INSTITUT CARDIOVASCULAIRE PARIS SUD

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# Stratégie optimale de revascularisation (chez le patient pluritronculaire diabétique)

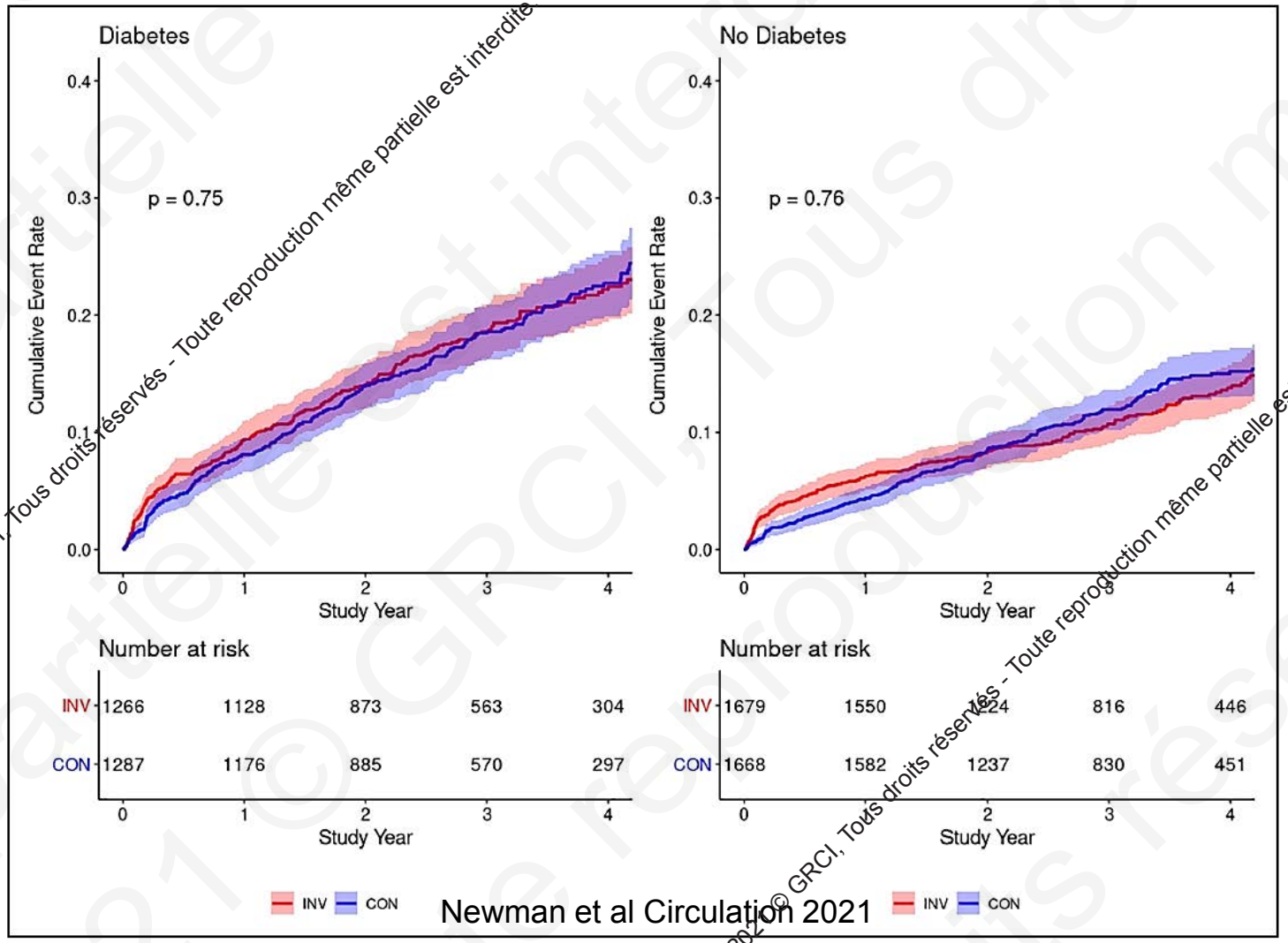
Bernard Chevalier

ICPS

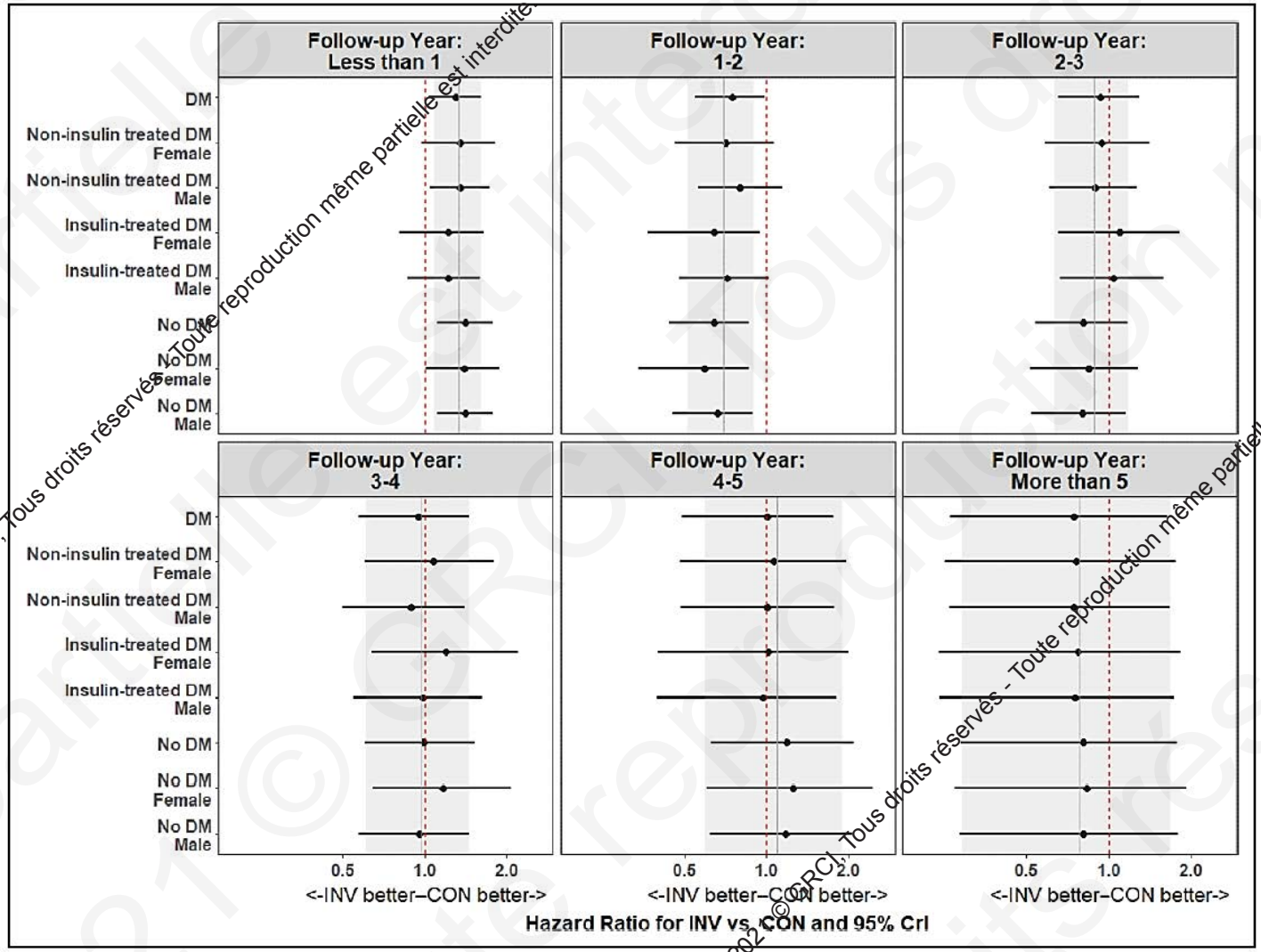
France

COI: CERC shareholder

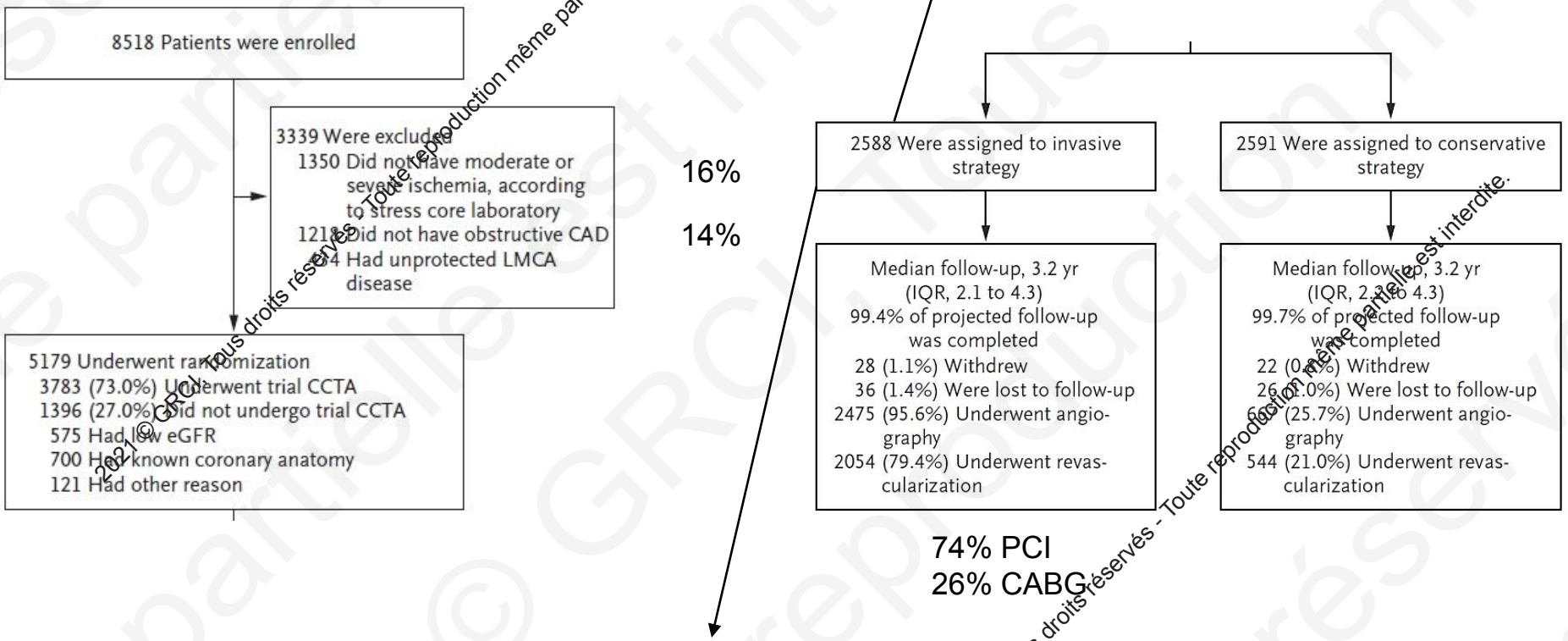
# Faut-il revasculariser ?




