British Society for Heart Failure

16th Annual Autumn Meeting

Making sense of acute heart failure

Fleming Room, Queen Elizabeth II Conference Centre, London

28–29 November 2013

Programme and Abstracts

www.bsh.org.uk
The BSH is grateful to the following for meeting-specific contributions:

**Gold exhibitors:**
- Novartis
- Pfizer
- Servier Laboratories

**Silver exhibitor:**
- Edwards Lifesciences

**Bronze exhibitors:**
- Abbott Vascular
- Alere
- Boston Scientific
- Gambro
- HeartWare
- Life Biomedical
- Medtronic
- ResMed
- Sunshine Heart
- Thoratec

**Other contributors:**
- National Institute for Cardiovascular Outcomes Research (NICOR)
- Wisepress

We also welcome support from the British Heart Foundation

The BSH also gratefully acknowledges the support provided by the Friends of BSH:
- Abbott Vascular
- Edwards Lifesciences
- HeartWare
- Medtronic
- Novartis
- Pfizer
- Servier Laboratories
- Thoratec
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This programme has been accredited by the Royal College of Nursing Centre for Professional Accreditation until 15 October 2014. Accreditation applies only to the educational content.

The meeting has been awarded 14 study hours and the reference is 5637.

The event is accredited by the Royal College of Physicians. The meeting has been awarded 11 credits and the reference is 84542.

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Please note that photography, video and audio recording of the sessions and slides of this meeting is strictly prohibited.

For scientific and/or technical reasons the BSH programme directors reserve the right to make any change to the programme.

The BSH cannot accept responsibility for personal accidents, or loss or damage to private properties of participants and exhibitors at the BSH Annual Autumn Meeting. Participants and exhibitors are advised to make their own arrangements if they consider it necessary.

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Programme – Day One  THURSDAY 28 NOVEMBER 2013

Programme directors: Paul Kalra (Portsmouth) / Jim Moore (Cheltenham) / Iain Squire (Leicester)

09:00–09:30  Registration – tea/coffee

09:30–09:40  Introduction  
Andrew Clark (Hull)

09:40–11:05  Session 1: Counting the cost of acute heart failure  
Chairs: Andrew Clark (Hull) / Iain Squire (Leicester)

09:40–10:15  Key note talk: What is acute heart failure and how do we treat it?  
John McMurray (Glasgow)

10:15–10:35  What leads onto hospitalisation?  
John Cleland (London)

10:35–10:55  What's happening in the UK? Data from the National Heart Failure Audit  
Theresa McDonagh (London)

10:55–11:05  Panel discussion

11:05–11:35  Coffee

11:35–12:50  Session 2: Optimising service delivery – how to make sense out of the chaos  
(Supported by an educational grant from Novartis)  
Chairs: Martin Cowie (London) / Theresa McDonagh (London)

11:35–11:40  Chaos reigns...  
Andrew Clark (Hull)

11:40–11:50  What do commissioners really want?  
Nigel Rowell (Middlesbrough)

11:50–12:25  Examples of acute service provision:
- Identification of patients – using B-type natriuretic peptide or echocardiography  
  Gerry Carr-White (London)
- The inpatient heart failure team  
  Jayne Masters (Southampton)
- Multi-disciplinary approach to acute heart failure care  
  Jackie Taylor (Glasgow)
- Specific considerations for the patient with heart failure post acute myocardial infarction  
  Angus Nightingale (Bristol)
- Heart failure units – the way ahead?  
  Suzanna Hardman (London)

12:25–12:40  What should a community service offer?  
Jim Moore (Cheltenham) / Annie MacCallum (Gloucestershire)

12:40–12:50  Panel discussion

12:50–14:00  Lunch and Meet the Experts sessions

14:00–15:00  Session 3: Clinical challenges in the management of acute heart failure (1)  
Chairs: Annie MacCallum (Gloucestershire) / Paul Kalra (Portsmouth)

14:00–14:15  Treatment options in diuretic resistance  
Martin Thomas (London)

14:15–14:30  Arrhythmias in acute heart failure  
Dominic Kelly (Hampshire)

14:30–14:45  Preventing decompensation in patients admitted for non-heart failure reasons  
John Baxter (Sunderland)

14:45–15:00  Myocarditis  
Simon Williams (Manchester)

15:00–15:35  Session 4: Philip Poole-Wilson Lecture  
Chair: Henry Dargie (Glasgow)

