

## Cardiovascular journals

### Cardiovascular risk prediction in newly diagnosed T2D



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The calculation of cardiovascular risk in patients with varying duration of T2D remains actively discussed.

This study provides significant

information on the level of detail required to assess patients with newly diagnosed T2D. As expected, in keeping with the patient's propensity for development of diabetes involving obesity and insulin resistance, together with a varying subclinical duration of diabetes, one in six people with newly diagnosed T2D have electrocardiographic evidence of silent myocardial infarction (SMI). These are patients who are older, female, sedentary but also

**“One in six people with newly diagnosed T2D have electrocardiographic evidence of silent myocardial infarction.”**

non-smokers compared with those without SMI. Their blood pressure is likely to be higher and they are already likely to be on intensive antihypertensive treatment as well as taking aspirin and lipid lowering therapy. Greater prevalence of microangiopathy in patients who experience SMI would suggest a significant impact of longer-period subclinical hyperglycaemia. Not surprisingly, evidence of SMI in this group of patients reflects an increased risk of fatal myocardial infarction and all cause mortality.

It is of note that the identification of SMI did not contribute substantially to predicted variables utilising the UKPDS Risk Engine. Thus, the data demonstrate significant level of pre-existent cardiovascular disease but also the need to establish individual patients' cardiovascular risk using the UKPDS Risk Engine.

### CIRCULATION

### Is SMI at diagnosis predictive of MI or all-cause mortality?

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Studies suggest that mortality after silent myocardial infarction (SMI) is greater than that after evident myocardial infarction (MI), although evidence of this association in people with recently diagnosed T2D remains elusive.

2 The authors of UK Prospective Diabetes Study (UKPDS) 79 investigated the incidence of SMI and its association with MI and all-cause mortality in 1967 people with newly diagnosed T2D. Cox proportional hazards regression was applied to analyse outcomes according to SMI status.

3 A total of 326 (16.6%) participants displayed electrocardiographical evidence of SMI at the time of enrolment into the study. Individuals with SMI were more likely to be female, older, non-smokers and sedentary.

4 SMI at diabetes diagnosis was associated with an elevated risk of fatal MI (hazard ratio [HR] 1.49, 95% CI, 1.15–1.94) and all-cause mortality (HR 1.26, 95% CI, 1.06–1.50). HR for nonfatal MI was nonsignificant. The risk of developing a subsequent MI increased by 58% in participants with SMI at the time of diabetes diagnosis and the risk of all-cause mortality increased by 31%.

5 However, the incidence of SMI did not significantly improve the predictive value of current UKPDS Risk Engine variables such as age or sex in terms of cardiovascular risk prediction.

6 The authors concluded that SMI was associated with an elevated fatal MI and all-cause mortality risk, but does not influence current UKPDS Risk Engine predictive variables.

Davis TM, Coleman RL, Holman RR (2013) Prognostic significance of silent myocardial infarction in newly diagnosed type 2 diabetes mellitus: United Kingdom prospective diabetes study (UKPDS) 79. *Circulation* **127**: 980–9

### AM J CARDIOL

### Diabetes predicts coronary lesion progression

Readability	✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 Diabetes is known to have a greater influence on cardiovascular disease risk in females compared to males, although the pathogenic mechanisms underlying this association are unclear.

2 The authors aimed to retrospectively determine the influence of diabetes and HbA<sub>1c</sub> on the progression of atherosclerosis in a cohort of postmenopausal women ( $n=423$ ) from the Women's Angiographic and Vitamin and Estrogen (WAVE) trial.

3 Women with diabetes reported a history of heart failure ( $P=0.007$ ), myocardial infarction ( $P<0.05$ ) and exercise-induced chest discomfort ( $P=0.07$ ) more frequently compared to those without. Women with diabetes

were also more likely to have a higher mean weight ( $P<0.001$ ).

4 Diabetes was associated with a greater number of total cardiac events, although the incidence of death or myocardial infarction was similar. Individuals with known diabetes and a baseline HbA<sub>1c</sub>  $\geq 6.5\%$  (48 mmol/mol) displayed greater minimum reductions in luminal diameter and average luminal diameter in coronary segments ( $P<0.001$ ,  $P=0.002$  and  $P=0.004$ , respectively).

4 An increased number of new lesions appeared in women with a baseline HbA<sub>1c</sub>  $\geq 5.7\%$  (39 mmol/mol), regardless of diabetes history.

5 The authors concluded that the presence of diabetes was predictive of established coronary lesion progression in postmenopausal women, compared to HbA<sub>1c</sub> alone. This suggests that the narrowing of existing coronary stenosis could be the result of negative remodelling, a process that could be less reliant on hyperglycaemia compared to new lesion formation.

Ahmad S, Xue Z, Silverman A et al (2013) Complexity of the relation between hemoglobin A1C, diabetes mellitus, and progression of coronary narrowing in postmenopausal women. *Am J Cardiol* **111**: 793–9

## CIRCULATION

### Weight gain and atherosclerosis

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

**1** Although intensive treatment (INT) of T1D can reduce the onset and risk of diabetes-related complications, people receiving INT have an increased risk of weight gain. In this study, the authors prospectively examined the relationship between intensive T1D therapy, weight gain and atherosclerotic disease.