Newman et al Circulation 2021



SPECT, PET, Stress Echo, Sress MRI ...EE




20%FFR

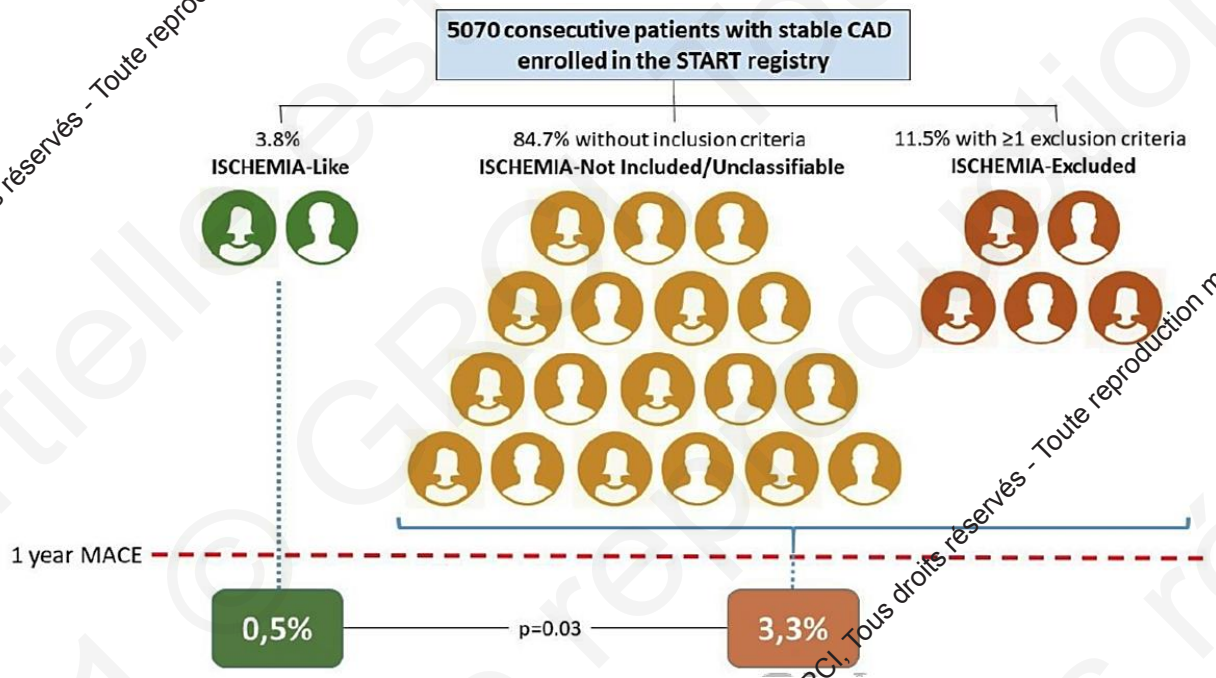
16%

14%

74% PCI
26% CABG

9% pas de lésion coronaire

# De la vie réelle à ISCHEMIA: 6 ans sur 320 centres





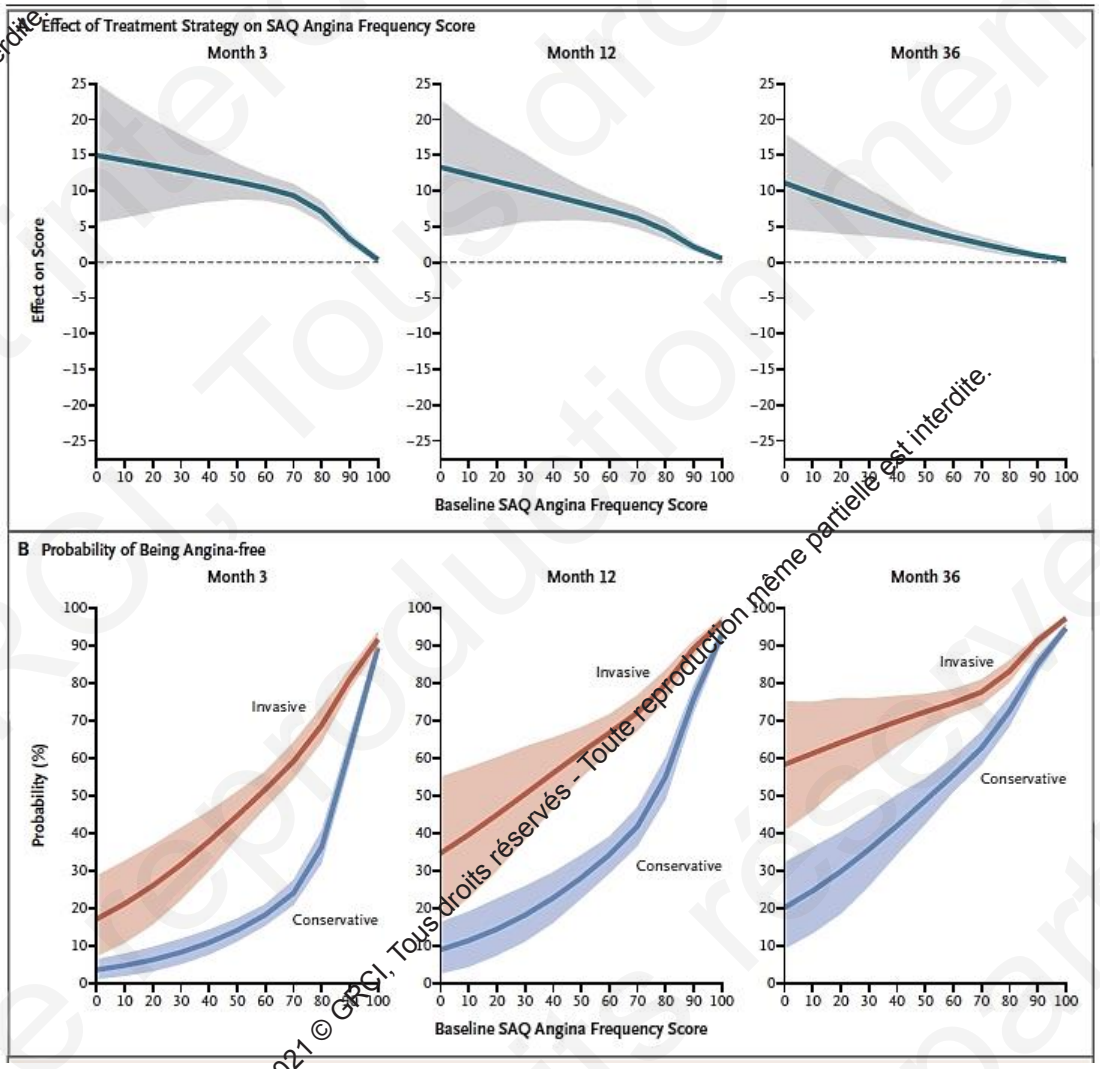



De Luca L et al Eurointervention 2020

**Table 2. Mean Estimated Effect of an Invasive Strategy on SAQ Summary Scores.***

| Month | Overall (N=4617) | Daily or Weekly Angina at Baseline (N=934) | Monthly Angina at Basel (N=2043) |
|---|---|---|---|
| | | *points (95% credible interval)* | |
| 3 | 4.1 (3.2 to 5.0) | 8.5 (5.8 to 11.1) | 5.5 (4.3 to 6.9) |
| 6 | 4.4 (3.5 to 5.3) | 10.5 (7.9 to 13.2) | 5.1 (3.7 to 6.4) |
| 12 | 4.2 (3.3 to 5.1) | 7.3 (4.8 to 9.9) | 4.8 (3.4 to 6.1) |
| 18 | 3.3 (2.5 to 4.2) | 6.3 (3.9 to 9.0) | 3.6 (2.2 to 4.9) |
| 24 | 2.9 (2.1 to 3.7) | 5.0 (3.0 to 7.2) | 3.5 (2.3 to 4.7) |
| 30 | 2.9 (2.1 to 3.6) | 5.2 (3.2 to 7.2) | 3.3 (2.2 to 4.3) |
| 36 | 2.9 (2.2 to 3.7) | 5.3 (3.4 to 7.5) | 3.1 (2.0 to 4.2) |
| 42 | 3.0 (2.2 to 3.8) | 5.5 (3.3 to 7.7) | 2.9 (1.7 to 4.1) |
| 48 | 3.1 (2.1 to 3.9) | 5.6 (3.2 to 8.0) | 2.7 (1.3 to 4.0) |

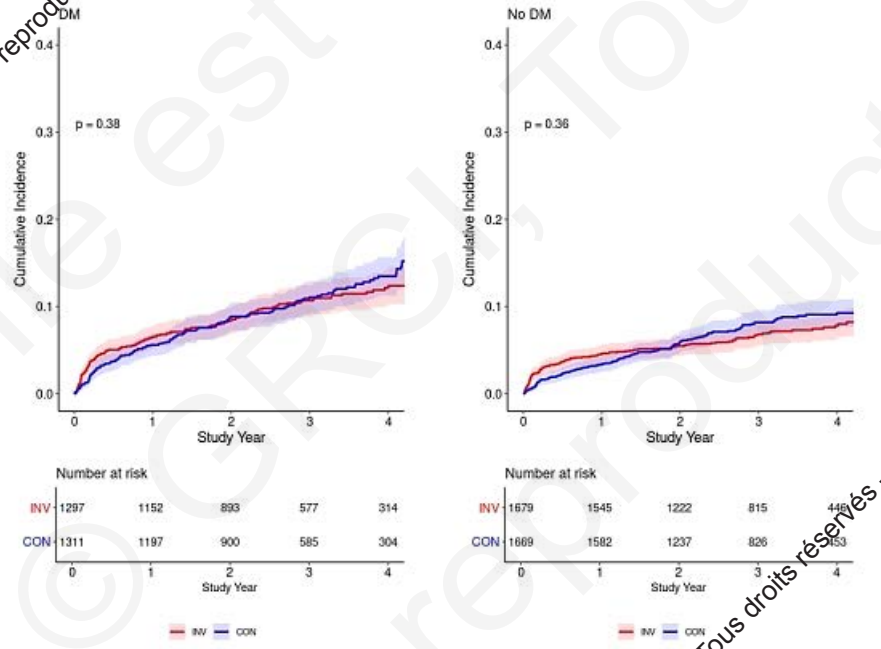
* Data are the posterior mean differences (invasive minus conservative) in SAQ Summary scores at each




