Sténose d'artère rénale: Histoire naturelle Physiopathologie et Diagnostic

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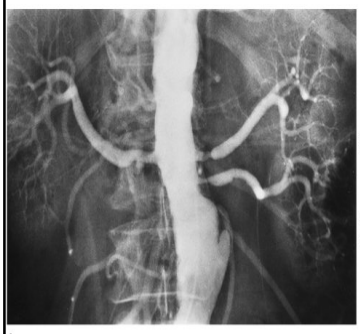
Service de Néphrologie CHU Liège



MANIFESTATIONS OF RENOVASCULAR DISEASE

Renal artery stenosis →
- Asymptomatic "Incidental RAS"
- Renovascular hypertension
- Ischemic nephropathy
- Accelerated CV disease
  - Congestive heart failure
  - Stroke
  - Secondary aldosteronism

A B

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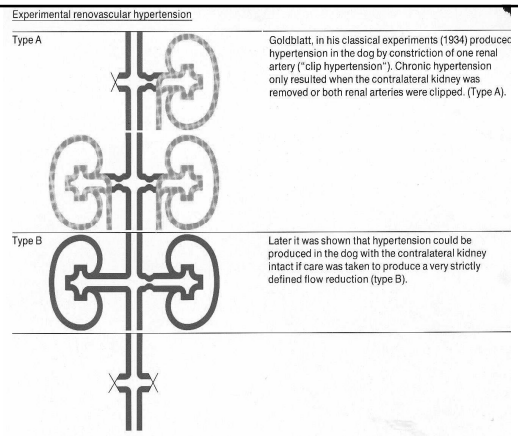
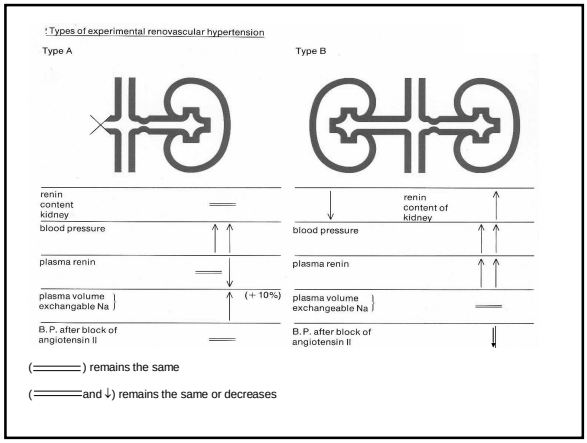
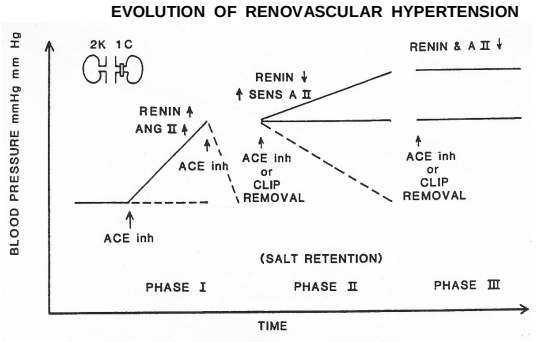






Schematic drawing showing theoretical phases of experimental (and clinical) Goldblatt renovascular hypertension.

Etiologies de la SAR

Table 1. **Features of the two major forms of renal artery disease**

Renal artery disease history	Incidence (%)	Age	Location of lesion in renal artery
Atherosclerosis	85–90	> 50 years	Proximal 2 cm;
Fibromuscular dysplasias	10		
Intimal		Children, young adults	Mid main renal artery and/or branches
Medial		25–50 years	Distal main renal artery and/or branches
Periarterial		15–30 years	Mid to distal main renal artery or branches

Table 1. **Arterial Involvement in Fibromuscular Dysplasia.***

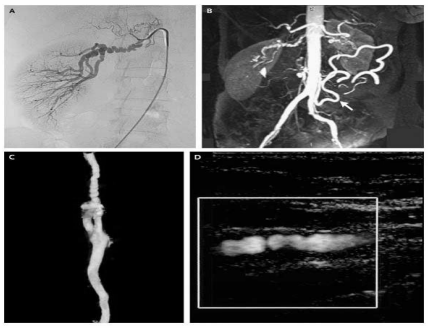
Arteries Involved	Frequency of Involvement (%)
Renal arteries	60–75
Bilateral	35
Extracranial cerebrovascular circulation (carotid or vertebral arteries)	25–30
Associated intracranial aneurysm	7–50
Multiple vascular beds	28
Other arterial beds (iliac, popliteal, splanchnic, hepatic, coronary, subclavian, brachial, aorta, superficial femoral, tibial, or peroneal)	Uncommon, exact frequency unknown

* Fibromuscular dysplasia may be a generalized process; in rare cases, it has also been identified in the venous system.

