GROSSESSE ET MALADIES RÉNALES

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Rein et grossesse

- Modifications physiologies rénales
- Infections urinaires, lithiases
- Néphropathies chroniques
- Dialyse et transplantation
- HTA chronique
- Pré-éclampsie

Modifications anatomiques

Taille des reins augmentée

- 1-1.5cm ou 30% en volume

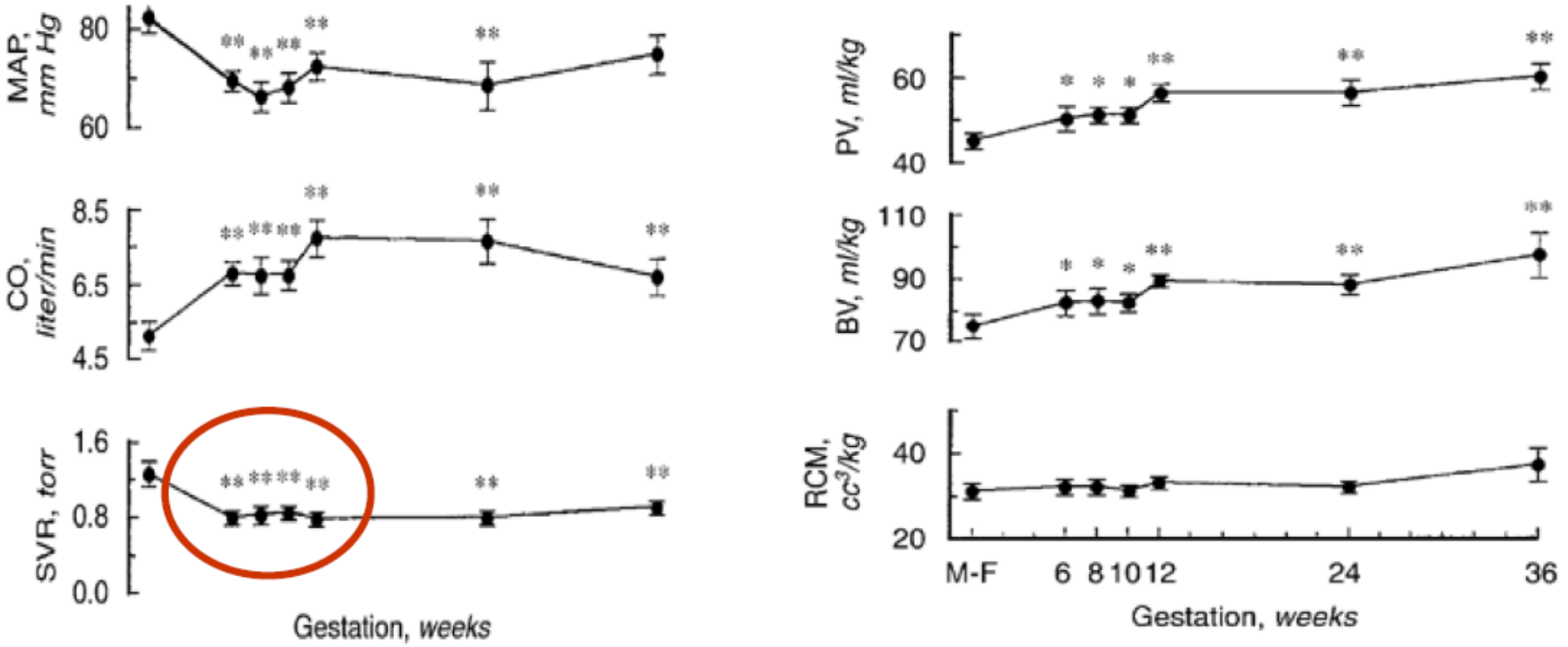
Dilatation de l'arbre urinaire

- 80-90%
- Prédominance droite
- Primi-parts
- Disparait en post-partum

Lié à progestérone, compression Utérine (dextrorotation)…

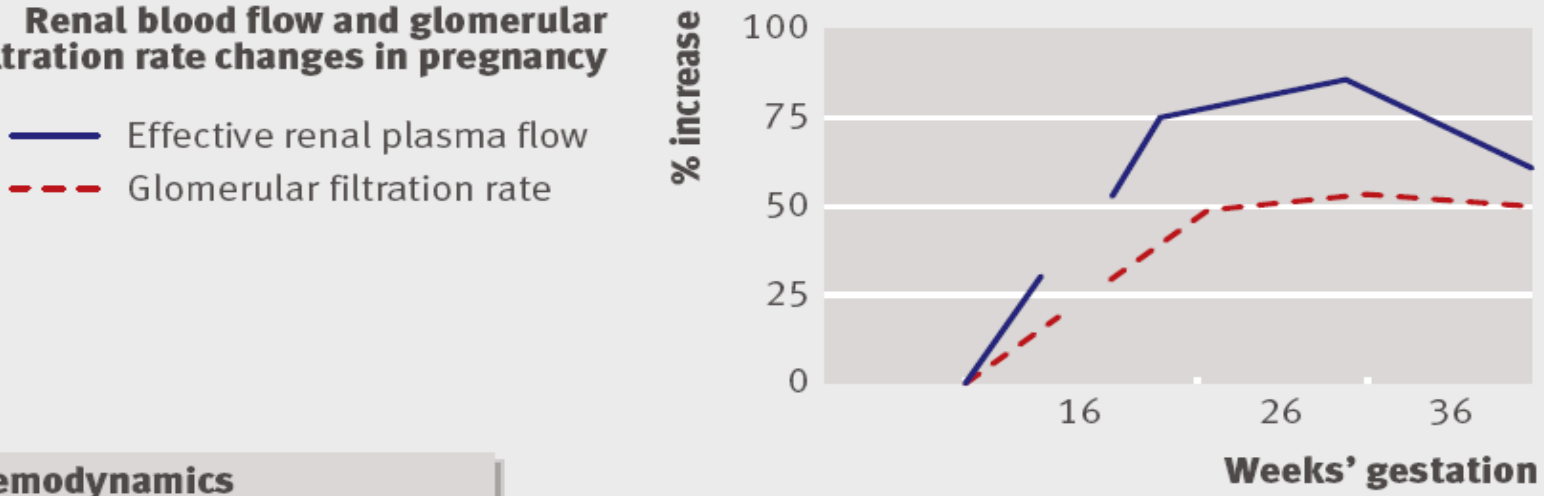
Fainaru. IntJObsGyn 2002

Modification de l'hémodynamique



Chapman. Kint 1998

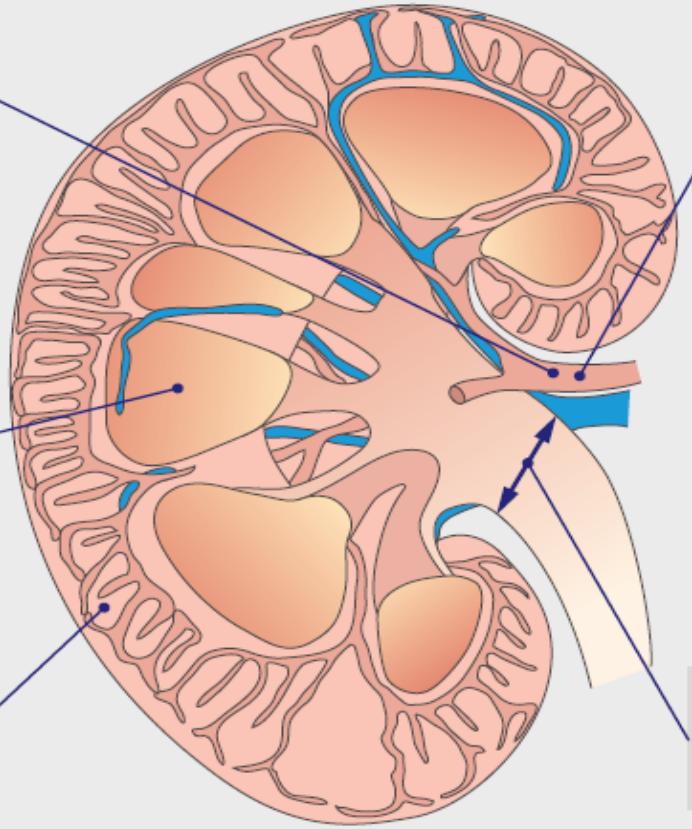
Renal blood flow and glomerular filtration rate changes in pregnancy



Renal haemodynamics
- ↑ Renal blood flow (70%)
  Plethoric kidney swells
- ↑ Bipolar diameter (1cm)
- ↑ Glomerular filtration rate (50%)
- ↑ Proteinuria (≤ 260 mg/24 h)

Tubular function
- ↑ Glycosuria
- ↑ Bicarbonaturia (metabolic acidosis)
- ↑ Calciuria
- ↓ Plasma osmolality
  (↓10 mosmol/kg)

Endocrine function
- ↑ Renin
- ↑ Erythropoietin
- ↑ Active vitamin D



↑ Pelvicalyceal dimensions (right › left)