15:00–15:35  Beta-blockers in heart failure: active agents with unexplored potential  
Sian Harding (London)

15:35–16:05  Tea and Meet the Expert session

16:05–16:45  Session 5: Heart failure research in the UK  
(Supported by an educational grant from Servier)  
Chairs: Suzanna Hardman (London) / Jim Moore (Cheltenham) / John Cleland (London)

16:05–16:15  Where does the BSH fit in?  
Andrew Clark (Hull)
(to incl. BSH Research Fellow Award: winner announcement)

16:15–16:25  Cardiac magnetic resonance imaging (CMRI) characteristics of patients with heart failure and different QRS morphologies  
Pierpaolo Pellicori (Hull)

16:25–16:35  Dyspnoea at rest is not the predominant emergency department presentation of patients subsequently admitted with heart failure  
Ahmad Shoaib (Hull)

16:35–16:45  Should cardiac resynchronisation therapy be considered for patients with severe chronic kidney disease?  
Donah Zachariah (Portsmouth)
(Young Investigators’ Award winner to be announced before lunch tomorrow)
16:45–17:15 Session 6: Hyde Park  
Chairs: John Baxter (Sunderland) / Simon Williams (Manchester)  
16:45–16:52 The NHS should be run like a budget airline  
Nigel Rowell (Middlesbrough)  
16:52–16:59 Telehealth for heart failure management: patient empowered self-care or surveillance by the nanny state?  
Kevin Goode (Hull)  
16:59–17:06 CRT stands for Collapse of Rational Thinking  
Darrel Francis (London)  
17:06–17:13 Can exercising with a cold give you heart failure?  
Simon Williams (Manchester)  
17:15 Cheese and wine reception

Programme – Day Two FRIDAY 29 NOVEMBER 2013

09:00–09:25 BSH Annual General Meeting (AGM)  
Chairs: Andrew Clark (Hull) / Simon Williams (Manchester)  
09:30–10:30 Session 7: Cases  
Chairs: Hugh McIntyre (Hastings) / Roy Gardner (Glasgow)  
09:30–09:45 Case 1  
Parminder Chaggar (Manchester)  
09:45–10:00 Case 2  
Rob Howlett (Thaxted)  
10:00–10:15 Case 3  
Dawn Lambert (Portsmouth)  
10:15–10:30 Case 4  
Alison Duncan (London)  
10:30–11:00 Coffee  
11:00–12:35 Session 8: Heart failure with normal ejection fraction  
Chairs: Jim Moore (Cheltenham) / John McMurray (Glasgow)  
11:00–11:35 Keynote lecture: Heart failure with normal ejection fraction – what is it? Walter Paulus (Amsterdam, Netherlands)  
11:35–11:55 Echocardiography beyond left ventricular ejection fraction Alan Fraser (Cardiff)  
11:55–12:15 What treatment should we consider? Martin Cowie (London)  
12:35–13:30 Lunch and Meet the Expert sessions  
13:50–14:20 Session 9: Acute heart failure trials update  
Chair: Iain Squire (Leicester)  
13:50–14:20 Acute heart failure trials update John McMurray (Glasgow)  
14:20–15:05 Session 10: What else can we do in advanced heart failure?  
Chairs: Dominic Kelly (Hampshire) / Nick Banner (Harefield)  
14:20–14:35 How to approach the hypotensive patient? Roy Gardner (Glasgow)  
14:35–14:50 When to consider cardiac resynchronisation therapy in the very sick? Peter Cowburn (Southampton)  
14:50–15:05 Who to consider for a left ventricular device? Steve Shaw (Manchester)  
15:05–15:30 Tea and Meet the Expert session  
15:30–16:15 Session 11: Clinical challenges in the management of acute heart failure (2)  
Chairs: Ceri Davies (London) / Paul Kalra (Portsmouth)  
15:30–15:45 Who should receive an ICD? Derek Connelly (Glasgow)  
15:45–16:00 Amyloid and the heart Carol Whelan (London)  
16:00–16:15 Peripartum cardiomyopathy Mark Petrie (Glasgow)  
16:15–16:45 Session 12: The debate  
Chair: John Baxter (Sunderland)  
Hospitalisation for acute heart failure is good for you?  
Pro: Andrew Clark (Hull)  
Con: Dargoi Satchi (Stoke-on-Trent)  
16:45 Meeting close
# Meet the Expert Sessions