10 à 15% familial

Slovut, D. P. et al. N Engl J Med 2004;350:1862-1871

Imaging of Fibroplasia

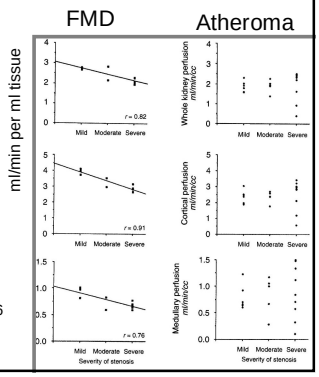


Slovut, D. P. et al. N Engl J Med 2004;350:1862-1871

Parenchymal perfusion and stenosis grade

Tissue perfusion is related to stenosis grade in FMD, not in atherosclerotic RAS

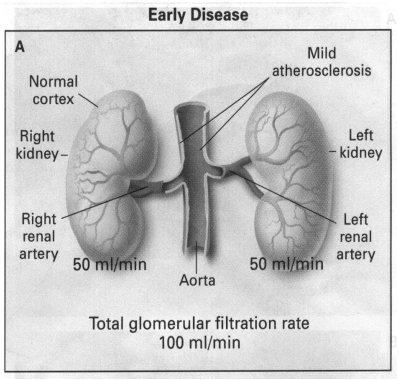
Lerman et al., Kidney Int 1996;49:846



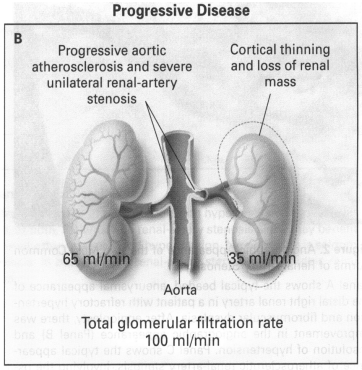
Histoire naturelle d'une SAR athéroscléreuse

Facts about atherosclerotic RAS

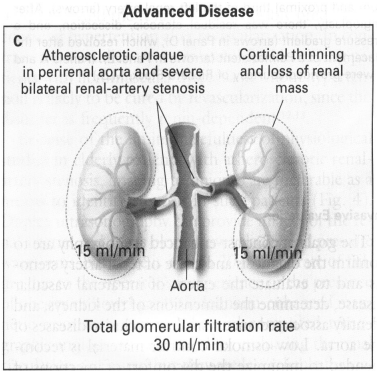
- Atherosclerotic RAS (ARAS) is a progressive disease.
- It affects patients with atherosclerosis elsewhere, and long-term outcome is driven by extrarenal disease.
- Many patients with ARAS need angiotensin-converting enzyme inhibition (ACEI).



Safian and Textor, ***N Engl J Med***, 2001, **344**, 430-442.



Safian and Textor, ***N Engl J Med***, 2001, **344**, 430-442.

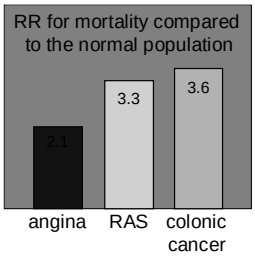


Safian and Textor, ***N Engl J Med***, 2001, **344**, 430-442.

Pronostic

Mortality and renal events in ARAS

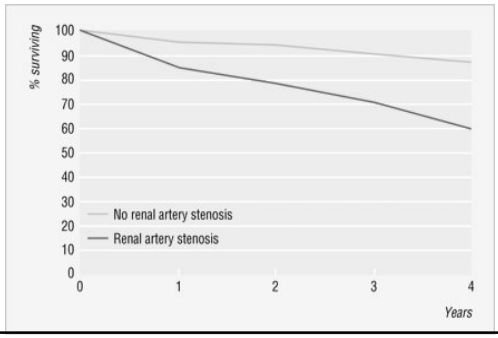
Causes of death (7.1-year FU)	
MI	50 %
CHF	14 %
Stroke	7 %
Aneurysm	5 %
Renal failure	5 %
Non-renal non-CV	19 %



Johansson et al., J Hypertens 1999;17:1743 (n=164)