Williams. BMJ 2008

Infections urinaires

Screening lors de visites

- Bactériurie: 2-7% des grossesses
- Risque ↑ prematurité + morbi-mortalité

→ traitement même si asymptomatique

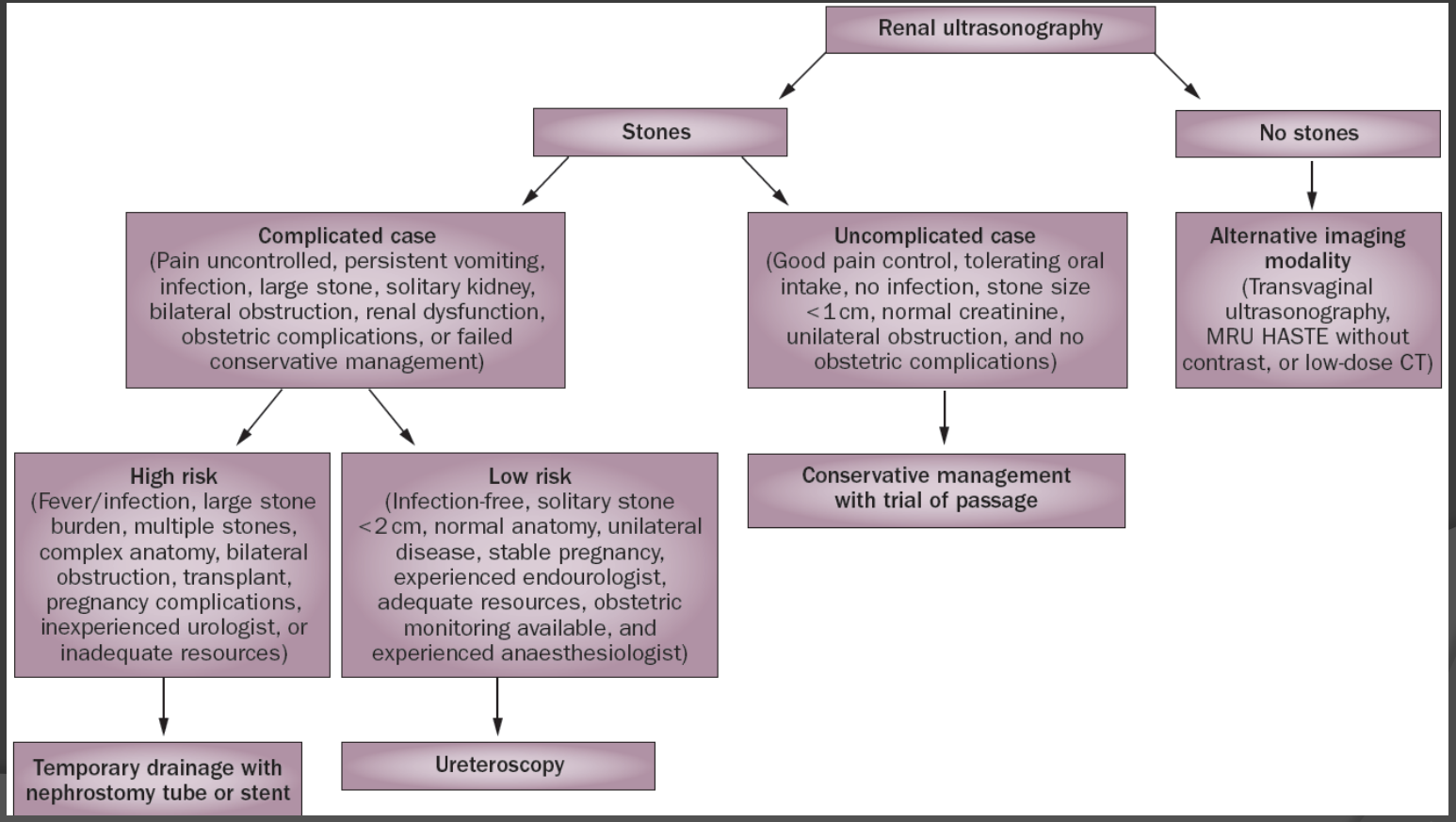
- IU basse: 1% grossesse
- Pyélonéphrite: favorisée par compression vessie, dilatation urétérale

→ traitement: pas de quinolones!

Lithiases urinaires

- Facteur favorisant: ↑ oxalate, calcium, urate, sodium urinaire
- Facteur protecteur:↑ citrate, mg, uromodullin

MAIS risque augmenté de cristallisation: stase (hydronéphrose), ↑ ph U



Semins. NatRevUrol 2013

Néphropathies chroniques

- Effets de l'IRC sur la grossesse

- Effet de la grossesse sur l'IRC

- Evolution IRC durant la grossesse:
  - Néphropathie diabétique
  - Néphropathie à IgA
  - Néphropathie lupique

Effet de la grossesse sur IRC

- Dépend du stade IRC: ↑ stade 3-5
- ↑ risque déclin fonction rénale si HTA ou protéinurie

Table 3 | Estimated effects of prepregnancy renal function on pregnancy outcome and maternal renal function. Values are the estimated percentage of women or neonates affected

Mean (SD) prepregnancy serum creatinine value (µmol/l)	Effects on pregnancy outcome				Loss of >25% renal function		
	Fetal growth restriction	Preterm delivery	Pre-eclampsia	Perinatal deaths	During pregnancy	Persists postpartum	End stage renal failure after 1 year
<125	25	30	22	1	2	0	0
125-180	40	60	40	5	40	20	2
>180	65	>90	60	10	70	50	35
On dialysis	>90	>90	75	50*	N/A	N/A	N/A

N/A=not applicable.
Estimates are based on literature from 1985-2007, with all pregnancies attaining at least 24 weeks' gestation.[1-4 7 8 w8-w16]
*If conceived on dialysis, 50% of infants survive; if conceived before introduction of dialysis, 75% of infants survive.

Williams. BMJ 2008

Effet de la grossesse sur IRC

- 360 femmes avec maladies rénales mais fonction rénale normale, pas de protéinurie

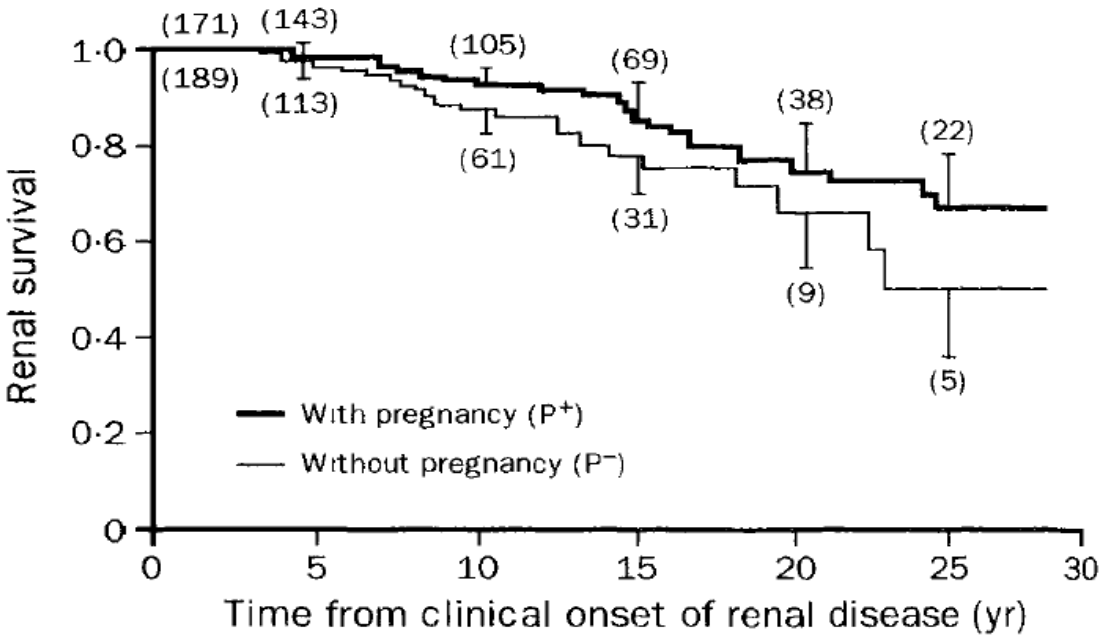


Figure 1: **Kaplan-Meier renal survival curves free of ESRF in P⁺ and P⁻ groups**

Bars represent 95% confidence intervals.

Jungers.Lancet 1995

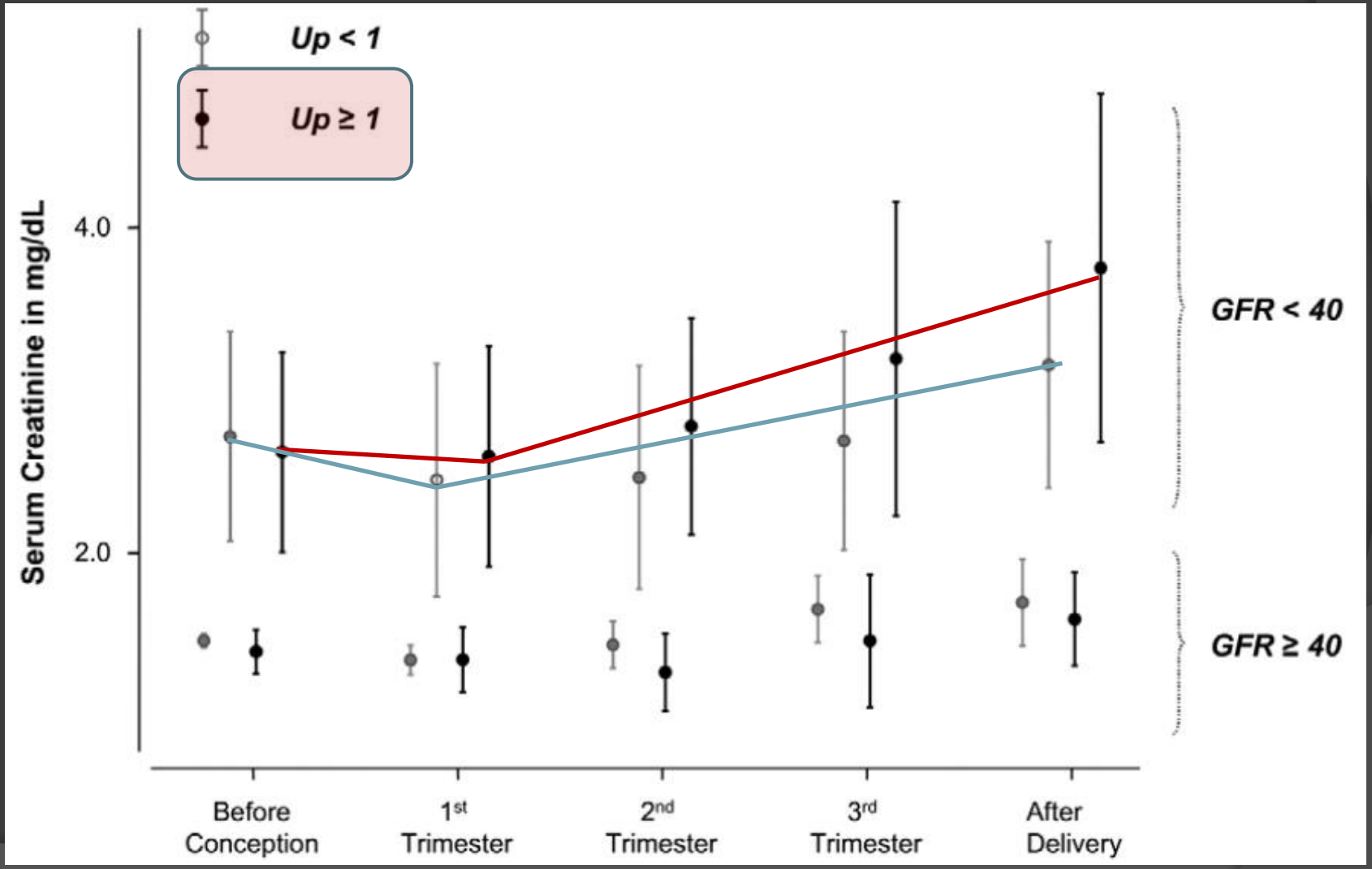
Effet de la grossesse sur IRC

	Odds ratio (95% CI)	p
Pregnancy after onset of glomerulonephritis		
No	1	
Yes	1·15 (0·61–2·18)	NS
Historical form of glomerulonephritis		
Membranous GN	1	
IgA GN	1·93 (0·6–6·2)	NS
Membranoproliferative GN	3·78 (1·2–12·1)	p<0·02
Focal and segmental glomerulosclerosis	6·9 (1·8–26·8)	p<0·007
Hypertension		
No	1	
Yes	8·94 (3·7–21·5)	p<0·0001
Proteinuria		
<1 g/d	1	
1–3 g/d	2·16 (1·5–7·1)	NS
>3 g/d	3·35 (1·2–13)	p=0·08