**2** Individuals with T1D were randomised to receive either intensive or conventional therapy during the Diabetes Control and Complications Trial (DCCT). Intima-media thickness ( $n=1015$ ) and coronary artery calcium score ( $n=925$ ) were measured during follow-up, as a part of the Epidemiology of Diabetes Interventions and Complications (EDIC) Study.

**3** An increased intima-media thickness was observed in individuals from the 4th quartile of weight gain (+5%,  $P<0.001$  EDIC year 1,  $P=0.003$  EDIC year 6). These participants had a greater BMI, waist circumference, required more insulin and more frequently had elevated coronary artery calcium scores (odds ratio [OR], 1.55; CI, 0.97–2.49;  $P=0.07$ ) compared with minimal weight gainers, regardless of treatment type.

**4** Participants with waist circumference and blood pressure measurements meeting metabolic syndrome criteria had an increased intima-media thickness ( $P=0.02$  to  $<0.001$ ) and individuals with high-density lipoprotein had elevated coronary artery calcium scores (OR 1.6; CI, 1.1 to 2.4;  $P=0.01$ ).

**5** The authors concluded that weight gain is associated with increased atherosclerotic disease, blood pressure, dyslipidemia, obesity and insulin resistance.

Purnell JQ, Zinman B, Brunzell JD et al (2013) The effect of excess weight gain with intensive diabetes mellitus treatment on cardiovascular disease risk factors and atherosclerosis in type 1 diabetes mellitus: results from the Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Study (DCCT/EDIC) study. *Circulation* **127**: 180–7

## AM J CARDIOL

### SDB as a risk factor for cardiac events

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

**1** The authors aimed to determine the incidence of heart failure (HF), coronary artery disease (CAD) and atrial fibrillation (AF) in people with asymptomatic T2D and sleep disordered breathing (SDB).

**2** Electronic health records of 834 individuals were included in the study. SDB was present in 188 patients (21%) at baseline. A total of 22 congestive HF, 72 CAD and 40 AF

events were observed during the median follow-up time of 4.9 years.

**3** SDB was correlated with CAD (hazard ratio [HR] 1.8, 95% CI, 1.1–3.0,  $P=0.01$ ; adjusted HR 1.9, 95% CI, 1.2–3.2,  $P<0.01$ ) and AF incidence (HR 2.6, 95% CI, 1.4–4.7,  $P=0.01$ ; adjusted HR 2.9, 95% CI, 1.5–5.9,  $P<0.01$ ).

**4** Other factors associated with CAD included older age, high blood pressure, increased left ventricular mass and female gender.

**5** The authors concluded that SDB is significantly associated with increased rates of CAD, AF and HF in people with T2D.

Seicean S, Strohl KP, Seicean A et al (2013) Sleep disordered breathing as a risk of cardiac events in subjects with diabetes mellitus and normal exercise echocardiographic findings. *Am J Cardiol* **111**: 1214–20

## CIRCULATION

### Revascularisation: PCI-DES or CABG?

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

**1** The authors aimed to determine if percutaneous coronary intervention (PCI) with a drug-eluting stent (DES) is cost-effective in treating multivessel coronary revascularisation in people with diabetes or multivessel coronary artery disease (CAD), when compared to coronary artery bypass grafting (CABG). Participants ( $n=1900$ ) with

diabetes or multivessel CAD were randomised to receive PCI with DES ( $n=953$ ) or CABG ( $n=947$ ).

**2** CABG was associated with increased quality-adjusted life expectancy and did not greatly effect the cost-effectiveness ratios  $< \$10\,000$  per life-year, despite cumulative 5-year costs being \$3641 higher per patient.

**3** The authors concluded that CABG is a cost effective treatment strategy for revascularisation in people with diabetes and multivessel CAD.

Magnuson EA, Farkouh ME, Fuster V et al (2013) Cost-effectiveness of percutaneous coronary intervention with drug eluting stents versus bypass surgery for patients with diabetes mellitus and multivessel coronary artery disease: results from the FREEDOM trial. *Circulation* **127**: 820–31

## J AM COLL CARDIOL

### CAN associated with increased LV mass

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓

**1** The authors set out to establish the association between cardiovascular autonomic neuropathy (CAN) and left ventricle (LV) morphology and function in people with T1D ( $n=966$ ) using cardiac magnetic resonance imaging.

**2** Participants with abnormal R-R variation displayed increased

cardiac output and greater LV mass compared with individuals with normal R-R variation ( $P<0.05$ ).

**3** Systolic function measured by ejection fraction, end-systolic, end-diastolic volumes, and stroke volumes was comparable in people with CAN ( $n=371$ ) and without CAN ( $n=595$ ).

**4** The authors concluded that CAN is significantly associated with elevated LV mass and concentric remodelling in people with T1D.

Pop-Busui R, Cleary PA, Braffett BH (2013) Association between cardiovascular autonomic neuropathy and left ventricular dysfunction: DCCT/EDIC study (Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications). *J Am Coll Cardiol* **61**: 447–54

**“Coronary artery bypass grafting (CABG) was associated with increased quality-adjusted life expectancy and did not greatly effect the cost-effectiveness ratios  $< \$10\,000$  per life-year, despite cumulative 5-year costs being \$3641 higher per patient.”**