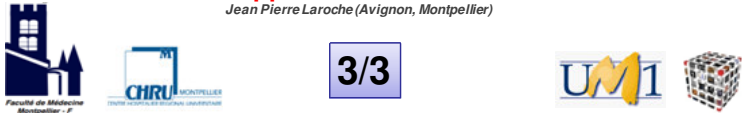
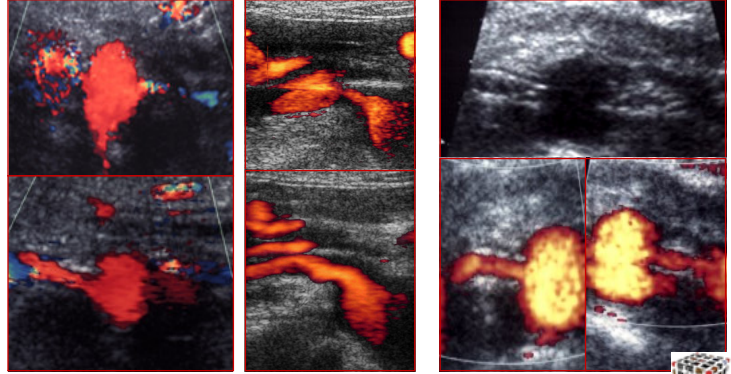



Echo Doppler des Artères Rénale
 Jean Pierre Laroche (Avignon, Montpellier)

3/3





Echo Doppler couleur : contrôles post angioplastie

Écho Doppler couleur : contrôles post angioplastie

■ **Étude Bakker JU et Coll : Cardiovasc Intervent Radiol 1999, 22:475-480**

- Sténose intra stent < 50% :
 - * PSV < 226 cm/sec
 - * RRA < 2,7
- Sténose intra stent > 50% :
 - * PSV > 226 cm/sec
 - * RRA > 2,7

Time to Recurrence/Censure – overall

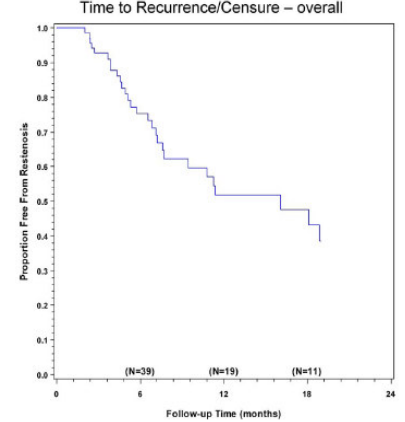



Fig 2. Estimated restenosis-free survival. The estimation method accounts for the correlated data. The standard error of the survival estimate is <0.1 for the displayed postintervention interval.

Restenosis after renal artery angioplasty and stenting: Incidence and risk factors

JVS 2009

Matthew A. Gervino, MD, MS,* Matthew S. Edwards, MD, MS,*
 Jeffrey D. Pearce, MD,* Jeanette S. Andrews, MS,* Randolph L. Geary, MD,* and
 Kimberley J. Hansen, MD,* *Western Salem, NC*



Quantification sténose artère rénale en Echo Doppler

Normes

Degré Sténose	Sténose > 60%
Vit Syst Max	> 180 cm/sec
Rapport Réno Aortique	> 3,3
	0,50 < IR < 0,75

Longueur rein droit = rein gauche =

IR Rein droit = IR Reine gauche =

Le degré de sténose est exprimé en réduction de diamètre (angle < 60°)

	Artère rénale droite	Artère Rénale gauche
VSM =		
RRR =		
IR =		
Degré de sténose %		

Indice de confiance = /5

Quel est le traitement des sténoses de l'artère rénale ?

Annals of Internal Medicine | REVIEW

Effectiveness of Management Strategies for Renal Artery Stenosis: A Systematic Review

Ethan Balk, MD, MPH; Gowri Raman, MD; Mei Chung, MPH; Stanley Ip, MD; Athina Tziotzi, MD; Alvaro Alonso, MD; Priscilla Chew, MPH; Scott J. Gilbert, MD; and Joseph Lau, MD

Background: Atherosclerotic renal artery stenosis is increasingly common in an aging population. Therapeutic options include medical treatment only or revascularization procedures.

Purpose: To compare the effects of medical treatment and revascularization on clinically important outcomes in adults with atherosclerotic renal artery stenosis.

Data Sources: The MEDLINE database (inception to 6 September 2005) and selected reference lists were searched for English-language articles.

Study Selection: The authors selected prospective studies of renal artery revascularization or medical treatment of patients with atherosclerotic renal artery stenosis that reported mortality rates, kidney function, blood pressure, cardiovascular events, or adverse events at 6 months or later after study entry.

Data Extraction: A standardized protocol with predefined criteria was used to extract details on study design, interventions, outcomes, study quality, and applicability. The overall body of evidence was then graded as robust, acceptable, or weak.

Data Synthesis: No study directly compared aggressive medical therapy with angioplasty and stent placement. Two randomized trials compared angioplasty without stent and medical treatments. Eight other comparative studies and 46 cohort studies met criteria for analysis. Studies generally had poor methodologic quality and limited applicability to current practice. Overall, there was no robust evidence. Weak evidence suggested no large differences in mortality rates or cardiovascular events between medical and revascularization treatments. Acceptable evidence suggested similar kidney-related outcomes but better blood pressure outcomes with angioplasty, particularly in patients with bilateral disease. Improvements in kidney function and cure of hypertension were reported among some patients only in cohort studies of angioplasty. Available evidence did not adequately assess adverse events or baseline characteristics that could predict which intervention would result in better outcomes.

Limitations: The evidence from direct comparisons of interventions is sparse and inadequate to draw robust conclusions.

Conclusions: Available evidence does not clearly support one treatment approach over another for atherosclerotic renal artery stenosis.

Ann Intern Med. 2006;145:901-912.
For author affiliations, see end of text.
www.annals.org

Type de biblio	Article (Traduction intégrale, Commentaire)
Titre court	Pertinence de l'angioplastie rénale, approche via le logiciel ANPARIA.
Code Biblio	350 (Artères rénales, HTA vasc)

Titre français	Pertinence de l'angioplastie rénale. Le logiciel ANPARIA, une approche panel expert multidisciplinaire.
Titre original	The Appropriateness of Renal Angioplasty. The ANPARIA Software: A Multidisciplinary Expert Panel Approach
Auteurs	Gerbaud L., Manhes G., Debourse J., Gouby G., Glanddier P.Y., Vader J.P., Boyer L., Detex P. (CHU Clermont-Ferrand).
Revue	CardioVascular and Interventional Radiology 2008 (nov.) ; 31 : 1059-68
Traduction	P. Giordana (Nice), F. Becker
Commentaire	P. Giordana

Cet outil est en ligne sur le site <http://www.chu-clermontferrand.fr/anparia/>

THE NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

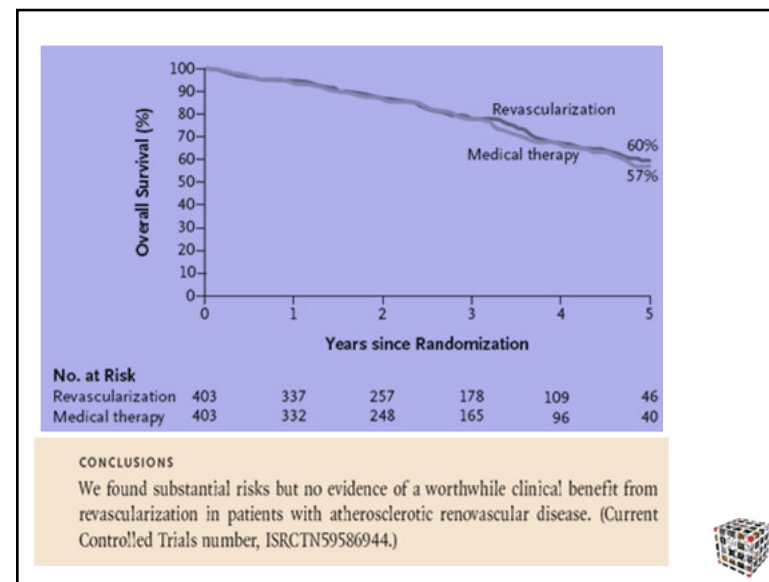
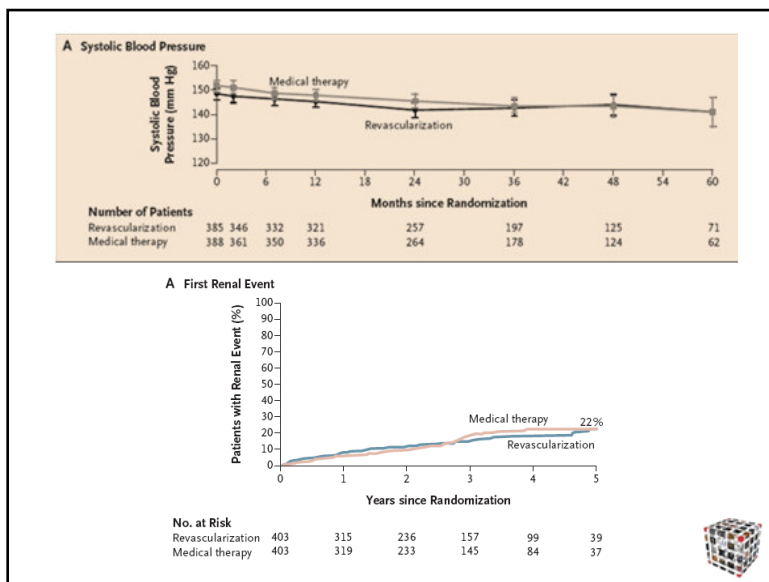
Revascularization versus Medical Therapy for Renal-Artery Stenosis