Table 2: **Adjusted relative risk for ESRF in relation to pregnancy, histological form of glomerulonephritis, hypertension, and proteinuria**

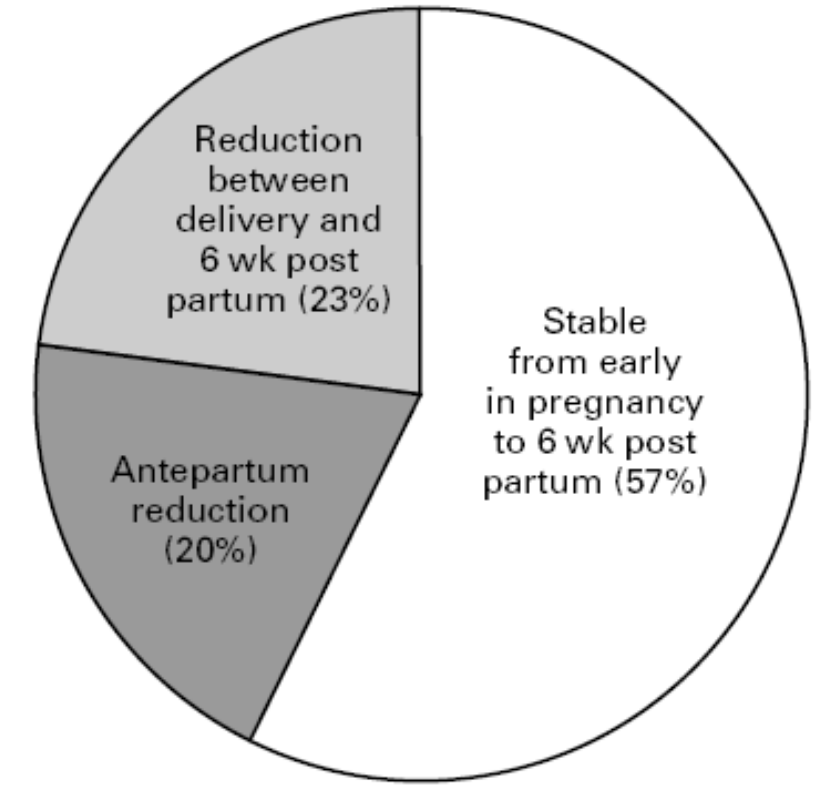
Jungers.Lancet 1995

Effet de la grossesse sur IRC

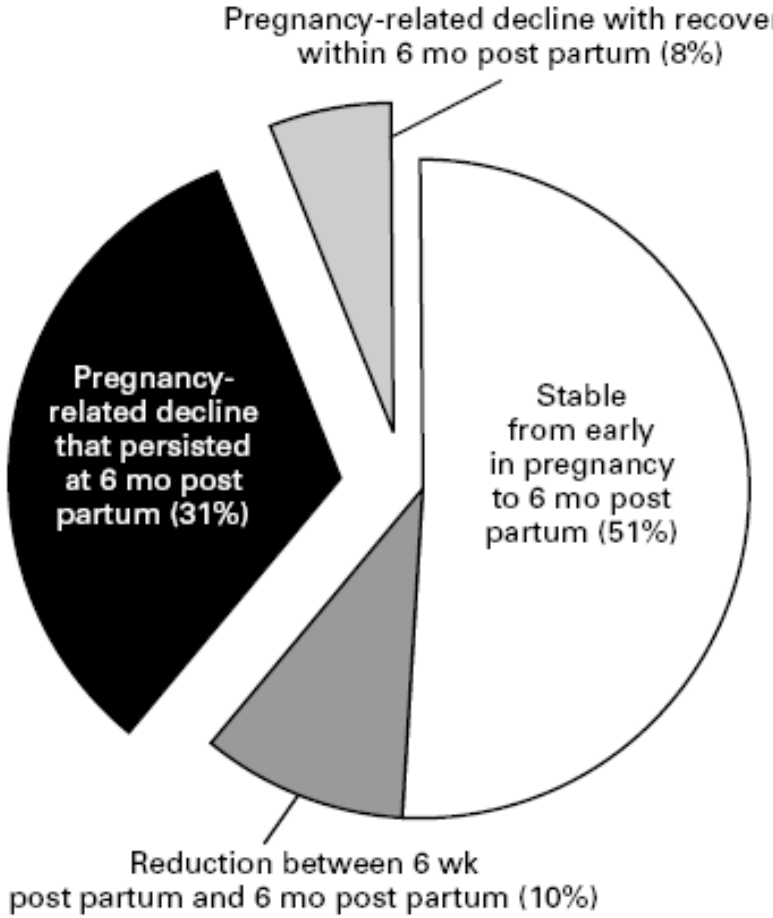


imbasciati. AJKD 2007

Effet de la grossesse sur IRC



Glomerular Filtration Rate during Pregnancy



Glomerular Filtration Rate 6 mo Post Partum

Jones. NEJM 1996

Effet de l'IRC sur la grossesse

Grossesse rare chez IRC en raison de baisse fertilité, dysfonction sexuelle et découragement par médecins

- Dépend du stade IRC: ↑ complications stade 3-5
- Ne semble pas dépendre d'HTA

Table 3 | Estimated effects of prepregnancy renal function on pregnancy outcome and maternal renal function. Values are the estimated percentage of women or neonates affected

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On dialysis	>90	>90	75	50*	N/A	N/A	N/A

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Estimates are based on literature from 1985-2007, with all pregnancies attaining at least 24 weeks' gestation.[1-4 7 8 w8-w16]
*If conceived on dialysis, 50% of infants survive; if conceived before introduction of dialysis, 75% of infants survive.

Williams. BMJ 2008

Effet de l'IRC sur la grossesse

Outcome	Kidney Disease	No Kidney Disease	*P*
Delivery timing[a]			
Preterm	151 (19.4)	106 (13.6)	0.002
Extremely preterm	10 (1.3)	1 (0.1)	0.007
Early preterm	44 (5.7)	11 (1.4)	<0.001
Late preterm	97 (12.5)	94 (12.1)	0.8
Delivery by cesarean	251 (32.3)	207 (26.6)	0.01
LOS in hospital > 3 d	117 (15.0)	95 (12.2)	0.1
Gestational age at delivery (wk)	37.5 ± 2.5	38.2 ± 1.8	<0.001
Preeclampsia/eclampsia	72 (9.3)	66 (8.5)	0.6
Maternal death	9 (1.2)	8 (1.0)	0.8
Infant weight at birth (g)	3,106 ± 675	3,314 ± 560	<0.001
Low birth weight, ie, <2,500 g	102 (13.1)	47 (6.0)	<0.001
SGA infant	71 (9.1)	54 (6.9)	0.1
Infant death	1 (0.1)	2 (0.3)	0.6
Admission to NICU	75 (9.6)	43 (5.5)	0.002
Admission to NICU/ infant death	75 (9.6)	45 (5.8)	<0.001

- ✓ ↑ risque prématurité
- ✓ ↑ risque césarienne
- ✓ ↑ risque petit poids
- ✓ ↑ risque SI

Kendrick .AJKD2015

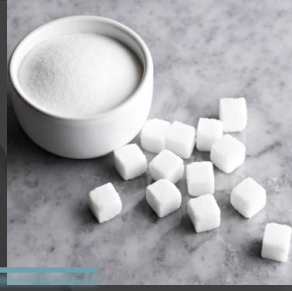
Effet de l'IRC sur la grossesse

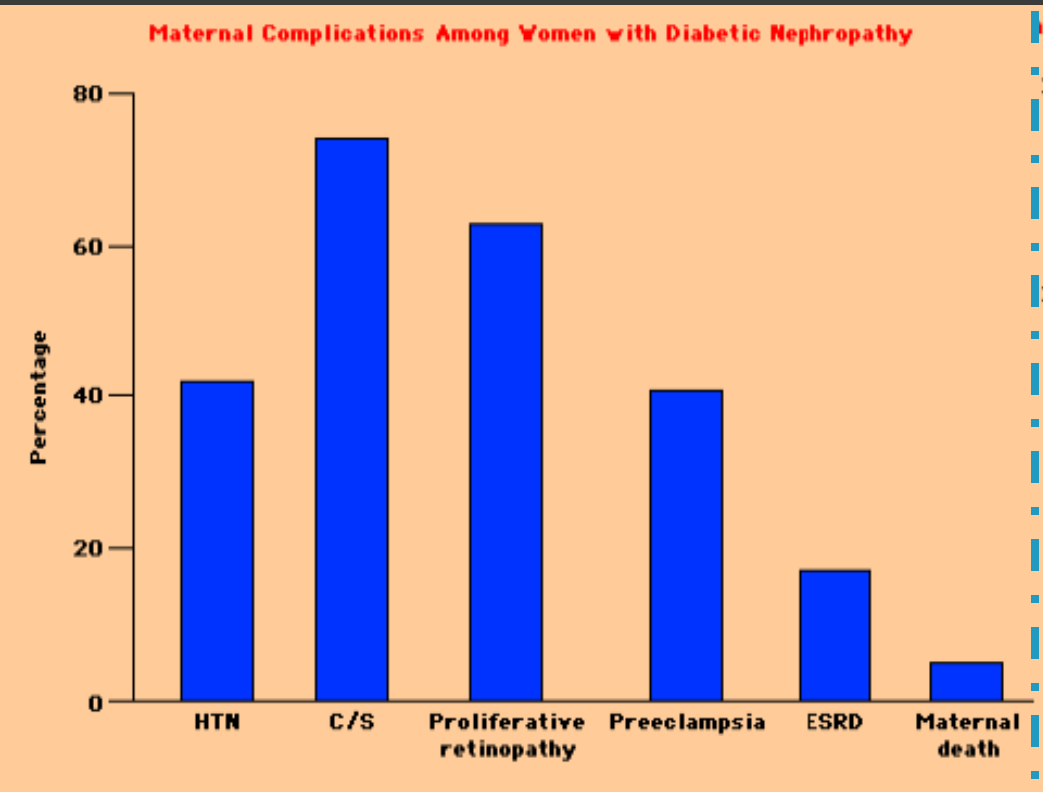
- Effet protéinurie de départ et IRC?