**Exhibition Area – Benjamin Britten Lounge**

## Thursday 28 November 2013

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<td>Prof Theresa McDonagh (King's College Hospital, London)</td>
<td>13:25–13:35</td>
<td>In depth look at acute HF patients (data from the National HF Audit)</td>
<td>Novartis exhibition stand</td>
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<td>Dr Ahmet Fuat (Darlington Memorial Hospital)</td>
<td>13:49–13:59</td>
<td>Access to cardiac resynchronisation therapy in a typical GP practice – does our data let us and the patients down? Experience of a novel audit tool that facilitates best practice in primary care cardiology</td>
<td>Medtronic exhibition stand</td>
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<td>Dr Steve Shaw (Wythenshawe Hospital, Manchester)</td>
<td>15:48–15:58</td>
<td>A practical guide to managing a VAD patient</td>
<td>Thoratec exhibition stand</td>
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<td>Prof Simon Redwood (St Thomas' Hospital, London)</td>
<td>13:15–13:25</td>
<td>A proven therapy that extends life and improves quality of life for your patient with severe aortic stenosis</td>
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<td>Dr Alexander Lyon (National Heart &amp; Lung Institute, Imperial College, London)</td>
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<td>Heart rate as a new therapeutic target in heart failure: new insights from the SHIFT trial</td>
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<td>Mr Neil Wrightson (Freeman Hospital, Newcastle)</td>
<td>15:18–15:28</td>
<td>Challenges and opportunities with LVAD therapy</td>
<td>HeartWare exhibition stand</td>
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Key note talk: What is acute heart failure and how do we treat it?

John McMurray (BHF Cardiovascular Research Centre, Glasgow)

The abstract for this presentation was not submitted before going to press.

What leads onto hospitalisation?

John Cleland (Imperial College, London)

Patients may be hospitalised with heart failure for many reasons and usually there is more than one.

About half of patients will be admitted with acute, severe breathlessness and about half with worsening exertional breathlessness and increasing peripheral oedema.

Many of the patients in the former category and all of the patients in the latter category will have experienced a gradual deterioration in symptoms and an increase in body weight in the preceding days or weeks. Deterioration may be due to worsening of the underlying medical problem, failure to receive or failure to ingest medication, the onset of atrial fibrillation, infection, worsening anaemia and deteriorating renal function.

A minority of patients will have a sudden onset of acute symptoms with little prodrome. Common causes of sudden, unheralded worsening heart failure in the UK are the development of rapid atrial fibrillation or an acute myocardial infarction.

Whether a patient requires admission and the duration of that admission is often determined by factors such as general frailty, social network and informal carers, and the organisation of services in the community.

Careful monitoring, perhaps best delivered through home telemonitoring, can identify a proportion of the impending crises, facilitate their early management and may prevent some admissions (while provoking others that may be life-saving).

Many admissions to hospital with heart failure are unnecessary and reflect the lack of alternative strategies for care.

What’s happening in the UK? Data from the National Heart Failure Audit

Theresa McDonagh (King’s College Hospital, London)

No abstract was required for this presentation.
Chaos reigns...
Andrew Clark (Castle Hill Hospital, University of Hull)

No abstract was required for this presentation.

What do commissioners really want?
Nigel Rowell (Endeavour Practice, Middlesbrough)

“Right person, right place, right time” pretty well sums up a commissioner’s view to… well everything really! The relationship between length of stay and readmission is inconsistent. This implies that patients either languish in wards with heart failure undiagnosed, or some don’t benefit from lifesaving (and bed-saving) therapies.

In heart failure, hospital is never far away, with the disease trajectory often requiring outpatient reviews, urgent readmissions, tweaks to therapy and devices. And yes sometimes readmission acutely is unavoidable – it’s in the nature of the disease and the people who have it. Just as in cancer, a joined up primary-secondary service led by a multi-disciplinary team benefits patients and is cost-effective, yet we have been late players to this game.

Diagnosis of heart failure at the time you hit the hospital bed, with care from an expert and close attention to follow up will always win the day. And the commissioner’s cheque book.