ASTRAL

The ASTRAL Investigators*

No. of Patients	0	6	12	24	36	48	60
Revascularization	403	349	336	329	263	191	127
Medical therapy	403	363	347	343	272	183	119

NEJM 2009



ARTICLE | Annals of Internal Medicine

Stent Placement in Patients With Atherosclerotic Renal Artery Stenosis and Impaired Renal Function

STAR

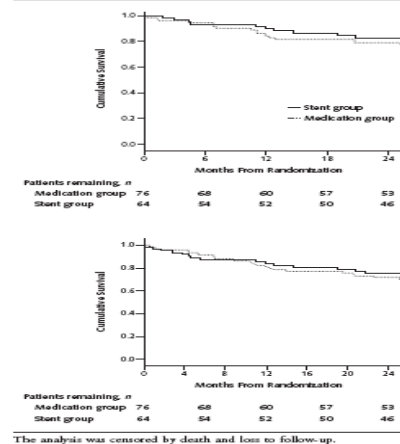
A Randomized Trial

Liesbeth Bax, MD, PhD; Arend-Jan J. Woittiez, MD, PhD; Hans J. Kouwenberg, MD; Willem P.T.M. Mali, MD, PhD; Erik Buskens, MD, PhD; Frederik J.A. Beek, MD, PhD; Branko Braam, MD, PhD; Frans T.M. Huysmans, MD, PhD; Leo J. Schultze Kool, MD, PhD; Matthieu J.C.M. Rutten, MD; Cornelius J. Doorenbos, MD, PhD; Johannes C.N.M. Aarts, MD; Ton J. Rabenlink, MD, PhD; Pierre-François Plouin, MD; Alain Raynaud, MD; Gert A. van Montfrans, MD, PhD; Jim A. Reekers, MD, PhD; Anton H. van den Meiracker, MD, PhD; Peter M.T. Pattynama, MD, PhD; Peter J.G. van de Ven, MD, PhD; Dammis Vroegindewij, MD, PhD; Abraham A. Kroon, MD, PhD; Michiel W. de Haan, MD, PhD; Cornelis T. Postma, MD, PhD; and Jaap J. Beutler, MD, PhD*

Conclusion: Stent placement with medical treatment had no clear effect on progression of impaired renal function but led to a small number of significant procedure-related complications. The study findings favor a conservative approach to patients with ARAS, focused on cardiovascular risk factor management and avoiding stenting.

Ann Intern Med. 2009;150:840-848.

Figure 2. Survival curves for the primary end point (top) and the primary end point plus death (bottom) during 2 years of follow-up.



Que reste t-il en 2012 de l'angioplastie des artères rénales ?

- OAP flash et sténose AR
- HTA incontrôlables malgré le traitement médical
- Ascension rapide de la créatinine sous IEC/ARA II
- Traitement concomittant (AAA etc...)
- *Dysplasie fibro musculaire*

Remarques :

- Etude CORAL en attente
- En cas de sténose athéromateuse, contrôle +++++ des facteurs de risque CV et traitement optimal (statine, AP)



Evolution des Sténoses Athéromateuses de l'AR

Sténoses Asymptomatiques

Sténoses Symptomatiques

CONCLUSION

This prospective, population-based evaluation of prevalent RVD among free-living, elderly Americans suggests that the rate of significant changes in RVD is low. This low rate of progression, combined with no observed progression in significant RVD to renal artery occlusion, does not justify prophylactic intervention for asymptomatic renovascular disease in the elderly.

- 28 % des sténoses < 60 % s'aggravent
- 48 % des sténoses > 60 % s'aggravent
- 5 % évoluent vers l'occlusion

Pearce JD, JVS 2006

Caps et al: Circulation 1998



Chirurgie versus Angioplastie AR

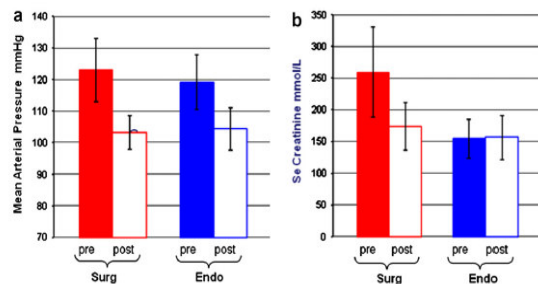


Figure 3 Graphs showing the pre- and post-procedural MAP (a) and serum creatinine (b) demonstrating advantage for surgical studies and overall deterioration in post-procedural renal function in endovascular studies.

An Analysis Comparing Open Surgical and Endovascular Treatment of Atherosclerotic Renal Artery Stenosis

R. Abela ^a, S. Ivanova ^a, S. Lidder ^a, R. Morris ^b, G. Hamilton ^{a,*}

EJVES 2009



Revascularisation : Les études

Table 1 Pivotal controlled randomized trials and meta-analyses

Total name/meta-analysis	Acronym	Authors	Journal/year	Outcome and remarks
Blood pressure outcome of angioplasty in atherosclerotic renal artery stenosis: a randomized trial	DPPA ^a	Pesci PE, Chiallo G, Chiallo R, et al.	Hypertens 1998	Primary BP hypertension control. Results: trend towards better BP control after PTA. Limitations: Small numbers (23 patients in drug arm vs. 24 in PTA arm).
Randomized comparison of percutaneous angioplasty vs. conventional medical therapy for hypertensive patients with atherosclerotic renal artery stenosis	SNARCC ^b	Wabaster J, Marshall F, Abolmaali M, et al.	J Hum Hypertens 1998	Primary BP hypertension control. Results: difference in BP was 20/10 mmHg in favour of PTA (P=ns). Subgroup of Medical RAS: BP drop in PTA group (P<0.05). Limitations: small study cohort (55 patients); stenosis >50% included.
Arterial mapping and balloon angioplasty in renal atherosclerotic renovascular disease: a randomized trial ^c		Van de Ven PG, Kooze R, Boudier J, et al.	Lancet 1999	Technical success: 57% (PTA) vs. 88% (meds). Revascularization rate: 48% (PTA) vs. 14% (meds).
The Effect of Balloon Angioplasty on Hypertension in Atherosclerotic Renal Artery Stenosis	DRASTIC ^d	Van Jaarsveld JC, Krigen P, Heumen H, et al.	N Engl J Med 2000	Primary BP difference in BP response at 12 years. Results: mean daily drug dose significantly lower in the angioplasty group (2.1 ± 1.3 vs. 3.1 ± 1.7, P<0.001). No difference in BP control. Limitation: Interruption (happened by 44% crossover rate to balloon angioplasty) 44% in the drug group.
Revascularisation versus medical therapy for renal artery stenosis	ASTRAL ^e	Whalley K, Hughes N, Gray R, et al.	N Engl J Med 2000	No evidence for clinically important bias from revascularization in patients with atherosclerotic renovascular disease.
Balloon angioplasty or medical therapy for hypertensive patients with atherosclerotic renal artery stenosis: A meta-analysis of randomized controlled trials ^f		Narayan AV, Vico K, Parke R, Logan AC.	Am J Med 2003	Pooled analysis of DRASTIC, DPPA, and SNARCC (206 patients overall). Results: angioplasty better systemic and diastolic BP after PTA.
The bene- of stent placement and blood pressure and backflowing for the prevention of progression of renal dysfunction caused by atherosclerotic renal stenosis of the renal artery	STAR ^g	Bax LL, Wenzel A, Kowarsky W, et al.	Am Heart J 2009; 157(4): 658-663	Primary BP reduction in creatinine clearance >20% compared with baseline. 145 patients followed up for 2 years with extended follow-up to 5 years. Results: 15% in stent group and 20% in medication group matched the primary BP. Limitations: the study was underpowered to provide a definite answer of any. Only 46/145 patients assigned to stenting received a stent.
Prospective randomized trial of operative or interventional treatment for renal artery occlusive disease	RAOOD ^h	Babus KM, Peller T, Roobach S, et al.	Proc Surg 2009; 14(4): 74	Single-center study. Primary BP: composite of complications and durability. Fifty patients (25 per group) with RAS >70% with follow-up >4 years. Results: procedure-related mortality was 15% in interventional group and 4% in surgical group. Four-year follow-up mortality was 18% in interventional group and 25% in surgical group. Both groups showed significant improvement in blood pressure (P<0.05 in both groups) and improvement in or stabilization of renal function. Freedom from recurrent RAS (>70%) was achieved in 91.1% of surgical group and 79.1% of interventional group.