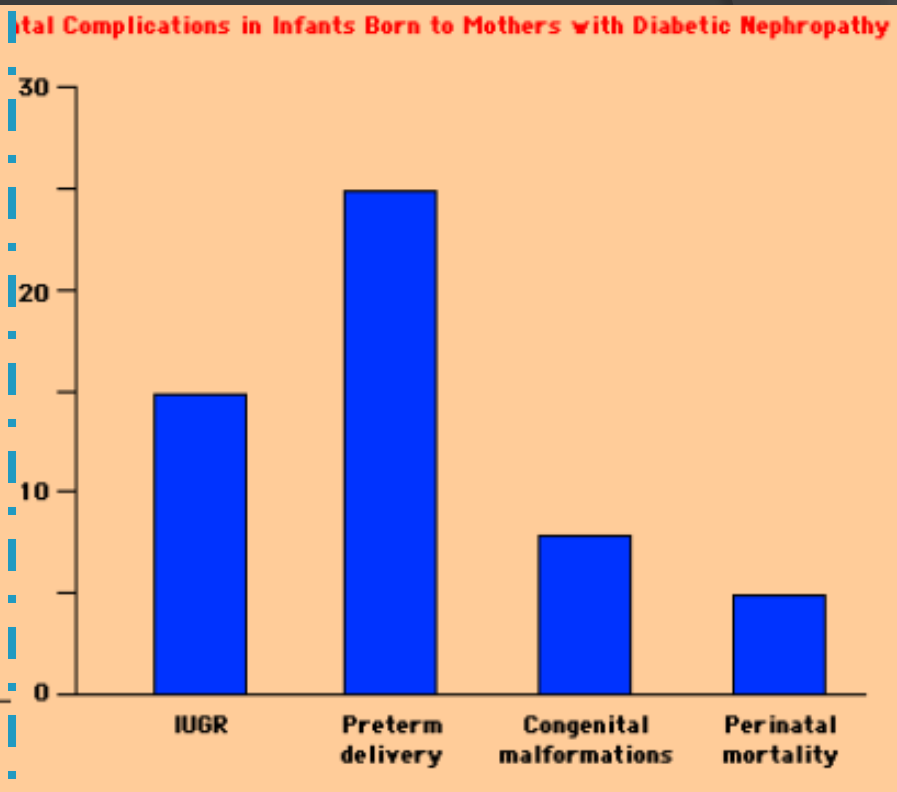
	All (N = 49)	GFR* ≥ 40mL/min/1.73 m^2 & Up < 1 g/d (N = 16)	GFR* ≥ 40mL/min/1.73 m^2 & Up ≥ 1 g/d (N = 6)	GFR* < 40 mL/min/1.73 m^2 & Up < 1 g/d (N = 12)	GFR* < 40 mL/min/1.73 m^2 & Up ≥ 1 g/d (N = 15)
Pregnancy duration (wk)	35.2 ± 3	36.7 ± 2.5	35.3 ± 2.3	35 ± 1.8	33.5 ± 3.5
Preterm delivery (<37 wk)	31 (63 [49-75])	7 (44 [23-67])	4 (66 [30-90])	9 (75 [47-91])	11 (73 [48-89])
Cesarean sections	36 (73 [60-84])	11 (69 [44-86])	2 (33 [10-70])	12 (100 [76-100])	11 (73 [48-89])
Perinatal deaths	2 (4 [1-14])	0 (0 [0-19])	0 (0 [0-39])	0 (0 [0-24])	2 (13 [4-38])
Birth weight (g)	2,262 ± 735	2,519 ± 670	2,540 ± 787	2,275 ± 531	1,864 ± 806
Birth weight < 2,500 g	29 (59 [45-72])	7 (44 [23-67])	1 (17 [3-56])	9 (75 [47-91])	12 (80 [55-93])
Small for gestational age	19 (39 [26-53])	6 (38 [18-61])	1 (17 [3-56])	4 (33 [14-61])	8 (53 [30-75])

Imbasciati. AJKD 2007

Néphropathie diabétique: complications







uptodate

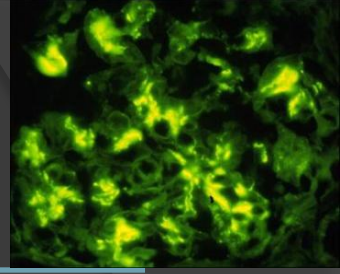
Néphropathie diabétique: progression ?

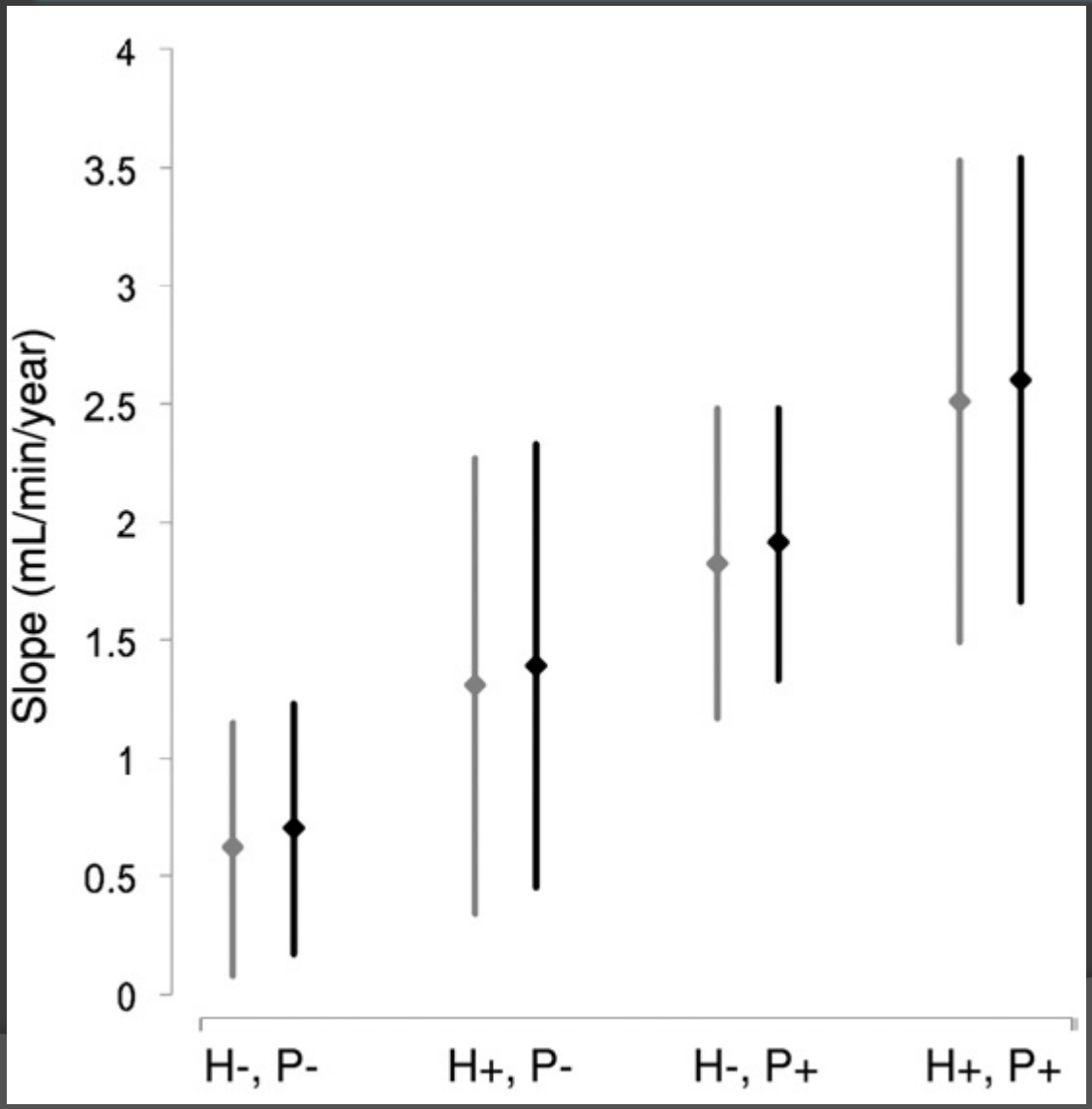
- Pas de risque de progression de la microalbuminurie lié à grossesse si contrôle glycémique et tensionnels bons.

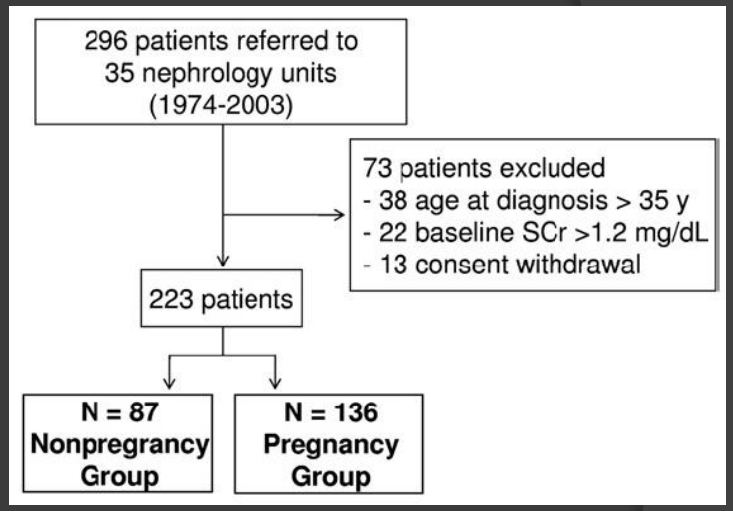
Complication/risk factor	Progression to complication*		Adjusted OR†	*P*-value
Microalbuminuria	Yes = 32	No = 235		
Gave birth (%)	25	23	1.34 (0.55, 3.27)	0.6
Age (years)	24 ± 7	26 ± 6	0.98 (0.91, 1.06)	0.6
Duration (years)	10 ± 6	11 ± 7	1.02 (0.96, 1.09)	0.7
HbA_{1c} (%)	7.5 ± 2	6.2 ± 1.9	1.36 (1.12, 1.64)	0.002
Systolic BP (mmHg)‡	110 ± 11	111 ± 13	0.99 (0.96, 1.03)	0.6

- Progression possible si IRC avancée
- Grossesse non contre-indiquée
- Bloqueurs du système RAA doivent être arrêtés.