Examples of acute service provision:
Identification of patients – using B-type natriuretic peptide or echocardiography
Gerry Carr-White (St Thomas’ Hospital, London)

Managing acute heart failure patients in a busy inner-city London hospital poses particular challenges. Across King’s Health Partners we have trialed two different approaches to improve the quality of inpatient care. At Guy’s and St Thomas’ we have piloted a B-type natriuretic peptide (BNP)-based emergency referral system, and at King’s College Hospital we have used an early referral system based on echocardiography. We will share the preliminary results of these two projects and some of the lessons learnt from implementing them.

Examples of acute service provision:
The inpatient heart failure team
Jayne Masters (Southampton University Hospitals NHS Trust)

The introduction of a specialist heart failure team dramatically reduced inpatient mortality. Improved use of evidence-based therapies, together with more aggressive diuretic use, may contribute to the difference in patient outcomes.
Examples of acute service provision:
Multi-disciplinary approach to acute heart failure care

Jackie Taylor (Glasgow Royal Infirmary)

The Glasgow experience – a work in progress

The National Audit for Heart Failure has shown some encouraging trends, but there is certainly no room for complacency. Improving the patient pathway for patients requiring hospitalisation for heart failure is one component of our strategy for delivering comprehensive heart failure services.

Local audit across Glasgow highlighted great variability in care between different hospital sites: patients were often cared for by non-specialists, with limited access to echocardiography, significant delays in investigation and suboptimal management and follow up.

A review of acute services led to the merger of two major teaching hospitals in 2011 and this afforded the opportunity to redesign the pathway for patients with decompensated heart failure. The key factors included the development of a larger cardiology unit, better identification of patients on admission and improving links with the heart failure specialist nurse service through regular multi-disciplinary team meetings. Subsequent audit has shown a substantial improvement in the process of care. Maintaining this requires continual reinforcement of the benefits for both patients and service alike.

Development of services is most likely to succeed where improvements in quality of care can be aligned to improvements in performance and with national strategy.

Examples of acute service provision:
Specific considerations for the patient with heart failure post acute myocardial infarction

Angus Nightingale (Bristol Royal Infirmary)

Heart failure is a common occurrence following myocardial infarction (MI), especially in anterior MI, and may occur acutely or subacutely. Left ventricular (LV) systolic dysfunction is the strongest predictor of outcome post-MI. Several mechanisms are responsible, including remodelling secondary to infarction, stunning, arrhythmias (atrial and ventricular) and valve dysfunction.1

Remember that arrhythmias and mechanical complications (such as ventricular septal defect or papillary muscle rupture) can present as acute heart failure post-MI and need specific treatment.

Signs and symptoms suggestive of heart failure include sinus tachycardia, 3rd heart sound (S₃) and crackles in the chest. These are supported by chest X-ray [CXR] and evidence of cardiac dysfunction (on echo or magnetic resonance imaging). Natriuretic peptides are raised and may be useful for diagnosis, risk stratification and discharge decisions.

Classification of heart failure post-MI is made using the Killip Class:

I no crackles or S₃
II pulmonary congestion with crackles in <50% of lung fields or S₃ or sinus tachycardia
III pulmonary congestion with crackles in >50% of lung fields
IV cardiogenic shock.

Treatment of heart failure post-MI includes oxygen (to achieve oxygen saturation >95%) and intravenous diuretics. Cautious volume loading may be appropriate if blood pressure (BP) is <90 mmHg. There is limited evidence to support the use of vasopressors, inotropes or intra-aortic balloon pumping in cardiogenic shock. Intravenous nitrates are useful if BP is >120 mmHg.

In the early post-MI phase there are clear benefits for angiotension-converting enzyme inhibitors (or angiotensin-receptor blockers such as valsartan) and the aldosterone antagonist, eplerenone, in the absence of hypotension, hypovolaemia and renal dysfunction. In EPHESUS (Epleronone Post-Acute Myocardial Infarction Heart Failure Efficacy and Survival Study), eplerenone (25 mg titrated up to 50 mg) was started on days 3–14 post-MI in patients with an ejection fraction <40% and signs of heart failure (crackles, S₃ or pulmonary congestion on CXR) or diabetes.2 To be included they needed to have a baseline creatinine <200 mmol/l and K⁺ <5.0 mmol/l. Eplerenone reduced mortality at one year from 16.6% to 14.4% without significant adverse events. Beta-blockers have an important role in reducing arrhythmias and improving outcomes post-MI.