EPMA

SNARCCG

DRASTIC

ASTRAL

STAR

RAOOD

En attente CORAL





Welcome to the web site for the Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)

Public Information
CORAL is an NIH-funded multicenter clinical trial of patients with atherosclerotic blockage of blood flow to the kidneys, which may be present in up to 3 million Americans. Find out more about characteristics of individuals with this condition, and where to get more information about participating in this important clinical trial.

Researchers
CORAL is a clinical trial that will test the hypothesis that stenting atherosclerotic renal artery stenosis in patients with systolic hypertension reduces the incidence of cardiovascular and renal events.
[Password protected](#)

Patient Information
The main goal of CORAL is to gain knowledge that may help future patients. This section addresses what you as a patient in the CORAL clinical trial should know. Educational materials are available as well as in-depth information on the CORAL clinical trial itself.

For more information, contact the Clinical Coordinating Center at 419-383-6287





Questions, Technical Issues? Contact the Webmaster.
Copyright © 2006 CORAL. All Rights Reserved.




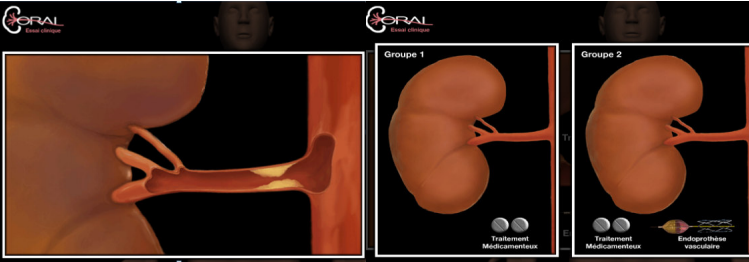
Benefits of Medical Therapy Plus Stenting for Renal Atherosclerotic Lesions (CORAL)

This study is ongoing, but not recruiting participants.

First Received on April 19, 2004 Last Updated on June 4, 2010 [History of Changes](#)

Sponsor:	National Heart, Lung, and Blood Institute (NHLBI)
Information provided by:	National Heart, Lung, and Blood Institute (NHLBI)
ClinicalTrials.gov Identifier:	NCT00081731

Arms	Assigned Interventions
Optimal Medical Therapy: Active Comparator Optimal anti-hypertensive therapy Intervention: Drug: Atacand	Drug: Atacand Atacand and caduet or optimal medical therapy for hypertension
Stenting: Experimental Stent procedure plus optimal anti-hypertensive therapy Intervention: Procedure: Angioplasty plus stenting	Procedure: Angioplasty plus stenting Angioplasty plus stenting of the renal artery





Groupe 1


Traitement Médicamenteux

Groupe 2

Traitement Médicamenteux + Endoprothèse vasculaire




European Heart Journal
doi:10.1093/eurheartj/ehr211



ESC Guidelines on the diagnosis and treatment of peripheral artery diseases

Document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries

The Task Force on the Diagnosis and Treatment of Peripheral Artery Diseases of the European Society of Cardiology (ESC)



Recommendations for diagnostic strategies for RAS

Recommendations	Class ^a	Level ^b	Ref ^c
DUS is recommended as the first-line imaging test to establish the diagnosis of RAS.	I	B	171, 172
CTA (in patients with creatinine clearance >60 mL/min) is recommended to establish the diagnosis of RAS.	I	B	151, 174
MRA (in patients with creatinine clearance >30 mL/min) is recommended to establish the diagnosis of RAS.	I	B	174
When the clinical index of suspicion is high and the results of non-invasive tests are inconclusive, DSA is recommended as a diagnostic test (prepared for intervention) to establish the diagnosis of RAS.	I	C	-
Captopril renal scintigraphy, selective renal vein renin measurements, plasma renin activity, and the captopril test are not recommended as useful screening tests to establish the diagnosis of RAS.	III	B	151, 178



Echo Doppler +++

Angio Scanner de confirmation si CI Créat > 60ml/mn

Angio MR si CI Créat > 30 ml / mn

Si forte probabilité de SAR Avec tests non invasifs non conclusifs : ANGIOGRAPHIE

Scintigraphie et test au captopril non recommandés






Recommendations: treatment strategies for RAS

Recommendations	Class ^a	Level ^b	Ref ^c
Medical therapy			
ACE inhibitors, angiotensin II receptor blockers, and calcium channel blockers are effective medications for treatment of hypertension associated with unilateral RAS.	I	B	166, 182, 183, 189, 192, 219
ACE inhibitors and angiotensin II receptor blockers are contraindicated in bilateral severe RAS and in the case of RAS in a single functional kidney.	III	B	151, 166, 182, 183, 189, 192

ACE, Inhibiteurs calciques utilisable en cas de sténose unilatérale

CI si sténose AR bilatérale ou rein unique

Endovascular therapy

Angioplasty, preferably with stenting, may be considered in the case of >60% symptomatic RAS secondary to atherosclerosis.	IIb	A	151, 201-204
In the case of indication for angioplasty, stenting is recommended in ostial atherosclerotic RAS.	I	B	205, 220
Endovascular treatment of RAS may be considered in patients with impaired renal function.	IIb	B	193, 206, 221-223
Treatment of RAS, by balloon angioplasty with or without stenting, may be considered for patients with RAS and unexplained recurrent congestive heart failure or sudden pulmonary oedema and preserved systolic left ventricular function.	IIb	C	-



Angioplastie + Stent si SAR > 60% ATHEROME

Lésion ostiale stent recommandée

En cas de SAR rein unique discussion

Angioplastie à discuter si SAR et insuff card inexpliquée et récidivante ou OAP flash + fonction ventriculaire gauche conservée



Rein > 8 cm, IR < 0.80

Surgical therapy

Surgical revascularization may be considered for patients undergoing surgical repair of the aorta, patients with complex anatomy of the renal arteries, or after a failed endovascular procedure.	IIb	C	-
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Si chirurgie aorte et lésions anatomiques complexes des AR et/ou échec angioplastie rénale

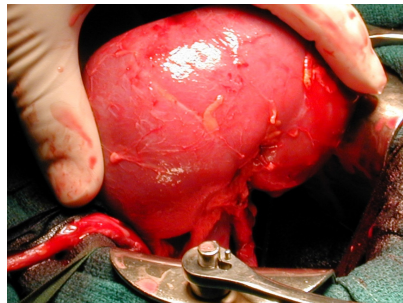



Conclusion

Échographie Doppler et artère rénale

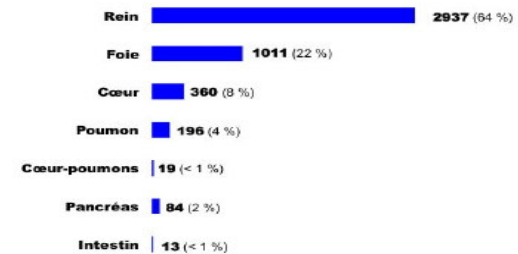
**Méthode fiable, rapide, atraumatique
nécessitant opérateur entraîné**