From ISCHEMIA
Spertus JA et al NEJM 2020

# Spontaneous MI in ISCHEMIA

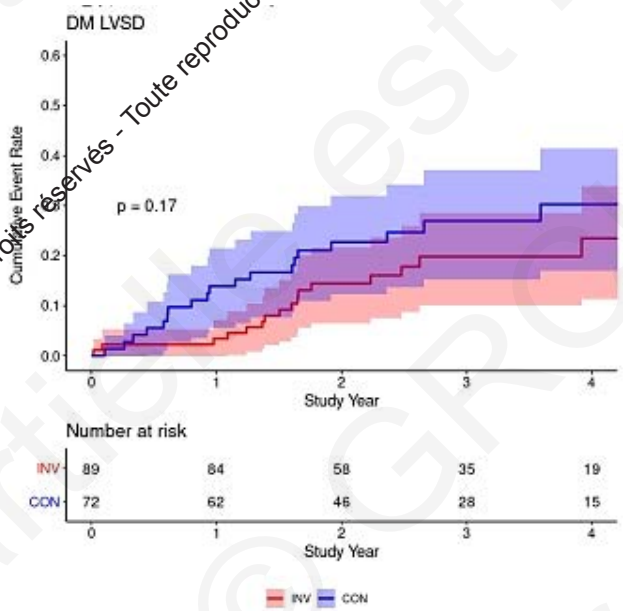
Figure VId. Cumulative incidence of fatal and non-fatal MI (accounting for competing risks) by treatment strategy, stratified by diabetes status

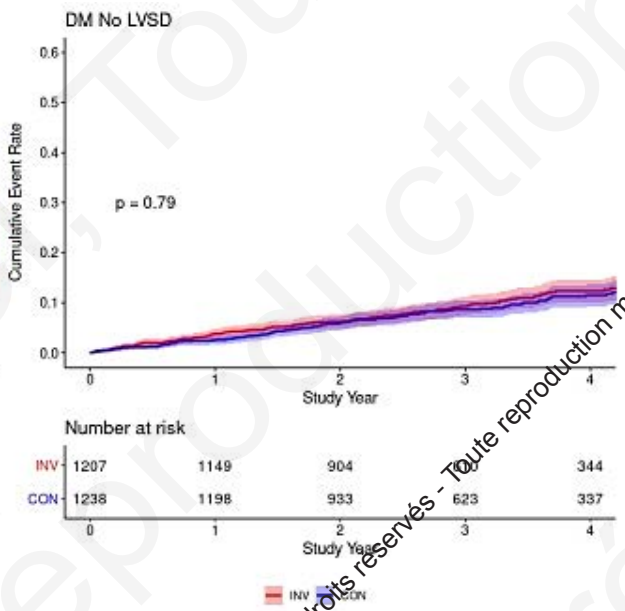





Chaitman BR et al Circulation 2020 / Newman et al Circulation 2021

# Death + MI in pts with LV systolic dysfunction



# And I.R.L? MVD+Diabetes

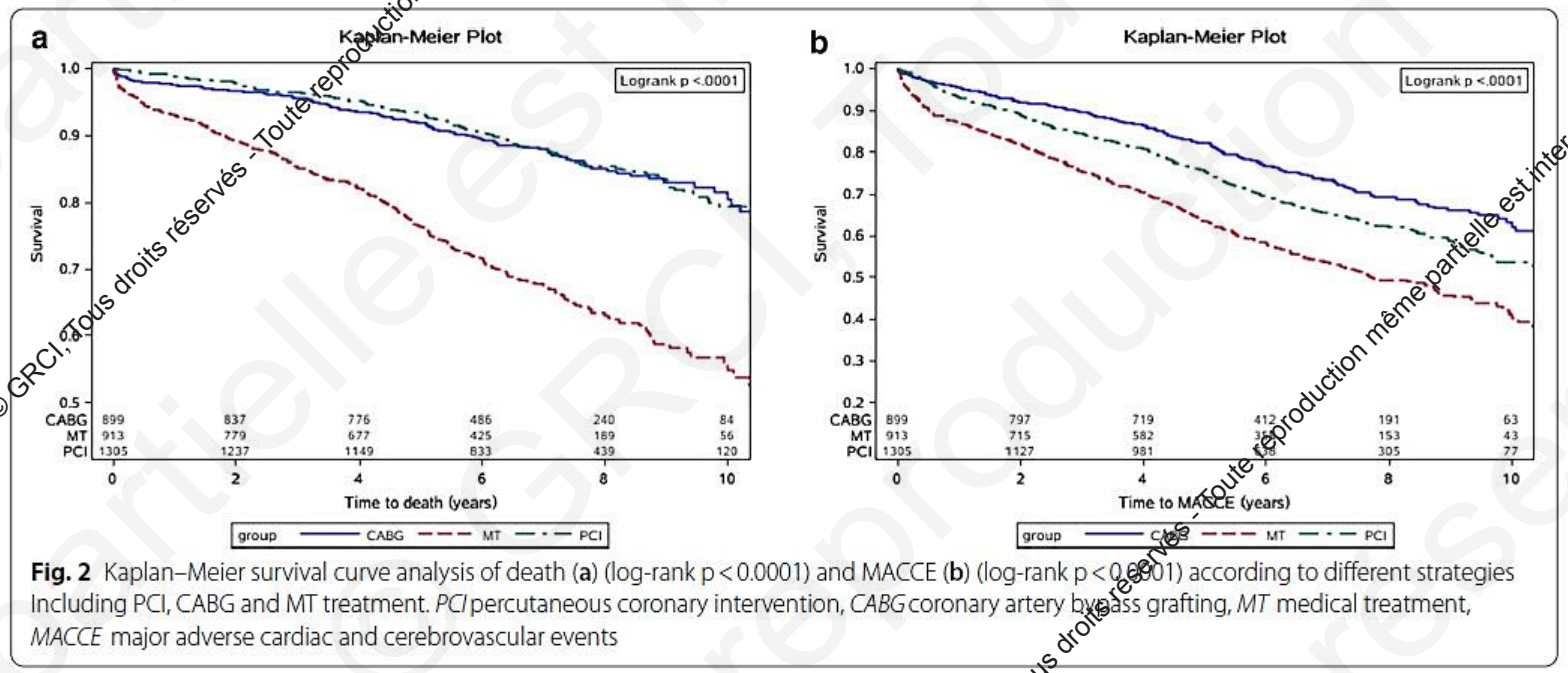



**Fig. 2** Kaplan–Meier survival curve analysis of death (**a**) (log-rank p < 0.0001) and MACCE (**b**) (log-rank p < 0.0001) according to different strategies Including PCI, CABG and MT treatment. *PCI* percutaneous coronary intervention, *CABG* coronary artery bypass grafting, *MT* medical treatment, *MACCE* major adverse cardiac and cerebrovascular events

