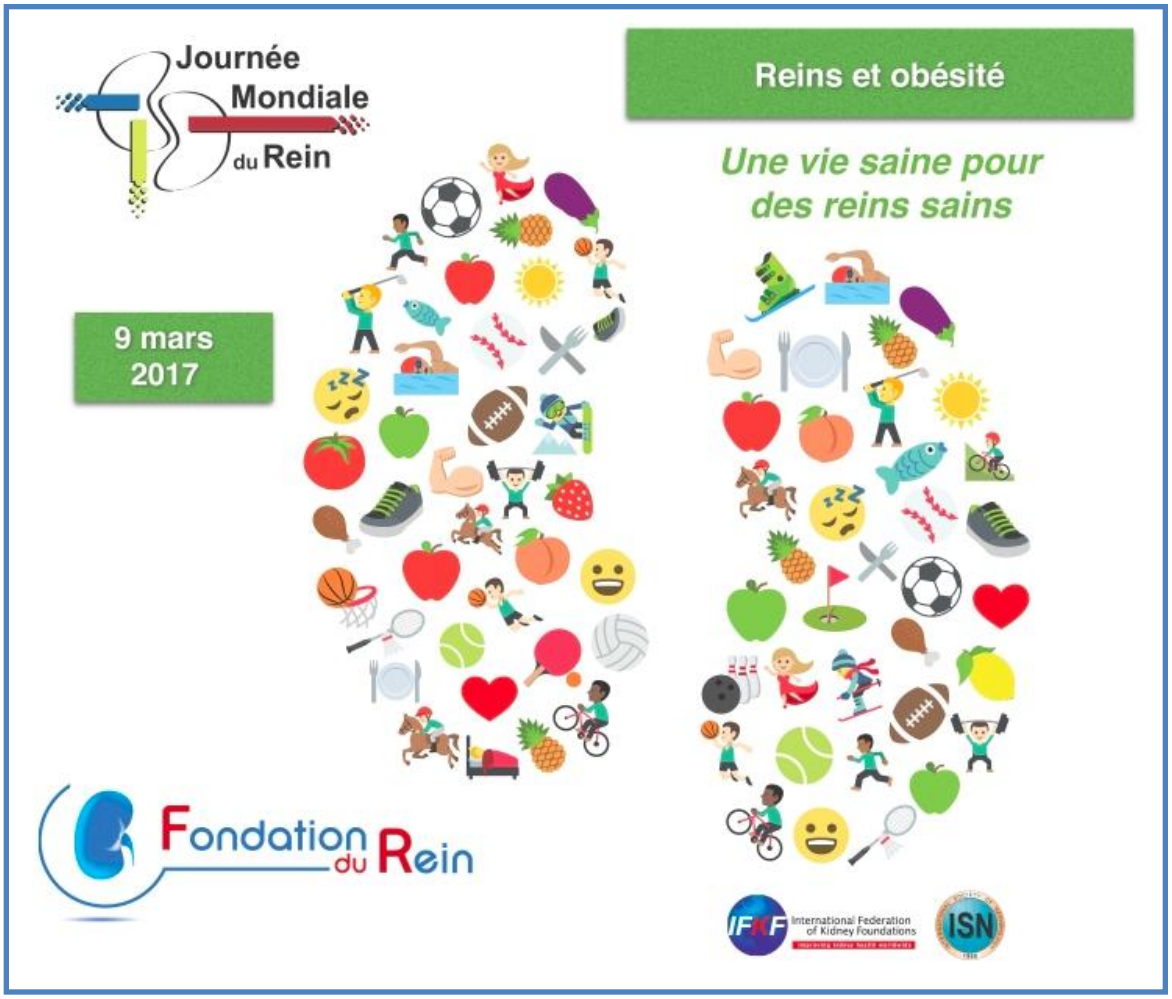
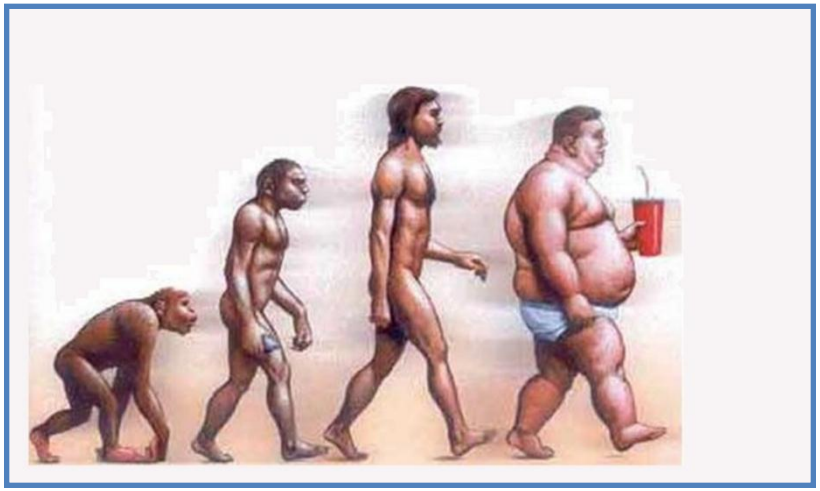