- formation
- matériel correct
- sélection patients

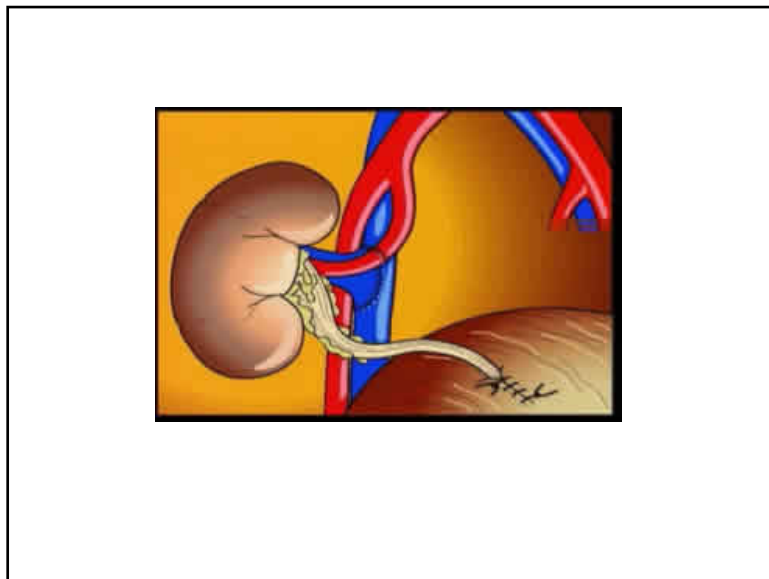
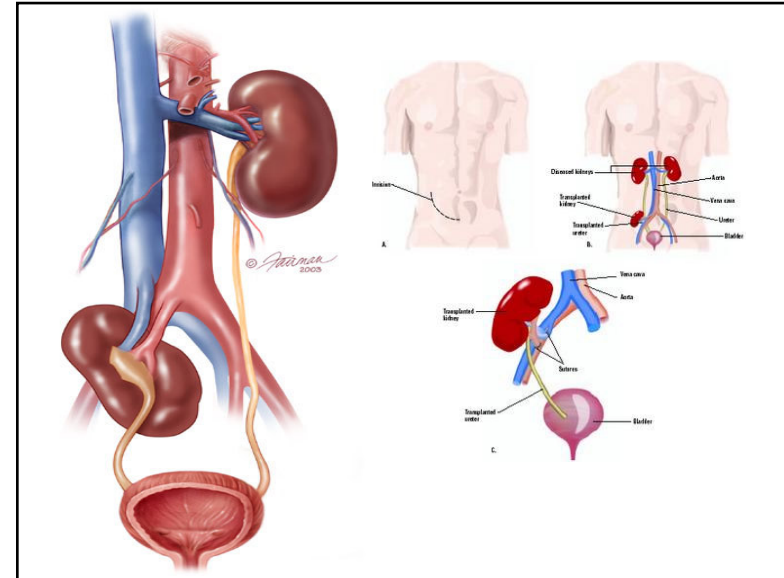
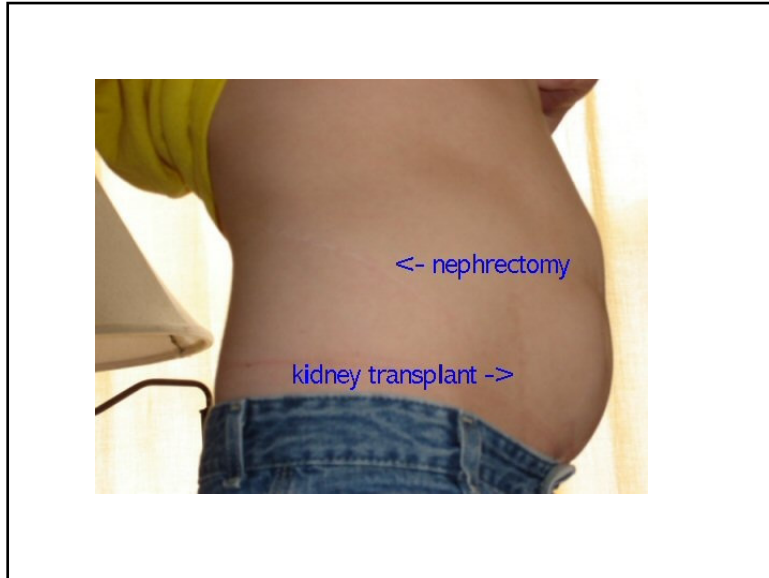


**Greffe Rénale
Contrôle Artère du Greffon**

Répartition des greffes en 2008



232 greffes ont été réalisées à partir de donneurs vivants :
- 222 greffes de rein
- 10 greffes de foie





“ Conduite à tenir

La fréquence des examens de surveillance systématique, en dehors des complications, est variable en fonction des équipes : un premier examen de référence est programmé vers J15-20 (retour à la normale de la fonction rénale en postgreffe) ; puis un autre examen à J90 (pic de fréquence des sténoses de l'artère rénale) et un examen de surveillance annuel au minimum par la suite.

Imagerie diagnostique du rein transplanté et des complications de la greffe rénale

O. Hélon, J.-M. Correas, D. Eiss, E. Thervet, C. Legendre

Toute référence à cet article doit porter la mention : Hélon O, Correas JM, Eiss D, Thervet E, Legendre C. Imagerie diagnostique du rein transplanté et des complications de la greffe rénale. BMC (Bavivier SAS, Paris), Néphrologie, 18-06-10, 2005.

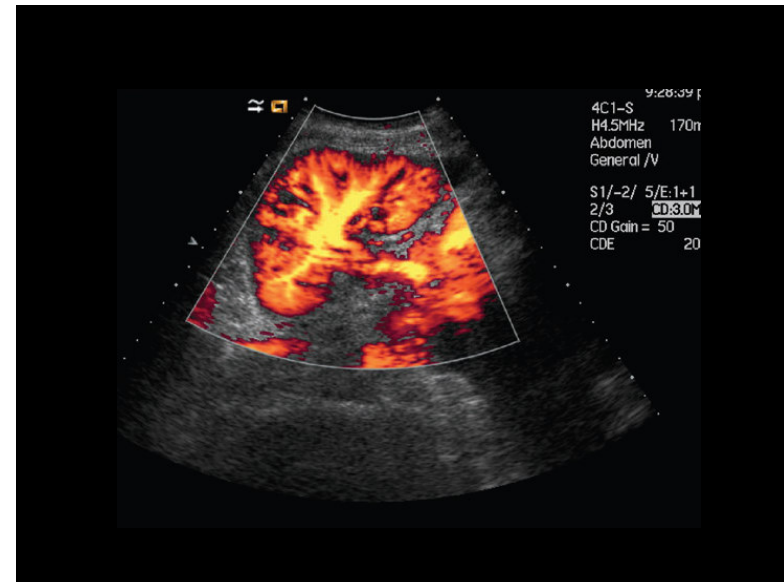
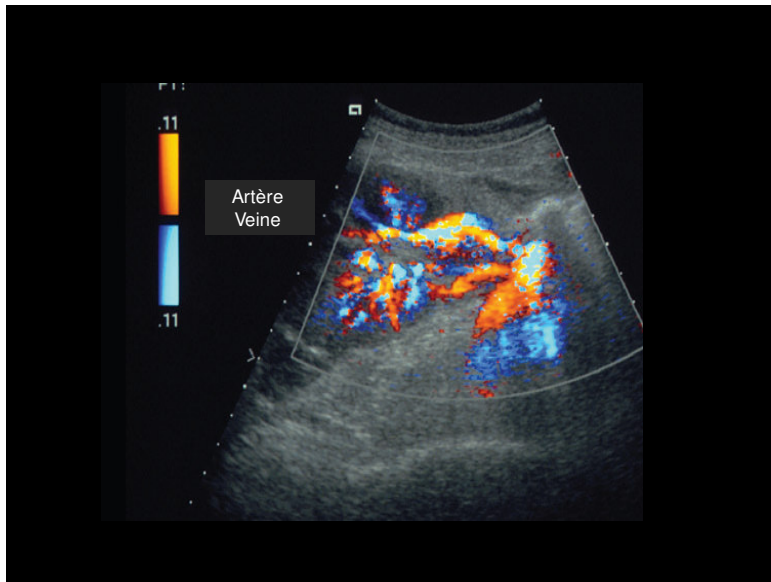
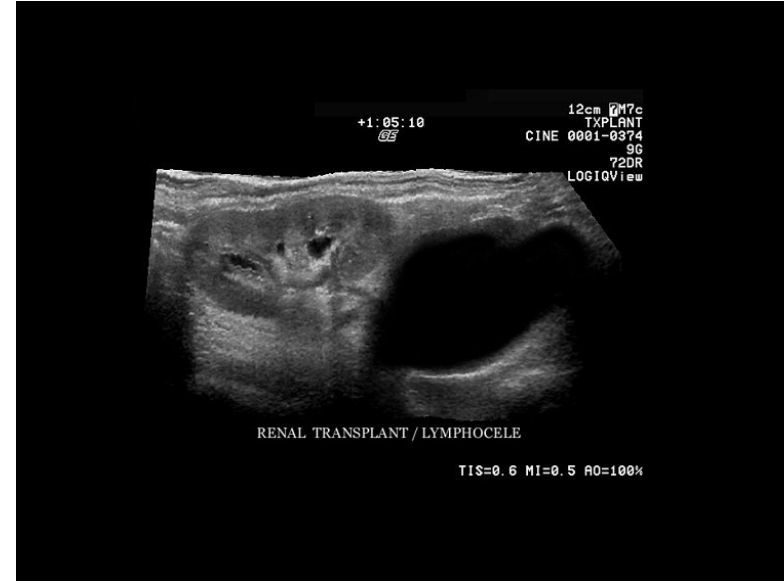
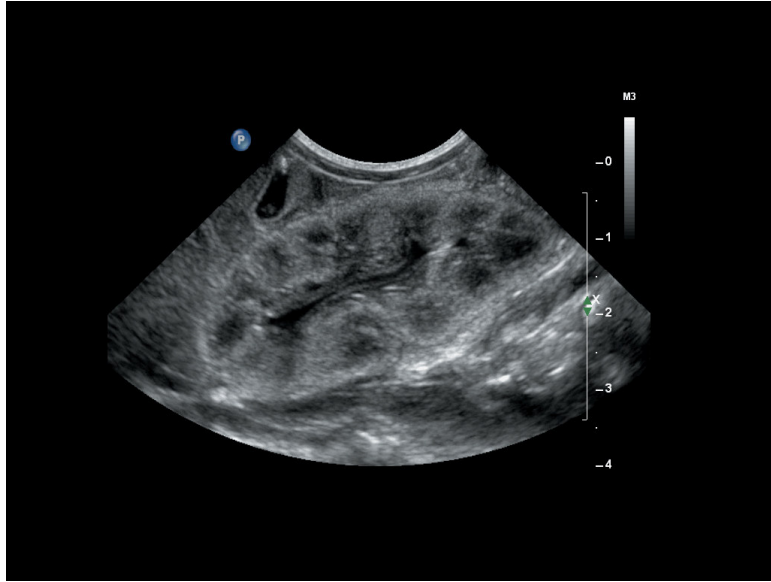
Echo Doppler et Greffe Rénale (1)

