Special situations include the switch from intravenous continuous insulin infusion to subcutaneous insulin therapy and patients who receive enteral or parenteral nutrition or glucocorticoid therapy. He noted that hyperglycemia during total parenteral nutrition is associated with a greater risk of hospital mortality [Pasquel FJ et al. *Diabetes Care* 2010].

Dr. Umpierrez stressed that MNT is an essential component of the glycemic management program for all hospitalized patients with diabetes and hyperglycemia and that providing meals with a consistent amount of carbohydrates can be useful in coordinating doses of rapid-acting insulin to carbohydrate ingestion. He also reviewed the risks of hypoglycemia in the hospital setting.

According to the guidelines, an in-hospital glycemic control program should include: administrative support for an interdisciplinary steering committee using a systems approach to improve care of inpatients with hyperglycemia and diabetes; a uniform method of collecting and evaluating point-of-care testing and insulin use data as a way of monitoring the safety and efficacy of the glycemic control program; and the provision of accurate devices for glucose measurement at the bedside with ongoing staff competency assessments.

Dr. Umpierrez also specified methods and goals for educating patients and professionals. These include diabetes self-management education that focuses on short-term survival goals; identification of community resources to provide continued support to patients; and ongoing staff education to update diabetes knowledge in general and whenever an adverse event that is related to diabetes management occurs.

CVD Prevention and Treatment in Women With Diabetes

Written by Phil Vinall

Cardiovascular disease (CVD) is the number one killer of women in westernized countries. Its connection to diabetes, a particularly strong risk factor that disproportionately affects women, has been well established. In a session that was devoted to the implications for CVD prevention and the treatment of women with diabetes, L. Kristin Newby, MD, Duke University Medical Center, Durham, North Carolina, USA, discussed differences in current diabetes treatment that are related to gender.

Major randomized controlled trials (RCTs) over the past 1 to 2 decades have changed the practice of CVD prevention in women, with 3 studies having a particular impact on the current guidelines for the prevention of CVD in women. The Women's Health Initiative (WHI) [Rossouw JE et al. *JAMA* 2002] and the Heart and Estrogen/Progestin Replacement Study [Hulley S et al. *JAMA* 1998] were, in large part, responsible for the recommendation that hormone therapy not be used for the primary or secondary prevention of CVD, as it is not effective and may be harmful [Mosca L et al. *Circulation* 2007, 2011]. Aspirin is one of the least expensive and most frequently used preventive therapies for cardiovascular events; however, the Women's Health Study (WHS), which evaluated the use of low-dose aspirin as primary prevention for CVD in women, provided evidence of a sex-based response to aspirin therapy. Among the women in the WHS, aspirin therapy resulted in a significant (p=0.04) overall reduction in stroke (RR, 0.83; 95% CI, 0.69 to 0.99) and a nonsignificant overall 9% reduction in cardiovascular events, a slight increase in the risk of hemorrhagic stroke (RR, 1.24; 95% CI, 0.82 to 1.87; p=NS), and no benefit on myocardial infarction (MI; RR, 1.02; 95% CI, 0.84 to 1.25). To assess for the effect of gender, the authors conducted a gender-specific on aspirin therapy random-effects meta-analysis of data from 6 trials that showed a reduction in risk for MI and no influence on stroke among men but no effect on MI in women and a reduction in the incidence of stroke [Ridker PM et al. *N Engl J Med* 2005].

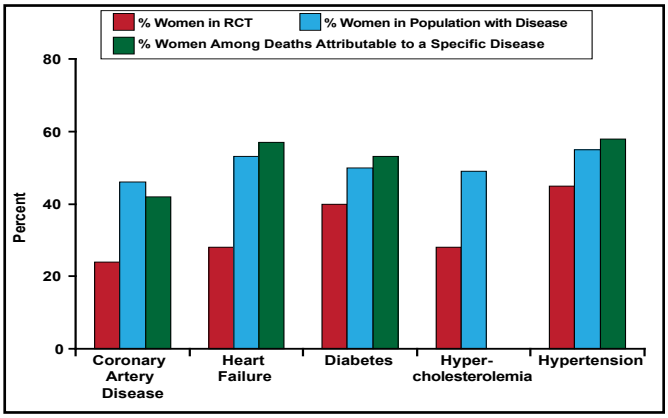
Aspirin resistance is present in up to 40% of patients with diabetes, and the prevalence of resistance increases with decreasing metabolic control [McGuire D. Braunwald's Heart Disease: A Textbook Of Cardiovascular Medicine 2012. Elsevier]. Large RCTs are currently evaluating if higher doses of aspirin might overcome the effects of resistance, but the 2011 American Heart Association guidelines state that aspirin (75 mg/day to 325 mg/day) should be used in women with coronary heart disease unless contraindicated and that this therapy is reasonable in women with diabetes unless contraindicated. Signals of an increased risk of MI among younger women and risks for bleeding led to the recommendation against routine use of aspirin in healthy women aged <65 years to prevent MI [Mosca L et al. *Circulation* 2011].

