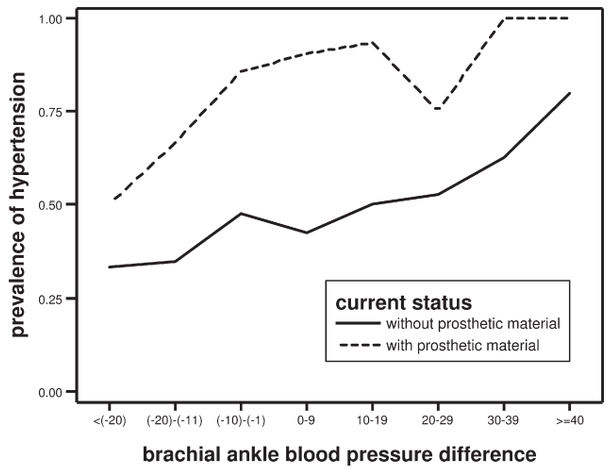


Figure 2. Prevalence of hypertension (antihypertensive drugs, hypertension at ambulatory blood pressure measurement, or hypertension at exercise) according to use of prosthetic material to repair the coarctation and according to the noninvasively measured systolic brachial–ankle blood pressure difference.

30 % de patients hypertendus
sans recoa (20 mmHg)
meilleur résultat sans matériel prothétique

reconsidérer le gradient résiduel de 20 mmHg comme critère de réintervention

Comparison of Surgical, Stent, and Balloon Angioplasty Treatment of Native Coarctation of the Aorta

An Observational Study by the CCISC
(Congenital Cardiovascular Interventional Study Consortium)

Forbes et al. JACC 2011

Table 2 Baseline Characteristics

	Surgery (n = 72)	Balloon (n = 61)	Stent (n = 217)	p Value (2-Sided)
Age, yrs	10.0 ± 9.7	9.0 ± 8.0	16.6 ± 10.9	<0.001*
Age range, yrs	0.1/58.6	0.4/42.5	2.2/74.3	
Weight, kg	35 ± 24	30 ± 21	55 ± 24	<0.001*
Male	69%	64%	69%	0.750
Pre-intervention right-arm SBP, mm Hg	137 ± 19	138 ± 23	143 ± 21	0.061

Table 3 Acute Outcomes

	Surgery (n = 72)	Balloon (n = 61)	Stent (n = 217)	p Value (2-Sided)
Post-intervention right-arm SBP, mm Hg	123 ± 13	118 ± 15	125 ± 15	0.002*
Discharge ULG	7.7 ± 18.2	10.3 ± 12.9	4.9 ± 13.2	0.032
Discharge ULG ≤10 mm Hg	64%	56%	76%	0.011*
Discharge ULG ≤15 mm Hg	73%	69%	81%	0.101
Post-intervention catheterization SBP gradient	NA	12.4 ± 12.2	4.8 ± 8.6	<0.001*
% Increase in coarctation measurement post-intervention	NA	125%	172%	0.008*
Any complications	18.1%†	9.8%	2.3%	<0.001*
Aortic wall injury	UK‡	9.8%	0.0%	<0.001*
Dissection/intimal tear	UK‡	9.8%	0.0%	
Aneurysm	UK‡	0.0%	0.0%	
Balloon rupture	NA	0.0%	0.5%	
Stent migration	NA	n/a	1.4%	
Femoral	UK‡	0.0%	0.5%	
Atrial fibrillation	3%	0%	0%	
Severe/prolonged hypertension	3%	0%	0%	
Length of stay, days	6.4/5.0	3.6/1.0	2.4/1.0	<0.001*

Table 4 Short-Term Follow-Up Outcomes

Outcomes	Surgery (n = 52)	Balloon (n = 37)	Stent (n = 125)	p Value (2-Sided)
Age at follow-up, yrs	12.1 ± 10.9	10.4 ± 9.2	17.2 ± 10.1	<0.001†
Weight at follow-up, kg	41.3 ± 30.6	34.4 ± 22.4	59.3 ± 21.9	<0.001†
Normal SBP*	84.6%	72.2%	87.2%	0.096
Antihypertensive medications	40%	16%	41%	0.019†

Moins de complications immédiates avec les stents versus chirurgie et angioplastie seule

Table 6 Intermediate Follow-Up Outcomes

	Surgery (n = 23)	Balloon (n = 25)	Stent (n = 77)	p Value (2-Sided)
Age at follow-up	15.0 ± 11.2	12.9 ± 6.5	18.3 ± 9.8	0.035†
Weight at follow-up	57.4 ± 22.4	40.3 ± 16.2	60.8 ± 18.6	<0.001†
Normal SBP*	96%	72%	82%	0.092
Antihypertensive medications	13%	16%	31%	0.130

Table 7 Intermediate Follow-up Outcomes by Integrated Imaging

	Surgery (n = 16)	Balloon (n = 16)	Stent (n = 56)	p Value (2-Sided)
Any complications*	25.0%	43.8%	12.5%	0.020‡
Aortic wall injury	12.5%	43.8%	7.1%	0.003‡
Dissection/intimal tear	0.0%	6.3%	1.8%	0.598
Aneurysm	12.5%	43.8%	5.4%	<0.001
Coarct:Dao ratio, mean	0.98	0.79	0.80	0.011‡
Coarct:Dao ratio ≥0.6	88%	93%	89%	1.000
Any reobstruction	18.8%	18.8%	14.3%	0.923
Mild†	6.3%	18.8%	12.5%	
Moderate	6.3%	0%	1.8%	
Severe	6.3%	0%	0%	

