relationship between insulin resistance, myocardial energetics and diabetic function, Tyg-I correlated with rest and stress PCr/ATP and rest and stress E/A. In multiple linear regression analysis, the HbA1C was significantly associated with stress MBF (β= -0.02, p=0.0007).

Conclusion T2D patients show reductions in PCr/ATP, GLS and diastolic function at rest. In response to dobutamine stress, all three groups show similar decrements in myocardial energetics and diastolic function, and similar increments in GLS and LVEF, but with a blunted increment in stress MBF in T2D patients. HBA1c is a predictor of the stress MBF, and rest and stress LVEF show significant associations with rest and stress MBF. Significant associations were detected between the rest and stress energetics and diastolic function, possibly suggesting that diastolic function is a more energetically sensitive process.

Conflict of Interest Nil

CARDIAC AND SKELETAL MUSCLE ENERGETIC PATHWAYS FOLLOWING ANTHRACYLINE CHEMOTHERAPY FOR BREAST CANCER

Background/Introduction Anthracycline-related cardiac dysfunction is a recognised consequence of cancer therapies. Here we assess resting cardiac and skeletal muscle energetic status as an early mechanistic pathway of myocyte derangement and explore molecular targets of skeletal myocyte metabolism, protein synthesis/degradation and mitochondrial biogenesis signalling.

Methods We conducted a prospective, mechanistic, observational, longitudinal study of chemotherapy-naive breast cancer patients undergoing anthracycline-based chemotherapy, compared to a healthy control group. 31P-Magnetic Resonance spectroscopy in cardiac and skeletal muscle (phosphocreatine/phosphocreatine/phospholipid ratios respectively), cardiac magnetic resonance (CMR) imaging inclusive of T1 and T2 mapping, echocardiography-derived global longitudinal strain and diastolic function, serum NT-pro-BNP and skeletal muscle biopsies from the right vastus lateralis were assessed before and after 3 cycles of Docetaxel. Statistical significance was set at p<0.05.

Results Twenty-five female breast cancer patients (median age 53 years, range 32 – 74 years) receiving a mean epirubicin dose 307 mg/m2 and twenty-eight controls (median age 44 years, range 23 - 65) were recruited. All study assessments in breast cancer patients at pre-chemotherapy stage were comparable to the matched healthy controls. However, following chemotherapy, breast cancer patients demonstrated a small but significant reduction in cardiac function (global longitudinal strain -22.9 ± 3.9 vs -19.1 ± 3.3 %, p=0.01 and CMR-derived ejection fraction 65 ± 5 vs 62 ± 4 %, p=0.047), a mild increase in CMR-derived indexed left ventricular volumes (end diastolic 65 ± 10 vs 74 ± 11 ml/m2, p=0.014 and end systolic 23 ± 5 vs 28 ± 5 ml/m2, p=0.01) as well as an increase in left ventricular T1 and T2-mapping (1289 ± 29 vs 1321 ± 31 ms, p=0.004 and 50 ± 4 vs 55 ± 7 ms, p=0.027, respectively) and serum NT-Pro-BNP (49 ± 25 vs 108 ± 84 pg/m, p=0.008). After epirubicin, there was significant reduction in cardiac PCr/ATP ratio (2.0 ± 0.7 vs 1.2 ± 0.6, p=0.007) and a significant increase in skeletal muscle Pi/PCr ratio (0.13 ± 0.04 vs 0.24 ± 0.1, p<0.001) and PPAR gamma, 0.35 ± 0.2 vs 0.60 ± 0.1 (p=0.01) and muscle mass regulator myostatin-2 (0.16 ± 0.1 vs 0.24 ± 0.1, p<0.001).

Conclusion Contemporary doses of epirubicin for breast cancer result in significant reduction of cardiac and skeletal muscle high energy 31P-metabolism alongside skeletal myocellular alterations of protein synthesis and metabolic regulation pathways.

Conflict of Interest None

MEASURING PCr/ATP AS A MARKER OF MYOCARDIAL ENERGETICS ACROSS THE SPECTRUM OF METABOLIC CARDIAC DISEASE

Introduction Derangements in myocardial energetics are thought to play an important role in the pathophysiology of several cardiac diseases. Myocardial energetics can non-invasively be assessed by measuring the phosphocreatine-to-adenosine triphosphate ratio (PCr/ATP) using 31Phosphorus spectroscopy in cardiac and skeletal muscle. We aimed to study myocardial and skeletal muscle energetics in healthy controls, patients with diabetes mellitus type 2 (T2D), and patients with non-obstructive coronary artery disease (NOCAD) to determine if abnormalities in myocardial energetics could be detected in NOCAD patients.

Methods Patients were recruited from the University of Aberdeen’s heart failure clinic, and NOCAD patients were identified using cardiac Doppler echocardiography, coronary angiography and cardiac magnetic resonance imaging. Energetics were assessed in cardiac and skeletal muscle using 31P-MRS cardiac and skeletal muscle spectroscopy. Patients were divided into three groups: healthy controls, T2D patients and NOCAD patients. Statistical significance was set at p<0.05.

Results Healthy controls showed normal myocardial energetics with a PCr/ATP ratio of 2.0 (0.05) and a GLS of 21.7 (1.2). T2D patients showed reductions in PCr/ATP (1.6 (0.1), p=0.007) and GLS (19.3 (1.1), p=0.001). NOCAD patients showed similar decrements in myocardial energetics and GLS compared to T2D patients (PCr/ATP = 1.6 (0.1), GLS = 19.3 (1.1), p<0.001).

Conclusion Myocardial energetics are deranged in T2D and NOCAD patients, with a further reduction in T2D patients compared to NOCAD patients. These findings suggest that abnormalities in myocardial energetics can be detected in NOCAD patients, and may play an important role in the pathophysiology of several cardiac diseases.