Effect of coexistent RAS on survival among patients having coronary angiography

McLaughlin et al BMJ 2000; 320: 1124



Prévalence

Prévalence des sténoses de l'artère rénale

Prévalence pour la population générale : autopsie de 5.194 patients (Sawicki ***et al., J.Int.Med.***, 1991)

⇒ 4,3% âge moyen 69 ans

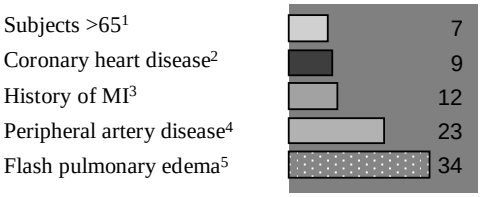
Prévalence accrue dans les populations à risque :

⇒ Hypertendus

⇒ Diabétiques

Prévalence dépendante de l 'âge

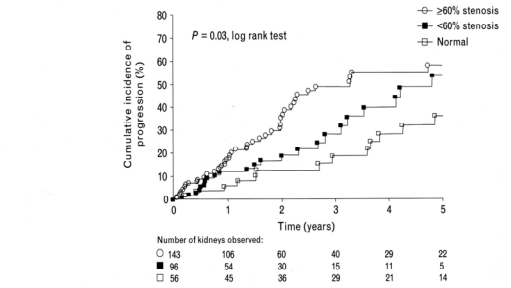
Prevalence of RAS by presentation, %



[2] Hansen et al., J Vasc Surg 2002;36:443
[2] Conlon et al., Kidney Int 2001;60:1490
[3] Uzu et al., Am J Kidney Dis 1997;29:733
[4] Swartbol et al., Int Angiol 1992;11:195
[5]MacDowall et al., Lancet 1998;352:13

Progression de la SAR

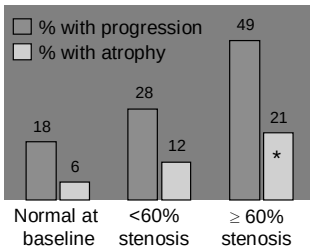
Fig. 6



Progression of atherosclerotic renal artery disease by baseline status. Reprinted with permission from Caps

Textor J HTA 2005; 23, suppl 3.

Renovascular disease progression in RAS

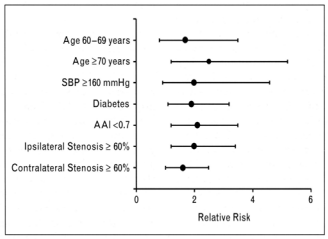


n=170, 33-mo follow-up
Progression: detectable increase in stenosis grade
Atrophy: reduction in renal length by > 1 cm

Occlusion* incidence: 3%

Caps et al., Circulation 1998;98:2866 and Kidney Int 1998;53:735

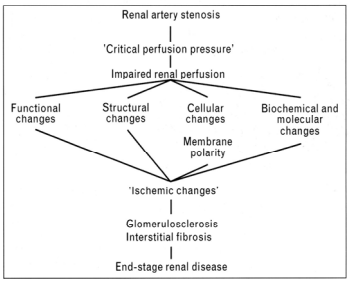
Fig. 1



Risk factors for progression of renal artery stenosis. ●, mean values; bars, 95% confidence intervals. SBP, systolic blood pressure; AAI, ankle–arm index. Adapted with permission from Caps.

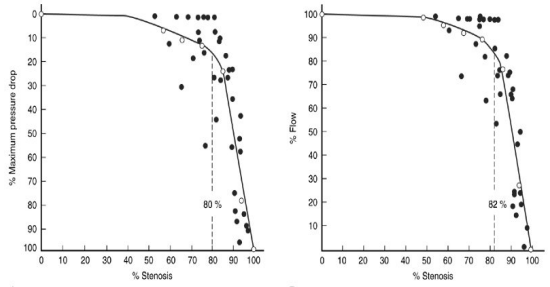
Covit A., ***J Hypertens***, 2005; 23 (suppl 3): S15-S22.

Fig. 1



Pathologic progression from renal artery stenosis to end-stage renal disease.

Jaff M., ***J Hypertens***, 2005; 23 (suppl 3): S1-S3.



(From May AG, Van de Berg L, DeWeese JA, et al: Critical arterial stenosis. Surgery 54:250-259, 1963.)