Dans le suivi, meilleurs résultats HD avec la chirurgie ou les stents vs angioplasties
Stents plus haut taux de réintervention planifié
End to end non faisable à partir de 8 ans

Table 8 Reintervention

	Surgery (n = 72)	Balloon (n = 61)	Stent (n = 217)
Patients with reintervention	4	6	44
Patients with planned procedures	0	2	35
Patients with unplanned procedures	4	4	9
Time to first planned reintervention, yrs	NA	1.43 ± 1.70	1.14 ± 1.15
Time to first unplanned reintervention, yrs	2.24 ± 2.23	1.28 ± 1.43	2.84 ± 1.43

A Prospective Observational Multicenter Study of Balloon Angioplasty for the Treatment of Native and Recurrent Coarctation of the Aorta

Kevin C. Harris,[1] MD, Wei Du,[2] PHD, Collin G. Cowley,[3] MD, Thomas J. Forbes,[2] MD, and Dennis W. Kim,[4*] MD, PHD; On Behalf of the Congenital Cardiac Intervention Study Consortium (CCISC)

Catheterization and Cardiovascular Interventions 83:1116–1123 (2014)

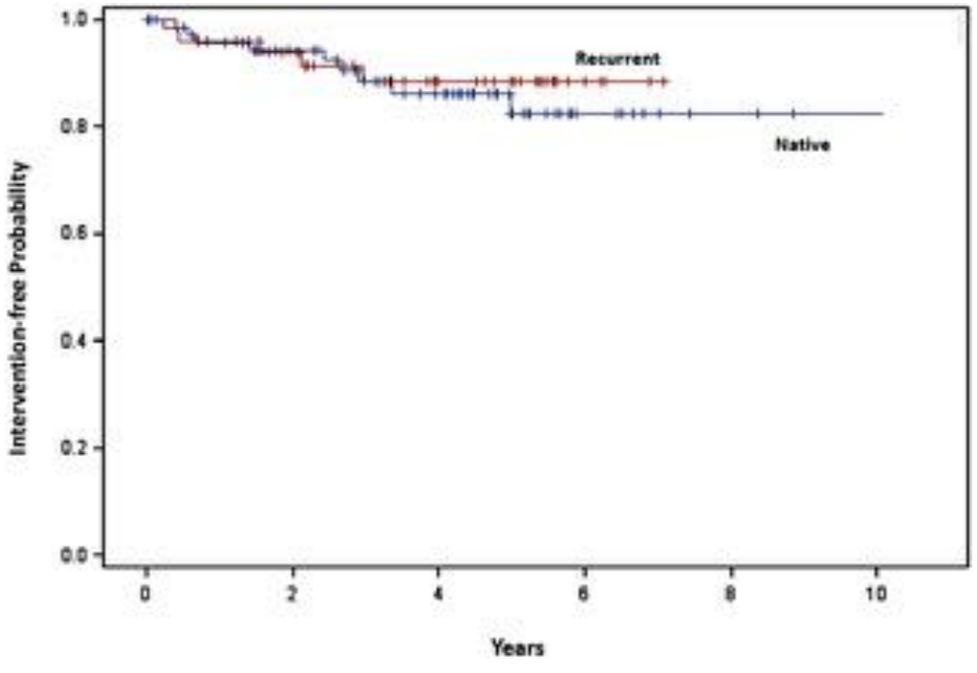


Fig. 1. Intervention-free survival in native and recurrent co-

Angioplastie seule
Bons résultats persistants dans les reCoa
Résultats moins bons dans les CoA natives
↑de recoa
↑d'anévrismes

Procedural Results and Acute Complications in Stenting Native and Recurrent Coarctation of the Aorta in Patients Over 4 Years of Age: A Multi-Institutional Study

Catheterization and Cardiovascular Interventions 70:276–285 (2007)

Thomas J. Forbes,[1*] MD, Swati Garekar,[1] MD, Zahid Amin,[2] MD, Evan M. Zahn,[3] MD, David Nykanen,[3] MD, Phillip Moore,[4] MD, Shakeel A. Qureshi,[5] MD, John P. Cheatham,[6] MD, Makram R. Ebeid,[7] MD, Ziyad M. Hijazi,[8] MD, Satinder Sandhu,[8] MD, Donald J. Hagler,[9] MD, Horst Sievert,[10] MD, Thomas E. Fagan,[11] MD, Jeremy Ringewald,[12] MD, Wei Du,[1] PhD, Liwen Tang,[1] MD, MS, David F. Wax,[13] MD, John Rhodes,[14] MD, Troy A. Johnston,[15] MD, Thomas K. Jones,[15] MD, Daniel R. Turner,[1] MD, Carlos A.C. Pedra,[16] MD, and William E. Hellenbrand,[17] MD, Congenital Cardiovascular Interventional Study Consortium (CCISC)

TABLE III. Characteristics of Coarctation[a]

Characteristics	*N*
Type of coarctation	
Native	296 (52.4)[b]
Recurrent surgical	228 (40.4)
Recurrent interventional	
Post balloon angioplasty	21 (3.7)
Post stent	20 (3.5)
Location of coarctation	
Isthmus	341 (81.4)
Distal transverse arch	55 (13.1)
Other	23 (5.5)
Extent of coarctation	
Discrete	325 (74.7)
Long segment	110 (25.3)

[a]Missing data accounts for the missing percentage in each characteristic.
[b]Values in parentheses indicate percentages.