Continued on page 8
Continued from page 7

The challenge in the UK, with an increasingly rapid turnover of patients, is to implement protocols to detect and treat myocardial dysfunction and heart failure promptly. This needs careful coordination of acute coronary syndrome and heart failure teams, with rapid availability of echo and other imaging modalities. In order to safely monitor the many medications prescribed post-MI, clear shared-care agreements are needed with primary care to ensure patients are appropriately monitored.

Many patients with heart failure post-MI may be eligible for cardiac resynchronisation therapy and implantable cardiac defibrillators, and the indications for these should be re-evaluated 4–6 weeks after discharge.  

References


Examples of acute service provision:
Heart failure units – the way ahead?

Suzanna Hardman (Whittington Hospital, London)

It seems I will be addressing this important subject faster than the speed of light. In the interests of time and for those who still think there are arguments against heart failure units, essential reading includes ‘22 Reasons for the Bedroom Tax’ by Carol Ann Duffy. Please imagine the poem renamed ‘22 Reasons Not to implement Heart Failure Units’.

22 Reasons for the Bedroom Tax

Because the Badgers are moving the goalposts.
The Ferrets are bending the rules.
The Weasels are taking the hindmost.
The Otters are downing tools.
The Hedgehogs are changing the game-plan.
The Grass-snakes are spitting tacks.
The Squirrels are playing the blame-game.
The Skunks are twisting the facts.
The Pole-cats are upping the ante.
The Foxes are jumping the gun.
The Voles are crashing the party.
The Stoats are dismantling the Sun.
The Rabbits are taking the biscuit.
The Hares are losing the plot.
The Eagles are kicking the bucket.
The Rats are joining the dots.
The Herons are throwing a curveball.
The Shrews are fanning the flames.
The Field mice are sinking the 8-ball.
The Swans are passing the blame.
And the Pheasants are draining the oil from the tank – but only the Bustards have broken the bank.

Reproduced with permission from Carol Ann Duffy
What should a community service offer?

Jim Moore (Stoke Road Surgery, Bishops Cleeve, Cheltenham) / Annie MacCallum (Gloucestershire Care Services NHS Trust)

There exists little evidence to support what a community heart failure service should offer; therefore, this presentation is in part the reflections of ten years’ experience in delivering multi-disciplinary heart failure care from such a perspective.

Central to the delivery of effective seamless heart failure care is the need for all agencies to be fully aware of their roles and responsibilities and to effectively communicate with the patient, their families and each other.

Community services need to be responsive to patient needs and, in addition, aware of their own educational needs to deliver a high level of clinical effectiveness. Assessment of performance by patient feedback and clinical audit will help maintain the highest clinical standards and inform clinical effectiveness.

Treatment options in diuretic resistance

Martin Thomas (The Heart Hospital, London)

Diuretic resistance is a clinical state in which the response to diuretic therapy is reduced or lost before the therapeutic goal of relief from oedema has been achieved. It affects 20–30% of patients with heart failure. The causes of diuretic resistance are multi-factorial and include changes in diuretic bioavailability, physiological changes within the nephron, drug interactions and net sodium accumulation. No single strategy can overcome the clinical problem.

In the initial management of diuretic resistance, attention should first be given to the optimisation of standard heart failure treatment in combination with adequate fluid and sodium restriction. Subsequent approaches to therapy include increasing oral doses of diuretics, changing to intravenous therapy (either intermittent bolus or continual infusion) and sequential nephron blockade. Treatment with inotropes, such as dopamine, dobutamine and levosimendan, may also be a therapeutic option.

Despite these measures, diuretic resistance may still remain a major clinical problem, with patients continuing to accumulate fluid despite a combination of clinical interventions. Ultrafiltration is a novel way of treating patients with fluid overload who have failed to respond to diuretic therapy and may increase diuretic sensitivity following treatment.

Further reading


Arrhythmias in acute heart failure

Dominic Kelly (Hampshire Hospitals NHS Foundation Trust)

Management of arrhythmias in heart failure is a challenging and often frightening experience for the junior doctor, nurse or other member of the multi-disciplinary team. This is largely an evidence-light area of medicine where clinical experience may take precedence over clinical evidence. This session aims to give practical guidance into the management of both tachyarrhythmias and bradycardias in the context of acute heart failure.