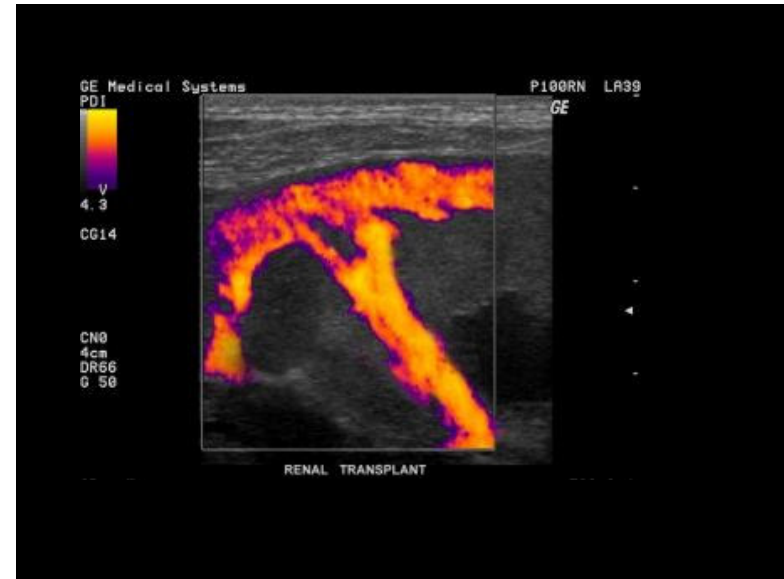
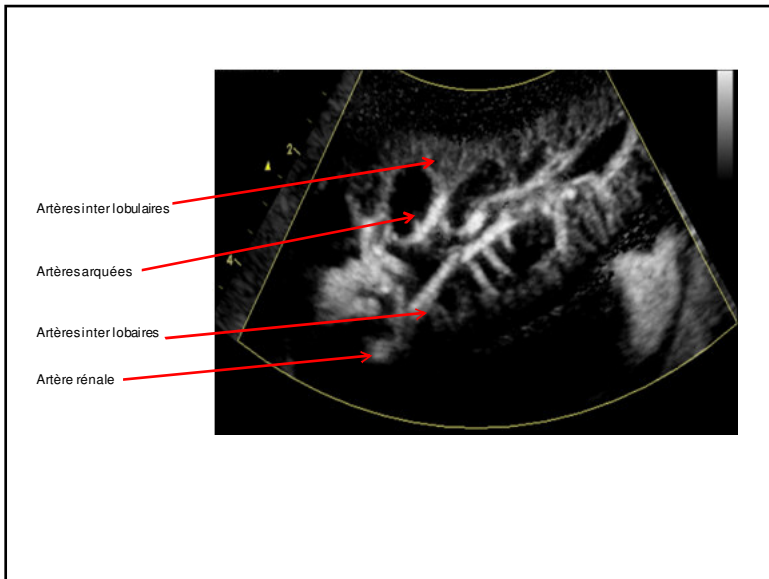
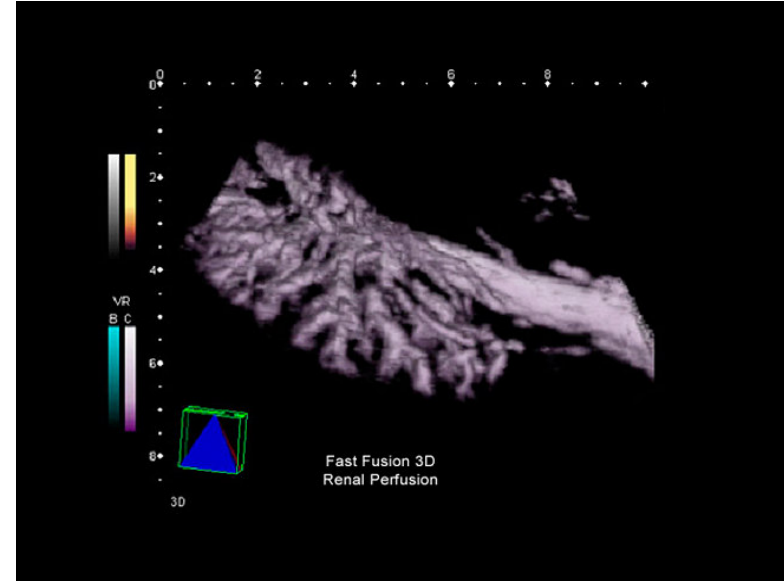
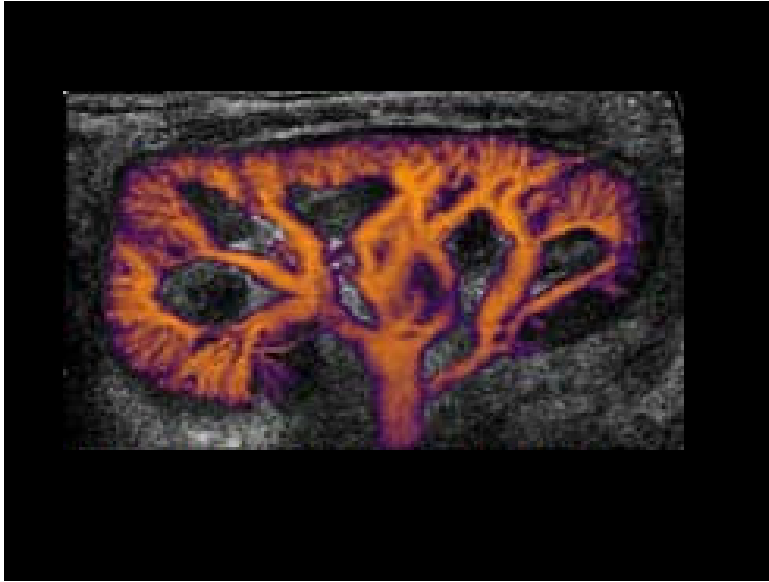
- Contrôle de l'artère du greffon à la recherche d'une **sténose (20 à 30% la première année)** en cas de :
 - HTA
 - Altération Clairance Créatinine
 - Souffle
- Examen simple :
 - Greffon en position superficielle (fosse iliaque droite ou gauche, position médiale)
 - Greffon fixé
- Matériel :
 - Sonde Convexe abdominale
 - Sonde Phased Array
- Critères diagnostiques
 - VSM > 200 cm/sec
 - Rapport Vitesse > 2,5/3
 - IR dans le greffon