TABLE IV. Technical Characteristics

Characteristics	
General anesthesia used in: $n = 366$ pts	259 (70.8)[a]
Median of sheath size in Fr	11 [6–16][b]
Balloon type: $n = 423$ pts[c]	
Z-med	118 (27.9)
Cordis	71 (16.8)
Balloon in balloon	188 (44.4)
XXL	19 (4.5)
Other	27 (6.4)
Prestent angioplasty: $n = 449$ pts	79 (17.6)
Balloon dimension: $n = 565$ pts Mean ± S.D.	15.2 ± 3.6 mm
Median balloon:Coarctation ratio	2 [1.1–18]
Initial stent type: $n = 511$ pts	
P 8 series/P10 series	170/154
LD	14
EV3	16
Genesis	104
Cheatham-Platinum series	33
Covered stent	14
Others	6
Number of stents used per procedure: $n = 565$	
1 stent	517
2 stents	40
3 stents	5
4–5 stents	3

[a]Values in parentheses indicate percentages.
[b]Values in square brackets indicate ranges.
[c]Missing data accounts for the missing percentage.

TABLE V. Complications Split up by Age Group

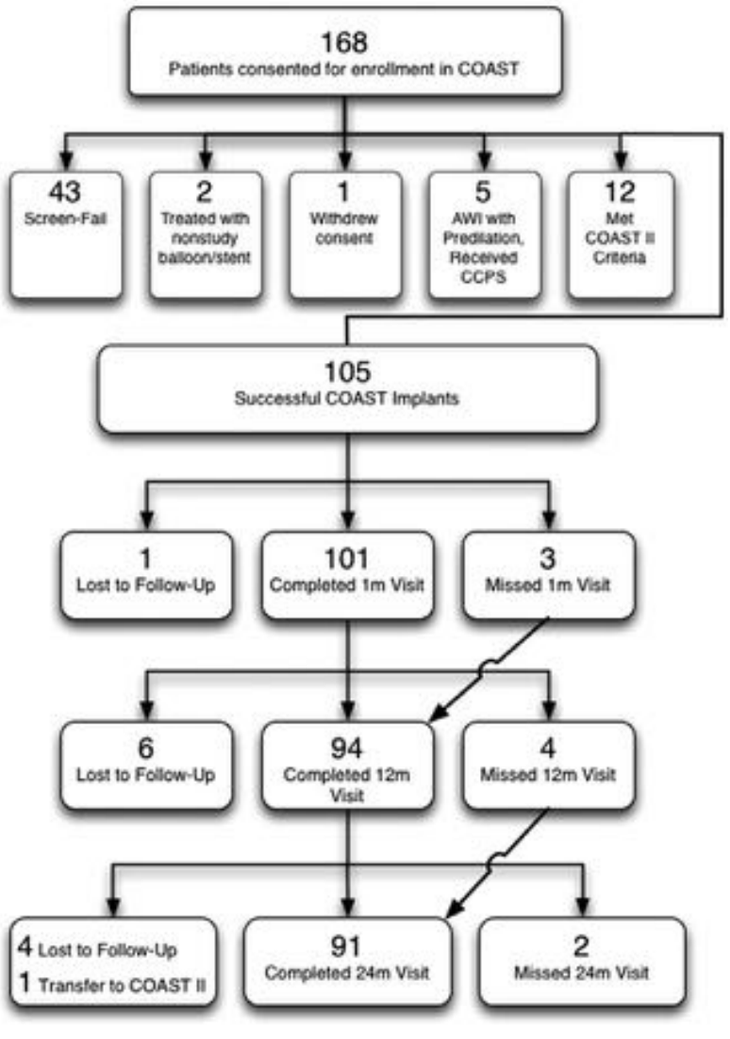
Age group (yrs)	4–9	10–19	20–29	30–39	>40	*Total*
Number of patients	74	324	88	37	42	*565*
All complications	6 (8.1)	44 (13.6)	11 (12.5)	6 (16.2)	13 (31)	*81 (14.3)*
Aortic wall complication	1 (1)	11 (3.4)	4 (4.6)	2 (5.4)	4 (9.5)	*22 (3.7)*
Technical complication	9 (10.7)	36 (11.1)	9 (10.3)	6 (16.2)	10 (23.8)	*71 (12.1)*

Complications techniques: rupture de ballon, malposition de stent
Complications aortiques: anévrisme, rupture aortique
Autres complications: AVC, anomalie vaisseau périphérique, autre évènement trombe embolie

Intermediate Outcomes in the Prospective, Multicenter Coarctation of the Aorta Stent Trial (COAST)

Jeffery Meadows, MD; Matthew Minahan, BS; Doff B. McElhinney, MD;
Kerry McEnaney, BS; Richard Ringel, MD; on behalf of the COAST Investigators*