Zhao et al Cardiovasc Diabetol 2021

# Que revasculariser ?



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# Clinical outcomes of deferred revascularisation using fractional flow reserve in patients with and without diabetes mellitus

Mark W. Kennedy[1], Eliza Kaplan[1], Rik S. Hermanides[1], Enrico Fabris[1,2], Veemal Hemradj[1], Petra C. Koopmans[2], Jan-Hank E. Dambrink[1,2], A. T. Marcel Gosselink[1], Arnoud W. J. van't Hof[1], Jan Paul Ottervanger[1], Vincent R. Bolvink[1], Wouter S. Remkes[1], Aize van der Sluis[1], Harry Suryapranata[2] and Elvin Kedhi[1*]

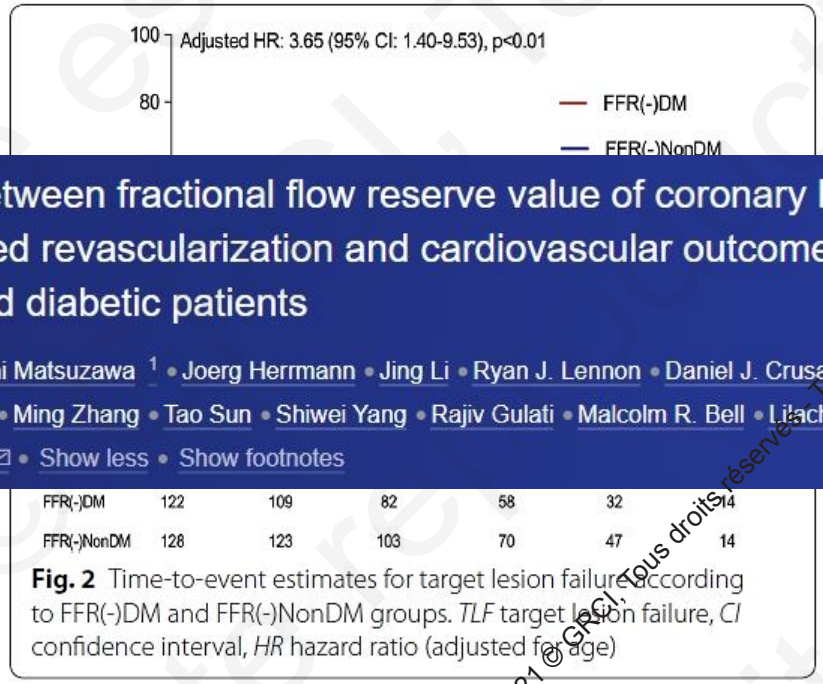



**Fig. 2** Time-to-event estimates for target lesion failure according to FFR(-)DM and FFR(-)NonDM groups. *TLF* target lesion failure, *CI* confidence interval, *HR* hazard ratio (adjusted for age)

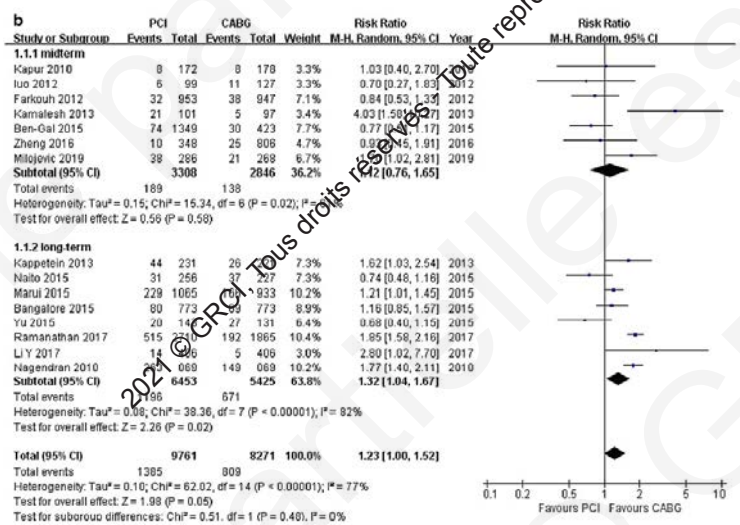
## Relation between fractional flow reserve value of coronary lesions with deferred revascularization and cardiovascular outcomes in non-diabetic and diabetic patients

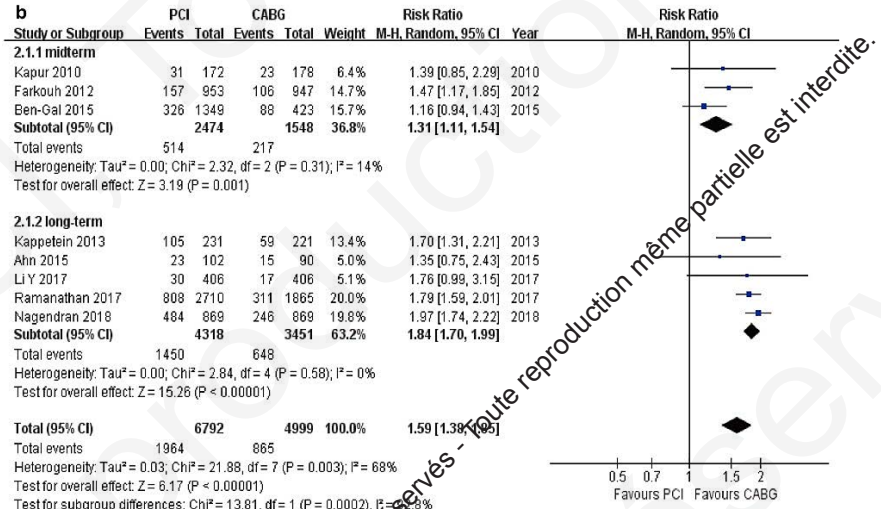
Zhi Liu [1] • Yasushi Matsuzawa [1] • Joerg Herrmann • Jing Li • Ryan J. Lennon • Daniel J. Crusan • Taek-Geun Kwon • Ming Zhang • Tao Sun • Shiwei Yang • Rajiv Gulati • Malcolm R. Bell • Lilach O. Lerman • Amir Lerman • Show less • Show footnotes

# Comment revasculariser ?

| Recommendations according to the extent of CAD | CABG | | PCI | |
|---|---|---|---|---|
| | Class[a] | Level[b] | Class[a] | Level[b] |
| ***One-vessel CAD*** | | | | |
| With proximal LAD stenosis | I | A | I | A |
| ***Two-vessel CAD*** | | | | |
| With proximal LAD stenosis | I | B | | |
| ***LM CAD*** | | | | |
| LM with low SYNTAX score 0 - 22 | I | A | I | A |
| LM with intermediate SYNTAX score >22 and ≤32 | I | A | | |
| LM with high SYNTAX score >32.[e] | I | A | III | B |
| ***Three-vessel CAD without diabetes mellitus*** | | | | |
| Three-vessel disease with low SYNTAX score 0 - 22 | I | A | I | A |
| Three-vessel disease with intermediate or high SYNTAX score >22[e] | I | A | III | A |
| ***Three-vessel CAD with diabetes mellitus*** | | | | |
| Three-vessel disease with low SYNTAX score 0 - 22 | I | A | | |
| Three-vessel disease with intermediate or high SYNTAX score >22[e] | I | A | III | A |