Obésité et Dialyse

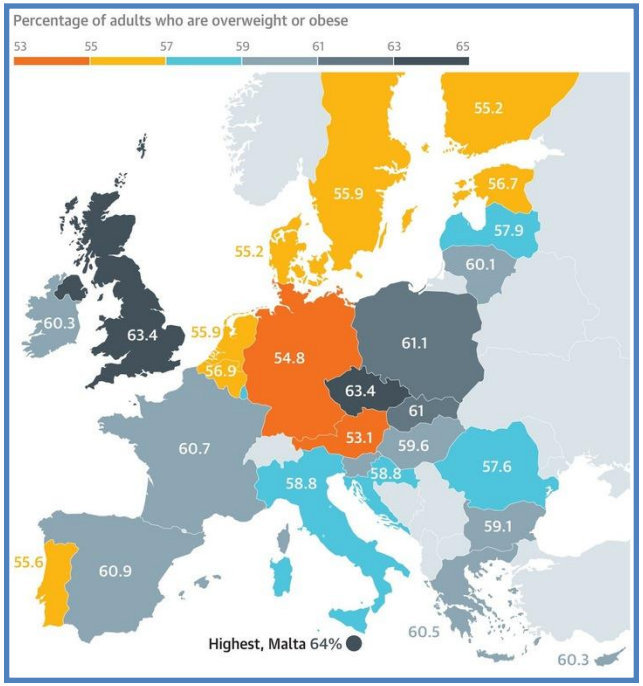
Cécile Courivaud
CHU Besançon

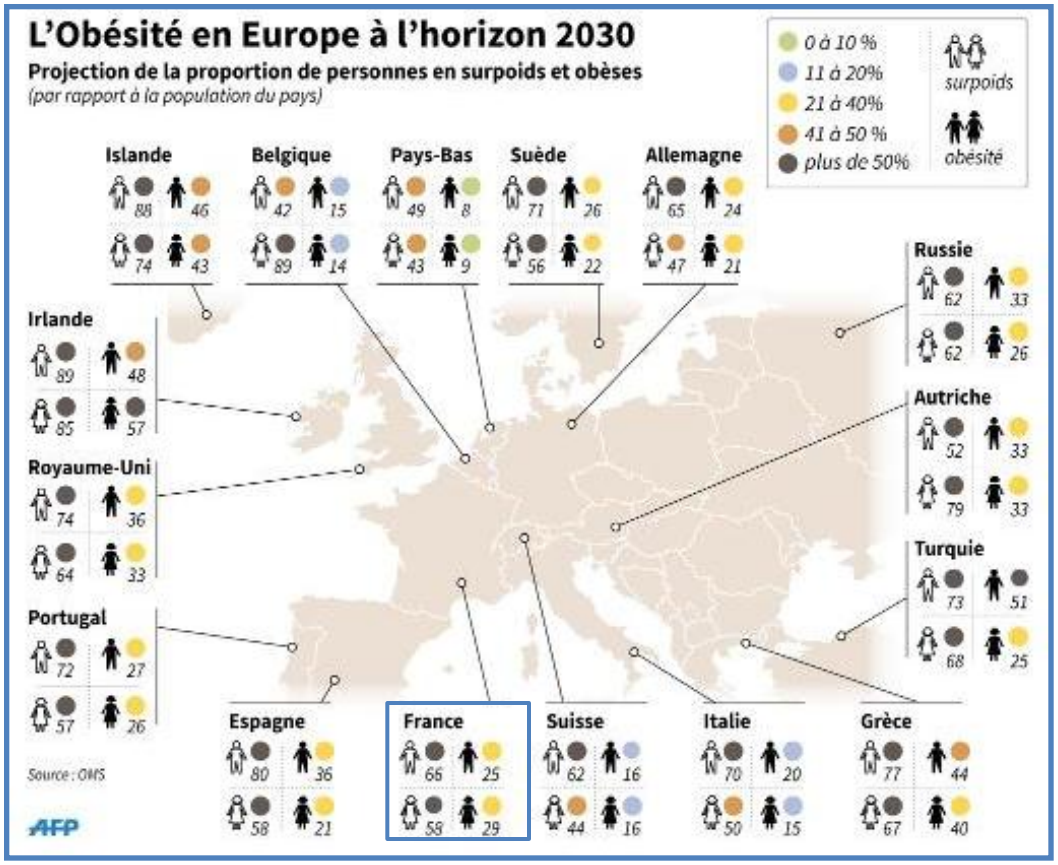
Epidémiologie



L'obésité: une Epidémie

6% en 1980 → 17% en 2012



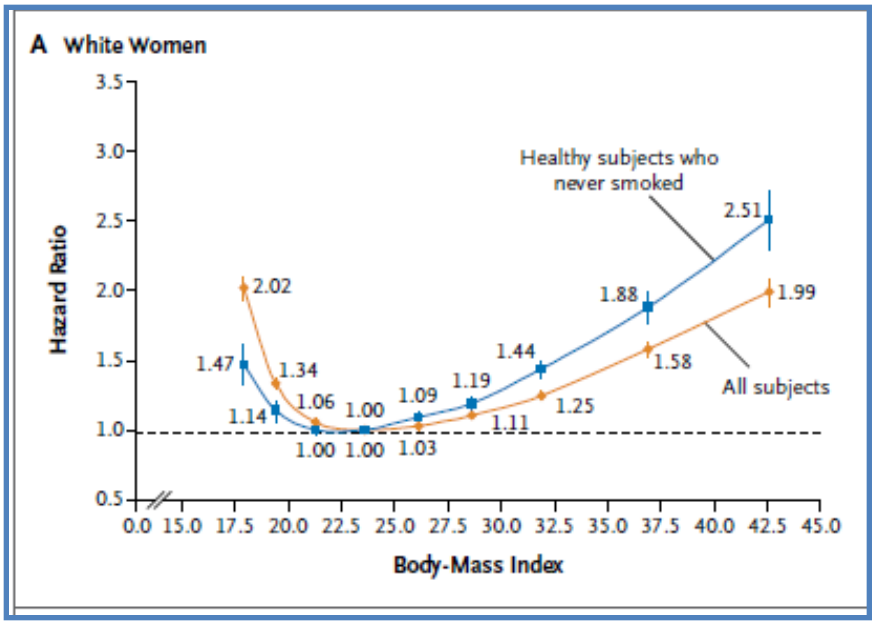


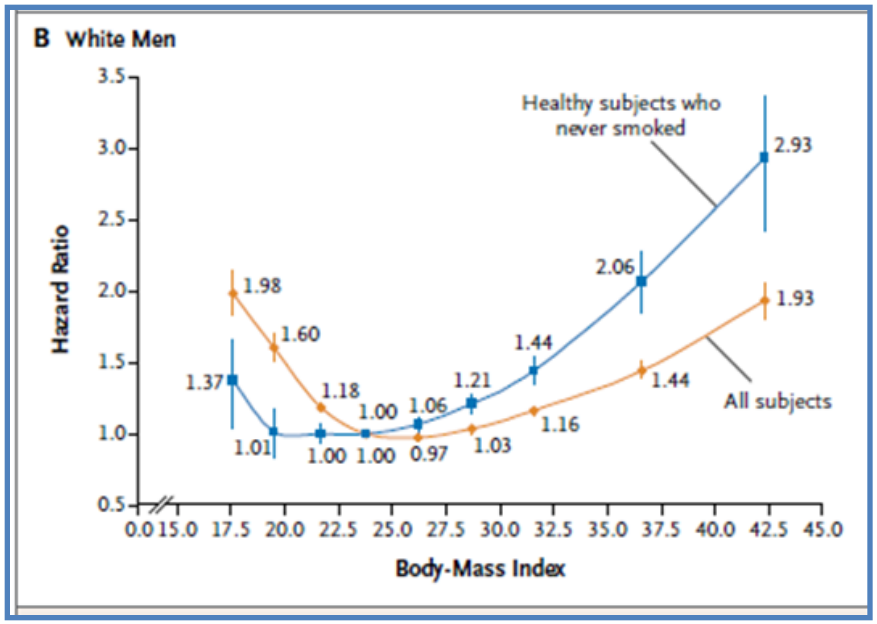
Epidémiologie

Figure 1. Estimated Hazard Ratios for Death from Any Cause According to Body-Mass Index for All Study Participants and for Healthy Subjects Who Never Smoked.

Hazard ratios and 95% confidence intervals are shown for white women (Panel A) and white men (Panel B). The hazard ratios were calculated with the use of age as the underlying time scale, were stratified by study, and were adjusted for alcohol intake (grams per day), educational level, marital status, and overall physical activity. Subjects were deemed healthy if they had no cancer or heart disease at baseline.

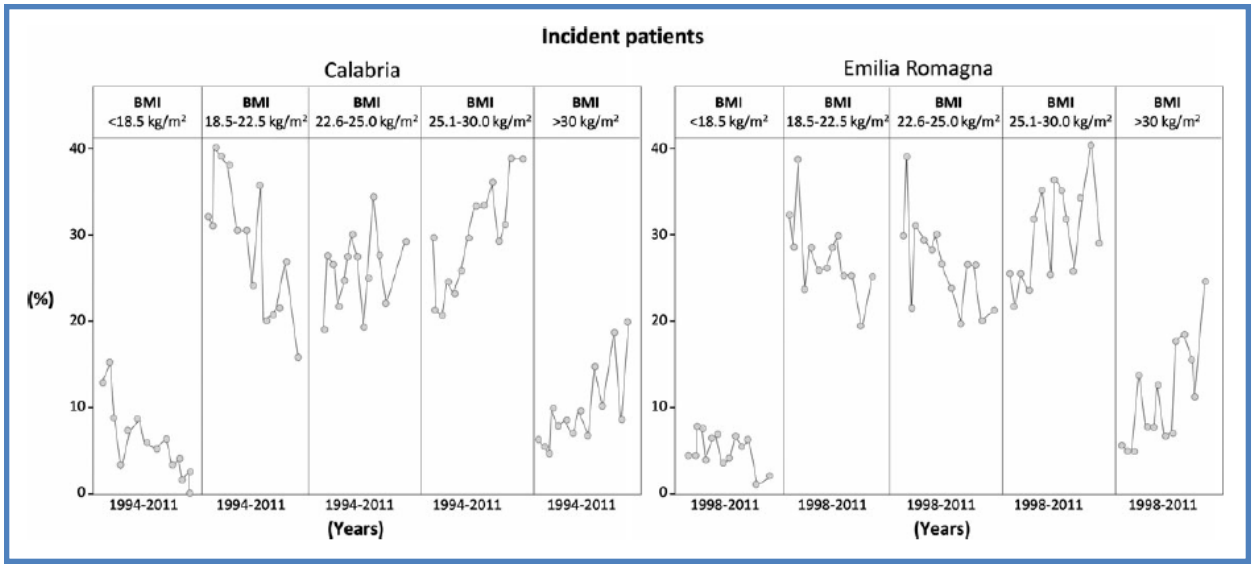
Suivi médian 10 ans [5-28]
n=1,46 million / 160 087 décès