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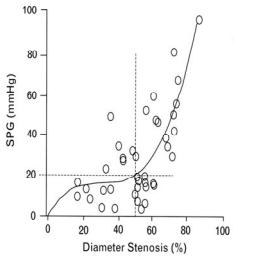
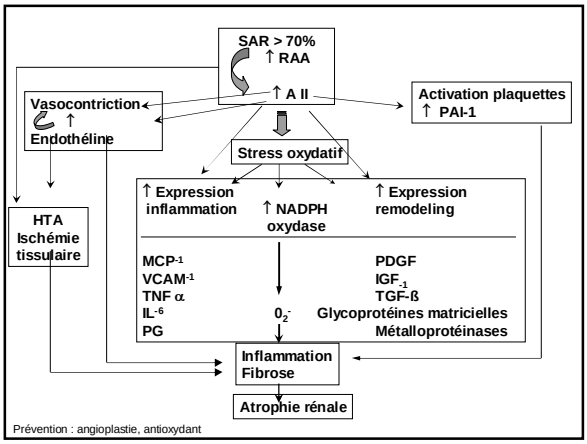
Fig. 2



Relationship between the systolic pressure gradient (SPG) and the percentage stenosis of the renal artery. Circles depict individual data points. The solid line depicts the curvilinear third-order exponential fit of these data points, and the dashed lines depict the break point in this curvilinear relationship.

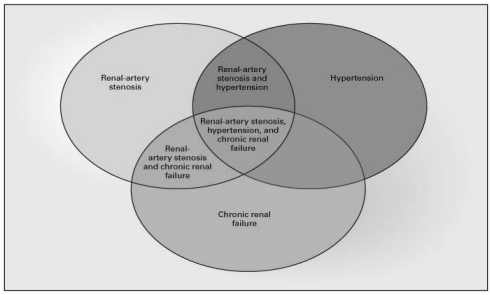
Gray B., ***J Hypertens***, 2005; 23 (suppl 3): S23-S29.



Prévention : angioplastie, antioxydant

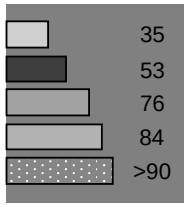
Clinique d'une SAR

Interrelation among Renal-Artery Stenosis, Hypertension, and Chronic Renal Failure.



Safian, R. D. et al. N Engl J Med 2001;344:431-442

Prevalence of HTN in patients with RAS, %



[1] MacDowall et al., Lancet 1998;352:13
[2] Hansen et al., J Vasc Surg 2002;36:443
[3] Conlon et al., Kidney Int 2001;60:1490
[4] Swartbol et al., Int Angiol 1992;11:195

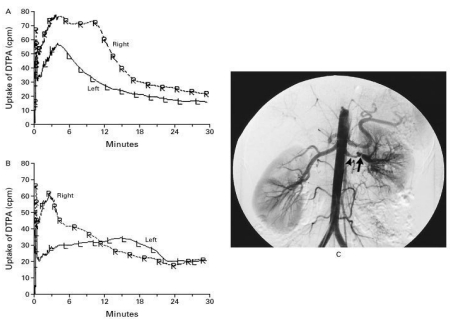
TABLE 1. CLINICAL FINDINGS ASSOCIATED WITH RENAL-ARTERY STENOSIS.

Hypertension
Abrupt onset of hypertension before the age of 50 years (suggestive of fibromuscular dysplasia)
Abrupt onset of hypertension at or after the age of 50 years (suggestive of atherosclerotic renal-artery stenosis)
Accelerated or malignant hypertension
Refractory hypertension (not responsive to therapy with ≥3 drugs)
Renal abnormalities
Unexplained azotemia (suggestive of atherosclerotic renal-artery stenosis)
Azotemia induced by treatment with an angiotensin-converting–enzyme inhibitor
Unilateral small kidney
Unexplained hypokalemia
Other findings
Abdominal bruit, flank bruit, or both
Severe retinopathy
Carotid, coronary, or peripheral vascular disease
Unexplained congestive heart failure or acute pulmonary edema

Safian and Textor, ***N Engl J Med***, 2004, **344**, 431-442.

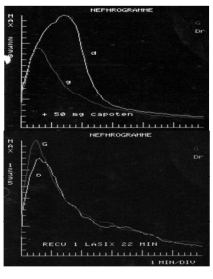
Comment explorer?
Tests fonctionnels
Tests anatomiques

A 22-year-old woman had had hypertension for one year, a vascular bruit on the left-hand side of the upper abdomen. Renal scanning with [99mTc]pentetic acid (DTPA) (Panel A). The patient was then given 25 mg of captopril orally, (Panel B). The scintigraphic images also suggested the presence of stenosis of the left renal artery (confirmed by arteriography).