# Death / MACCE in MVD+Diabetes



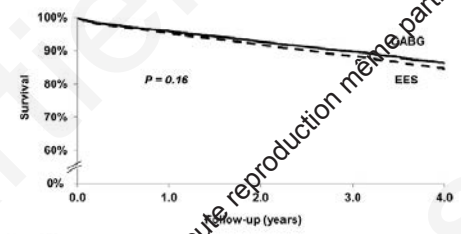







Zhai et Diabetol Metab Syndr 2019

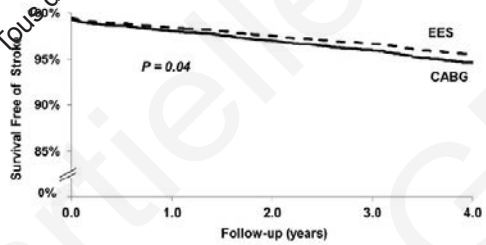
# EES vs CABG in pts with MVD (NYS)




No. at Risk

| | | | | | |
|---|---|---|---|---|---|
| CABG | 4048 | 3872 | 2920 | 1922 | 937 |
| EES | 4048 | 3872 | 2592 | 1393 | 370 |

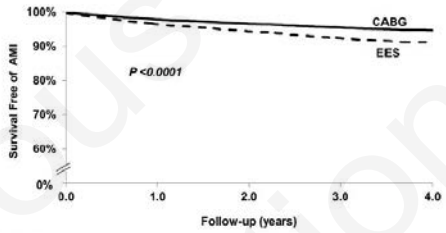
**Figure 2.** Everolimus eluting stent (EES) vs coronary artery bypass graft surgery (CABG): long-term (includes first 30 days) death.




No. at Risk

| | | | | | |
|---|---|---|---|---|---|
| CABG | 4048 | 3803 | 2856 | 1867 | 902 |
| EES | 4048 | 3831 | 2546 | 1358 | 356 |

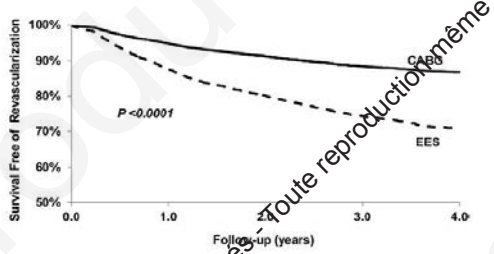
**Figure 4.** Everolimus eluting stent (EES) vs coronary artery bypass graft surgery (CABG): long-term (includes first 30 days) stroke.




No. at Risk

| | | | | | |
|---|---|---|---|---|---|
| CABG | 4048 | 3804 | 2833 | 1854 | 902 |
| EES | 4048 | 3742 | 2467 | 1310 | 351 |

**Figure 3.** Everolimus eluting stent (EES) vs coronary artery bypass graft surgery (CABG): long-term (includes first 30 days) myocardial infarction.

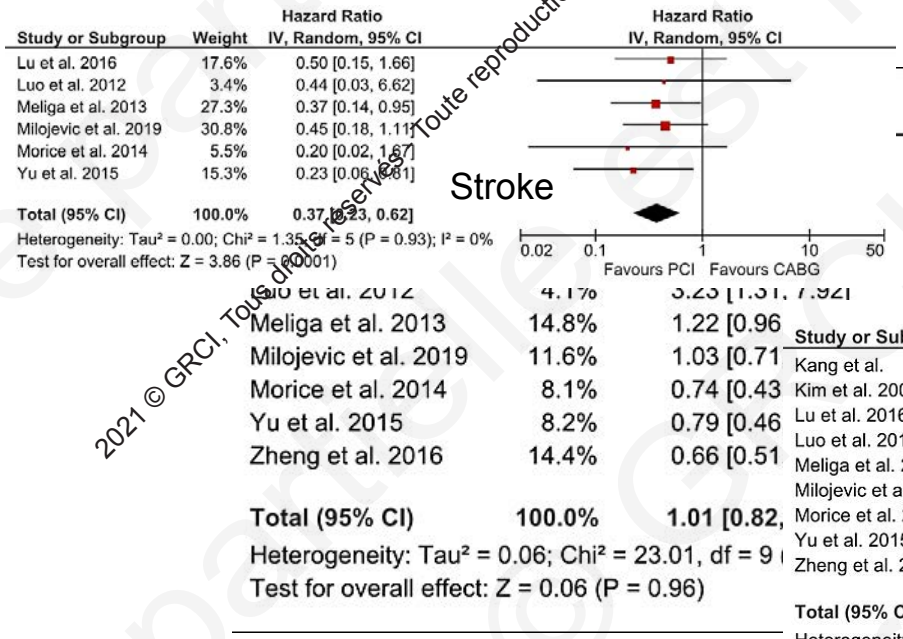



No. at Risk

| | | | | | |
|---|---|---|---|---|---|
| CABG | 4048 | 3672 | 2666 | 1690 | 806 |
| EES | 4048 | 3598 | 2048 | 1036 | 263 |

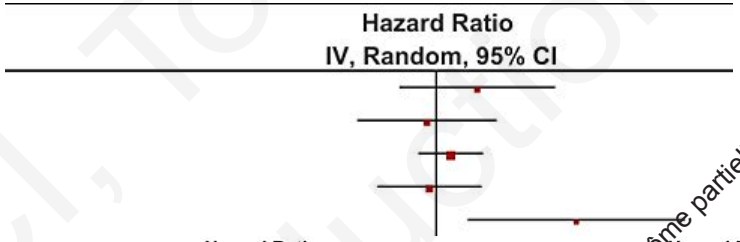
**Figure 5.** Everolimus eluting stent (EES) vs coronary artery bypass graft surgery (CABG): long-term (includes first 30 days) repeat revascularization.

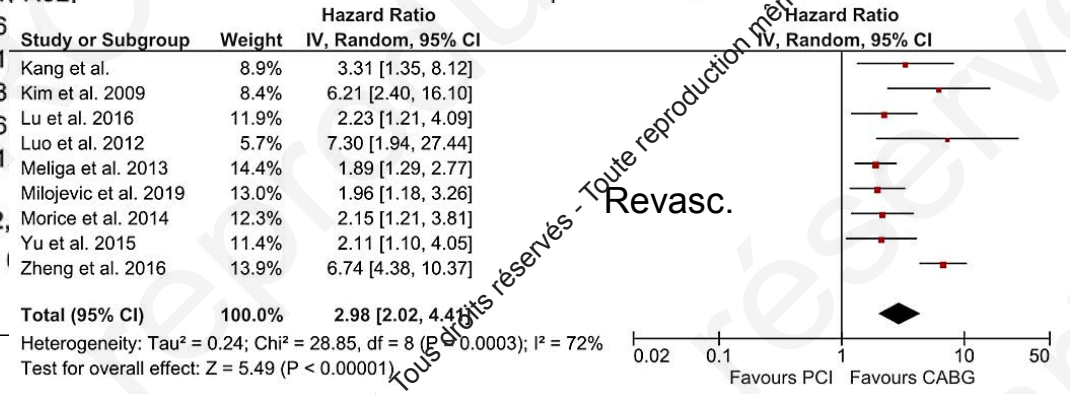
# Death/MI/Stroke in LM+Diabetes









# Comment décider ?

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# Qualité du contrôle glycémique?