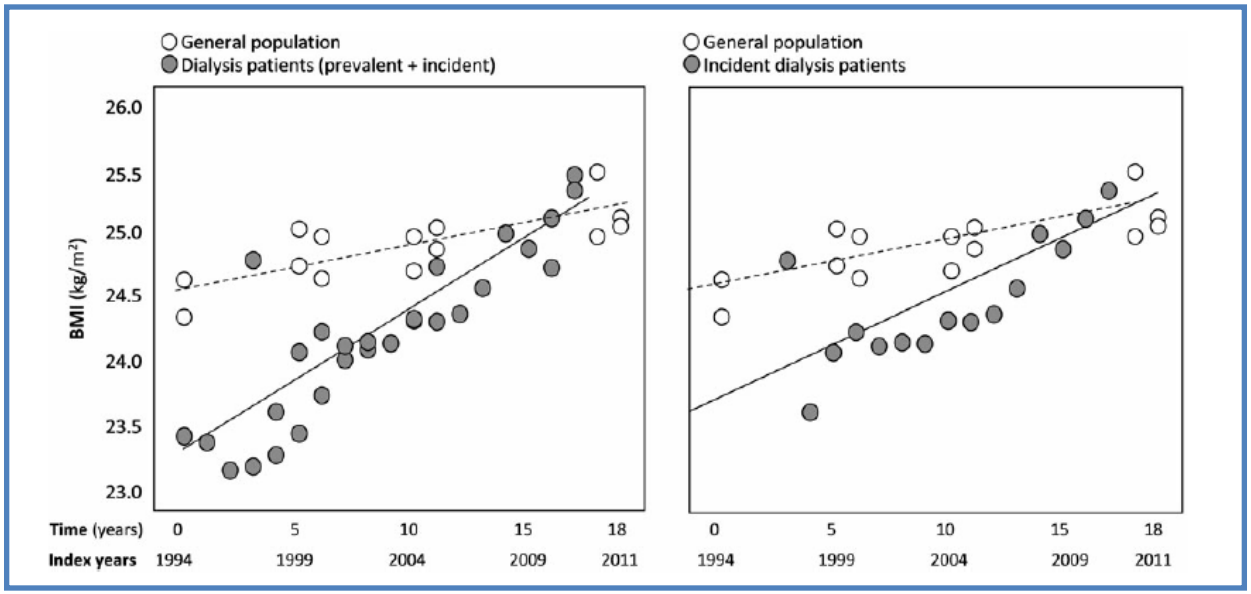


Berrington de Gonzalez A et al NEJM 2010

Epidémiologie



L'obésité en dialyse



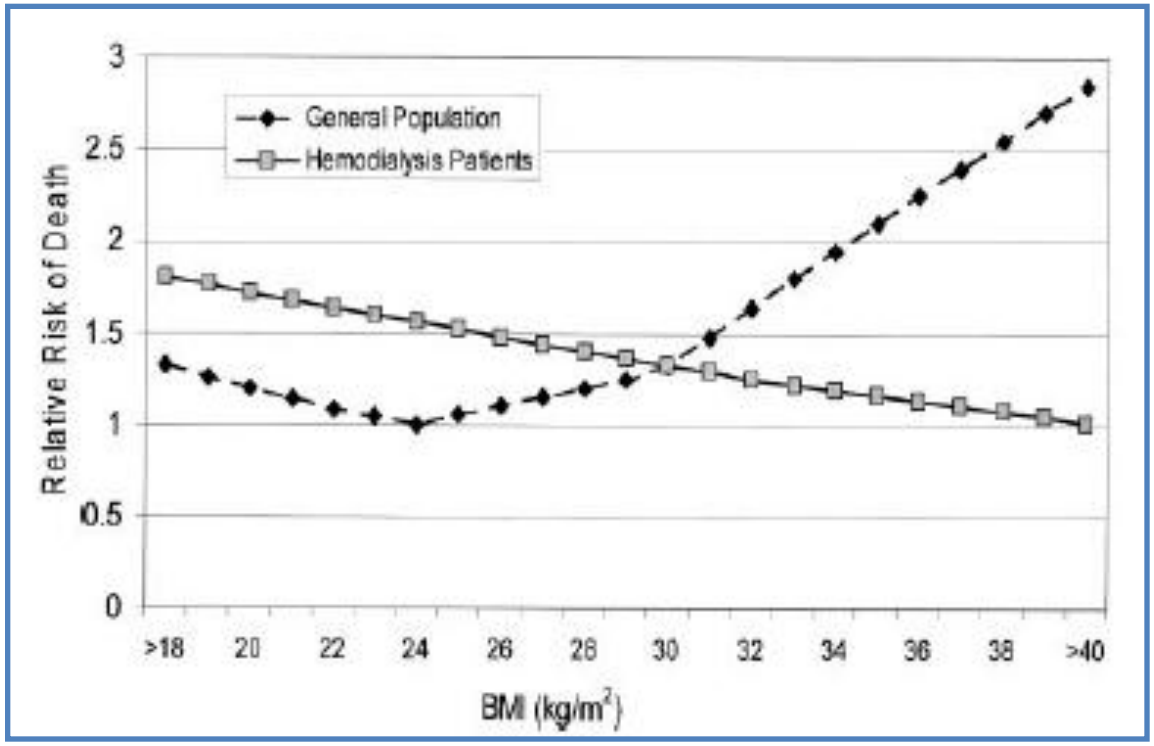
16 201 HD prévalents
3 559 HD incidents

<u>Calabria</u>: IMC ↑+8,5%
Obèse: 6 → 14%
<u>Emilia:</u> IMC ↑ +7,1 %
Obèse: 6 → 16%

Postorino M et al NDT 2016

IMC: quel impact en dialyse ?

!! Le paradoxe de l'obésité !!
!! Reverse epidemiology !!



Calle EE et al NEJM 1999 (pop US)
Leavey SF et al NDT 2001 (DOPPS)
Kalantar Z et al Am J Clin Nutr 2005

IMC: quel impact en dialyse ?

Hemodialyse

Table 1
Summary of studies with large sample size (>10,000 patients) evaluating association between BMI and survival/outcomes in HD patients.

Study	Nr. of patients	Follow-up (years)	Results
Kopple et al. [10]	12,965	1	Mortality rate decreased progressively as the patients' weight for height increased.
Port et al. [12]	45,967	2	The highest BMI tertile had the lowest mortality risk.
Lowrie et al. [11]	43,334	1	The log risk relationships were reverse J-shaped for weight/height and BMI.
Glanton et al. [13]	151,027	2	Obesity was associated with a reduced risk of mortality, stronger in African Americans.
Johansen et al. [14]	418,055	2	High BMI was associated with increased survival for whites, African Americans, and Hispanics but not for Asians.
Kalantar-Zadeh et al. [66]	54,535	2	Weight gain and both baseline and time-varying obesity may be associated with reduced cardiovascular mortality.
Kalantar-Zadeh et al. [67]	121,762	2	Higher BMI (up to 45 kg/m^2) and higher serum creatinine concentration were associated with greater survival.
Molnar et al. [65]	14,632	2.5	Transplant-waitlisted patients with lower BMI or muscle mass and/or unintentional weight or muscle loss have higher mortality.
Ricks et al. [87]	109,605	2	Whereas the survival advantage of high BMI is consistent across all racial/ethnic groups, black patients had the strongest association of higher BMI with improved survival.
Hall et al. [88]	21,492	–	Larger body size was associated with lower mortality among Pacific Islanders, Whites and most Asians.
Kalantar-Zadeh et al. [69]	121,762	2	Lower body mass, lower muscle mass, weight loss, and serum creatinine decline were associated with higher death rates.
Park et al. [89]	40,818	6	Higher BMI together with higher serum creatinine was associated with greater survival.

Dialyse péritonéale

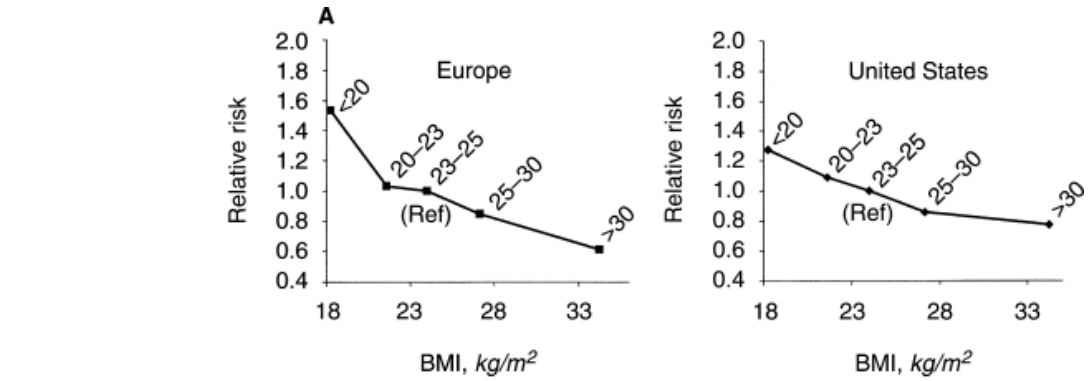
Table 2
Summary of studies with large sample size evaluating association between BMI and survival/outcomes in PD patients.

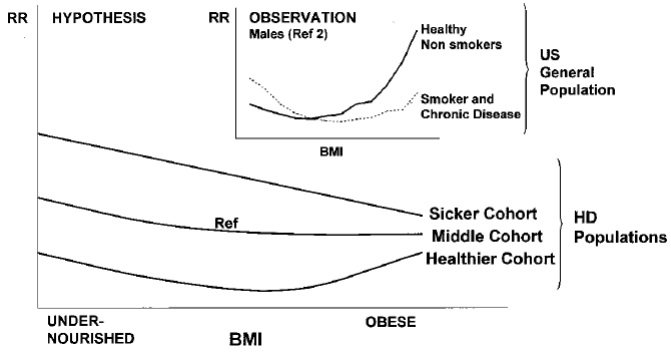
Study	Nr. of patients	Follow-up (years)	Results
Snyder et al. [48]	41,197	3	Overweight and obese patients have longer survival than those with lower BMI.
McDonald et al. [80]	9679	17.973 patients years	Obesity was associated with death and technique failure among Australia/New Zealand patients.
Abbott et al. [16]	1662	5	Survival for patients with BMI ≥ 30 kg/m^2 was not better than in other patients.
Stack et al. [90]	17,419	1	No survival advantage was associated with higher BMI values.
Ramkumar et al. [63]	10,140	17.500 patients years	Incident PD patients with high BMI and normal or high muscle mass have the best survival.
De Mutsert et al. [57]	688	5	Obese patients at the start of PD do not have a worse survival compared with patients with normal BMI. Patients with a low BMI have a twofold increased mortality risk.

Ekart R et al Eur J Int Med 2016

Biais méthodologique ?