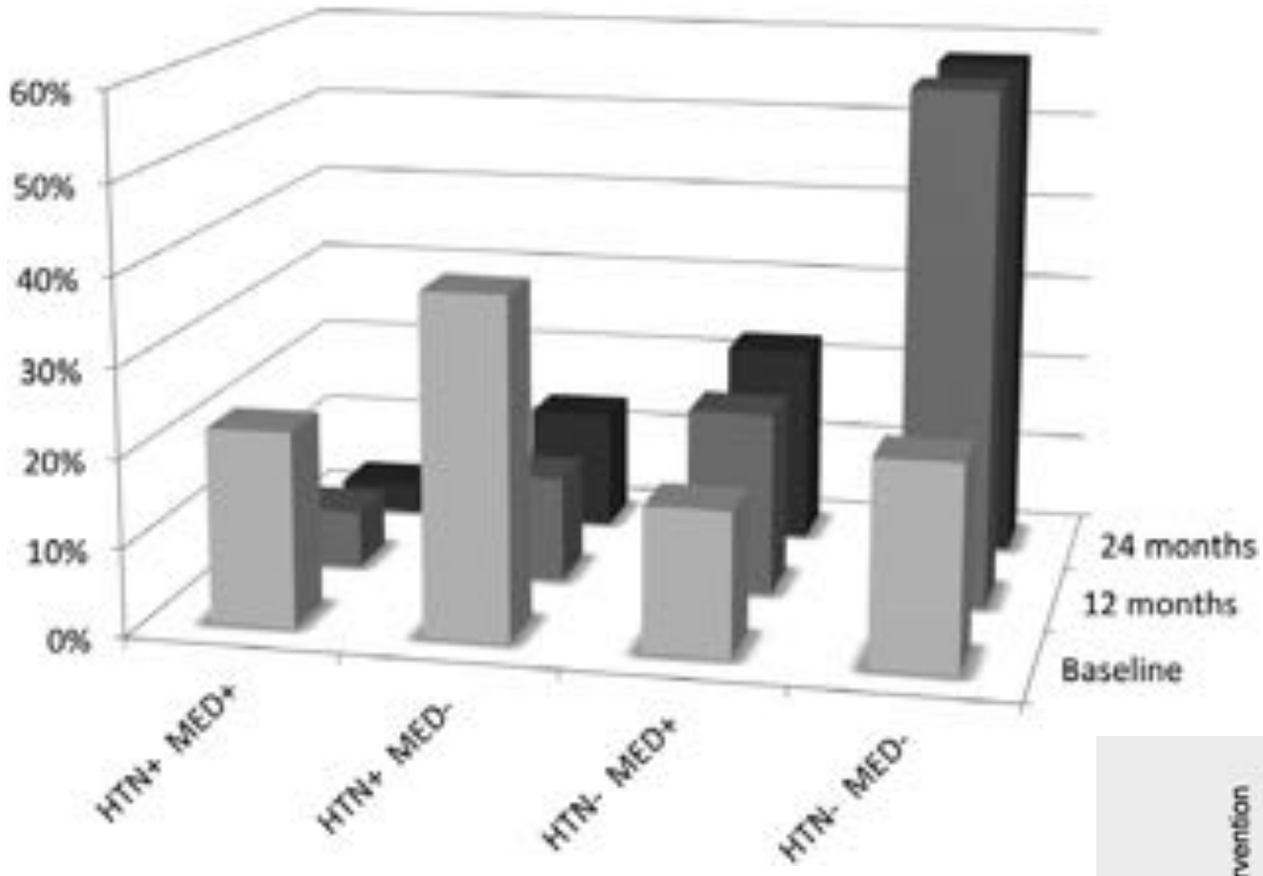
Circulation. 2015;131:1656-1664.



Native or recurrent aortic coarctation	Age >60 y
Weight <35 kg	Bloodstream infection
Cuff blood pressure difference or catheter-measured systolic coarctation gradient of 20 mm Hg	Connective tissue disorders, including Marfan syndrome, Turner syndrome, or inflammatory aortitis
	Prior stent placement
	Aortic aneurysm
	Pregnancy
	Subject lacking ability to consent

Table 4. Factors Associated With Persistent Systemic Arterial Hypertension and Antihypertension Medication Use

	At 12 mo		At 24 mo	
	Odds Ratio (95% CI)	*P* Value	Odds Ratio (95% CI)	*P* Value
Factors associated with persistent systemic arterial hypertension				
Male sex	0.72 (0.17–2.98)	0.65	2.42 (0.47–12.40)	0.29
Age at implantation	0.96 (0.89–1.02)	0.19	1.00 (0.94–1.05)	0.83
Baseline systolic blood pressure	1.06 (1.01–1.12)	0.01	1.04 (1.00–1.08)	0.07
Residual blood pressure gradient	1.07 (1.02–1.12)	<0.05	1.05 (1.00–1.09)	0.04
Factors associated with any antihypertension medication use				
Male sex	1.70 (0.54–5.35)	0.37	3.15 (0.81–12.31)	0.10
Age at implantation	1.06 (1.01–1.11)	0.02	1.08 (1.02–1.13)	<0.05
Baseline systolic blood pressure	1.02 (0.99–1.06)	0.16	1.01 (0.97–1.04)	0.74
Residual blood pressure gradient	1.02 (0.99–1.06)	0.16	1.02 (0.98–1.05)	0.39



