**CHIEF SCIENTIST OFFICE**

# FOCUS ON RESEARCH

## Moving Towards a New Personalised Medicine Approach to Primary Prevention in Diabetes: The First Steps

### Researchers

Dr. VH Chong, Dr. E Dow, Prof. RJ McCrimmon, Prof. CC Lang, Prof. AD Struthers

### Aim

The primary prevention of cardiovascular (CV) events needs to improve because diabetic patients have such a high CV event rate. On top of overt heart disease, a major problem in diabetes is the high incidence of silent but potentially lethal heart disease. The purpose of our study is to assess how many people with asymptomatic type 2 diabetes have multiple silent cardiac abnormalities and if there is a biomarker(s) which can early identify these silent abnormalities, which include left ventricular hypertrophy (LVH), left ventricular systolic dysfunction (LVSD), left ventricular diastolic dysfunction (LVDD) and left atrial enlargement (LAE).

### Project Outline/Methodology

This is a cross-sectional study of randomly chosen participants with Type 2 diabetes. All of them underwent clinical assessment, biochemical measurements including B-type Natriuretic Peptides, high sensitivity cardiac troponins and Growth Differentiation Factor 15; electrocardiography, transthoracic echocardiography, dobutamine stress echocardiography (or myocardial perfusion scan/CT Coronary Angiography) to detect myocardial ischemia and 24–hour ambulatory blood pressure measurement. The biochemical results were then compared against presence of silent cardiac abnormalities to assess their accuracy as potential screening tools.

### Key Results

LVDD is the most common silent cardiac abnormality (56%), followed by LAE (33%), and LVH (19%). The prevalence of both LVSD and myocardial ischaemia are 2% each. 29% of our study cohort has 1 cardiac abnormality, 24% has 2 cardiac abnormalities and 11% has 3 cardiac abnormalities. 36% has no cardiac abnormalities.

The analysis on biomarkers still needs to be performed, therefore the analysis of correlation between biomarkers and different cardiac abnormalities is awaited.

### Conclusions

Almost a quarter of our study population with well-controlled Type 2 diabetes harbour at least 2 silent cardiac abnormalities. This reveals significant silent cardiac abnormality burden despite well-controlled Type 2 diabetes and well-controlled blood pressure. The most common silent cardiac abnormalities are LVDD, LAE and LVH. Future analysis will show which biomarker is best at identifying silent heart disease, or whether different biomarkers are needed in combination to identify different forms of silent cardiac abnormalities.

### What does this study add to the field?

There is significant proportion of people with well-controlled Type 2 diabetes and blood pressure who harbour cardiac abnormalities other than myocardial ischaemia, namely LVH, LVDD and LAE which independently predicts mortality. This finding highlights the attention that will be needed to address these cardiac abnormalities and the importance of targeted therapy for these.

### Implications for Practice or Policy

It would be too early to conclude at this stage but biomarker results might raise possibility of screening for the above silent cardiac abnormalities in the Type 2 diabetes population. For those with high levels of biomarkers they will undergo cardiac imaging to identify which silent cardiac abnormalities are present with follow-on targeted therapy as personalised primary prevention.

### Where to next?

A future multicentre randomised controlled trial will ultimately be needed to ensure that treating abnormalities identified by BNP & high sensitivity cardiac troponins will reduce CV events in a cost effective manner.

### Further details from:

Dr. Vun Heng Chong
Clinical Research Fellow
Division of Molecular & Clinical Medicine
Mailbox 2, Level 7
Ninewells Hospital & Medical School
Dundee
DD1 9SY