Poids des comorbidités ?





DOPPS 9 714 HD 1996-2000

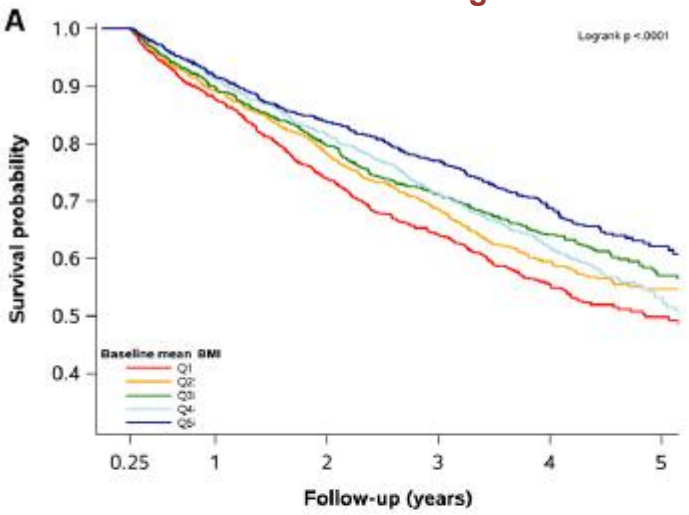
BMI	<20	20-22,9	23-24,9	25-29,9	≥30
RR by age group					
≥65 (n=4427)	2,23	1,81	1,7	1,33	1,11
45-64 (n=3858)	1,32	1,13	1 (ref)	0,91	0,76
<45 (n=1704)	0,8	0,57	0,53	0,57	0,52
RR for combined subgroup					
Age<45 + low severity of illness (n= 935)	1,53	1,03	1 (ref)	0,9	0,87

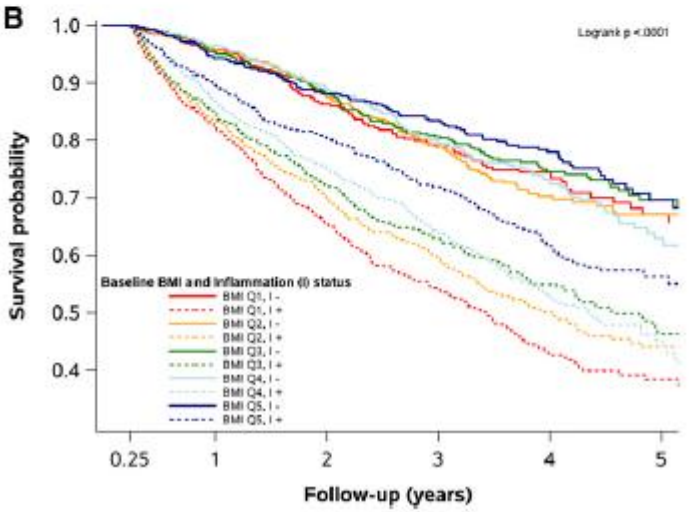
Illness selon:
Score de comorbidité
+ Albu

Leavey SF et al NDT 2001

Biais méthodologique ?

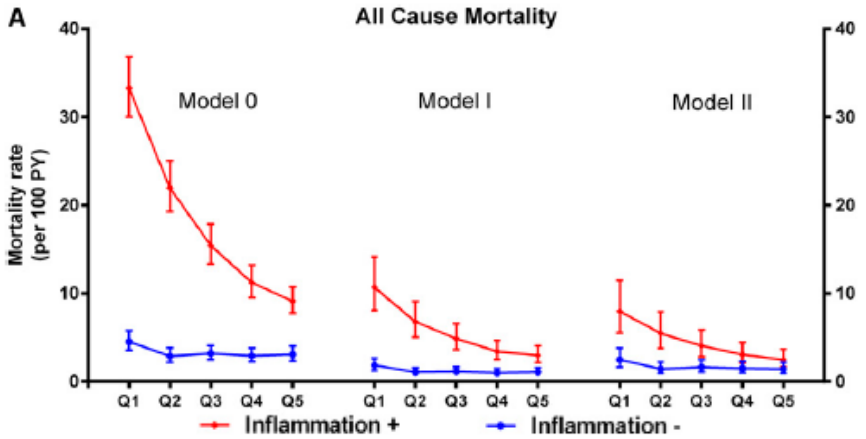
Infl + si:
CRP ≥ 10mg/L
+/- Albu ≤ 35g/l





Suivi médian 36,7 mois
n=5 904 HD incidents 2007-2009

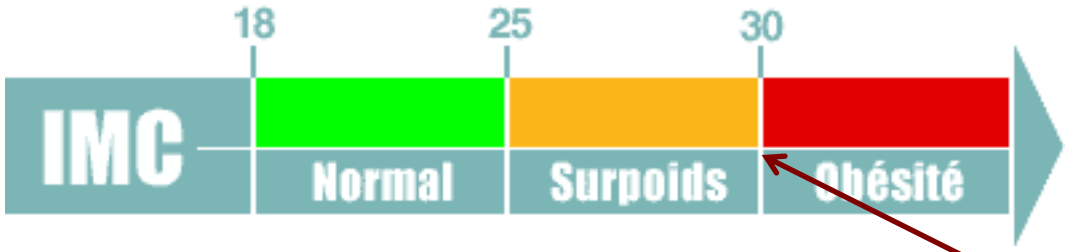
Model	BMI Quintile (kg/m²)	Hazard Ratio (95% Confidence Interval)	
		Inflammation Present	Inflammation Absent
0	1 (<21.5 kg/m²)	10.83 (8.22 to 14.26)[a]	1.51 (1.06 to 2.14)
	2 (21.5–24.0 kg/m²)	7.21 (5.43 to 9.57)[a]	0.95 (0.66 to 1.39)
	3 (24.1–26.4 kg/m²)	5.03 (3.76 to 6.72)[a]	1.04 (0.73 to 1.49)
	4 (26.5–29.8 kg/m²)	3.67 (2.72 to 4.95)	0.97 (0.68 to 1.40)
	5 (>29.8 kg/m²)	2.96 (2.19 to 4.01)	1
I	1 (<21.5 kg/m²)	10.02 (7.58 to 13.24)[a]	1.75 (1.23 to 2.49)
	2 (21.5–24.0 kg/m²)	6.39 (4.80 to 8.51)[a]	1.01 (0.70 to 1.47)
	3 (24.1–26.4 kg/m²)	4.55 (3.40 to 6.10)[a]	1.07 (0.75 to 1.53)
	4 (26.5–29.8 kg/m²)	3.21 (2.38 to 4.33)	0.94 (0.65 to 1.35)
	5 (>29.8 kg/m²)	2.78 (2.05 to 3.76)	1
II	1 (<21.5 kg/m²)	5.63 (4.25 to 7.46)[a]	1.80 (1.26 to 2.56)
	2 (21.5–24.0 kg/m²)	3.88 (2.91 to 5.17)[a]	1.03 (0.71 to 1.50)
	3 (24.1–26.4 kg/m²)	2.89 (2.16 to 3.89)[a]	1.16 (0.81 to 1.66)
	4 (26.5–29.8 kg/m²)	2.14 (1.59 to 2.90)	1.07 (0.74 to 1.54)
	5 (>29.8 kg/m²)	1.77 (1.30 to 2.40)	1

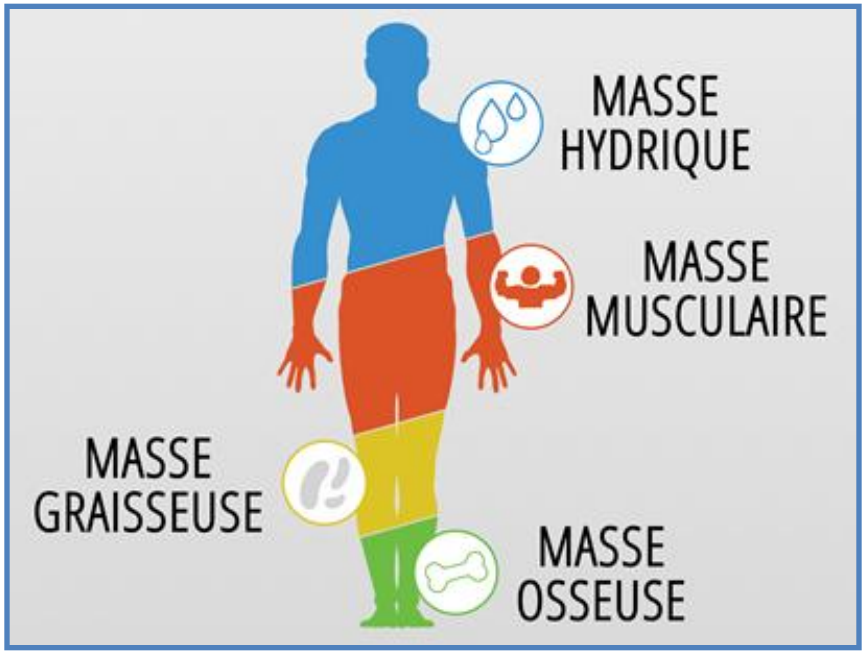


Stenvinkel P et al JASN 2016

Biais méthodologique ?

