AN IMPROVED EJECTION FRACTION PARAMETER CAPABLE OF REPRESENTING CARDIAC FUNCTION REGARDLESS OF HEART MORPHOLOGY TO DISTINGUISH HFPEF FROM NORMAL HEARTS

Choon Hwai Yap, Yu Zheng, Wei Xuan Chan, Christopher Charles, Mark Richards, Smita Sampath, Azud Abu Bakar Ali, Hwa Liang Leo. Imperial College London, London, UK; National University of Singapore; Merck Sharp & Dohme

Background Ejection Fraction (EF) has been an important parameter describing cardiac function, because of earlier work demonstrating its correlation with outcomes. However, during conditions such as Heart Failure preserved ejection fraction (HFpEF), EF fails to distinguish HFpEF from healthy patients. There are further reports that EF can be skewed by the geometry of the heart, and Heart Failure (HF) can present a wide variety of cardiac morphologies due to remodelling. The reason for the poor performance of EF and its dependency on geometry is unclear, and it is further unclear if such geometric changes from HF remodelling affects cardiac function. We strive to address this here, and derive an improve and simple EF parameter to resolve this.

Methods We developed a simple discretized numerical model to relate incompressible myocardial strains to stroke volume. We used data from two porcine animal models of heart failure, one for HFpEF and one for HF reduced EF (HFrEF), and literature clinical measurements to inform our model. We used the model to test the effects of geometric changes relevant to HF on the ability of the heart to convert myocardial strains to flow function.

Results Our animal models showed that cardiac dilation and wall thickening are primary features relevant to HF. Further investigation via our numerical model showed that wall thickening with no change to strain artificially increased EF, while cardiac dilation with no change to strain artificially decreased EF, demonstrating that EF can be skewed by geometric

Conflict of Interest Heart Failure
WHAT ACTUALLY HAPPENS IN A SPECIALIST HEART FAILURE CLINIC?

1Arvind Singhal, 1Jiliu Pan, 1Barbara Cassimon, 2Martin Cowie. 1Royal Brompton Hospital, London, UK; 2Imperial College, London

Introduction Provision of specialist outpatient services has struggled to keep up with the growing demands of the heart failure (HF) epidemic in the UK. The Covid-19 pandemic necessitated a dramatic change in how HF clinics are delivered, with a reduction in face-to-face contact. The need for in-person appointments remains unknown. We evaluated pre-pandemic face-to-face clinic appointments in detail, to see what appointments achieved, in order to plan future services.

Methods We conducted a retrospective cohort study of patients who had completed 3 years of follow up (1st January 2017 to 31st December 2019) in a specialist HF clinic. Inclusion criteria were a clinician diagnosis of HF or left ventricular systolic dysfunction (from clinic letters and echocardiography), or at least moderate valvular disease with symptoms. Patient electronic health records were reviewed, and for each clinic attendance, the following were noted:

- Presence of new or worsening symptoms or signs of HF, or symptoms relating to HF treatment, as assessed by the clinician
- Change in cardiovascular medications
- Investigations requested
- Documented patient education, advice, or discussion of care plan

Results 100 patients were included in the cohort. The median age was 68, and patients were predominantly male (80%) with HFrEF (78%). There was a total of 666 appointments over the 3 years of follow up. Patients had a median of 2 appointments per year (Figure 1). Figure 2 shows the frequency of investigations, symptoms and clinician actions in appointments. 21% of appointments documented new or worsening HF or treatment-related symptoms, and cardiovascular therapy was changed in 36% of appointments, ranging from 55% of nurse-led appointments to 31% where the patient saw a junior doctor. Therapy change was more common in appointments when there was a change in symptoms (53% vs 31%, p < 0.001). 41% of patients had no documented worsening in HF symptoms throughout the entire 3 year follow up period. Patient education or clinical advice was documented in 32% of appointments. Follow-up duration was shorter following a change in symptoms (127 vs 163 days, p=0.03) and therapy change (128 vs 170 days, p=0.03). 45% of appointments had no documented worsening HF symptoms, change in cardiovascular therapy, specialist referral or specialist test (excluding echocardiography and phlebotomy); we consider these to be ‘routine’ follow-up appointments.

Conclusion Most HF patients were seen in a specialist HF clinic at least 6-monthly, but worsening symptoms and therapy change at the time of consultation were uncommon. Investigations other than phlebotomy and echocardiography, which may be performed outside of specialist centres, were rarely

Conflict of Interest None to declare