Néphropathie à IgA





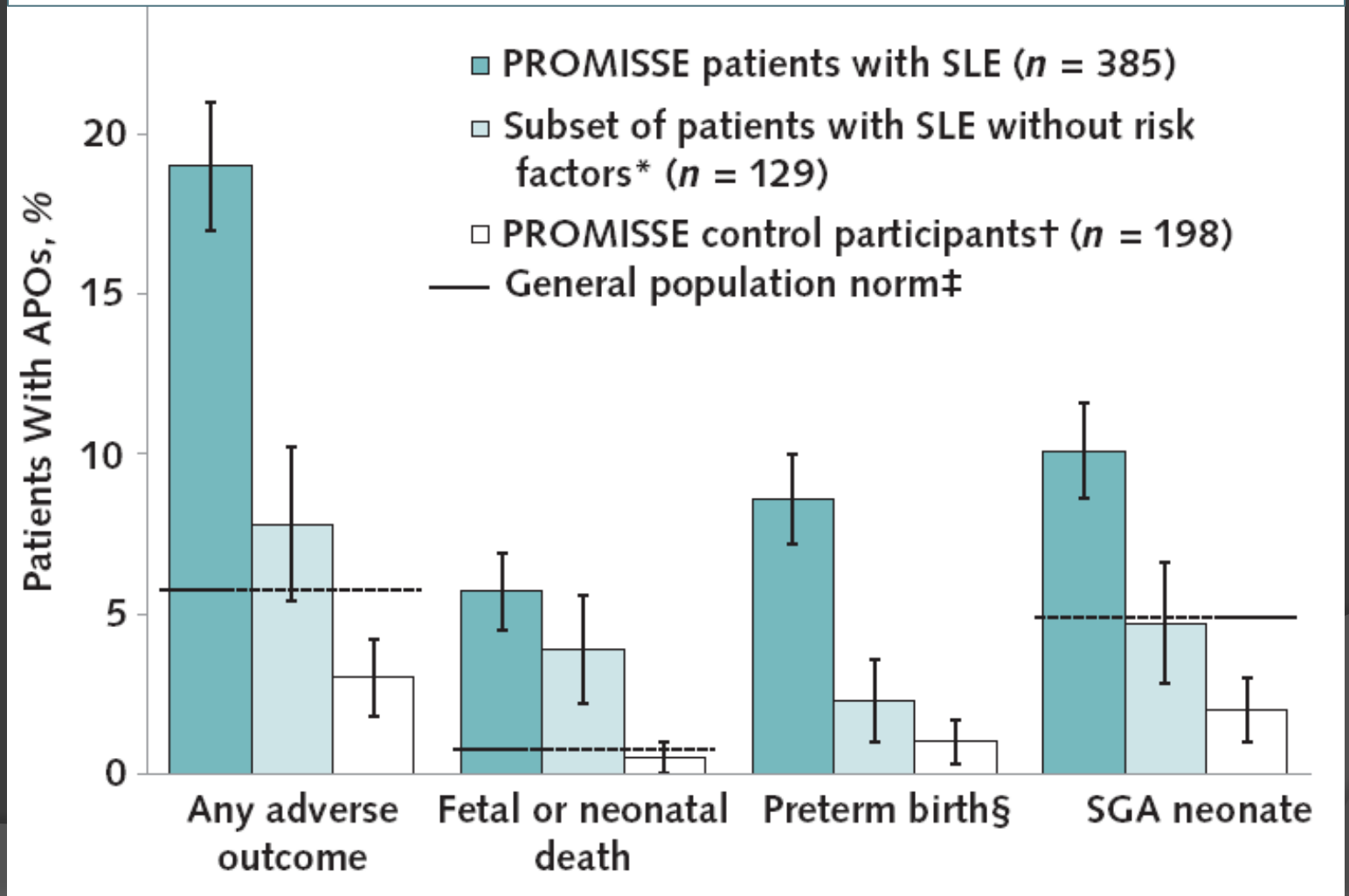


Pas d'influence de la grossesse sur la progression de la maladie.

Progression liés à l'HTA et protéinurie

Néphropathie lupique

Outcome bon dans population avec protéinurie<1g et creat <1.2mg/dl
F risque: activité maladie, anticoagulant lupique+, hispanic, antiHTA



Buyon. AnnIntMed 2015

Néphropathie lupique

	Renal (n=35)	No renal (n=60)	p value
Preeclampsia, n (%)	8 (22.8)	8 (13.3)	0.2
Premature rupture membranes, n (%)	4 (11.4)	3 (5)	0.2
All flare, n (%)	19 (54.2)	15 (25)	0.004
Renal flare, n (%)	16 (45.7)	4 (6.6)[a]	0.00001
Extrarenal flare, n (%)	3 (8.5)	11 (18.3)	0.1
Any maternal complication, n (%)	31 (88.5)	26 (43.3)	0.00001

	Renal (n=35)	No renal (n=60)	p value
Spontaneous abortions, n (%)	4 (11.4)	4 (6.6)	0.4
Stillbirth, n (%)	3 (8.5)	2 (3.3)	0.2
Total fetal loss, n (%)	7 (20)	6 (10)	<0.05
Neonatal death, n (%)	1 (2.8)	2 (3.3)	0.8
Preterm birth, n (%)	17 (48.5)	24 (40)	0.4
Live born, n (%)	28 (80)	54 (90)	0.1
Low birth weight <2,500 g, n (%)	10 (28.5)	21 (35)	0.06
Weight (g)	2,488±707	2,506±760	0.9
Cesarean section, n (%)	25 (68.5)	38 (63.3)	0.6
Any fetal complication, n (%)	25 (71.4)	32 (53.3)	0.8

Dialyse et grossesse

TABLE 1. Incidence and outcome of pregnancy in women on chronic HD

Reference	Year	No. of pregnancies/no. of women	Incidence of pregnancy	Surviving infants	Neonatal deaths	Spontaneous abortion
3	1992	27/380	7%	30%	—	—
4	1994	58/1281	1.5%	37%	5%	44%
5	1998	184/6230	2.2%	40%	3%	46%
6	1998	15/1472	1%	50%	13%	—
7	1999[a]	172/5000	3.4%	49%	5%	12%
8	2002	18	—	50%	17%	—

TABLE 2. Duration and complications of pregnancy in women on chronic HD

Reference	No. of pregnancies	Mean pregnancy (weeks)	Mean newborn weight (g)	Incidence of polyhydramnios	Incidence of maternal htn	Cesarean section deliveries
5	184	32.4 ± 4.6	—	—	79%	—
6	15	—	1164 (700–1900)	62%	—	8 (53%)
7	68	31.9	1543.5 ± 671.9 (530–2856)	33%	42%	—
8	18	32	1542 (512–1660)	46%	72%	6 (46%)

Holley. Sem Dial 2003

Dialyse et grossesse: prise en charge

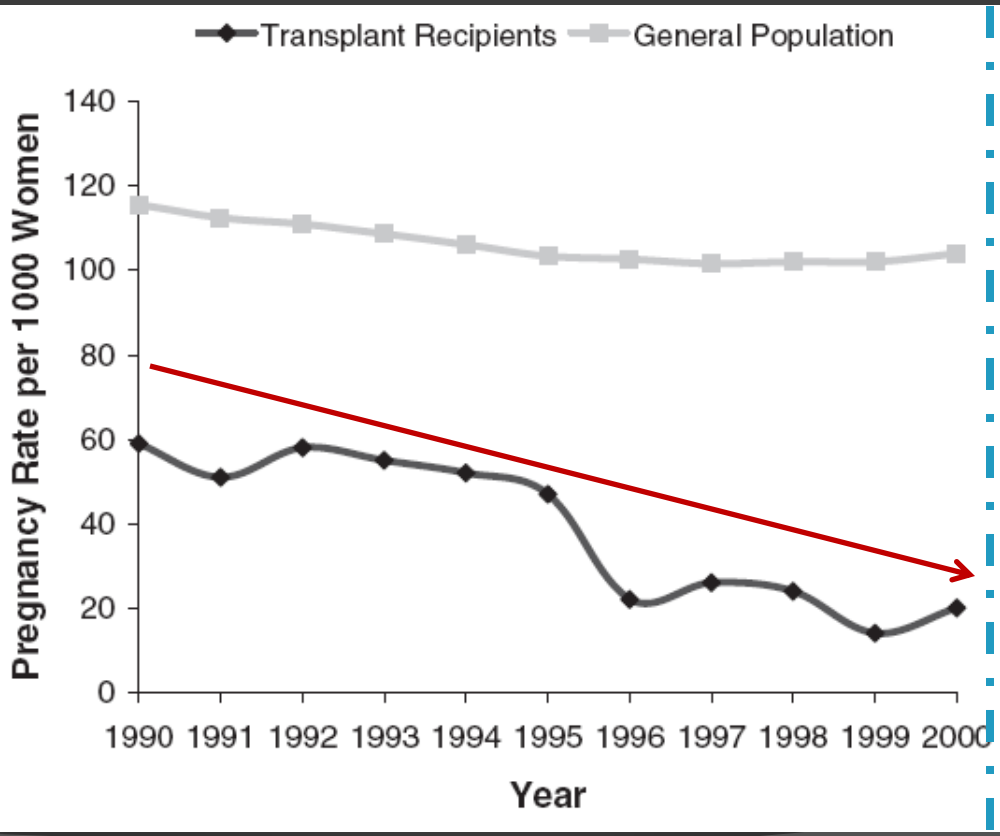
Table 1. Management strategy for providing care to ESRD patients on intensive hemodialysis

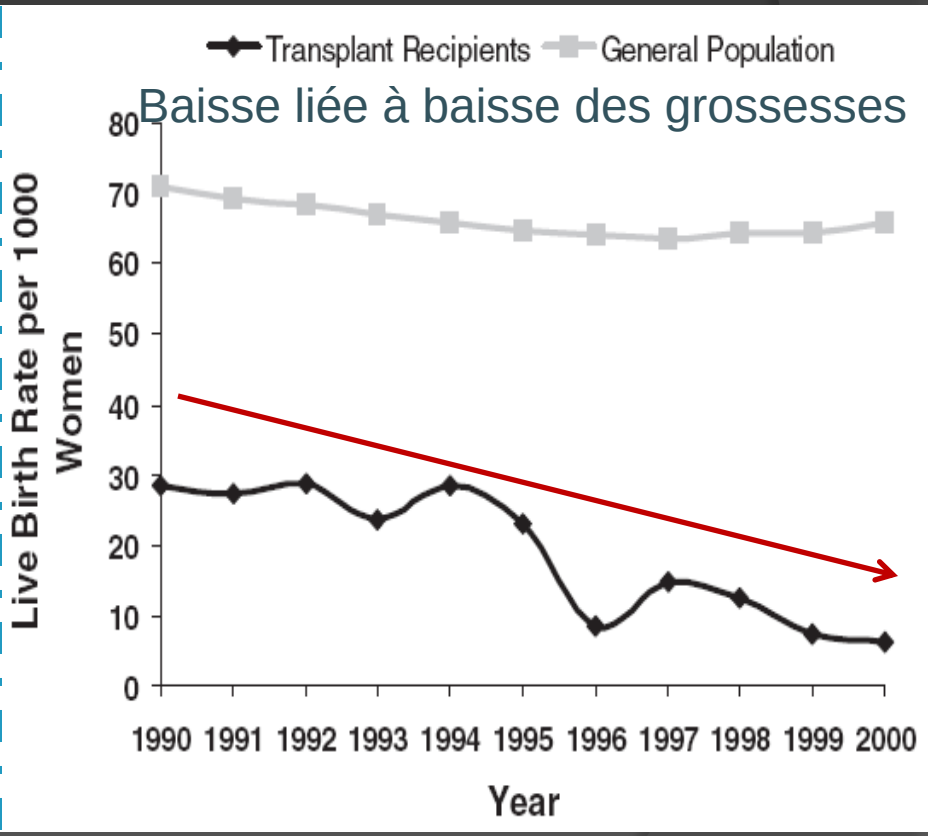
Anemia	Target hemoglobin value 110–120 g/l with erythropoietin-stimulating agents
	Use of weekly maintenance or bolus therapy of intravenous iron therapy to keep iron saturation >30%, ferritin >300
Blood pressure	Stop ACEI or ARB and avoid diuretics
	Drugs of choice: methyldopa, calcium channel blockers, hydralazine, labetalol
	Target postdialysis blood pressure <140/90 mmHg, avoid intradialytic hypotension
Bone metabolism	Increased dialysate calcium (1.5 mmol/l)
	May require addition of sodium phosphate to dialysate
	Use of inactive vitamin D supplementation adjusted to PTH and ALP levels as per KDOQI
Circulation	Monthly (first and second trimester) then weekly (third trimester) volume assessments to adjust target ultrafiltration accordingly
Diet and vitamins	Daily protein intake 1.5–1.8 g/kg/d
	Double dose of MVI orally per day
	Folate 5 mg orally daily, especially early in pregnancy
Dialysis	Use of biocompatible dialyzers
	Dialysis duration of 36 h/week
	Blood and dialysate flow as blood pressure permits
	Unfractionated heparin to prevent filter clotting
Electrolytes and acid–base	Dialysate potassium of 3 meq/l typically
	Dialysate bicarbonate of 25 meq/l
Fetal monitoring	First trimester screen (nuchal translucency, PAPP-A, βhCG) between 9 and 13 weeks
	Maternal serum screen (AFP, total hCG, inhibin A, and unconjugated estriol) between 15 and 18 weeks
	Level II ultrasonography to measure cervical length and assess for anomalies at 18–20 weeks
	Placental US with Doppler assessment at 22 weeks
	Weekly US and biophysical profile from 26 weeks until delivery
Follow-up	Weekly clinical and biochemical evaluation of above