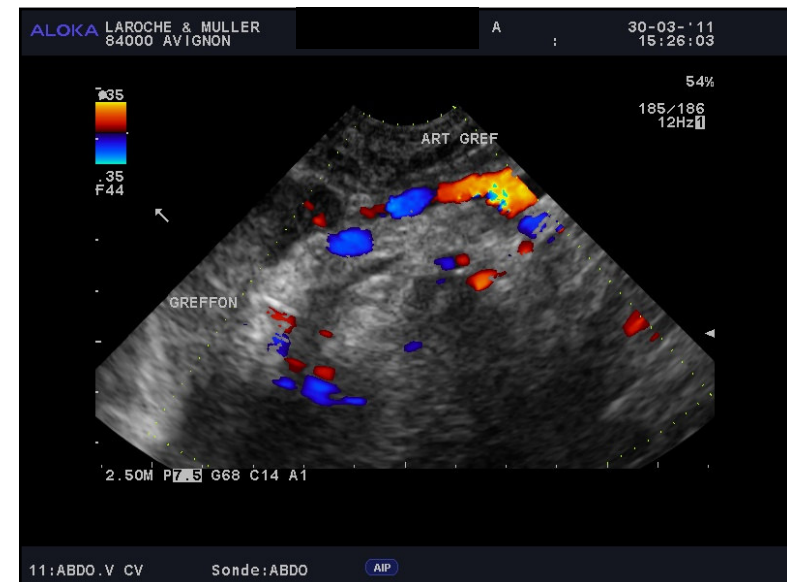
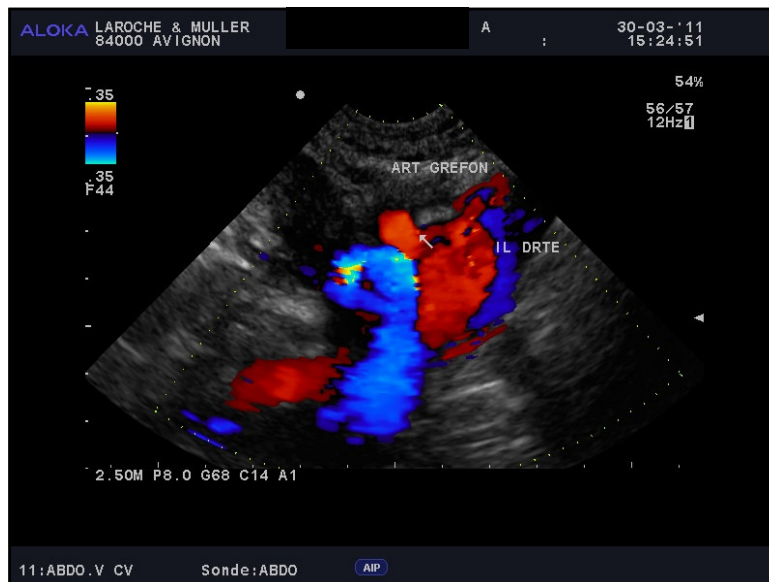
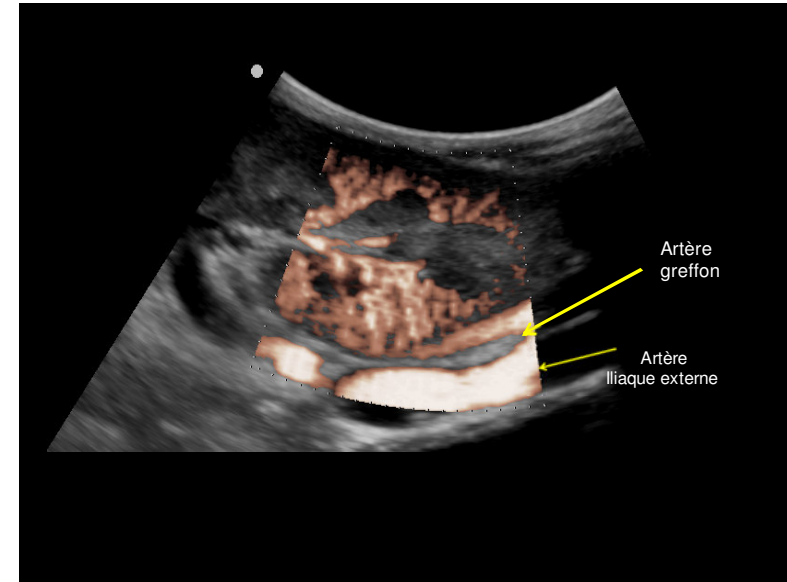
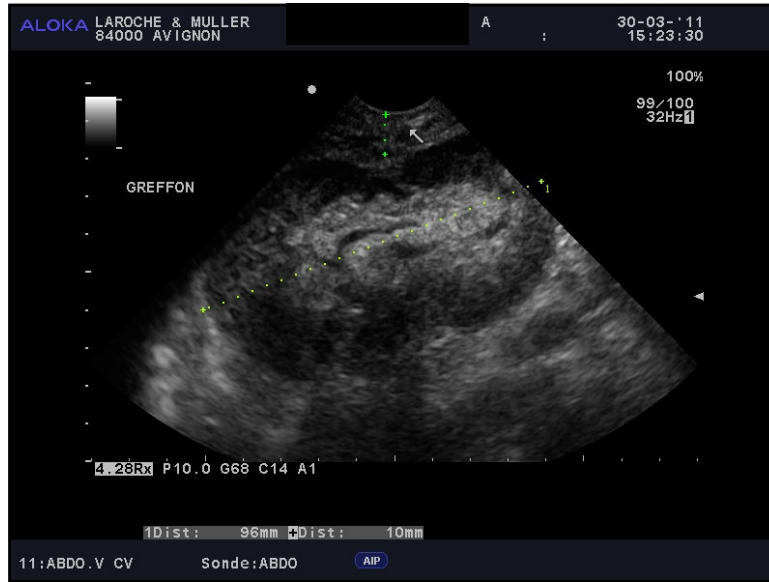
Echo Doppler et Greffe Rénale (2)

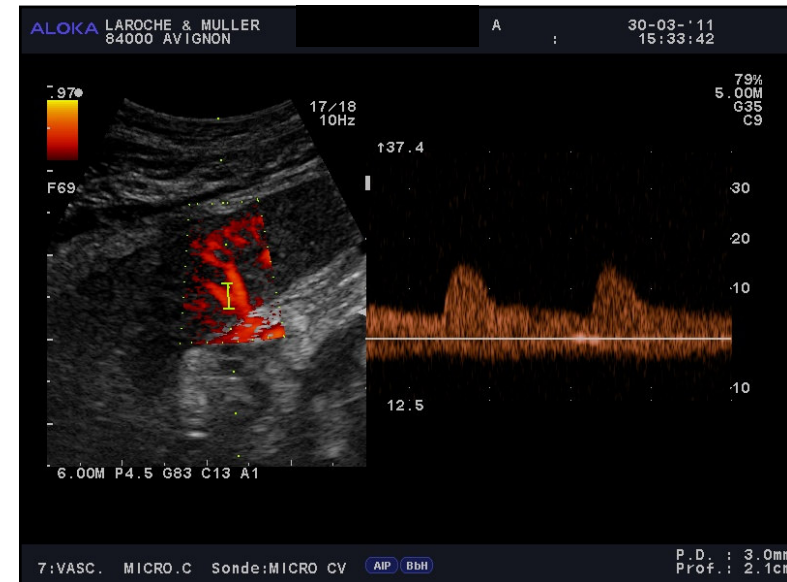
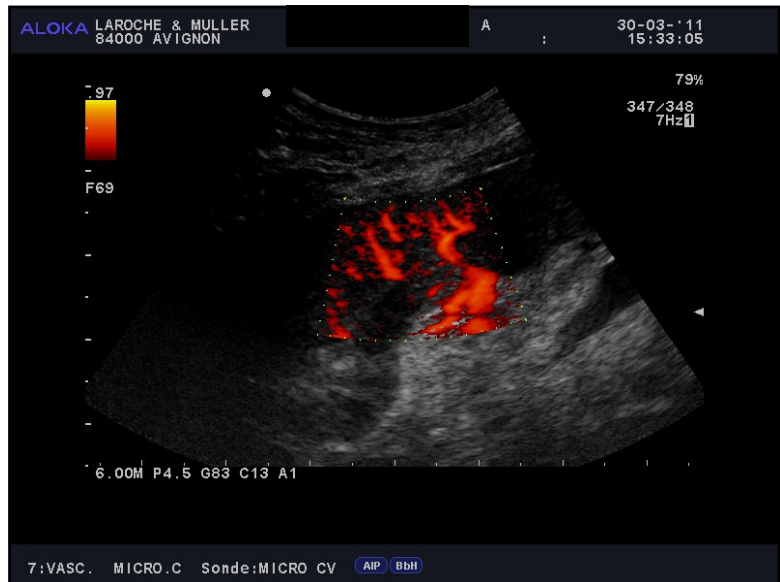
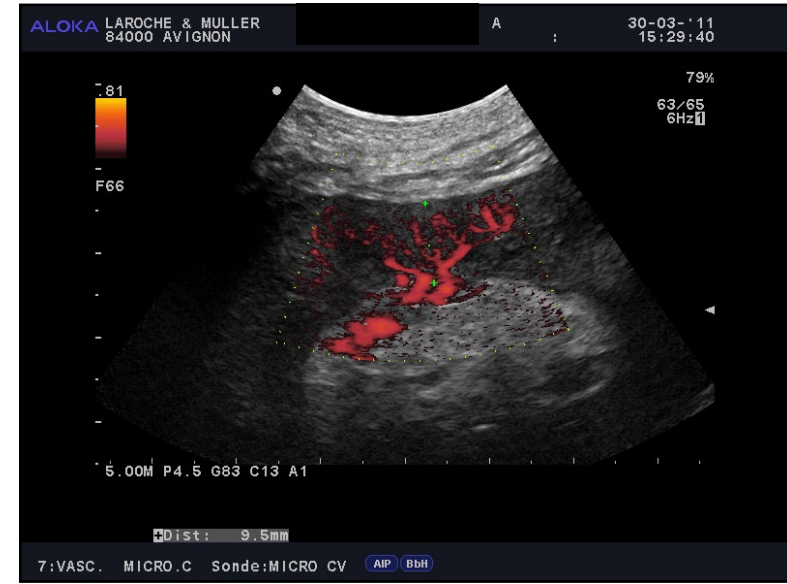
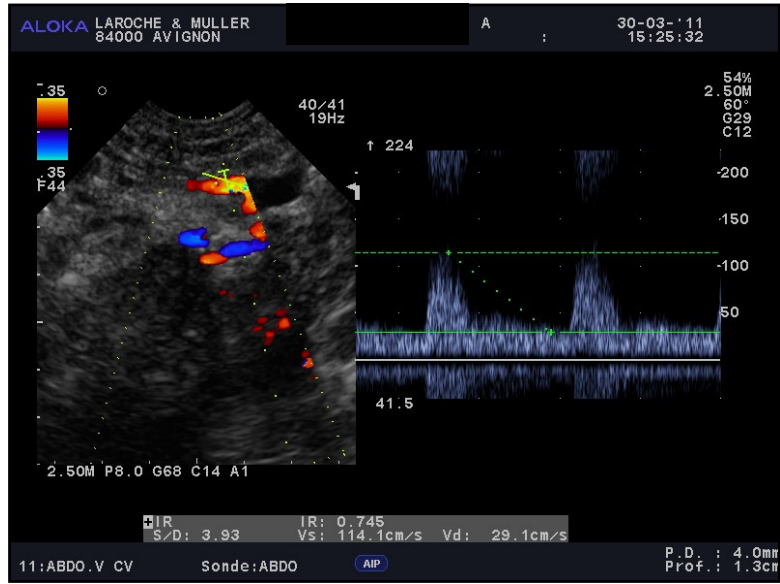
- Attention :
 - Etude systématique axe donneur (iliaque) , en amont et en aval de la zone d'anastomose
 - Les contrôles très précoces (post opératoire) génèrent des altérations des VSM
 - Variations anatomiques (1 ou 2 artères du greffon)
 - Nécessité d'avoir le CR opératoire
 - Ce n'est pas un examen systématique
 - FAV intra parenchyme post biopsie du greffon
- Fiabilité ++++