Finally, although statin therapy greatly lowers cardiovascular risk, in the WHI study, the incidence of new-onset diabetes mellitus was associated with statin use among postmenopausal women [Culver AL et al. *Arch Intern Med* 2012]. The underpinnings of the recently scrutinized relationship between statin use and new-onset diabetes mellitus are unknown.

Although the data generally support similar treatment responses in women and men and although there is no clear evidence that diabetes alters treatment benefit of

proven therapies in women, the enrollment of women in RCTs remains low, relative to their overall representation in disease populations (Figure 1) [Melloni C et al. *Circ Cardiovasc Qual Outcomes* 2010]. To ensure that the evidence that supports treatment is relevant to women, more attention must be focused on increasing recruitment of women into randomized clinical trials.

Figure 1. Inclusion of Women in RCTs Supporting Women's Prevention Guidelines.



Reproduced with permission from the American Heart Association. Melloni C et al. Representation of Women in Randomized Clinical Trials of Cardiovascular Disease Prevention. *Circ Cardiovasc Qual Outcomes*. 2010;3:135-142.

China Da Qing Study: Lifestyle Change in Women With IGT Extends Life

Written by Rita Buckley

Twenty-three years of follow-up data from the China Da Qing Diabetes Prevention Study (CDQPDS) show that lifestyle intervention to prevent diabetes can reduce all-cause and cardiovascular (CV) mortality among women with impaired glucose tolerance (IGT) but not among men. Findings from the study were reported by Guangwei Li, MD, Department of Endocrinology, China-Japan Friendship Hospital, Beijing, China.

In 1986, 577 adults with IGT from 33 clinics in Da Qing, China, were randomly assigned to a control group or 1 of 3 lifestyle intervention groups (diet, exercise, or diet plus exercise). Active intervention was carried out from 1986 to 1992. Participants who were assigned to the exercise group or diet-plus-exercise group were encouraged to increase the amount of their physical activity by at least 1 unit per day (as defined in Table 1) and by 2 units per day, if possible, for participants aged <50 years with no evidence of CV disease (Table 1) [Pan XR et al. *Diabetes Care* 1997].

A 20-year follow-up study showed that group-based combined lifestyle interventions over 6 years in people with IGT can prevent or delay diabetes for up to 14 years after the active intervention [Li G et al. *Lancet* 2008]. Lifestyle intervention for 6 years in IGT was also associated with a 47% decline in the incidence of severe, vision-threatening retinopathy over 20 years [Gong Q et al. *Diabetologia* 2011].

Table 1. Activities Required for Increasing Activity by One Unit of Exercise.

Intensity	Time (min)	Activity
Mild	30	Slow walking, shopping, house cleaning
Moderate	20	Faster walking, cycling, heavy laundry, ballroom dancing
Strenuous	10	Slow running, climbing stairs, volley ball, table tennis
Very strenuous	5	Jumping rope, basketball, swimming

The aim of the current trial was to examine all-cause and CV mortality among those who participated in the 6-year lifestyle intervention that was implemented in the Da Qing Diabetes Prevention Study. In 2009, 23 years after randomization, participants were traced to determine the long-term impact of the interventions on mortality; 47 women and 127 men had died.

Mortality rates were compared between the control groups and the combined intervention groups (diet, exercise, and diet plus exercise). All-cause mortality was defined as death from any cause. CV mortality was defined as death from coronary heart disease, stroke, and sudden death.

In women, combined lifestyle intervention (diet, exercise, and diet plus exercise) reduced all-cause mortality by 53% (hazard rate ratio [HRR], 0.47; 95% CI, 0.25 to 0.86), with cumulative all-cause mortality of 16.2% (95% CI, 11.2 to 21.2) in the intervention group versus 29.3% (95% CI, 17.5 to 48.0) in the control group (p=0.02). Among men, there was no significant difference in cumulative all-cause mortality (p=0.41) between the combined intervention and control groups (41.1% versus 46.7%).

The reduction in all-cause mortality in women was mainly because of differences in CV mortality (heart disease and stroke; HRR, 0.30; 95% CI, 0.12 to 0.68), with 23-year cumulative mortality of 6.8% in the intervention group (95% CI, 3.4 to 10.2) versus 18.8% (95% CI, 8.8 to 28.8) in the control group (p=0.006). In men, there was also no significant difference in cumulative CV mortality (p=0.47) in the combined intervention and control groups (26.4%; 95% CI, 21.1 to 31.6 versus 27.4; 95% CI, 18.6 to 32.2).

Data from the intervention groups (diet, exercise, and diet plus exercise) suggest that combined lifestyle intervention significantly lowers all-cause and CV mortality among