Reintervention pour

- **2d temps de dilatation**
- **anévrisme vu à l'IRM**

Peu de complications techniques

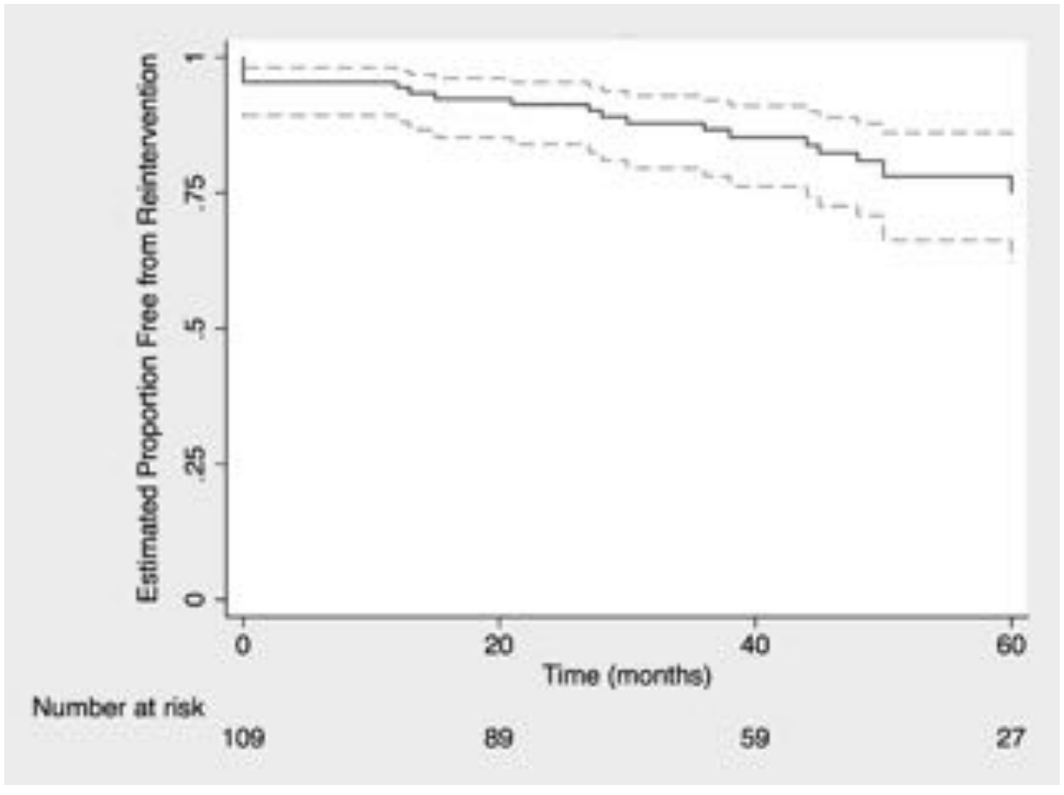


Figure 5. Estimated freedom from reintervention with 95% confidence intervals (dashed lines). One hundred ten patients

Balloon Dilatation and Stenting for Aortic Coarctation
A Systematic Review and Meta-Analysis

Maximilian Salcher, MSc; Huseyin Naci, PhD; Tyler J. Law, MD; Titus Kuehne, MD; Stephan Schubert, MD; Marcus Kelm, MD; on behalf of Cardioproof Consortium*

Circ Cardiovasc Interv. 2016;9:e003153

- Méta-analyse
- Supériorité du stenting pour diminuer le gradient
- Tendance à moins d'évènements indésirables graves pendant l'hospitalisation avec le stent qu'avec la dilatation seule

En pratique: stenting dès que l'enfant a un poids suffisant pour mettre un stent qui peut être redilaté

The effectiveness of stenting of coarctation of the aorta: a systematic review

Eline M.J. Hartman[1], BSc; Ilse M. Groenendijk[1], BSc; Helena M. Heuvelman[1], MD; Jolien W. Roos-Hesselink[2], MD, PhD; Johanna J.M. Takkenberg[1]*, MD, PhD; Maarten Witsenburg[2,3], MD, PhD

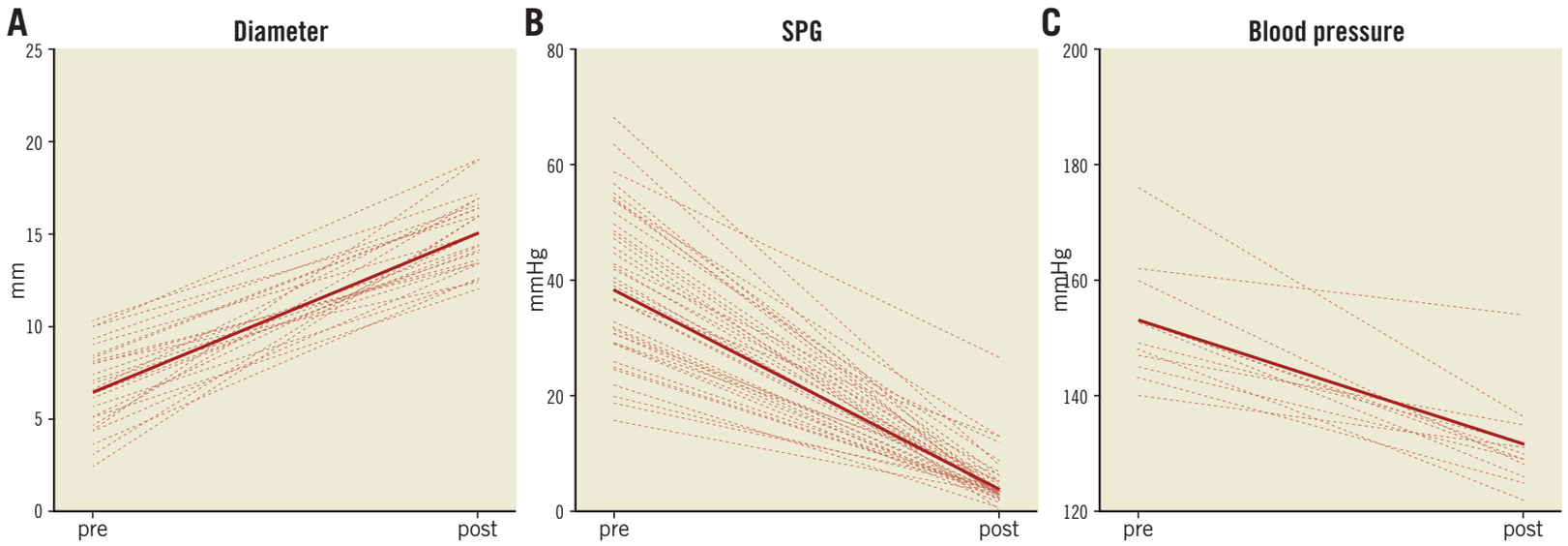


Figure 2. *Changes in aortic diameter, systolic peak gradient (SPG) and systolic blood pressure before and early post stenting. A) Aortic diameter. B) SPG. C) Blood pressure.*

Impact on daily practice

Coarctation stenting is an effective way to relieve the obstruction and to lower the blood pressure in the short term, with an acceptable complication rate. However, long-term data on its effect on blood pressure and on the occurrence of late complications are lacking. A prospective multicentre follow-up study including MRI or CT imaging may provide these clinically important data.