Alkhunaizi. CurrOpinionHypert 2015

Transplantation et grossesse

Etude observationnelle sur 16’295 femme transplantées de 1993-2000





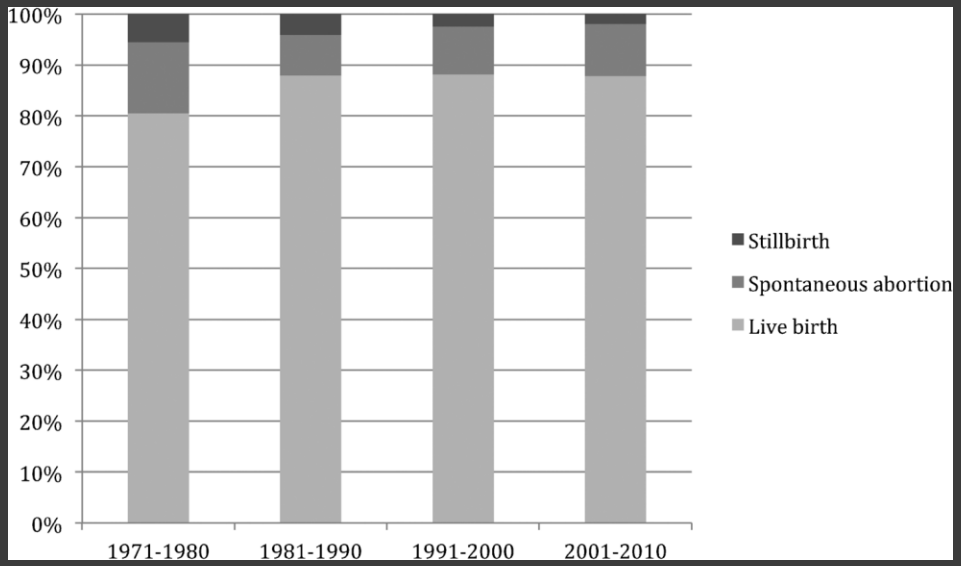
Baisse liée à baisse des grossesses

Gill. AmJTransplant2009

Table 3: Factors associated with pregnancy

Factor	Hazard ratio	95% CI	p-Value
Age at transplantation (years)			
15–19	0.85	0.60–1.19	0.34
20–24	1.42	1.12–1.81	0.004
25–29	Reference	–	–
30–44	0.26	0.20– 0.32	<0.0001
Race			
White	Reference	–	–
Black	1.15	0.93–1.43	0.20
Other	1.34	0.96–1.89	0.09
Cause of end-stage renal disease			
Glomerulonephritis	Reference	–	–
Diabetes	0.63	0.48–0.84	0.001
Other	0.77	0.63–0.94	0.01
Living donor (reference deceased donor)	1.07	0.88–1.31	0.48
Duration of dialysis treatment before transplantation			
No dialysis	Reference	–	–
<1 year	1.33	0.82–2.15	0.24
1 to <3 years	1.44	0.90–2.30	0.13
≥3 years	1.64	1.01–2.66	0.05
Year of transplantation			
1990–1994	1.00	–	–
1995–1999	0.57	0.45–0.73	<0.0001
2000–2003	0.38	0.25–0.57	<0.0001
Immunosuppressant medication treatment			
Tacrolimus (reference cyclosporine)	1.48	1.10–2.00	0.01
Mycophenolate mofetil (reference azathioprine)	0.46	0.33–0.63	<0.0001
Sirolimus (reference no sirolimus)	1.37	0.77–2.43	0.29
Glomerular filtration rate (mL/min/1.73 m^2)[1]			
<30	Reference	–	–
30–59	1.30	0.85–1.98	0.22
≥60	1.48	0.96–2.28	0.07
RUCA group[2]			
1.0–3.9	Reference	–	–
4.0–6.0	0.82	0.58–1.15	0.25
>6.0	0.81	0.81–1.16	0.25
Median household income			
$0–28 999	1.36	1.04–1.77	0.03
$29 000–35 999	0.92	0.69–1.22	0.56
$36 000–45 999	1.10	0.85–1.41	0.48
≥$46 000	Reference	–	–

Transplantation et grossesse



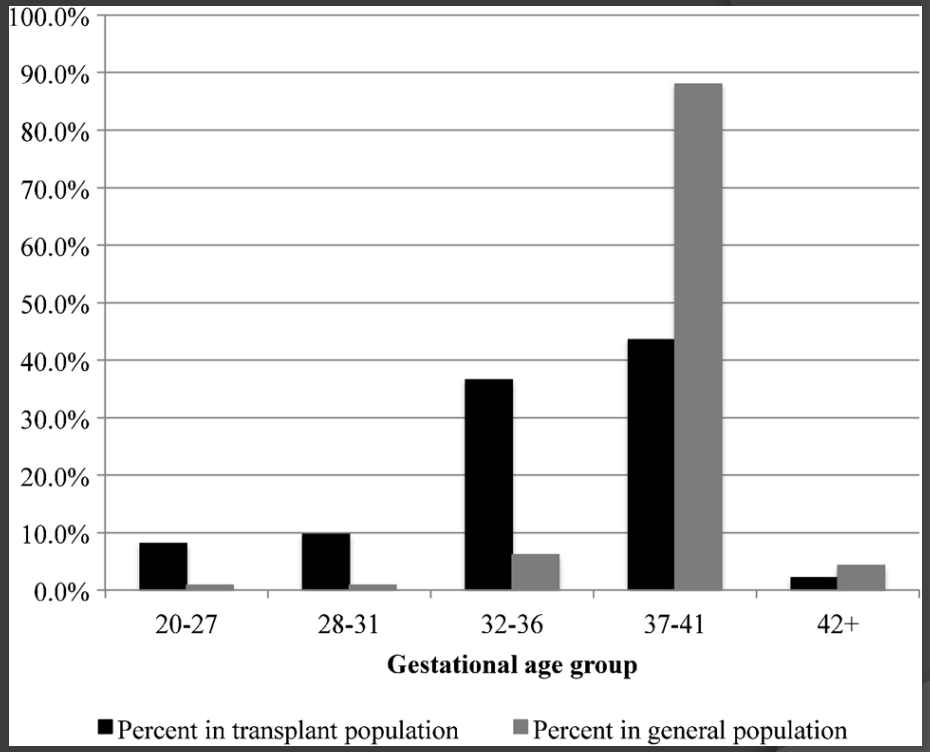


Table 4: Mean gestational age and birth weight for births over 20 weeks (2001–2010)

	N	Mean	SD	95% CI	p-Value
Gestational age					
Transplant	186	35.4	4.6	34.8, 36.1	
Australia	2 768 051	38.9	0.1	38.9, 38.9	
Difference		−3.5		−3.5, −3.5	<0.0001
Birth weight					
Transplant	161	2485	783	2363, 2607	
Australia	2 768 051	3358	2	3358, 3358	
Difference		−873		−874, −872	<0.0001

Wild. AmJTransplant2013

Hypertension dans la grossesse

Classification:

- Hypertension chronique
- Hypertension gestationnelle
- Pre-éclampsie
- Eclampsie

Hypertension chronique

= Hypertension connue avant la grossesse

Ou

Diagnostiquée avant la 20^{e} semaine

- ✓ TA>140/90mmHg

- ✓ Hypertension persistante 12 sem post partum
- ✓ 1-5% des femmes enceintes
- ✓ Hypertension essentielle:90%

NHBPEPWG. AmJObstGyn 2000

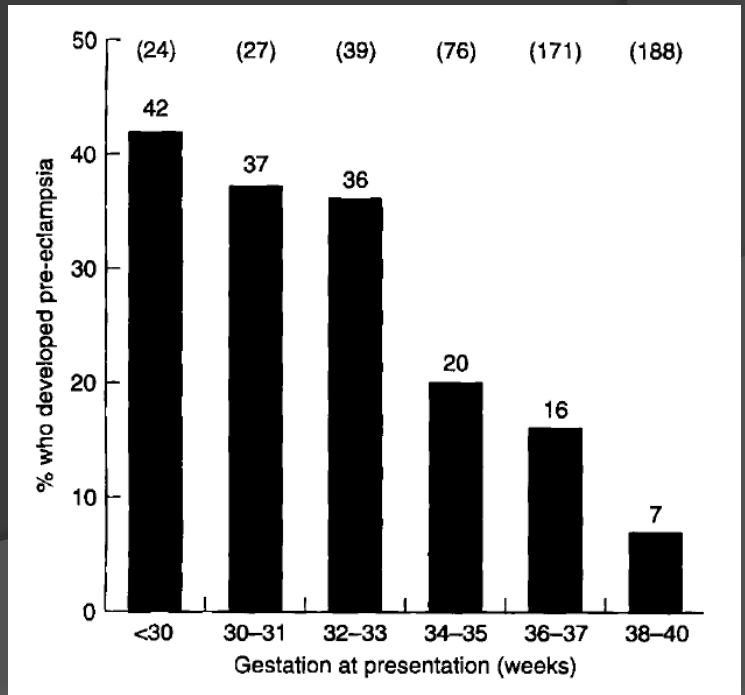
Hypertension gestationnelle

= Hypertension de novo après 20 sem de gestation

- ✓ Transitoire
- ✓ Retour à tensions normales 3 mois après l'accouchement
- ✓ Pas de protéinurie

→ pre-eclampsie: 15-25%

→ HTA à 5 ans: 16%



Pre-eclampsie

= Hypertension de novo après 20 sem de gestation

! Eclampsie = apparition convulsions

- ✓ TA>140/90mmHg
- ✓ Protéinurie (>300mg/24h)
- ✓ Thrombocytopénie, perturbation tests hépatiques, coagulopathie
- ✓ 3-15% des femmes enceintes

- → 5% vont développer HTA à 5 ans
- → ? Évolution fonction rénale

! Peut également compliquer une HTA chronique

TABLE 2. INCIDENCE OF PREECLAMPSIA ACCORDING TO BASE-LINE CHARACTERISTICS OF WOMEN WITH CHRONIC HYPERTENSION.