IMC comme indicateur d'obésité ?

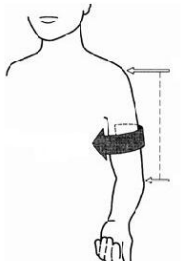


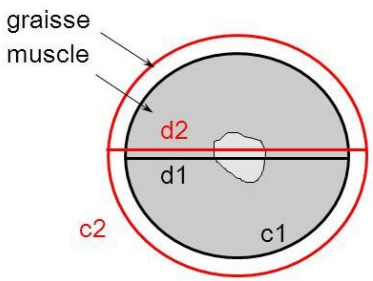


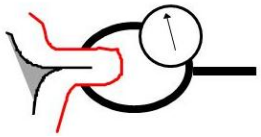
93Kg
175cm

Biais méthodologique ?

792 HD USA 2001-2006 → survie à 5 ans (222 décès)

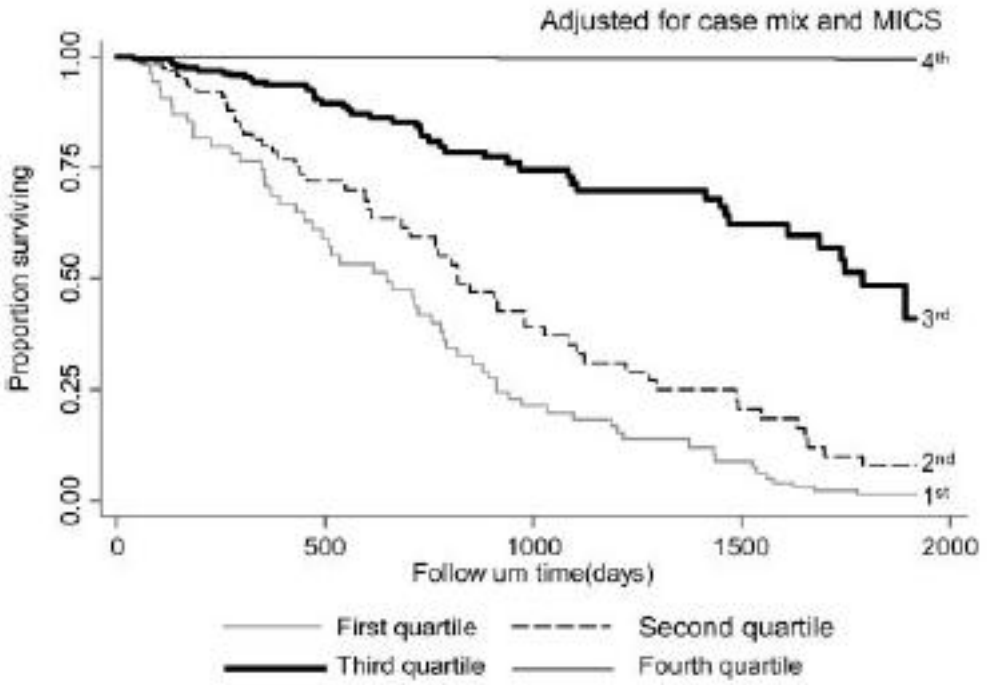






Circonférence brachiale
Pli cutané tricipital

CMB = CB - 3,14 PCT ⟶ masse maigre



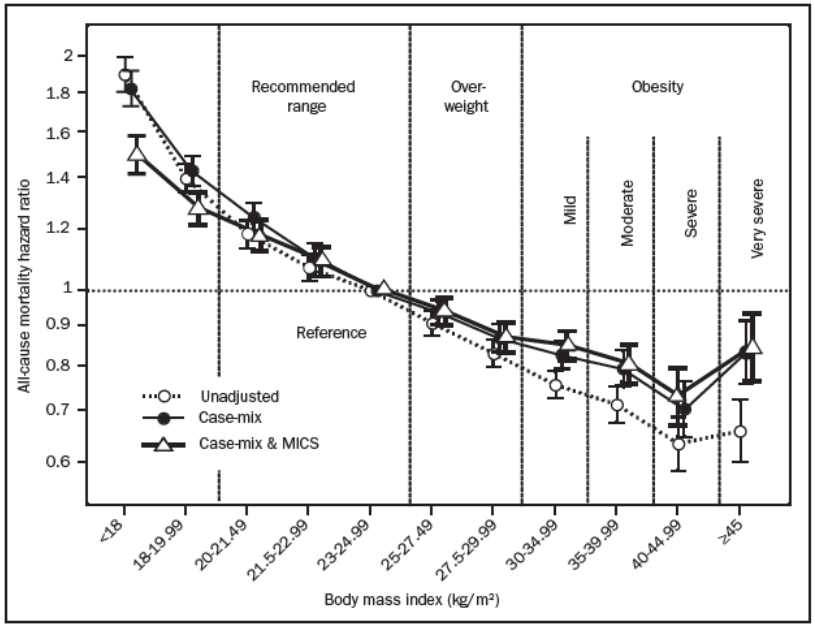
	Low MAMC and Low TSF	Low MAMC and High TSF	High MAMC and Low TSF	High MAMC and High TSF
Number of subjects	194	202	205	191
Number of deaths	70	51	46	55
Crude mortality	36%	25%	22%	28%
Unadjusted death HR	1	0.66 (0.46 to 0.95)	0.60 (0.41 to 0.87)	0.71 (0.49 to 1.00)
P value	n/a	0.02	<0.01	0.05
case-mix adj. death HR	1	0.61 (0.41 to 0.89)	0.59 (0.39 to 0.88)	0.52 (0.36 to 0.77)
P value	n/a	0.01	<0.001	<0.001

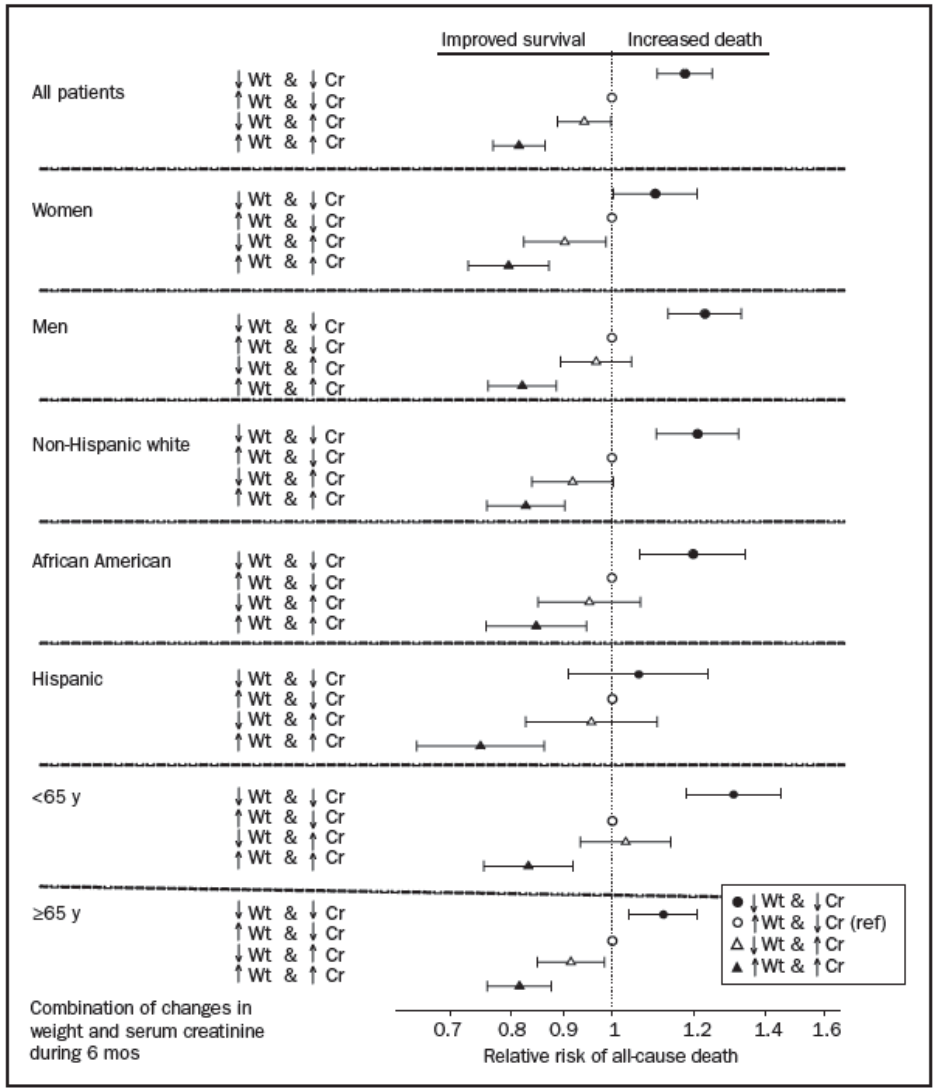
IF FAT IS GOOD, MUSCLE IS BETTER

Noori N et al cJASN 2010

Biais méthodologique ?