Comparison Between Covered and Bare Cheatham-Platinum Stents for Endovascular Treatment of Patients With Native Post-Ductal Aortic Coarctation

Immediate and Intermediate-Term Results

Bahram Sohrabi, MD,* Peiman Jamshidi, MD,*† Alireza Yaghoubi, MD,* Afshin Habibzadeh, MD,* Yashar Hashemi-aghdam, MD,‡ Araz Moin, MD,‡ Babak Kazemi, MD,* Samad Ghaffari, MD,* Mohammad Reza Abdolahzadeh Baghayi, MD,* Khalil Mahmoody, MD§

Table 4. Clinical Findings During Follow-Up Between Groups

	Bare CP (n = 60)	Covered CP (n = 60)	p Value
Recurrent coarctation	4 (6.7)	0 (0)	NS
Pseudoaneurysm in aortic segment at 12-month follow-up	0	2 (3.3)	NS
Total mortality	1 (1.7)	0	NS

Values are n (%).

Abbreviations as in Table 2.

120 patients
CoA natives serrées
Diamètre zone coarctée 3.5 mm
Pas de différence stent couvert et stent nu

Covered Stents for Coarctation of the Aorta

Treating the Interventionalist or the Patient?*

Ziyad M. Hijazi, MD, MPH, Damien P. Kenny, MB, MD

Patients à haut risque uniquement
Patients >40 ans
Quasi interruption
Turner

Aortic elasticity after aortic coarctation relief: comparison of surgical and interventional therapy by cardiovascular magnetic resonance imaging

Table 1 Group characteristics

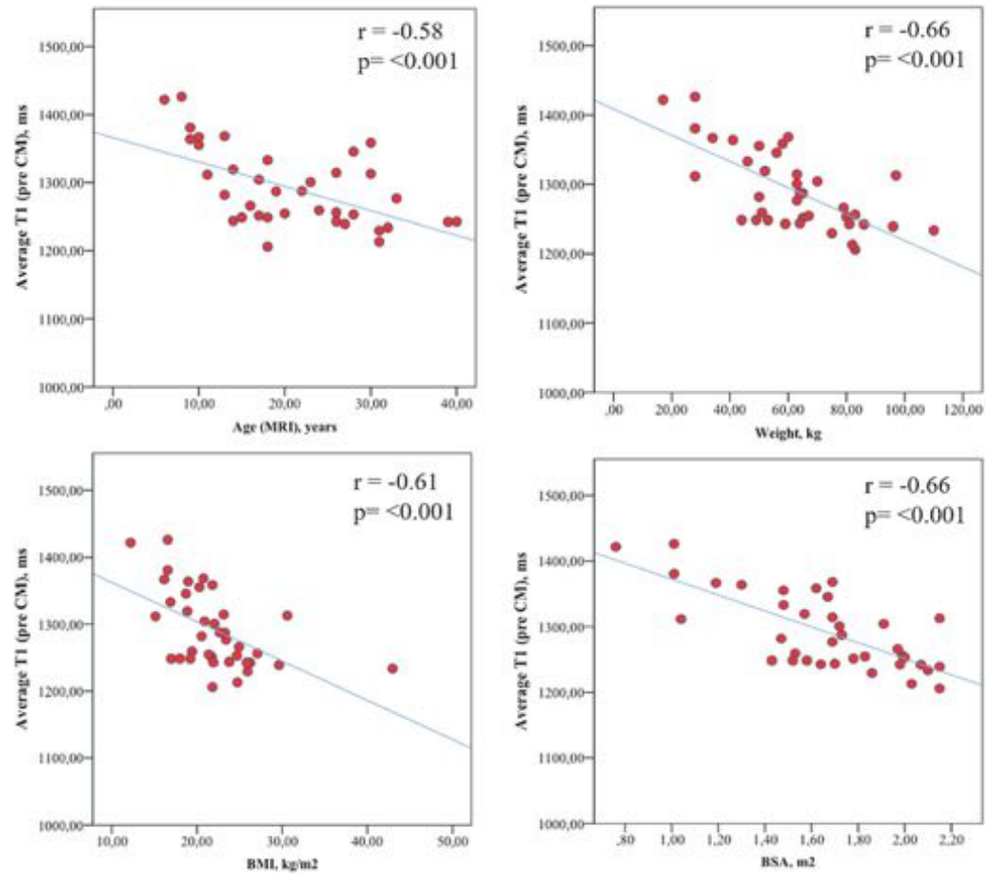
Measurements	All, $N = 50$	Surgery, $N = 32$	Stent, $N = 18$	*p*-value
Age at treatment (years)	1.5 (0.0–24.5)	0.4 (0.0–12.6)	6.7 (0.0–24.5)	0.04
Years after treatment	13.2 (0.7–38.7)	17.2 (4–35)	6.6 (0.7–38.7)	0.05
Age at CMR (years)	20.5 ± 9.5	20.5 ± 9.7	20.5 ± 9.5	0.99
Weight (kg)	60.7 ± 22.7	59.9 ± 24.0	61.9 ± 20.8	0.8
Height (cm)	166.0 (111–195)	167.0 (111–195)	166.0 (118–190)	0.86
BMI (kg/m^2)	21.6 ± 5.2	21.4 ± 4.7	22.0 ± 6.3	0.73
BSA (m^2)	1.7 ± 0.4	1.6 ± 0.4	1.7 ± 0.3	0.7
Diastolic BP (mmHg)	63.1 ± 9.4	62.7 ± 9.4	64.0 ± 9.7	0.65
Systolic BP (mmHg)	117.0 (90.0–165.0)	115.5 (90.0–165.0)	118.5 (96.0–147.0)	0.07
Pulse pressure (mmHg)	55.5 ± 12.5	53.8 ± 12.9	58.5 ± 11.6	0.20
Heart rate (b/min)	74.0 (48.0–110.0)	74.0 (48.0–110.0)	71.5(51.0–91.0)	0.27
Medication				
- ACE inhibitor (n)	2	1	1	
- ARB ((n)	16	9	7	
- Betablocker (n)	12	6	6	
- ASA (n)	1	0	1	