Preventing decompensation in patients admitted for non-heart failure reasons

John Baxter (Sunderland Royal Hospital)

There is a large evidence base to help guide the management of patients admitted with decompensated heart failure. The evidence base has been incorporated into clinical guidelines. NICE quality standards also help guide service delivery for these patients. It is therefore understandable that the primary focus of heart failure teams is to deliver effective care for patients whose primary reason for admission to hospital is decompensated heart failure.

In our efforts to improve the care for these patients, we must not neglect heart failure patients who are admitted for reasons other than decompensated heart failure.

Heart failure patients are also at risk of complications of heart failure treatment. Acute renal failure, or falls due to bradycardia or hypotension, may precipitate admission.

Acute illness such as chest or urinary sepsis, stokes and delirium, or the development of other co-morbidities, such as malignancy, may precipitate episodic hospital admission in patients with heart failure.

During these admissions, due either to a complication of heart failure treatment or an unrelated co-morbidity, patients are at risk of decompensation of their heart failure. It is important therefore that inpatient heart failure services are aware of these patients and involved as required.

This talk will discuss the issues of case identification of heart failure patients admitted for non-heart failure reasons, discuss specific scenarios which increase the risk of heart failure decompensation, and give practical advice about how to avoid this event. The talk will discuss ways to support the discharge of these patients, and reduce the risk of subsequent decompensation of their heart failure.

Myocarditis

Simon Williams (Wythenshawe Hospital, Manchester)

Simon Williams will discuss the contemporary management of acute myocarditis. Up-to-date information regarding the aetiology, diagnosis and assessment will be presented. Optimal investigations (including the role of myocardial biopsy) will be addressed. Up-to-date therapies including antiviral and immune modulations will be discussed. Slides can be shared after the presentation if desired.
Beta-blockers in heart failure: active agents with unexplored potential

Sian Harding (National Heart & Lung Institute, London)

It was while in Philip Poole-Wilson's laboratory at the National Heart and Lung Institute that I began work on the cardiomyocyte in heart failure. This started in 1987 with the development of a method for obtaining isolated ventricular cardiomyocytes from human heart and the design of a system for robust measurement of contraction in single cells. With this we showed that both beta1- and beta2-adrenocceptors were present on a single human cardiomyocyte and that inhibitory G-protein (Gi) suppression of the beta-adrenoceptor responses contributed to the desensitisation seen in heart failure. During this time it became apparent clinically that the beta-adrenoceptor agonists were not good agents in heart failure: despite initial alleviation of symptoms there was an increase in mortality. Beta-blockers, although contraindicated at that time due to cardiodepressant effects, were tentatively tried in these patients with encouraging results. Philip Poole-Wilson was one of the pioneers to take these agents forward into large clinical trials, such as COMET and SENIORS. At the same time, we found that some clinically used beta-blockers were biased agonists which activated a beta2-Gi cardiodepressant but overall cardioprotective pathway in human failing cardiomyocytes.1 We have suggested that this contributes to the ultimate success of beta-blockers in heart failure. Activation of this beta2-cardiodepressant pathway was also shown to be produced by biased agonism of high concentrations of adrenaline, and we more recently hypothesised that this could underlie the regional cardiac hypokinesis in stress or takotsubo cardiomyopathy. We reproduced the syndrome in a rat model of adrenaline exposure, showing that it was beta2-Gi dependent, and further that it was linked to cardioprotective effects to prevent adrenaline-induced damage and sudden cardiac death.2 We suggest that this is a natural protective mechanism in stress, and that beta-blockers used in heart failure have serendipitously harnessed this effect.

References
Where does the BSH fit in?
Andrew Clark (Castle Hill Hospital, University of Hull)

The BSH continues to thrive with over 1,000 members and an annual meeting with over 650 people attending. All the disciplines caring for patients with heart failure are represented in the Society. The BSH is well placed to support research in heart failure in the UK, and has managed to secure funding for a research fellowship, to be awarded every 2 years. The abstract session is here to encourage young researchers at an early stage in their career, and we aim to use our relationship with the BHF to promote clinical heart failure research further.

Cardiac magnetic resonance imaging (CMRI) characteristics of patients with heart failure and different QRS morphologies
Pierpaolo Pellicori,* Elena Lukaschuk, Jufen Zhang, Anil Joseph, Riet Dierckx, Paola Putzu, Christos Bourantas, Nasser Sherwi, Huan Loh, Andrew L Clark, John GF Cleland (Castle Hill Hospital, Hull)

Introduction: Increasing QRS duration is associated with worse outcome in patients with chronic heart failure (CHF), but the contribution of QRS morphology is unclear.