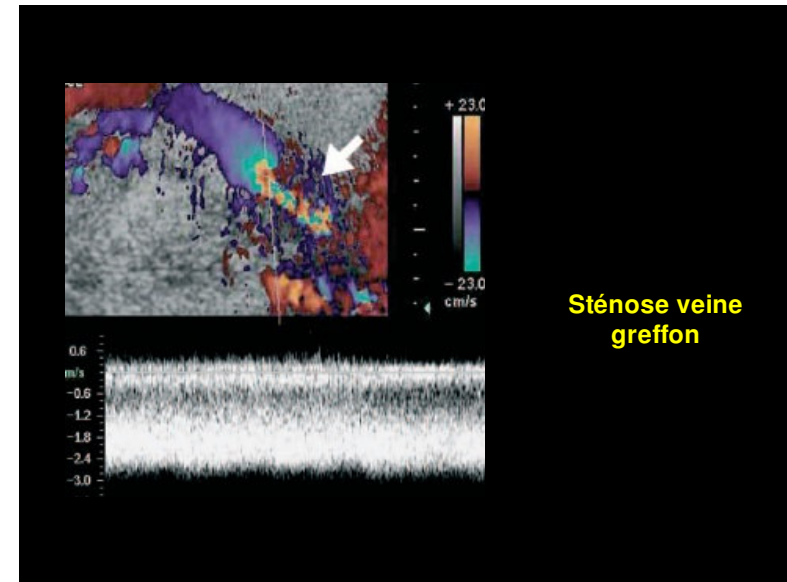
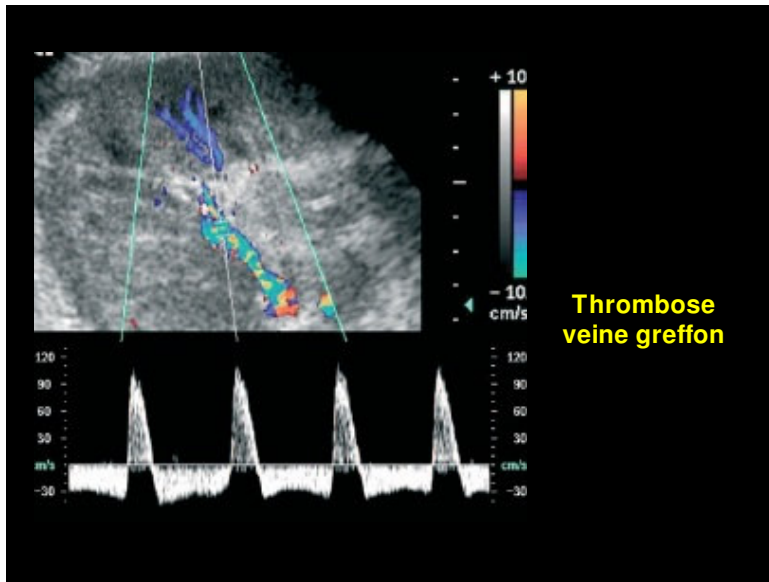
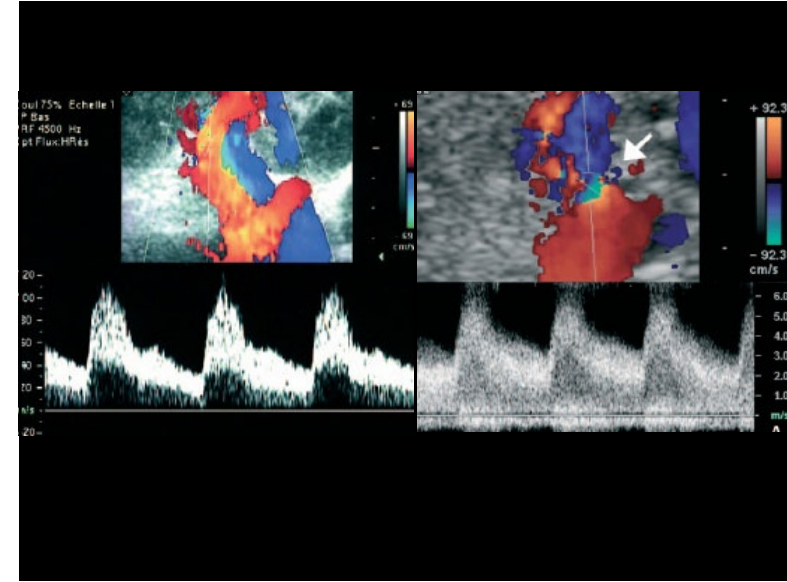
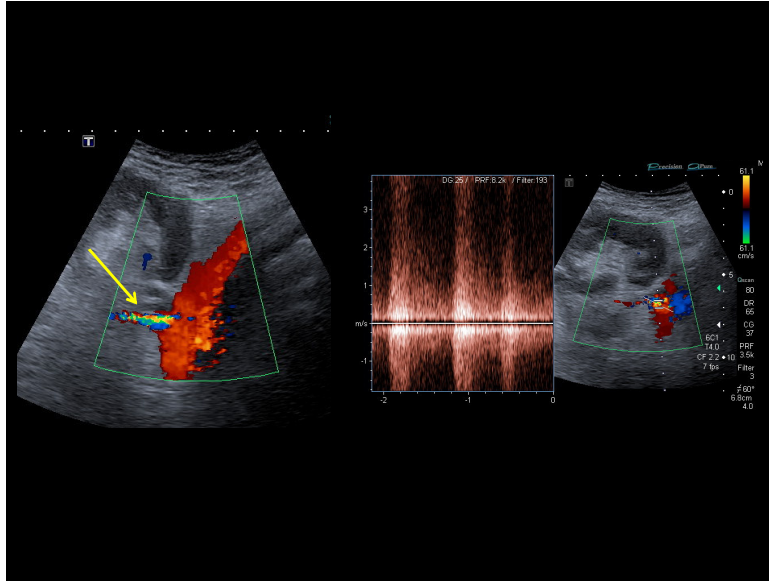
**Nécessité Echo Doppler fourche
AORTO ILIAQUE avant greffe**