121 762 HD USA 2001-2006 → survie à 5 ans



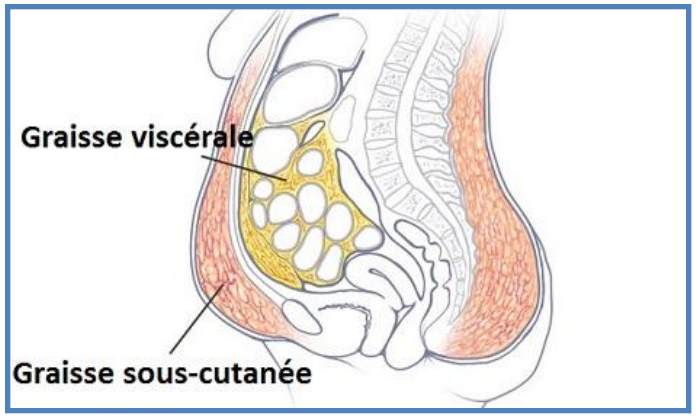


IF FAT IS GOOD, MUSCLE IS BETTER

Kalantar Zadeh K et al Mayo Clinic Proc 2010

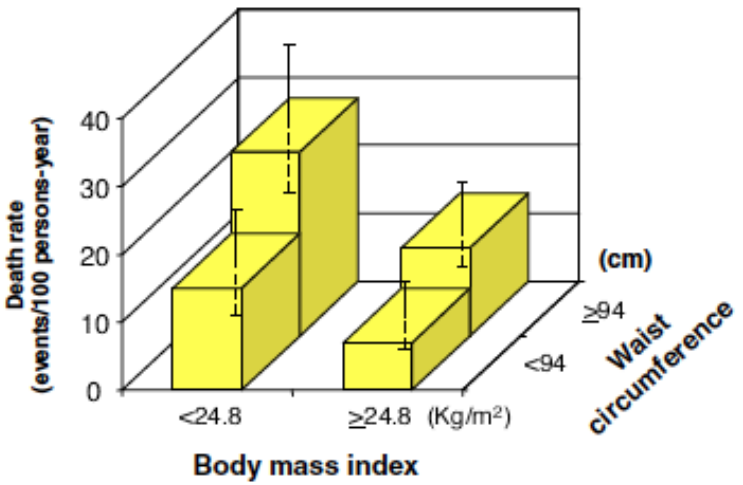
Biais méthodologique ?

537 HD Italie 2003-2006
Suivi 29 mois [1-47] – 182 décès

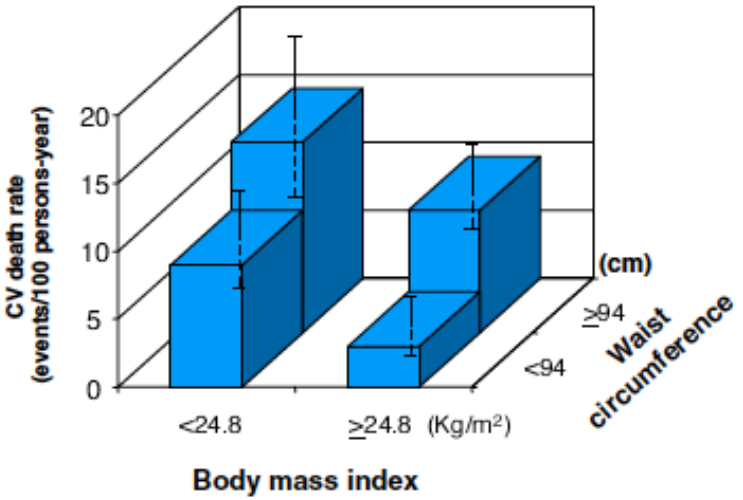


Tour de taille

All cause death



Cardiovascular death



Postorini M et al JACC 2009

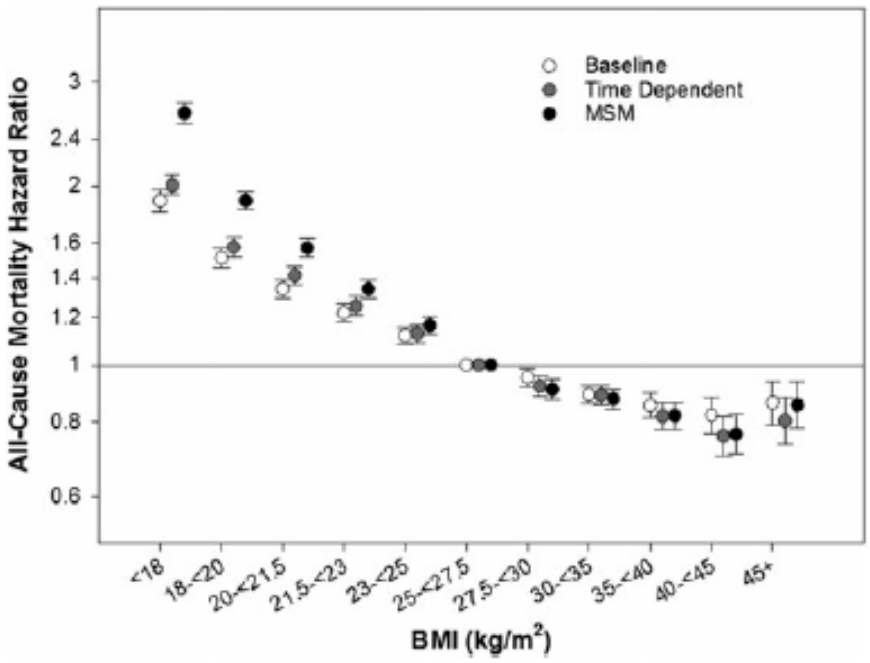
Biais méthodologique ?

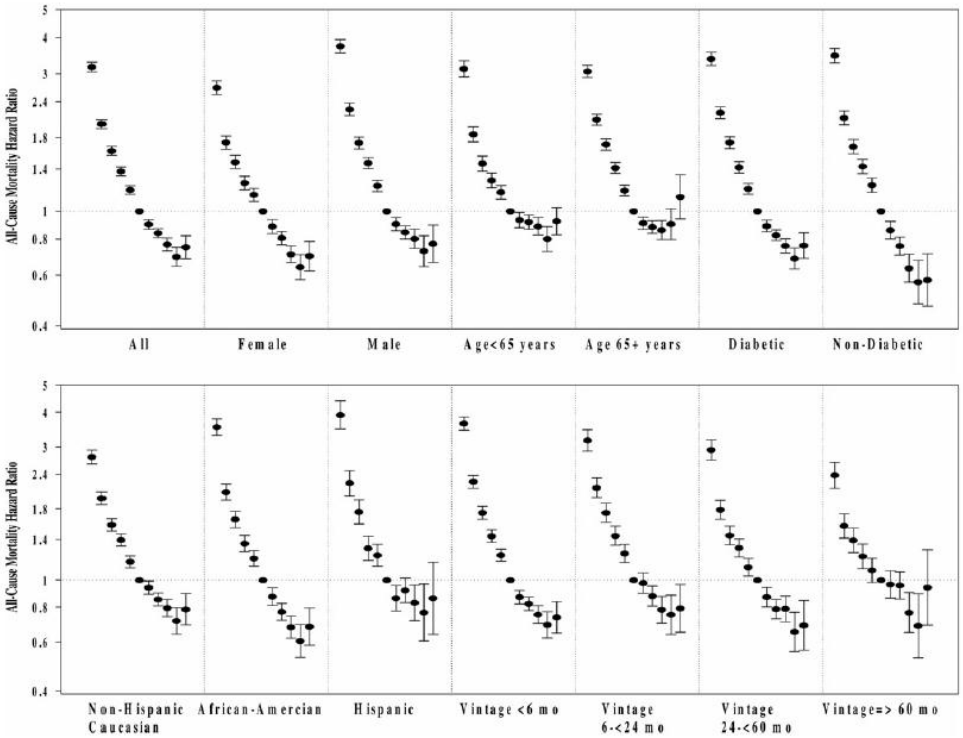
Examining the robustness of the obesity paradox in maintenance hemodialysis patients: a marginal structural model analysis

Megha Doshi[1], Elani Streja[1], Connie M. Rhee[1], Jongha Park[1,2], Vanessa A. Ravel[1], Melissa Soohoo[1], Hamid Moradi[1,6], Wei Ling Lau[1], Rajnish Mehrotra[3], Sooraj Kuttykrishnan[3], Csaba P. Kovesdy[4,5], Kamyar Kalantar-Zadeh[1,6,7] and Joline L. T. Chen[1,6]

Nephrol Dial Transplant (2016) 31: 1310–1319

123 624 HD USA 2001-2006





Biais méthodologique ?