Methods: 940 outpatients attending a community heart failure service between 2000 and 2010 who had cardiac magnetic resonance imaging (CMRI) and amino-terminal probrain natriuretic peptide (NT-proBNP) measured were included in the present analysis. CHF was defined as the presence of symptoms or signs associated with objective evidence of cardiac dysfunction: either a left ventricular ejection fraction (LVEF) <50% or a NT-proBNP ≥400 pg/ml (or ≥125 pg/ml if taking loop diuretics). QRS duration ≥120 ms was grouped as left bundle branch block (LBBB), right bundle branch block (RBBB) or indeterminate ventricular conduction delay (IVCD).

Results: Heart failure was confirmed in 877 patients and 320 had QRS ≥120 ms. Compared with patients with LBBB, those with RBBB had a lower median (interquartile range [IQR]) right ventricular (RV) ejection fraction (RBBB: 46 [37–57], IVCD: 48 [43–55], LBBB: 52 [42–61]%; p=0.014), greater median (IQR) RV mass (RBBB: 53 [42–73], IVCD: 49 [40–61], LBBB: 45 [36–56] g; p<0.001), higher median (IQR) plasma NT-proBNP (RBBB: 2013 [659–3573], IVCD: 1069 [470–2995], LBBB: 1159 [589–2207] pg/ml; p=0.026), more signs of peripheral congestion and a higher prevalence of atrial fibrillation. Median (IQR) LVEF was similar across groups (RBBB: 32 [27–43], IVCD: 35 [27–42], LBBB: 33 [27–44]%; p=0.983).

During a median (IQR) follow up of 1302 days (742–2237), 311 patients died. Compared with patients who had QRS <120 ms, RBBB (hazard ratio [HR] 1.98; 95% confidence interval [CI] 1.37–2.86; p<0.001) and indeterminate morphologies (HR 1.65; 95% CI 1.08–2.51; p=0.019) were associated with an adverse outcome, but LBBB was not. In a multivariable Cox regression model including CMRI data, neither QRS duration nor morphology were independently associated with an adverse outcome.

Conclusions: In patients with CHF with or without a reduced LVEF and QRS >120 ms, RBBB morphology identifies patients with more severe biventricular dysfunction on CMRI and a poorer prognosis.

*Presenting author
Dyspnoea at rest is not the predominant emergency department presentation of patients subsequently admitted with heart failure

A Shoaib,* M Zuhair, M Waleed, A Raza, X Kassianides, A Djahit, K Goode, K Wong, AL Clark, JF Cleland (Castle Hill Hospital, Hull)

Introduction: Acute heart failure is a progressively common reason for hospital admissions. It is generally assumed that these patients have breathlessness at rest, but UK National Audit data suggest otherwise. In clinical practice, treatment for acutely breathless patients is usually implemented within minutes of presentation but novel therapies studied in trials are not usually implemented until 6–12 hours after initial presentation and treatment.

Methods: We collected detailed information retrospectively from the case-notes of a representative sample of patients admitted with a primary diagnosis of heart failure to determine what proportions of patients were Short Of Breath At Rest (SOBAR), Comfortable At Rest but Breathless On Slight Exertion (CARBOSE) or Non-significant Short Of Breath (N-SOB). We measured blood pressure (BP), heart rate and respiratory rate (RR) at initial presentation at 1, 2, 3, 4–6, 6–12 and 12–24 hours. Results are described in median and Interquartile (IQR) ranges and the proportion with a systolic BP (SBP) >125 mmHg (RELAX-HF entry criterion). We assessed mortality in different groups at discharge, and 30 days, 90 days and 180 days after presentation.