Goto, A. et al. N Engl J Med 2001;344:430

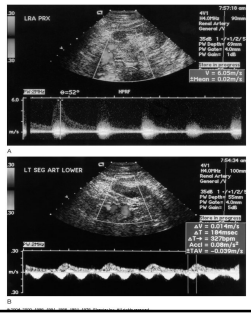
Angioscintigraphie rénale MAG3 +/- captopril



AVANTAGES:
- - non invasif
- - image fonctionnelle
- - DFM

DESAVANTAGES:
pertes de sensibilité si
- - IRénale
- - lésions bilatérales
- - prise d'inhibiteurs RAA

ECHO-DOPPLER couleur



AVANTAGES
- - disponibilité, coût
- - non toxique, suivi
- - réponse tensionnelle (?)

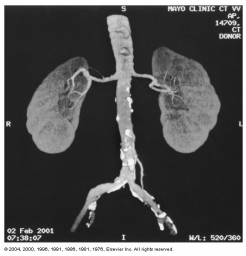
DESAVANTAGES
- - opérateur-dépendant
- - météorisme et adiposité
- - peut ne pas voir les artères accessoires

Angio-IRM + gadolinium

AVANTAGES
- - Vue anatomique 3-D
- - IRénale (+/-)
- - non opérateur-dépendant

DESAVANTAGES
- - disponibilité
- - claustrophobie
- - matériel métallique, suivi stent
- -Dysplasie FM

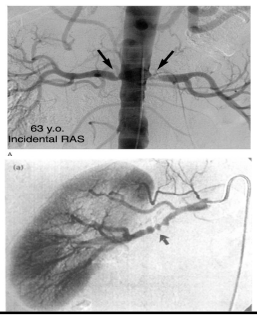
Angio-scanner



AVANTAGES
- - anatomie 3-D
- - disponibilité

DESAVANTAGES
- - produit de contraste
- - irradiation
- - DFM

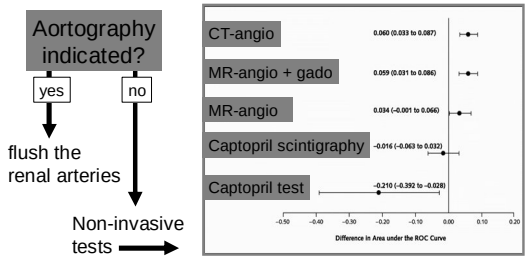
ARTERIOGRAPHIE



AVANTAGES
- - Gold standard
- - traitement dans la foulée

DESAVANTAGES
- - invasif
- - produit de contraste
- - hospitalisation

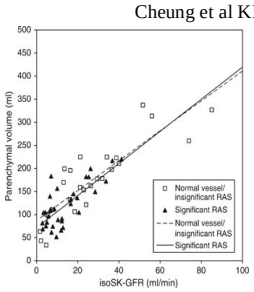
Imaging renal arteries in patients at risk, 2001



Vasbinder et al., Ann Intern Med 2001;135:401
reference test: ultrasonography

MR-derived renal morphology and renal function in ARVD

Cheung et al KI 2006; 69, 715



- 3D-MRI on 35 ARVD
- DTPA Tc (single-kidney GFR)
- Intérêt de coupler ces 2 mesures pour juger de l'intérêt de l'angioplastie.

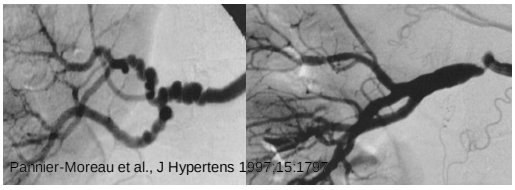
Conclusions

- La SAR est fréquente, pas toujours symptomatique.
- Le pronostic, dans le contexte de DFM est bon.
- Si contexte d'athérosclérose, le pronostic est surtout lié à l'état vasculaire général du patient.
- Le moment et le choix de l'exploration dépendent du patient, de l'expertise locale et du matériel.
- La découverte fortuite d'une SAR lors d'un examen ne doit pas obligatoirement conduire à une dilatation.

Merci pour votre attention.

Presentation of 104 unrelated patients

% females	90
Mean age at diagnosis	44.1
% with bilateral RAS	54
% with multifocal RAS	78
% with extrarenal stenosis	10
Familial presentation	11



Pannier-Moreau et al., J Hypertens 1997 15:1707