IMC augmenté

par excès de masse maigre + masse grasse

concept « obèse métaboliquement sain »

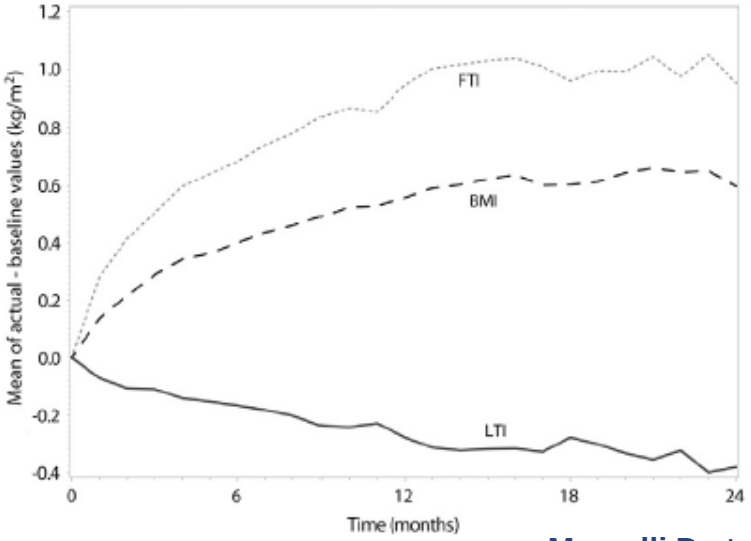
→ biais de sélection (pop de survivants)

Biais méthodologique ?

IMC augmenté
par excès de masse maigre + masse grasse
concept « obèse métaboliquement sain »
→ biais de sélection (pop de survivants)

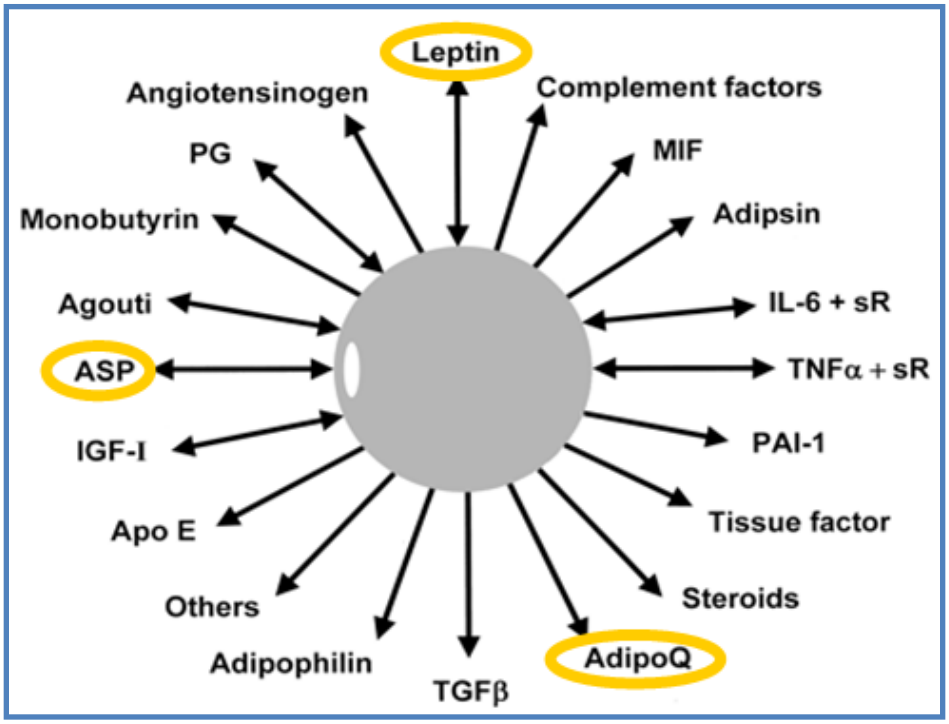
IMC normal
par excès de masse grasse
+ perte de masse maigre (liée à l'HD/pathologie sous jacente)
→ Exagération du gain de survie malgré ajustements

8 227 HD incidents international 2007-2014



Marcelli D et al J Ren Nutr 2016

Tout s'explique !



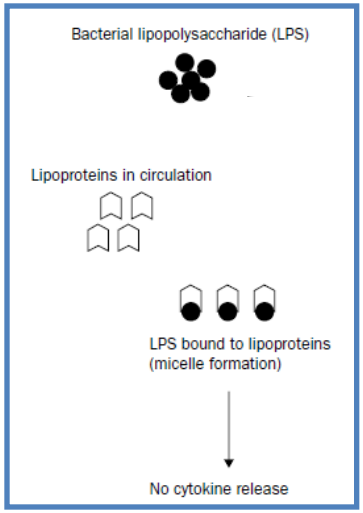
Tissu adipeux =
Organe endocrinien complexe

Hémodynamique favorable du patient obèse
- hyper activité sympathique
- hyper activité du SRAA

Tissu Adipeux:balance pro/anti -inflammatoire

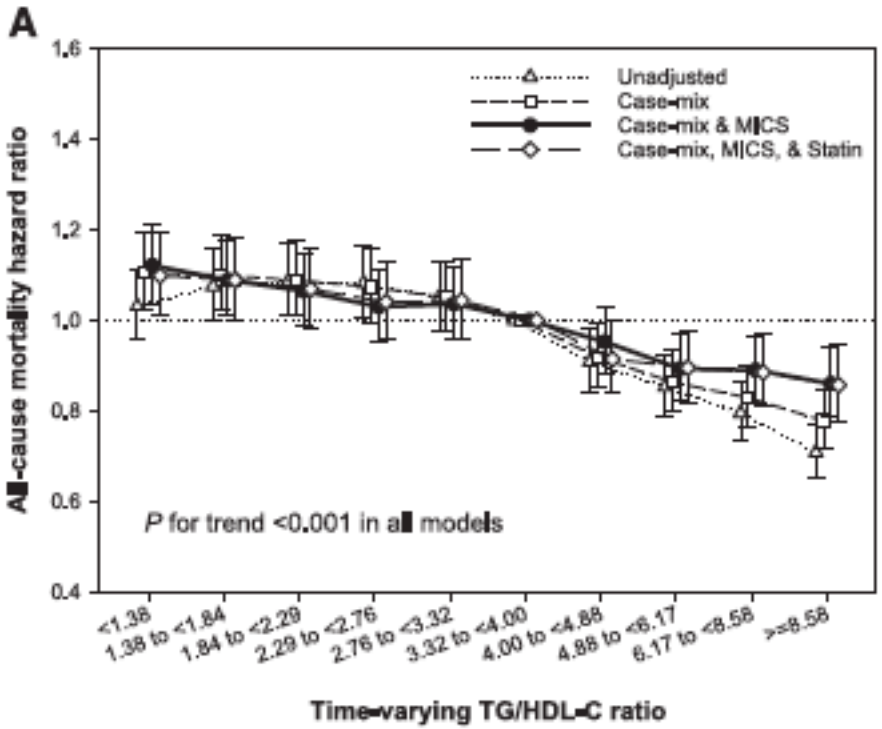
Tissu adipeux = réserve énergétique
- déplétion protéino-energétique induit par IRCT / EER

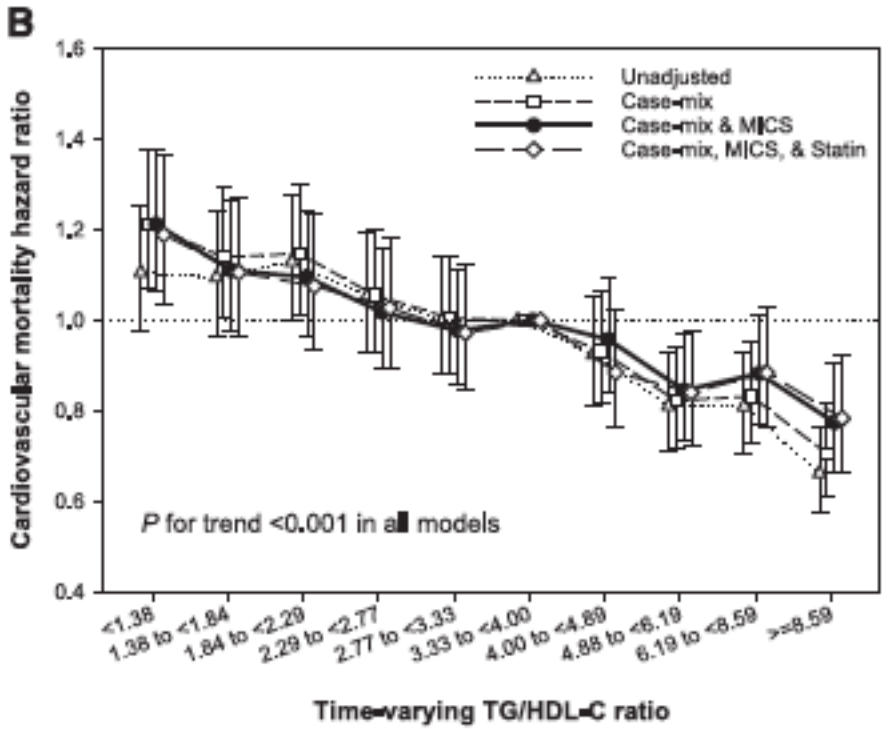
Source de Lipoproteines
- Neutralisation-clairance des endotoxines



Tout s'explique !

