Key points

- **People with diabetes and no history of myocardial infarction (MI) have equivalent coronary risks to people without diabetes but with a history of MI.**
- **There is a clear gender difference in terms of coronary risk between men and women without diabetes and with or without an MI history, with relative coronary risks being much lower in women.**
- **Women with diabetes with and without a history of MI have equivalent coronary risks to men with diabetes with and without a history of MI.**
- **Having renal impairment and diabetes significantly increases the coronary risk in both men and women to an even greater degree.**

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Diabetes and coronary risk

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Diabetes increases coronary risk in both men and women, and eliminates the gender difference that exists for this risk in those without diabetes. Having renal impairment increases the coronary risk in both men and women even more.

This article briefly highlights the excess coronary risk associated with diabetes in both men and women and how this risk is magnified when diabetes is associated with renal impairment. Awareness of this common clinical situation is important as there are effective therapies that greatly reduce a patient's coronary risk.

Diabetes and coronary heart disease

Over the past 10 years it has been generally accepted that there is an extreme coronary risk if a person has both diabetes and a history of myocardial infarction (MI).[1] The coronary risk of a person with diabetes and no history of MI is about equivalent to that of a person without diabetes but with a history of MI, the seven-year MI risk being about 20% (Figure 1).[1] Many are less aware of the association the other way around, with diabetes or prediabetes being present in about 60% of patients with an acute coronary syndrome but being previously identified in only about 30%.[2]

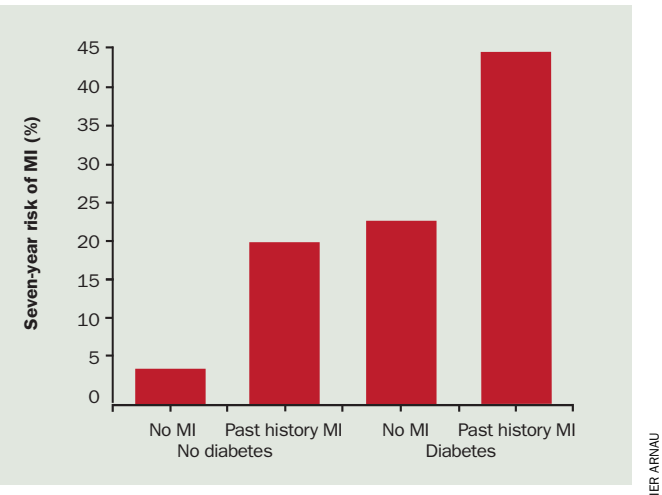

Figure 1. Diabetes equals coronary heart disease.[1] The coronary risk of a person with diabetes and no history of myocardial infarction (MI) is about the same as that of a person without diabetes but with a history of MI.

Another way of looking at the excess coronary risk associated with diabetes is to compare the ages at which the 20% 10-year coronary risk threshold is reached in men with diabetes and those without diabetes. These ages are 48 and 63 years, respectively; in other words, men with type 2 diabetes have a coronary age that is 15 years older than men without diabetes.[3]

The 'Your heart age forecast' tool (www.knowyournumbers.co.nz) compares an individual's current and future risk of a coronary event to a person of the same age without coronary risk factors. The Australian absolute cardiovascular disease risk calculator produced by the National Vascular Disease Prevention Alliance (www.cvdcheck.org.au) is another useful resource for determining an individual's coronary risk. The results of treatments the person may receive can be simulated by comparing the individual's future coronary risk with and without an intervention (e.g. quitting smoking, taking a statin or an ACE inhibitor). This demonstration may be useful in convincing people to accept that they are indeed at significant coronary risk and that starting and adhering to treatments and lifestyle changes are worthwhile.

Diabetes, coronary heart disease and gender difference

There is a clear gender difference in terms of coronary risk between men and women without diabetes and with or without an MI history, with relative coronary risks being much lower in women (Figure 2).[4] However, diabetes virtually eliminates this difference, so that women with diabetes with and without a history of MI have equivalent coronary risks to men with diabetes with and without a history of MI (Figure 2).[4]

In recent years, the American Heart Association and the National Heart Foundation of Australia have organised media campaigns to publicise the fact that coronary heart disease is an issue for women as well as for men. However, it may not be widely appreciated that coronary risk in women with diabetes is many times higher than in women without diabetes. In fact, the relative excess coronary risk in women with diabetes is much higher than in men with diabetes. This is because the coronary risk in women with no history of MI but with diabetes is *higher* than that in women with a history of MI but without diabetes (Figure 2). It should be remembered that the relative coronary risk in men with diabetes but no history of MI is about equivalent to that of a man without diabetes but with a history of MI.[4]

Although there should be awareness of and concern about coronary risk in women generally, there should be great concern about coronary risk in women with diabetes.

Diabetes, coronary heart disease and renal impairment

Health professionals have become aware of the increased coronary risk in men with diabetes and are becoming aware of the increased coronary risk in women with diabetes. However, they may not fully appreciate the significantly increased coronary risk associated with having both diabetes and renal impairment.