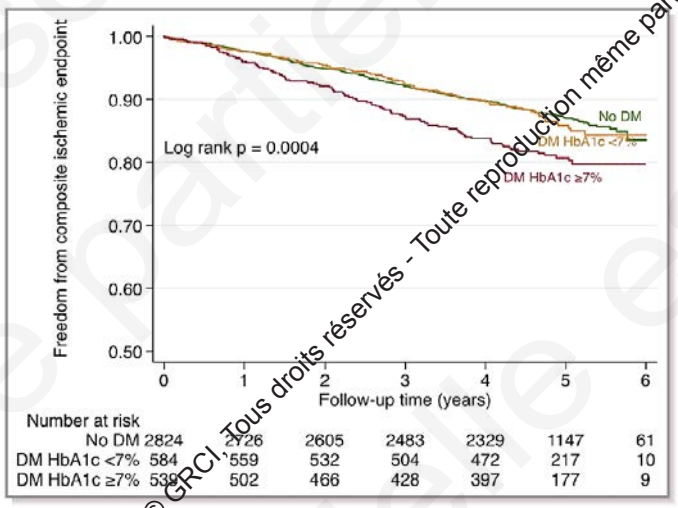
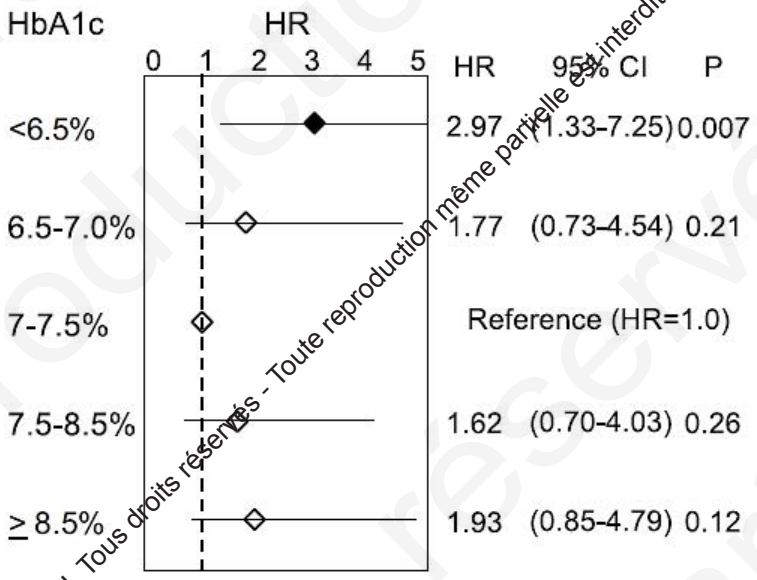



**Figure 1.** Cardiovascular death, myocardial infarction, or ischemic stroke during 5-year follow-up, according to diabetic status and diabetes mellitus (DM) control. Unadjusted Kaplan-Meier curves are shown. HbA1c indicates glycosylated hemoglobin.

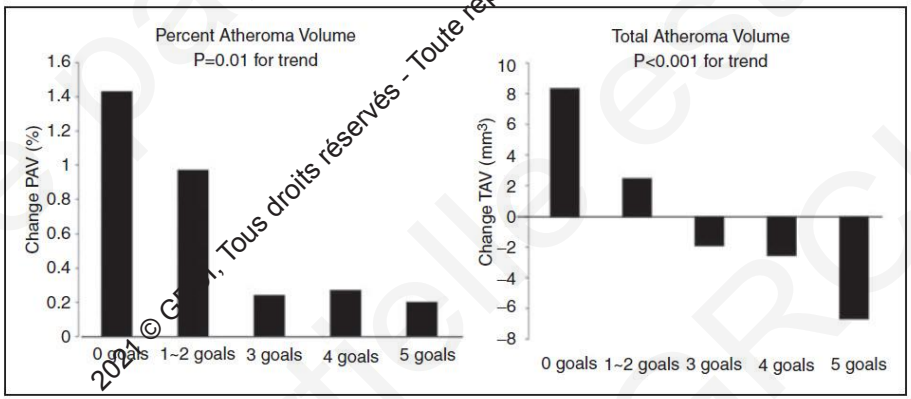
Lemesle et al JAHA 2018




Increased risk of cardiovascular mortality by strict glycemic control (pre-procedural HbA1c < 6.5%) in Japanese medically-treated diabetic patients following percutaneous coronary intervention: a 10-year follow-up study

Takehiro Funamizu[1], Hiroshi Iwata[1*], Yuya Nishida[2], Katsutoshi Miyosawa[1,3], Shinichiro Doi[1], Yuichi Chikata[1], Jun Shitara[4], Hirohisa Endo[1], Hideki Wada[4], Ryo Naito[5], Manabu Ogita[4], Tomotaka Dohi[1], Takatoshi Kasai[1], Shinya Okazaki[1], Kikuo Isoda[1], Katsumi Miyauchi[1] and Hiroyuki Daida[1]

# Inégalité vis-à-vis de la progression (lesion versus vaisseau)



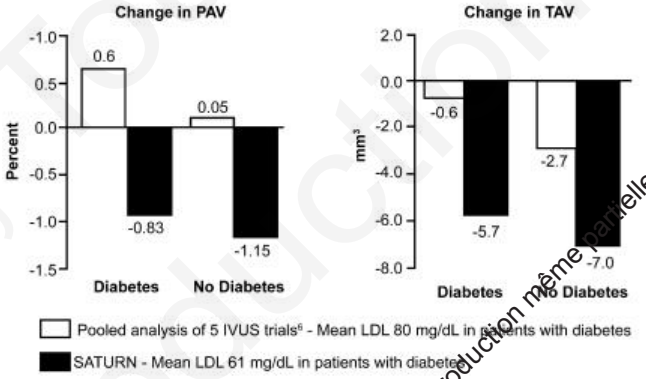




**Figure 2**—Comparison between current SATURN analysis and previous pooled analysis of five serial IVUS trials. Comparison of change in PAV and TAV seen in the current analysis of SATURN (black bars) in which the mean LDL-C in patients with diabetes was 61 mg/dL and a previous pooled analysis of five IVUS trials (6) (white bars) in which mean LDL-C in patients with diabetes was 80 mg/dL. Of note, statistical methods for the current analysis and previous analysis represented on this figure were different; thus no direct statistical comparisons between these analyses can be made.



