Methods We acquired de-identified data linked to hospital admissions and death from the NHS Greater Glasgow and Clyde (GGC) Health Board between 2011 and 2015 (population ~1.1 million) for anyone over the age of 50 with a coded diagnosis of coronary or peripheral arterial disease or heart failure or with repeat prescriptions of loop diuretics, renin-angiotensin-aldosterone inhibitors or beta-blockers. Patients were stratified into 5 sex-specific groups according to Hb concentration, from low to high: severe anaemia (<2g/dL below World Health Organisation (WHO) definition (<12g/dL in women and <13g/dL in men)); moderate anaemia (1-2g/dL below WHO); mild anaemia (0-1g/dL below WHO); 0-1g/dL above WHO, and greater than 1g/dL above WHO. The lowest Hb result for each patient was taken. Measurements of ferritin and transferrin saturation (TSAT) within one-year of the documented lowest Hb were identified. Mortality at 3-years stratified according to Hb is also reported.

Results Between 2011 and 2015, 181,368 people (~16% of the GGC population) had a Hb measurement of whom 19,586 had a diagnosis of heart failure and a further 26,482 were treated with loop diuretics at the time of reference Hb test; 97,811 (54%) had at least one value indicating anaemia, with the lowest value indicating severe anaemia in 50,960 (28%), moderate in 20,704 (11%) or mild in 26,147 (14%). Patients with a lower Hb were more likely to have heart failure and/or receive loop diuretics.

Serum ferritin was measured in 60,075 (33%) patients, including 43,906 who had anaemia (45% of those with anaemia). Patients with more severe anaemia were more likely to have ferritin checked (mild=33%; moderate=44%; severe=51%). In patients with severe anaemia who were tested, serum ferritin was <30ng/mL in 6,617 (25%) and between 30-100ng/mL in 6,675 (25%) compared to, in those with Hb >1g/dL above WHO, 626 (8%) and 3,140 (38%), respectively. TSAT was measured in 19,149 (11%) patients, including 16,732 (86%) with anaemia (17% of those with anaemia; most also had ferritin measured (16,998 (89%)). In patients with severe anaemia who were tested, TSAT was <20% in 8,696 (70%) compared to 282 (25%) in those with Hb >1g/dL above WHO.

Age and sex adjusted three-year mortality rose sharply as anaemia progressed (mild: HR=2.6 (2.3-2.7); p<0.001, moderate: HR=3.8 (3.5-4.0); p<0.001, severe: HR=7.3 (7.0-7.6); p<0.001). People with an Hb >1g/dL above WHO had a mortality of 5% compared to 9% in those with a Hb of 0-1g/dL above WHO (adjusted HR=1.5 (1.5-1.6); p<0.001).

Conclusions A low Hb is common in people with suspected or confirmed heart failure. Mortality is inversely related to Hb with a nadir of risk when values are at least 1g/dL above the WHO definition of anaemia. Many patients with anaemia are not investigated for ID and therefore are less likely to receive appropriate diagnostic investigations and the potential benefits of iron therapy.

Conflict of Interest None

Abstract 80 Figure 1

Background Cardiogenic shock (CS) is defined as hypotension despite adequate filling status with signs of organ hypoperfusion resulting from a primary cardiac disorder. It complicates 8% of acute myocardial infarctions and, despite the widespread availability of primary percutaneous coronary intervention, continues to have a high short term mortality of 35-50%. Traditional mechanical circulatory support (MCS) can improve cardiac output (CO) however these devices have significant adverse event profiles related to their position within the circulation.

PALVAD is an extra circulatory left ventricular assist device, designed to be implanted percutaneously. It provides cardiac support whilst sitting outside the circulatory system in the space between the pericardium and left ventricular (LV) free wall. The dual balloon system connects to a currently external pumping system via a driveline. The actuator (ACT) balloon augments CO through ECG gated LV systolic compression and the positioning balloon sits against the pericardial surface dissipating this force across a large area. Due to its position...
outside the circulation the device avoids risks with traditional MCS such as clot generation or bleeding (if anticoagulation required), haemolysis and the risk of intravascular infection leading to endocarditis. Furthermore, by avoiding the need for surgical implantation PAL-VAD avoids the risk of general anaesthetic in critically ill patients with the potential to enable more widespread timely initiation of MCS targeting improved outcomes in CS.

Purpose Assess device efficacy in a low CO state in a non-recovery porcine model.

Understand device interactions with the left ventricle and pericardium in a cadaveric model.

Methodology Non-recovery porcine model experiments were conducted in ten 40k-60g pigs at a large animal catheterisation facility. In 3 animals a closed chest coronary occlusion reperfusion technique was adopted. In 7 animals an Esmolol infusion was titrated to create a low output state. A Millar catheter was placed in the LV for simultaneous pressure and volume measurements and a Transonic flow probe was placed around the internal carotid for flow measurements. The device was inserted successfully percutaneously and operated for alternating periods of 5 minutes on and 1 minute off.

For the cadaveric experiment, the device was inserted into a Thiel embalmed saline or contrast perfused cadaver following which detailed CT and MRI imaging was undertaken with the device in varying configurations. CT images were reconstructed three dimensionally and analysed using NX computer aided design (CAD) software.

Results PAL-VAD had a significant impact across all target parameters with a mean increase of 44% ± 14.5 in CO, 43% ± 16.2 in stroke volume, 25% ± 14.7 in pressure and a 30% ± 18.5 in flow. There was no macroscopic evidence of epicardial or pericardial damage. Cadaveric imaging informed optimal positioning of the device in relation to the LV free wall and a 48% reduction in LV volume was seen when the ACT balloon was inflated.

Conclusions PALVAD performance during a low CO state in non-recovery porcine experiments is promising. Further recovery experiments, including histology assessment, are planned to evaluate safety and efficacy with longer term use to guide optimisation prior to a first-in-man trial.

Conflict of Interest Nil

INCREASED MYOCARDIAL FAT SUPPLY ENHANCES CARDIAC FUNCTION IN NORMAL HEARTS AND IN HEART FAILURE

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Introduction The failing heart is starved of energy, in part accounting for its contractile dysfunction. Energy supply is dependent upon metabolism of fat and glucose, hence altering metabolism of glucose and/or fat within the myocardium is therefore attractive as a therapeutic strategy for heart failure.