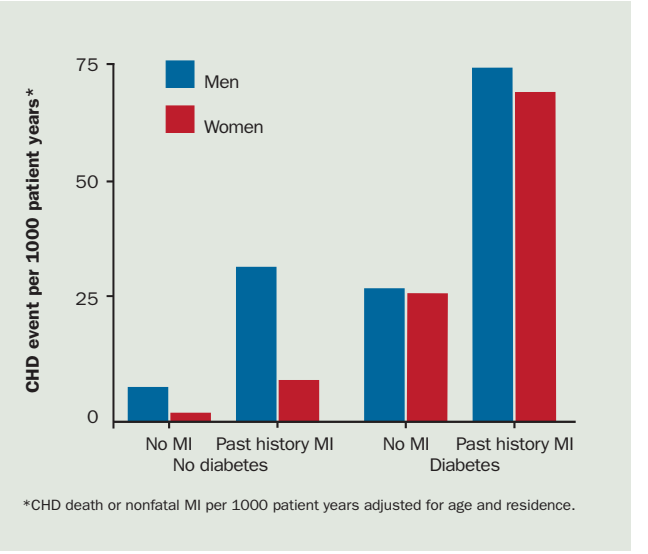

Figure 2. Diabetes and coronary heart disease: men versus women.[4] Women with diabetes with and without a history of MI have equivalent coronary risks to men with diabetes with and without a history of MI.

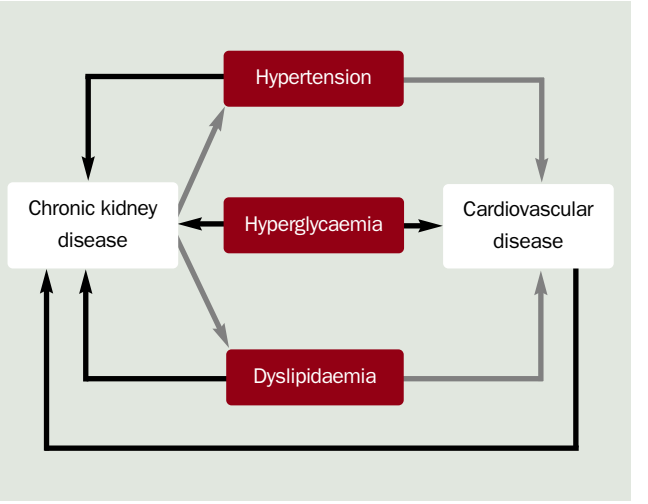

Figure 3. Chronic kidney disease and cardiovascular disease: vicious cycles.

It is known that the incidence of end-stage renal disease (ESRD) associated with diabetes is increasing at a steady rate, but it may not be appreciated that most people with diabetes who develop renal impairment die prematurely of cardiovascular disease well before reaching ESRD.[5] This excess risk arises because of several vicious cycles that occur (Figure 3).

The cycles are summarised as follows. Hyperglycaemia causes renal microvascular damage. Renal impairment can make glycaemic control more difficult, partly because of the increased risk of severe hypoglycaemia. Hypertension is common in patients with type 2 diabetes, and accelerates the renal impairment due to hyperglycaemia. Renal impairment also makes blood pressure control more difficult as medications become less effective and renal damage

itself causes hypertension. Micro- and macroproteinuria are associated with dyslipidaemia, which can also be difficult to control because of the renal impairment. Finally, renovascular disease resulting from hyperglycaemia, hypertension and dyslipidaemia can itself cause hypertension.

This significantly increased coronary risk is the explanation the author gives when asked by fellow health professionals about the value of screening for microalbuminuria as an early sign of renal impairment. The question is often in the form:

'I'm trying as hard as I can to control the diabetes, so how would the presence or absence of microalbuminuria affect my management?'

Once it is understood that the development of microalbuminuria is evidence of widespread endothelial damage (not just in the glomerulus) and that renal impairment causes a series of vicious cycles that progressively accelerate renal impairment, doctors often reconsider and agree that monitoring for microalbuminuria may be worthwhile and that maybe they could 'try harder' to control a patient's diabetes. The Steno-2 Study showed that 'trying harder' could halve the coronary event rate and halve the progression to severe renal impairment.[6] Doctors may also be able to persuade people with diabetes to 'try harder' regarding lifestyle modification and treatment adherence, since doing this can further significantly decrease their future coronary risk.[7]

Conclusion

Doctors and the lay diabetes community are now more aware of the increased coronary risk in men with diabetes than they were 10 years ago. However, they may not be aware of the extent to which diabetes increases the coronary risk in women – that is, women with diabetes have equivalent coronary risks to men with diabetes – or that having renal impairment and diabetes significantly increases the coronary risk in both men and women to an even greater degree. Greater awareness of this excess coronary risk may prompt both health professionals and people with diabetes to 'try harder' in the management of the condition and to use all the available effective interventions to reduce coronary risk. **CT**

References

1. Haffner SM, Lehto S, Rönnemaa T, Pyorala K, Laakso M. Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction. N Engl J Med 1998; 339: 229-234.
2. Bartnik M, Ryden L, Ferrari R, et al. The prevalence of abnormal glucose regulation in patients with coronary artery disease across Europe. The Euro Heart Survey on diabetes and the heart. Eur Heart J 2004; 25: 1880-1890.
3. Booth GL, Kapral MK, Fung K, Tu JV. Relation between age and cardiovascular disease in men and women with diabetes compared with non-diabetic people: a population-based retrospective cohort study. Lancet 2006; 368: 29-36.
4. Juutilainen A, Kortelainen S, Lehto S, Rönnemaa T, Pyörälä K, Laakso M. Gender difference in the impact of type 2 diabetes on coronary heart disease risk. Diabetes Care. 2004; 27: 2898-2904.
5. Yong T, Phillips PJ, Coates PTH. Neglected nephropathy. Aust Fam Physician 2006; 35: 398-402.
6. Gæde P, Vedel P, Larsen N, Jensen GCH, Parving H-H, Pedersen O. Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes. N Engl J Med 2003; 348: 383-393.
7. Rachmani R, Levi Z, Slavachevski I, Avin M, Ravid M. Teaching patients to monitor their risk factors retards the progression of vascular complications in high-risk patients with type 2 diabetes mellitus – a randomized prospective study. Diabet Med 2002; 19: 385-392.

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