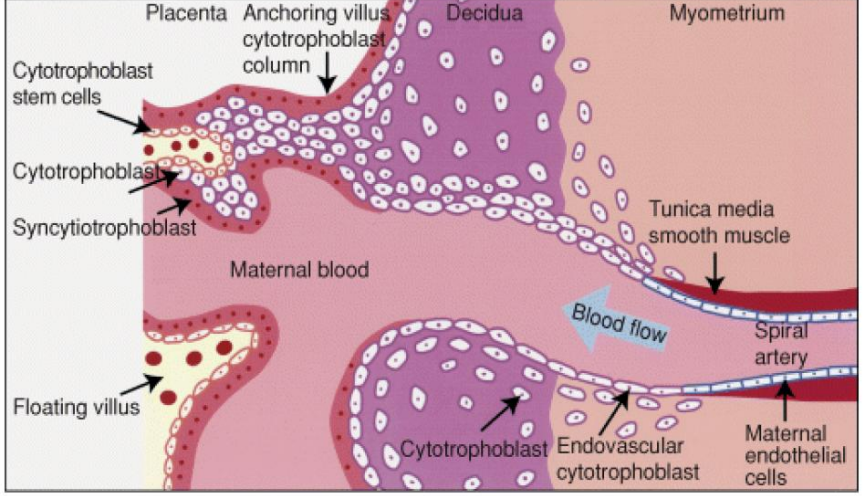
CHARACTERISTIC	PROPORTION WITH PREECLAMPSIA	OR (95% CI)*	P VALUE
	no./total no. (%)		
Maternal age			
≥35 yr	51/194 (26)	1.1 (0.7–1.6)	0.69
<35 yr	142/569 (25)	1.0	
Race			
Black	117/465 (25)	1.0 (0.7–1.3)	0.91
White†	76/298 (26)	1.0	
Previous preeclampsia			
Yes	58/181 (32)	1.6 (1.1–2.3)	0.02
No	135/582 (23)	1.0	
Duration of hypertension‡			
≥4 yr	94/308 (31)	1.6 (1.1–2.2)	0.007
<4 yr	99/452 (22)	1.0	
Diastolic blood pressure			
100–110 mm Hg	18/43 (42)	2.2 (1.3–5.0)	0.01
<100 mm Hg	175/720 (24)	1.0	
Proteinuria			
No	171/682 (25)	1.1 (0.7–1.6)	0.68
Yes	22/81 (27)	1.0	

Prevalence: 25%

Pre-eclampsia

Altération angiogénèse,
Facteurs altérés:

- ✓ ↑ sFlt1
- ✓ ↓PGF



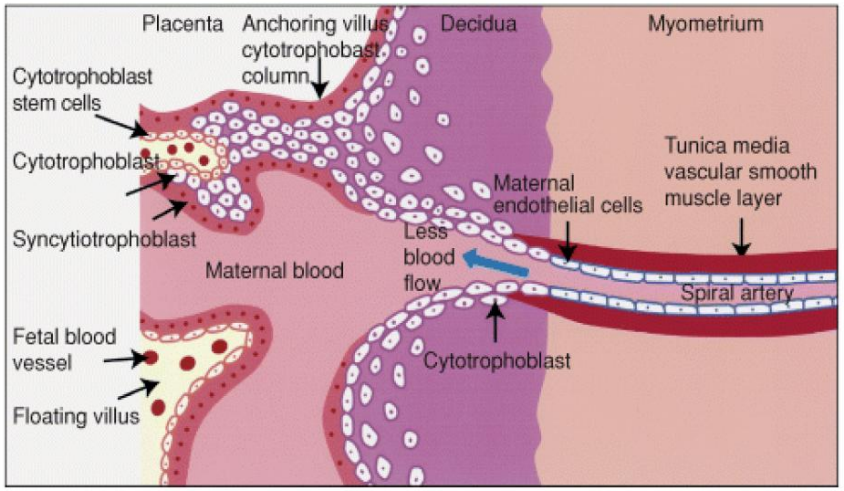
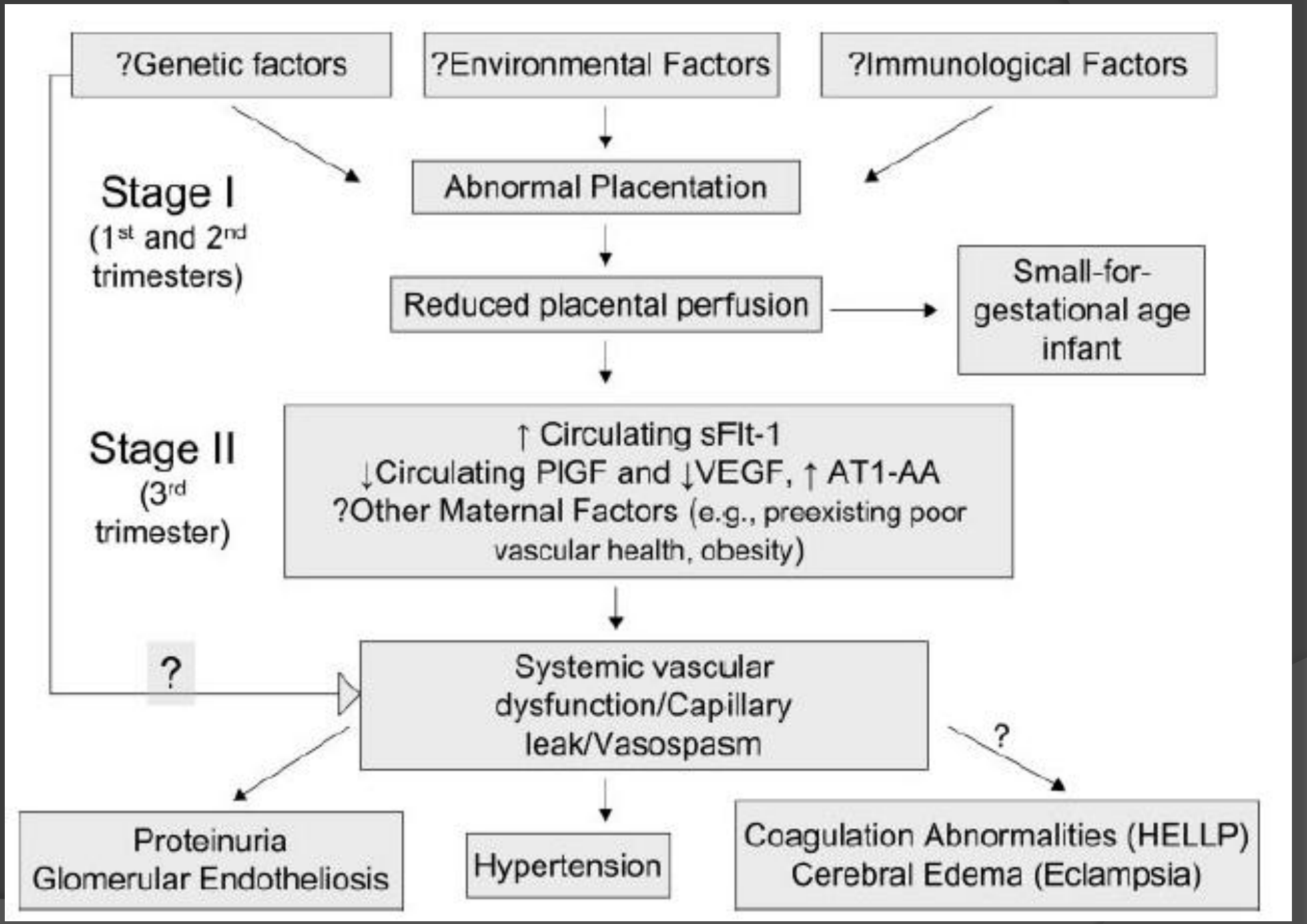


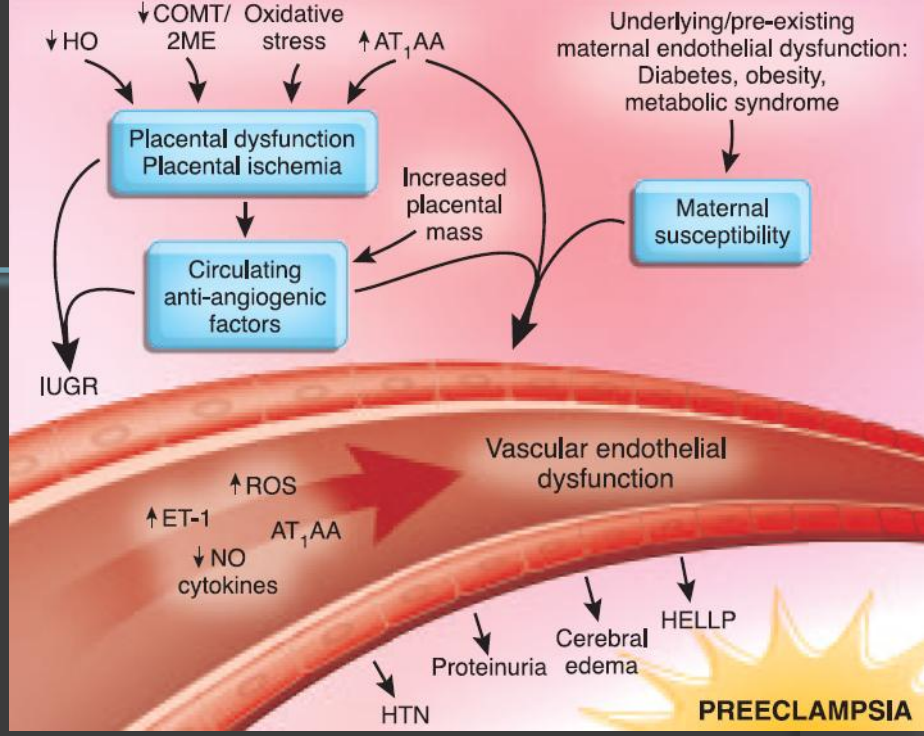
TABLE 1. Results of Tests Used for Detection/Prediction of Preeclampsia (PE)