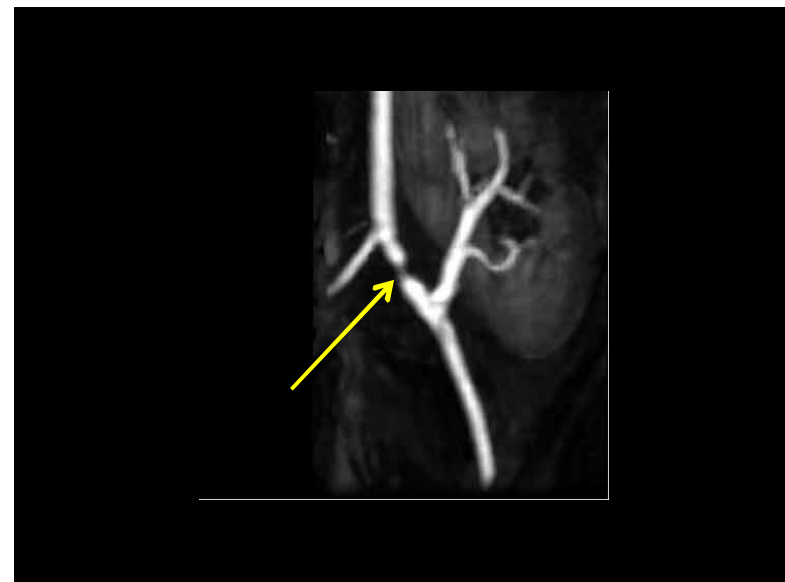
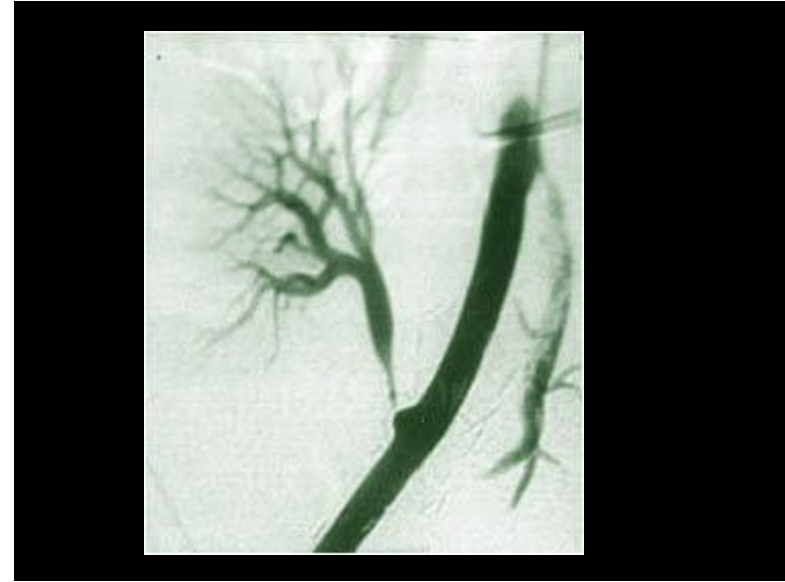
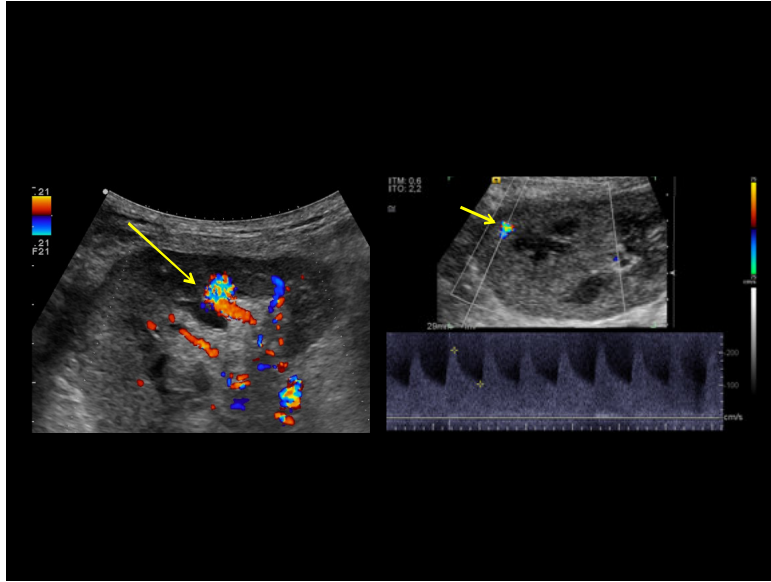


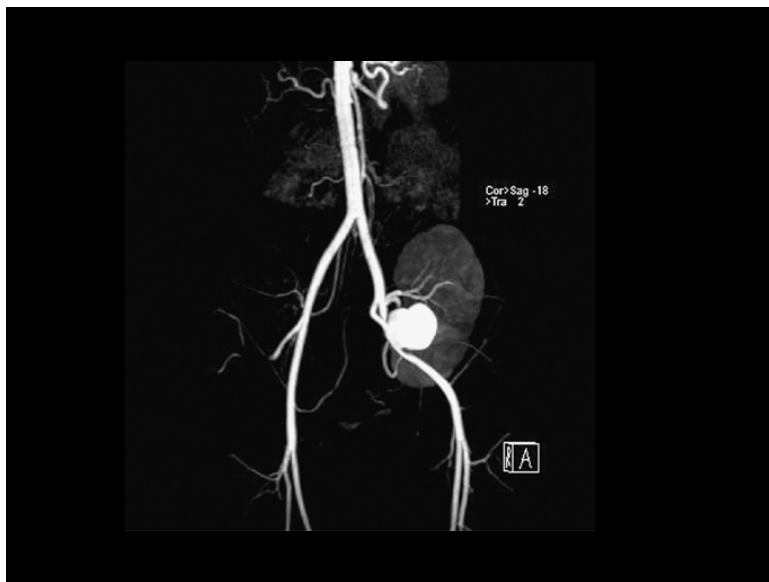
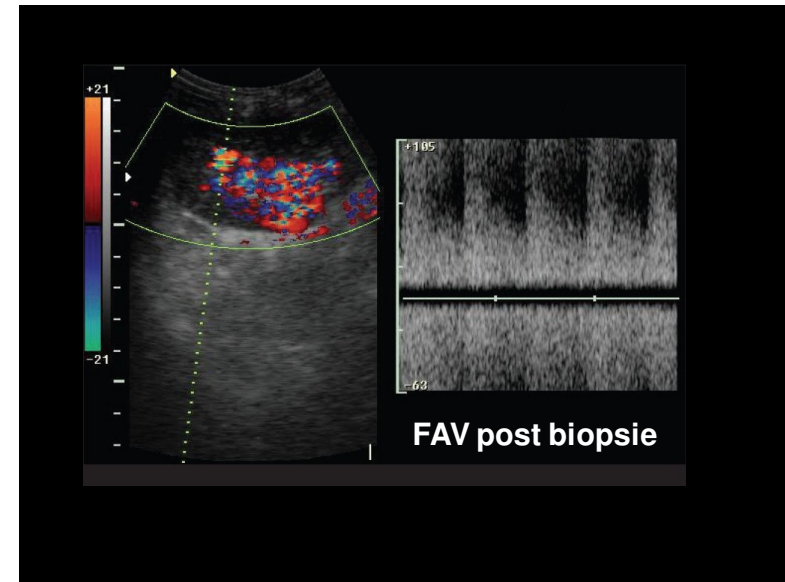
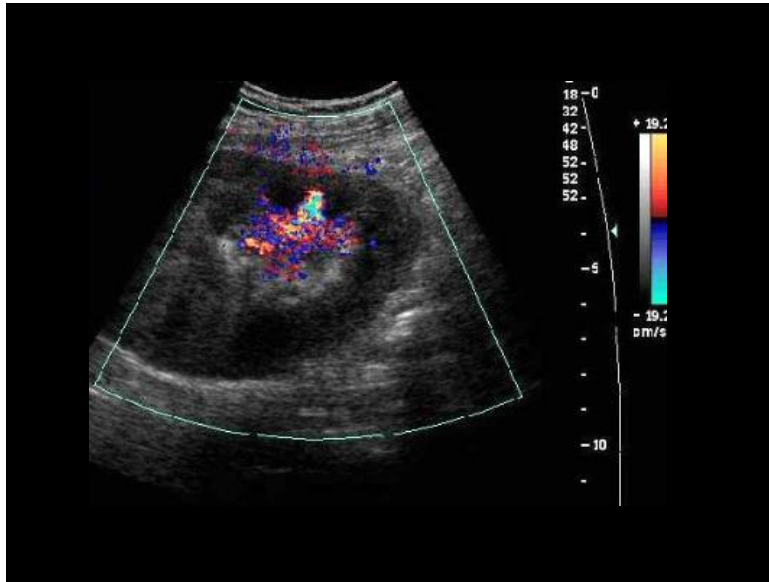












Conclusion : Echo Doppler Greffon Rénal

- Examen plus simple que l'Echo Doppler du rein en place
- Nécessite expérience ++++
- L'écho Doppler : EXAMEN DECISIONNEL en matière de détection de sténose de l'artère du greffon chez des patients pour lesquels la viabilité du greffon est VITALE +++++
- Travail en équipe