Kataoka et Eur J of preventive cardiology 2012
Stegman et al Diabetes Care 2014

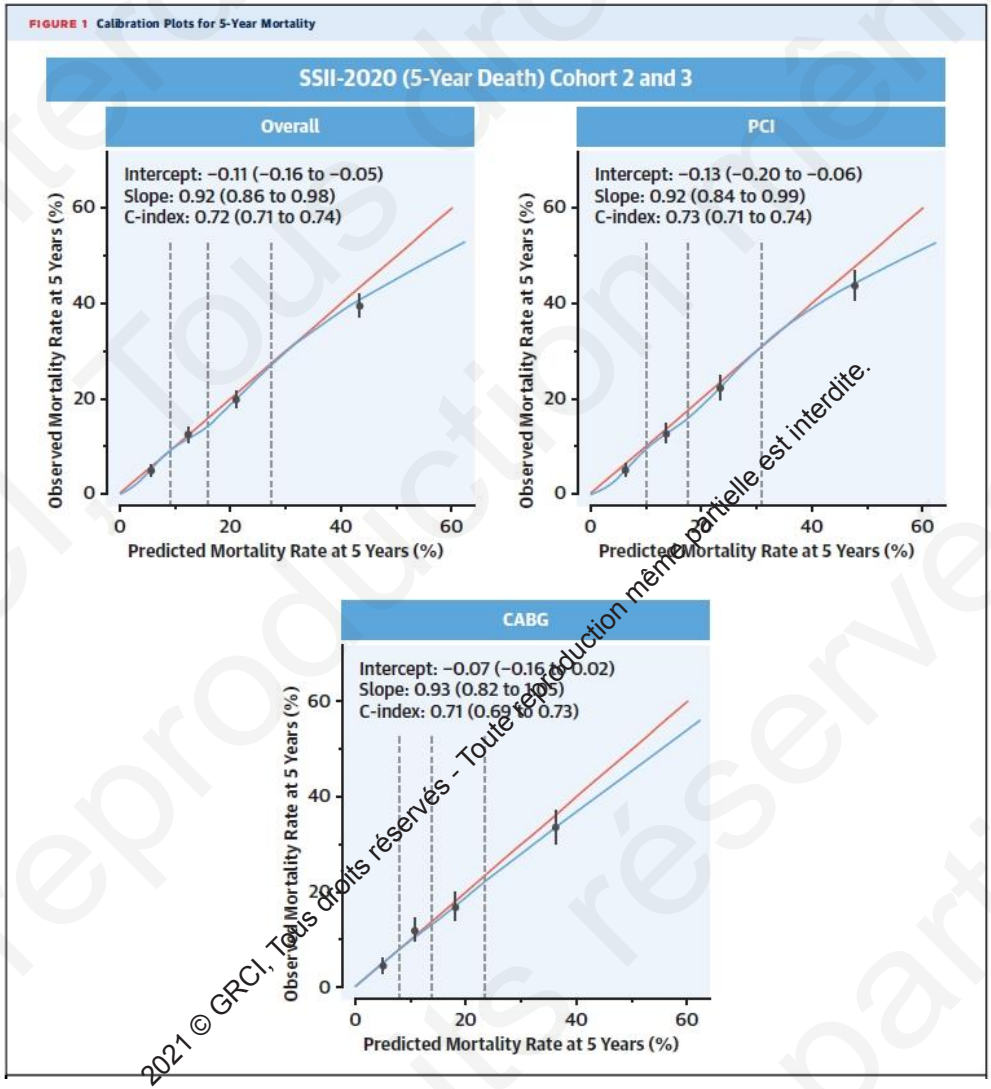
# Syntax II-2020 Takahashi et al Lancet 2020

| | Coefficient | HR (95% CI) | p value |
|---|---|---|---|
| **Prognostic index** | | | |
| Age, per 10 years | 0·72 | 2·05 (1·81–2·33) | <0·0001 |
| Creatinine clearance, per 10 mL/min per 1·73 m²* | −0·07 | 0·93 (0·88–0·99) | 0·0279 |
| Left ventricular ejection fraction, per 10%† | −0·31 | 0·73 (0·63–0·84) | <0·0001 |
| Chronic obstructive pulmonary disease | 0·48 | 1·62 (1·24–2·12) | 0·0004 |
| Peripheral vascular disease | 0·73 | 2·08 (1·63–2·62) | <0·0001 |
| Medically treated diabetes | 0·20 | 1·22 (0·95–1·57) | 0·1251 |
| Receiving insulin | 0·46 | 1·58 (1·14–2·19) | 0·0055 |
| Current smoker | 0·66 | 1·93 (1·52–2·45) | <0·0001 |
| **Predictive model** | | | |
| Prognostic index | 0·99 | 2·69 (2·42–3·01) | <0·0001 |
| CABG × three-vessel disease | −0·40 | 0·67 (0·53–0·86) | 0·0014 |
| CABG × left main coronary artery disease | −0·08 | 0·92 (0·72–1·19) | 0·5466 |
| PCI × left main coronary artery disease | −0·10 | 0·90 (0·70–1·17) | 0·4418 |
| PCI × (SYNTAX score − 29)/10 | 0·16 | 1·17 (1·06–1·30) | 0·0024 |

Table shows the estimated Cox regression coefficients for the prognostic index with seven variables, and for the predictive model with the predictive index and two predefined treatment interactions (three-vessel disease or left main coronary artery disease and anatomical SYNTAX score) entered into the SYNTAX II 2020 for predicting 10-year all-cause death. The formula used to predict this outcome is as follows: predicted probability of all-cause death at 10 years=1−exp(−0·243×exp[0·99×{0·72×age−0·07×creatinine clearance−0·31×left ejection fraction+0·48×chronic obstructive pulmonary disease+0·73×peripheral vascular disease+0·20×medically treated diabetes+0·46×on insulin+0·66×current smoker}−0·40×CABG×three-vessel disease−0·08×CABG×left main coronary artery disease−0·10×PCI×left main coronary artery disease+0·16×PCI×{SYNTAX score−29}/10−2·80]), where age is expressed in years per 10 years, the creatinine clearance is expressed per 10 mL/min per 1·73 m² (capped at 90 per 10 mL/min per 1·73 m²), and the left ventricular ejection fraction is expressed per 10% (capped at 50 per 10%). CABG=coronary artery bypass grafting. PCI=percutaneous coronary intervention. *Capped at 90 per 10 mL/min per 1·73 m². †Capped at 50 per 10%. HR=hazard ratio.

*Table 2:* **Model for predicting risk of all-cause death at 10 years**

**FIGURE 1** Calibration Plots for 5-Year Mortality



# Que retenir?

- Revasculariser comme un non-diabétique mais risque
- Attention à la stratégie « DEFER »
- PCI possible si
  - risque d'IDM précoce et de revascularisation tardive bas
  - Qualité de prévention secondaire élevée
- CABG le plus souvent si MVD (Syntax 20+)
- Utiliser le score SYNTAX 2020 pour gérer la Heart Team