Author	Serum sFlt1, pg/mL	GA, wk	Study Size, N	Sensitivity, %	Specificity, %	Odds Ratio
Levine et al[69]	>1131*	21–32	240			5.1 (for PE <37 wk)
	>2191*	33–41				6.0 (for term PE)
Hertig et al[70]	957	25–28	23	80	100	
Chaiworapongsa et al[79]	1560	24–28	88	16.7 (for PE at 29–34 wk)	97.4 (for PE at 29–34 wk)	
	1575	28–32		83 (for PE at 32–34 wk)	95 (for PE at 32–34 wk)	
	1575	28–32		18.5 (for PE >34 wk)	95 (for PE>34 wk)	
	2164	32–36		70 (for PE >37 wk)	97 (for PE >37 wk)	



Karumanchi. Hypertension 2005

Facteurs de risque



- ✓ Obésité
- ✓ Ethnie africaine
- ✓ Hta chronique
- ✓ Diabète et résistance à l'insuline
- ✓ Collagénoses
- ✓ Thrombophilie
- ✓ Augmentation testosterone circulante
- ✓ Grossesses multiples
- ✓ Atcd pré-eclampsie

Lain. JAMA 2002
Maynard. JASN 2009
Duckitt. BMJ 2005

Prévention

- Aspirine:

Réduction du risque de 15%

Réduction mortalité foetale et néonatale de 14%

→ Dans les groupes à risque dès 12e sem

Vitamine C, vitamin E, calcium, Huiles de poisson: inefficaces

- Sulfate de Mg pour prévention éclampsie

Duley. BMJ 2001

Traitement

- Contrôle tensionnel:

labetolol, hydralazine, methydopa, nifedipine, prazosine per os

Labetolol ou hydralazine iv si poussée

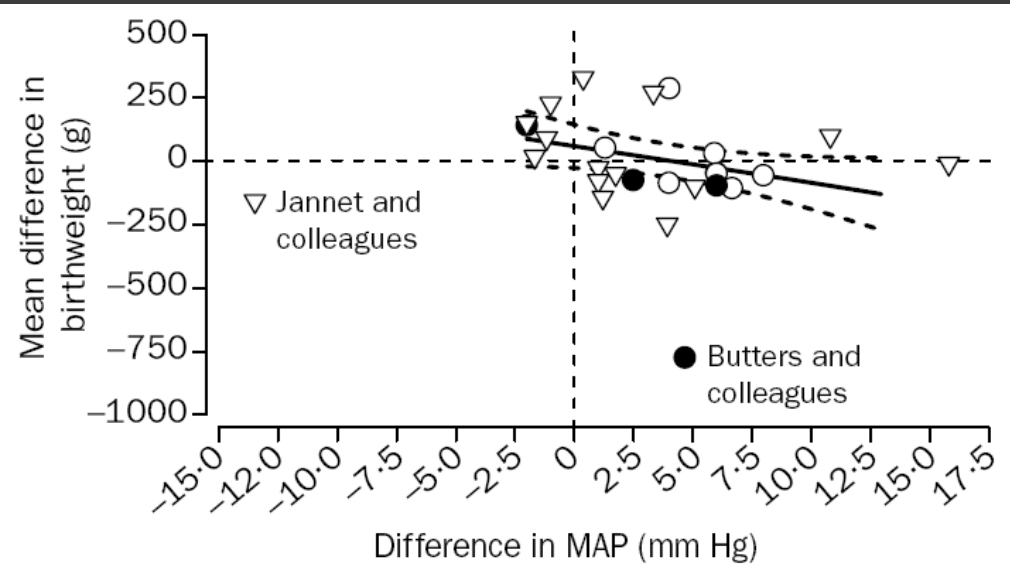
! PAS D'IECA/ARA2

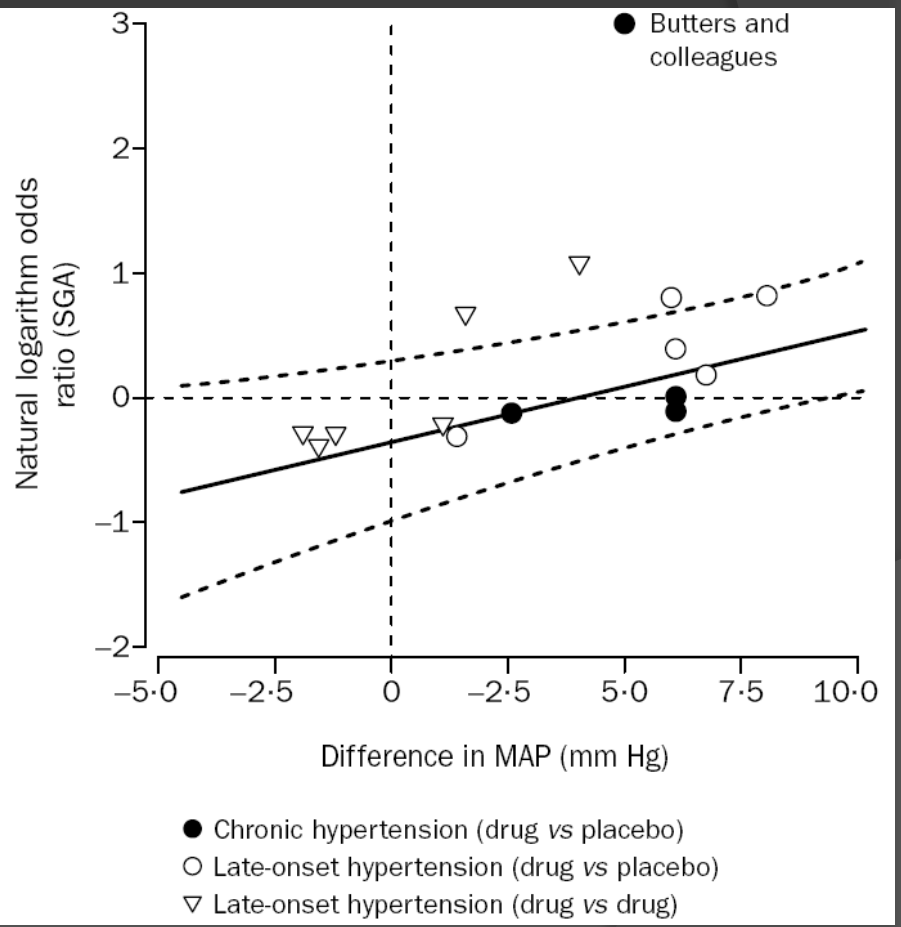
- Délivrance = seul traitement si PE
- Sulfate de Mg si éclampsie

Duley. BMJ 2001

HTA grossesse et traitement

Baisse de la pression artérielle peut
affecter la croissance fœtale intra-utérine: ne pas sur-traiter!





Von Dadelszen.Lancet 2000

IECA et grossesse

- Dans études animales

→mortalité fœtale importante

- Chez la femme:
  - →Oligohydroamnios
  - →Insuffisance rénale
  - →Hpotension néonatale (10%)
  - →Complications respiratoires (145)
  - →Teratogénicité?

  Recommendations: pas d'utilisation pendant la grossesse mais si exposition pas de données pour interrompre grossesse

CONCLUSIONS

Modifications physiologiques pendant la grossesse

- Néphropathie et grossesse:

Bonne évolution si fonction rénale conservée ou légérement diminuée et protéinurie <1g/j.

- HTA chronique:

Traitement profitable pour mère mais ne pas baisser la TAD<80mmHg, car peut être délétère pour croissance intra-utérine

Pas d'IECA

- Pre-eclampsie:

Prévention par aspirine

Délivrance = traitement

RECOMMENDATIONS SUIVI

Measure	Details of monitoring
Urine	Every 4-6 weeks check for (1) infection—keep urine sterile with prophylactic antibiotics after one urinary tract infection[w19]; (2) proteinuria—use thromboprophylaxis with low molecular weight heparin if >1 g proteinuria/24 h; (3) haematuria—if present, perform microscopy for red cell casts, which suggest active renal parenchymal disease. Normal red cell morphology suggests urological pathology—seek urological advice
Blood pressure	Check blood pressure regularly, depending on how well blood pressure is controlled. Aim to keep it between 120/70 mm Hg and 140/90 mm Hg with antihypertensive treatment. Inappropriately low blood pressure is associated with fetal growth restriction, high blood pressure is associated with renovascular damage
Renal function	Check serum creatinine and urea, depending on stage of disease.* More frequently for disease stages 3-5 and in the second half of pregnancy
Full blood count	Check haemoglobin and recognise the need for iron (serum ferritin) and erythropoietin to keep haemoglobin at 100-110 g/l[w20]
Ultrasound of renal tract	Perform baseline renal ultrasound at booking (around 12 weeks' gestation) for pelvicaliceal dimensions. Repeat if symptoms suggest obstruction

Williams. BMJ 2008

RECOMMENDATIONS SUIVI

Condition	Possible complications that need monitoring	Key management points
Primary glomerulonephritis	Hypertension; proteinuria; recurrent infection	Treat associated clinical features; outcome relates to control of clinical features and severity of renal impairment
Autosomal dominant polycystic kidney disease	Impaired renal function; hypertension	Make parents aware that the child has a 50% risk of inheriting the condition[w23]
Congenital urinary tract obstruction	Increased risk of urinary tract obstruction, even if previously surgically corrected[w24]	Perform kidney ultrasound in early pregnancy; serial assessment of renal function, urine culture, and blood pressure; repeat ultrasound if abnormalities in monitored parameters
Vesicoureteric reflux nephropathy	Recurrent urinary tract infections[w24]; ureteral obstruction; pre-existing renal impairment; hypertension	Prophylactic antibiotics may be needed; drainage of obstruction may also be necessary
Nephrolithiasis	Renal colic[w25]; ureteric obstruction	Magnetic resonance urography can be used in diagnosis to avoid exposure to radiation[w26]
Diabetic nephropathy	Declining renal function in women with pre-existing diabetic nephropathy[w27]; hypertension and proteinuria	Try to maintain good glycaemic control before, during, and after pregnancy
Nephritis caused by systemic lupus erythematosus	Can present like pre-eclampsia so investigate for distinguishing clinical and immunological features[w28]	Drug treatment managed by rheumatologist and obstetrician
Dialysis	Adjust dialysis to mimic the physiological changes of pregnancy[w29]	Haemodialysis is more effective than peritoneal dialysis at mimicking physiological change
Renal transplant	Pre-eclampsia; fetal growth restriction; deteriorating graft function[w30]	Delay pregnancy until graft function and immunosuppression are stabilised[w31]

Williams. BMJ 2008

Merci pour

votre attention