ACE Angiotensin converting enzyme inhibitor, *ARB* Angiotensin receptor blocker, *ASA* Acetylsalicylic acid, *BMI* Body mass index, *BSA* Body surface area, *CMR* Cardiovascular magnetic resonance, *BP* Blood pressure

Table 2 Comparison of CMR measurements in patients with surgical repair and endovascular stent implantation

CMR data	Surgery, $N = 32$	Stent, $N = 18$	p-value	CI (95)[a]
LVEDVi (ml/m^2)	73.5 (55.4–102.3)	78.7 (60.8–129.6)	0.04	− 13.8 - -0.06
LVESVi (ml/m^2)	26.3 (18.2–37.6)	26.5 (20.0–51.7)	0.41	−6.62 – 2.22
LVSVi (ml/m^2)	46.7 (35.1–70.6)	51.7 (36.6–77.9)	0.03	− 9.42 - -0.98
LVEF (%)	64.3 (55.1–75.9)	65.9 (56.1–70.7)	0.64	−3.62 – 2.63
LVmass index (g/m^2)	57.7 (31.8–75.8)	60.2 (28.1–116.5)	0.23	−17.6 – 3.19
RVEDVi (ml/m^2)	74.0 (51.7–109.8)	75.8 (55.4–111.4)	0.59	−8.73 – 5.62
RVESVi (ml/m^2)	28.7 (17.1–55.4)	30.9 (19.3–48.2)	0.92	− 5.05 – 5.65
RVSVi (ml/m^2)	43.4 (26.5–68.4)	47.3 (9.8–68.5)	0.21	− 7.82 – 3.15
RVEF (%)	60.9 (34.3–69.9)	61.3 (16.9–73.3)	0.59	−5.63 – 3.41
RVmass index (g/m^2)	22.1 (15.1–59.1)	24.9 (14.0–51.2)	0.51	− 5.09 – 2.67
LA_{max} (ml/m^2)	30.8 ± 8.7	35.5 ± 7.2	0.06	−9.61 – 0.26
LA_{min} (ml/m^2)	17.0 ± 6.0	19.0 ± 5.7	0.27	−5.52 – 1.60
LA_{ac} (ml/m^2)	21.8 ± 6.4	22.9 ± 5.1	0.54	−4,70 – 2.49
LA_{totemp} (ml/m^2)	13.8 ± 5.5	16.5 ± 5.0	0.1	− 5.93 – 0.50
$LA_{passemp}$ (ml/m^2)	9.0 ± 4.1	12.5 ± 3.9	0.01	−6.04 – − 1.09
$LA_{contractile}$ (ml/m^2)	4.8 ± 2.9	4.0 ± 4.6	0.43	−1.28 – 2.98
$LAEF_{reserve}$ (%)	43.9 ± 12.7	46.6 ± 12.3	0.48	− 10.3 – 4.89
$LAEF_{passiv}$ (%)	28.2 ± 10.6	35.2 ± 7.5	0.02	−12.8 – − 1.16
$LAEF_{contractile}$ (%)	7.6 ± 20.7	48.1 ± 18.3	0.93	− 12.6 – 11.51
Distensibility (10^{-3} $mmHg^{-1}$)				
- Aortic root	± 2.6	5.4 ± 3.7	0.64	−2.23 – 1.37
- AAo	6.8 ± 4.7	6.0 ± 3.2	0.51	−1.68 – 3.33
- Aortic arch	6.0 ± 3.0	6.2 ± 2.7	0.80	−1.92 – 1.49
- Isthmus	5.1 ± 3.3	4.8 ± 2.6	0.84	− 1.63 – 1.99
- Proximal DAo	5.0 ± 2.5	5.0 ± 2.1	0.89	− 1.31 – 1.50
- DAo at diaphragm	7.4 ± 3.9	6.3 ± 2.5	0.28	− 0.92 – 3.13
PWV (m/s)^2				
- Aortic arch	3.8 (2.0–10.0)	4.2 (1.9–7.7)	0.63	
- DAo	4.4 (2.5–107.3)	4.4 (3.3–14.0)	0.34	

