Worldwide survey of T2* cardiovascular magnetic resonance in Thalassaemia

John-Paul Carpenter1*, Taigang He1, Paul Kirk1, Lisa Anderson2, John B Porter3, Malcolm Walker1, Renzo Galanello4, Fabrice Danjou4, Gianluca Forni5, Antonis Kattamis6, Vassilis Ladis6, Marousos Drossou7, Demetra Vini7, Andreas Michos8, Vassiliou Perifanis9, Tuncay Haziroglu10, Ana Almeida11, Yesim Aydinok12, Mirella Rangelova13, Amal El-Beshlawy14, Mohsen Elalfy15, Ibrahim Alnasser16, Shahina Daar17, Juliano de Lara Fernandes18, Dudley J Pennell1

From 2011 SCMR/Euro CMR Joint Scientific Sessions
Nice, France. 3-6 February 2011

Introduction
Thalassaemia major (TM) affects hundreds of thousands of patients worldwide but only a minority have access to regular blood transfusion and chelation therapy. Cardiovascular magnetic resonance (CMR) T2* measurement provides an accurate, reproducible measurement of cardiac iron which is the cause of heart failure and early death in many transfused TM patients. This technique has been adopted as part of routine management in many countries where survival is now approaching normal but little is known about the severity and effects of myocardial iron loading in different geographical regions.

Purpose
The aim of this study was to describe the burden of disease of myocardial siderosis (measured by T2*) in different populations throughout the world and to assess the relationship between T2* and outcome such as heart failure and cardiac death.

Methods
34 worldwide centres were involved in this survey of 3376 patients from Europe, the Middle East, North America, South America, North Africa, Australia and Asia. Anonymised data on myocardial T2* values were analysed in conjunction with clinical outcomes (heart failure and death).

Results
Overall, 57.5% of patients had no significant iron loading (T2* >20ms), 22.6% had moderate cardiac iron (10ms<T2*≤20ms) and 19.9% had severe cardiac iron (T2* ≤10ms) at baseline. The lowest burden of iron was found in North Africa, North and South America with an intermediate level in Australia, Europe and the Middle East but a high proportion of patients (>50%) in South-East Asia had cardiac iron (T2* >20ms) at baseline. At the time of the first scan, 100 patients (3.3%) had confirmed heart failure, the majority of whom (77.0%) had myocardial T2* <10ms with almost all (99%) having T2* <20ms. There were 113 patients who subsequently developed heart failure. 92.0% of these had T2* <10ms and 99.1% had a T2* <20ms. There were 39 deaths. Cardiac T2* values were <10ms in 79.5%, with 92.3% <20ms.

Conclusions
Even in this well-treated cohort with access to transfusion, chelation and CMR, there is a large proportion of TM patients with moderate to severe cardiac iron loading. Low T2* (<10ms) is associated with cardiac failure and death. There is a huge unmet worldwide need in terms of access to specialist medical care (including transfusion and chelation therapy) together with advanced monitoring techniques (such as CMR).

Author details
1Royal Brompton and Harefield NHS Trust, London, UK. 2St. George’s Hospital NHS Trust, London, UK. 3University College Hospitals NHS Trust, London, UK. 4Ospedale Regionale Microcitemie, Cagliari, Italy. 5Ospedali Galleria di Genova, Genova, Italy. 6Agia Sophia Children’s Hospital, Athens, Greece.
7 General Hospital of Piraeus, Athens, Greece. 8 General Hospital of Corfu, Corfu, Greece. 9 Hippokration General Hospital, Thessaloniki, Greece. 10 Hacettepe Medical University, Ankara, Turkey. 11 University Hospital Santa Maria, Lisbon, Portugal. 12 Ege University Medical Faculty, Izmir, Turkey. 13 National Centre of Haematology, Sofia, Bulgaria. 14 Cairo University Hospital, Cairo, Egypt. 15 Ain Shams University Hospital, Cairo, Egypt. 16 King Fahad Armed Forces Hospital, Jeddah, Saudi Arabia. 17 Sultan Qaboos University, Muscat, Oman. 18 University of Campinas, Sao Paolo, Brazil.

Published: 2 February 2011