50 673 HD incidents 2007-2011
Suivi 19 mois [11-32] – 12 778 décès





Chang TI et al cJASN 2017

Obésité et dialyse au quotidien

Peut on promouvoir le surpoids en dialyse ?

Chirurgien:
« Il doit maigrir avant »

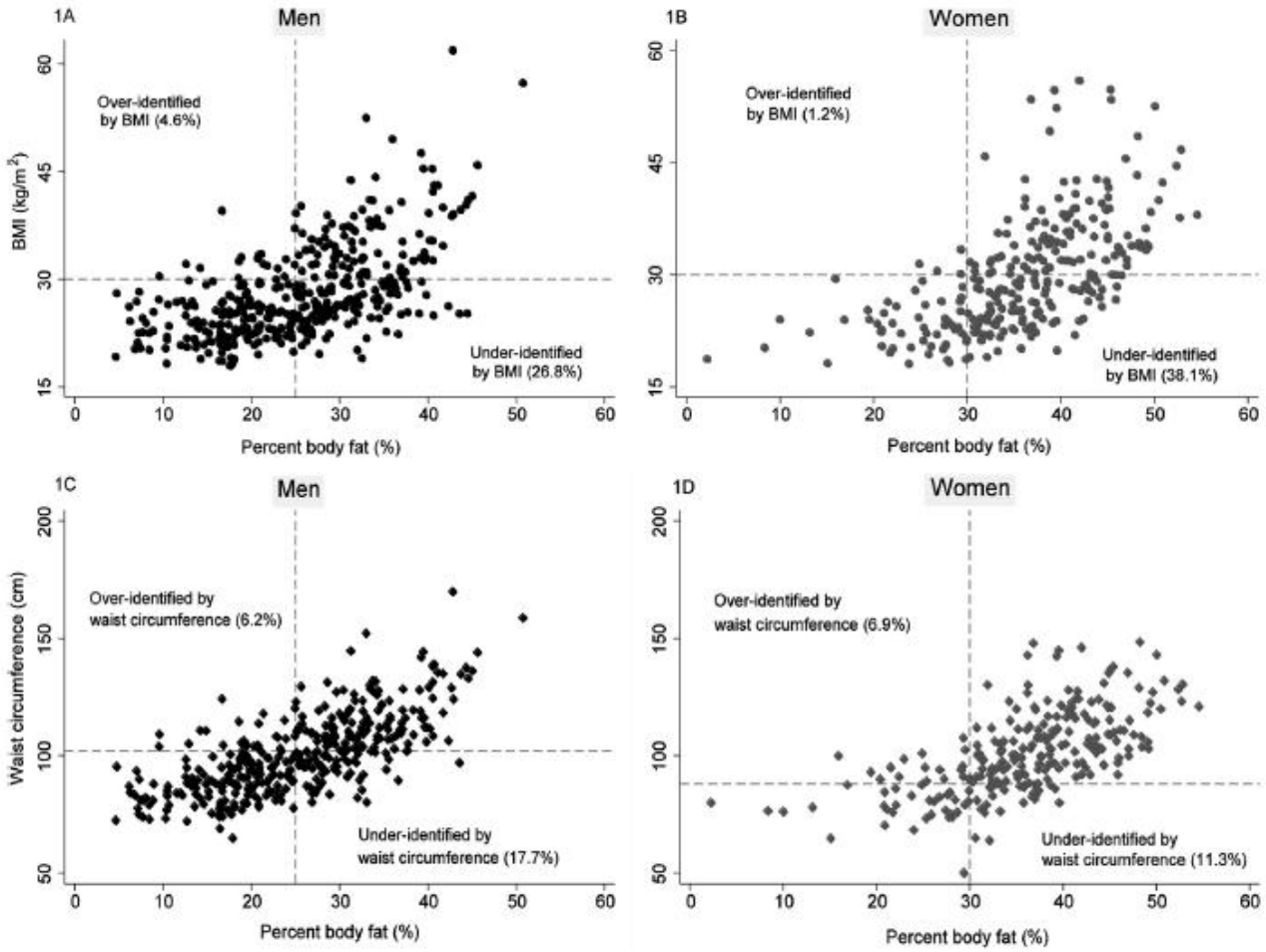
Néphrologue:
« Sa survie est meilleure avec cet IMC»

« Le transplanter, c'est améliorer sa survie »

Dialysé chronique
IMC 37
Candidat à la transplantation rénale

Obésité et dialyse au quotidien

Se baser sur IMC pour proposer une perte de poids ?



620 HD USA 2009-2011

Kittiskulnam P et al AJKD 2016

Obésité et dialyse au quotidien

Peut on promouvoir le surpoids en dialyse ?

Perte de poids si IMC ≥ 30 → OUI ….. Sauf .....

Perte de poids si IMC < 30 Mais tour de taille augmenté → Obésité « cachée »

Diminution de la ration calorique + Activité physique adaptée

Obésité et dialyse au quotidien

Peut on proposer aux patients obèses HD et DP ?

Considérer les objectifs d'adéquation:

- **qualité de vie**
- **épuration / masse métaboliquement active**
- **Coût métabolique potentiel de la DP**
- **bénéfice « ressource énergétique » de la DP / déplétion protéino-énergétique**

Obésité et dialyse au quotidien

Peut on proposer aux patients obèses HD et DP ?

Am J Med Sci. 2017 Jan;353(1):70-75. doi: 10.1016/j.amjms.2016.11.003. Epub 2016 Nov 5.

Peritoneal Dialysis in Class 2-3 Obesity-A Single-Center Experience.

Akula YV[1], Fülöp T[2], Dixit MP[3].

⊕ Author information

Abstract

Extreme obesity may hamper successful peritoneal dialysis (PD) delivery. Among our PD patients, we have identified 15 markedly obese (class 2-3 obesity: body mass index [BMI] ≥35kg/m^2) and 20 lean (BMI: 20-25kg/m^2) dialysis patients and reviewed multiple clinical, laboratory and dialysis-related parameters. Extreme outliers of obesity (BMI > 40; 6 subjects) received detailed review. Although weight (P < 0.0001) and BMI (P < 0.0001) differed significantly, weekly Kt/V (obese versus lean: 2.05 ± 0.51 versus 2 ± 0.36), creatinine clearance (86.8 ± 44.8 versus 70 ± 30.4L/1.73m^2) or residual renal functions were not statistically different. Total daily PD exchange volumes were similar (11.2 ± 2.5L versus 10.4 ± 2.5L, P = 0.378). Serum albumin, calcium, phosphorus, hemoglobin and parathyroid hormone levels did not differ, either. Analogous results have been obtained for extremely obese subjects (BMI 44.3 ± 4.2kg/m^2; range: 40.2-51.6). Our study shows only limited effect of class ≥2 obesity for successful PD in this predominantly African American cohort.

Am J Kidney Dis. 2002 Dec;40(6):1295-300.

Feasibility of adequate solute clearance in obese patients on peritoneal dialysis: a cross-sectional study.

Shibagaki Y[1], Faber MD, Divine G, Shetty A.

⊕ Author information

Abstract

BACKGROUND: It is widely assumed that obese patients are poorly suited for peritoneal dialysis (PD). Mathematical models predicting weight limits to achieve adequate solute clearance in anuric patients on continuous ambulatory PD therapy do not apply to the majority of obese patients on PD therapy.

METHODS: To define the extent to which obesity or large body size interferes with successful PD, the feasibility of achieving adequate solute clearance, defined by the Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines, was studied. We reviewed prospectively recorded data for 25 obese patients (body mass index > or = 29) from a group of 58 prevalent PD patients treated in an inner-city ambulatory dialysis center. Adequacy of solute clearances was assessed by comparing weekly Kt/V and weekly creatinine clearance (WCC) with those recommended by the K/DOQI. Adequacy also was examined separately for large patients, defined as those with total-body water (TBW) by the Watson and Watson equation of 48 L or greater. Similar analyses were performed separately for 10 anuric obese patients.

RESULTS: Eighty four percent and 88% of the 25 obese patients achieved K/DOQI targets for weekly Kt/V and WCC, respectively. Among the 10 anuric obese patients, 90% and 70% achieved these targets. Only 60% of those with TBW of 48 L or greater met the Kt/V target.

CONCLUSION: PD remains a viable option for obese patients with end-stage renal disease. It is possible for the majority of obese patients on PD therapy to achieve solute clearances recommended by the K/DOQI.

Conclusions

L'IMC = marqueur fiable – robuste à considérer en pratique clinique
à l'échelle de population
à l'échelle individuelle
+/- mesures de la composition corporelle

L'IMC = doit guider une prise en charge thérapeutique spécifique
priorité à l'activité physique adaptée
la perte de poids → perte de masse graisseuse métaboliquement délétère