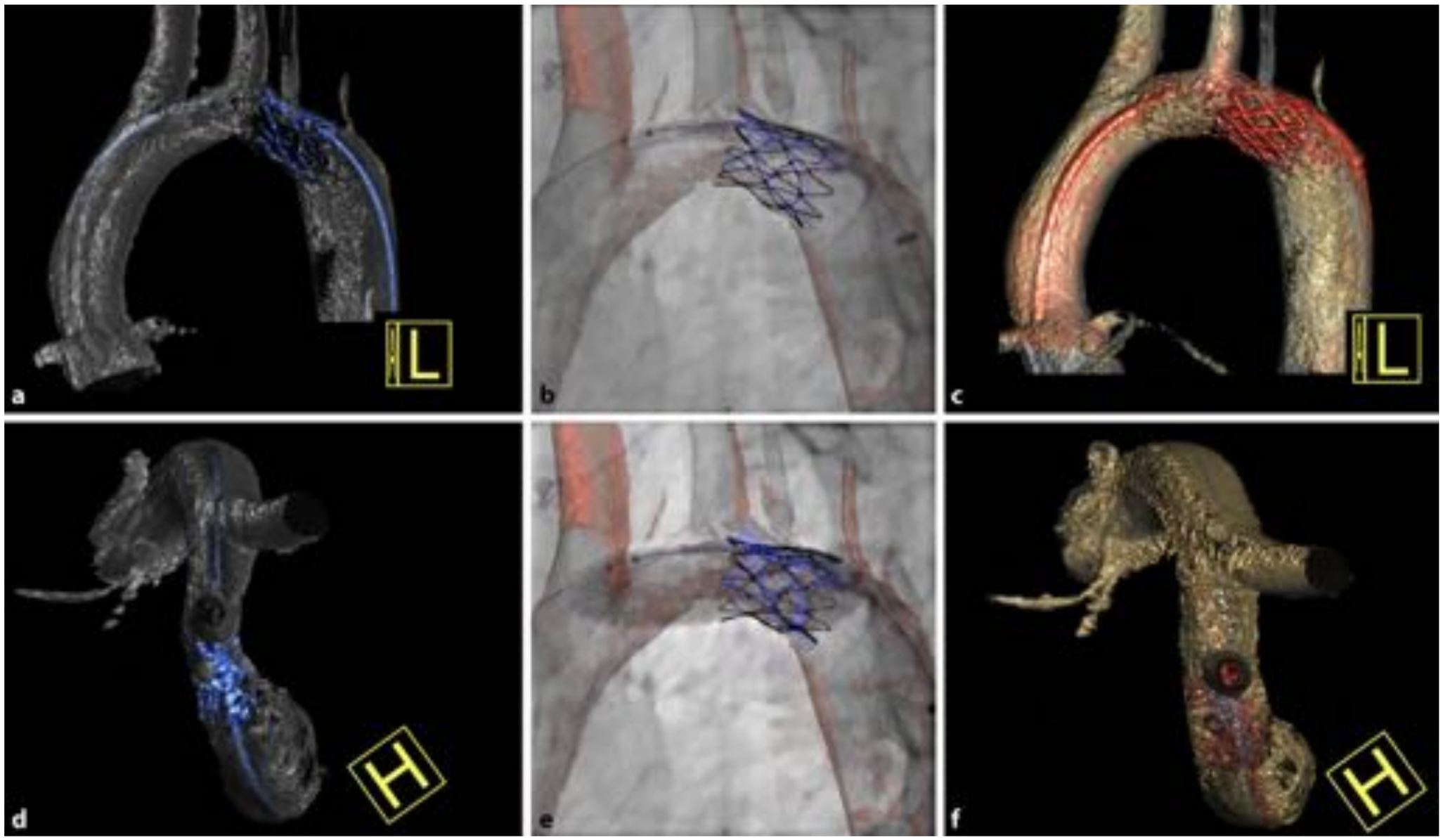
distensibilité
non liée au type de traitement
liée aux caractéristiques démographiques



Safety and efficacy of stenting for aortic arch hypoplasia in patients with coarctation of the aorta

E. G. Warmerdam · G. J. Krings · T. A. Meijs · A. C. Franken · B. W. Driesen · G. T. Sieswerda · F. J. Meijboom · P. A. F. Doevendans · M. M. C. Molenschot · M. Voskuil

Neth Heart J, Nov 2019



Coarctation néonatale

- Choc cardiogénique: dilatation au ballon

Pediatr Cardiol (2007) 28:183–192
DOI 10.1007/s00246-006-0074-4

ORIGINAL ARTICLE

Stent Angioplasty: An Effective Alternative in Selected Infants with Critical Native Aortic Coarctation

Take home messages

Coarctation néonatale

Coarctation native	première intention: traitement chirurgical
	thérapie de sauvetage (bas débit, défaillance ventriculaire gauche): dilatation (stenting si échec)
Recoarctation	première intention: dilatation au ballon
	stenting très rarement, après discussion avec le chirurgien

Coarctation de l’enfant (< 20kg)

première intention: traitement chirurgical

Coarctation native

dilatation si CI chirurgicale

première intention dilatation au ballon

Recoarctation

si échec de dilatation ou complication: stenting

Coarctation de l’aorte (> 20kg)

Stenting (redilatable à un diamètre d’aorte d’adulte)

Coarctation native: stent couvert ou nu

Recoarctation: stent nu

Maladie complexe

- Suivi à vie
- Dépistage agressif de l'HTA
- Traitement si gradient résiduel de 20 mmHg mais limite à changer peut-être; surtout si on évalue le gradient chez un patient sédaté
- Multiples options thérapeutiques, discussion multi-disciplinaire

Questions en suspens

Hypoplasie de l’arc aortique, place du traitement percutané?

Indication de nouvelle intervention percutanée:

- gradient de 20 mmHg, moins?
- HTA sans gradient clinique mais arc inhomogène?