Results: Of the 311 patients enrolled, 42% had SOBAR and 56% CARBOSE and only 4 N-SOB; 34% were women, the median age was 77 (IQR 71–84) years and median amino-terminal probrain natriuretic peptide (NT-proBNP) was 4082 (IQR: 1895–10,279 ng/L). Compared to patients with CARBOSE, patients with SOBAR were younger (76 vs 78 years), had higher HR (100 vs 85 bpm), SBP (141 vs 122 mmHg) and RR (24 vs 18 rpm) and were more often in atrial fibrillation (54% vs 49%). SBP was >125 mmHg in 73% patients with SOBAR and 46% with CARBOSE. SBP (122–116 mmHg), HR (85–82 bpm), and RR (18–18 rpm) changed little amongst patients with CARBOSE in the first 4–6 hours but all declined steeply in patients with SOBAR (141–128 mmHg, 100–90 bpm, and 24–20 rpm, respectively). By 4–6 hours, 52% patients presenting with SOBAR and 37% with CARBOSE had a SBP >125 mmHg and by 12–24 hours this had dropped to 44% and 26%, respectively. 8% of the patients in the SOBAR group and 11% in the CARBOSE group died during index admission, these increased to 6% and 10% at 30 days, 13% and 26% at 90 days, and 19% and 34% after 180 days of presentation. According to Cox regression analysis there was a 58% increased risk of death in CARBOSE compared to SOBAR (HR 1.58; confidence interval 1.08–2.29; p-value 0.02).

Conclusions: Most patients admitted with a primary diagnosis of heart failure present with CARBOSE rather than SOBAR. Patients presenting with SOBAR had, as expected, higher BP, heart and respiratory rates. CARBOSE showed little variation in these clinical characteristics in first 24 hours but suffered higher mortality during hospital admission and at 30, 90, 180 days of presentation. Despite a higher risk of mortality, due to low BP, relatively fewer numbers of patients were suitable for serelaxin in CARBOSE.

Figure. Comparison of survival between SOBAR and CARBOSE.
Should cardiac resynchronisation therapy be considered for patients with severe chronic kidney disease?

D Zachariah, 1,* B Olechowski, 2 R Sands, 1 NP Andrews, 1 R Balasubramaniam, 2 M Sopher, 2 J Paisley, 2 PR Kalra 1 (Portsmouth Hospitals NHS Trust; 2 Royal Bournemouth Hospital)

**Purpose:** Chronic kidney disease (CKD) is common in patients with chronic heart failure (CHF) and is associated with poor prognosis. Few data are available regarding the benefit and impact of cardiac resynchronisation therapy (CRT) in severe CKD. We sought to ascertain whether CRT is safe and beneficial in patients with CKD class 3b or worse and what impact CRT has on progression of renal dysfunction.

**Methods:** Consecutive patients undergoing CRT implantation at 2 UK centres (2009–11) were included. Data on haemoglobin, renal function, left ventricular function and outcomes were collected pre- and postimplant (3, 6 and 12 months). Outcomes and complication rates were compared by grouping patients as per estimated glomerular filtration rate (eGFR) ≥45 and <45 ml/min/1.73 m² (CKD classes 3b–5). Patients with eGFR measurements pre- and 12 months postimplant underwent further analysis. Changes in eGFR were evaluated and categorised as severe deterioration (eGFR fell by >5 ml/min/1.73 m²/year), minor change (−5 to +5 ml/min/1.73 m²/year) and significant improvement (eGFR increased by >5 ml/min/1.73 m²/year). Outcomes at 12 months within these categories were evaluated.

**Results:** 429 patients were included for comparison of outcomes and complications. 26% had eGFR <45 ml/min/1.73 m². CRT-defibrillator usage was similar between groups. Patients undergoing CRT implantation with an eGFR <45 ml/min/1.73 m² were older (mean age of 77±6 years) and ischaemic cardiomyopathy was the commonest aetiology.

Symptomatic benefit and major complication rates were similar (65% patients with eGFR ≥45 and 71% with eGFR <45 improved by ≥1 New York Heart Association class; pneumothorax 1.9% vs 2.7%, lead displacement 8.8% vs 7.1% and infection 2.5% vs 3.6% in the eGFR ≥45 vs <45 ml/min/1.73 m² categories, respectively). Mortality was 4.7% in those with eGFR ≥45 ml/min/1.73 m² and 11.6% in those with eGFR <45 ml/min/1.73 m² (p=0.011).

Of the 137 patients who underwent further analysis, 74 had severe deterioration in eGFR prior to implant (Table). Post CRT, 20.3% continued to have severe deterioration, 52.7% remained stable and 27% significantly improved. Mortality rates in those with severe deterioration were similar to those with stable and improved eGFR pre-implant (14.9%, 16.1%, 18.8%, respectively). Improving renal function postimplant was associated with reduced mortality. Where severe renal dysfunction persisted, mean change in eGFR dropped post CRT.

**Conclusions:** CRT implantation is safe and beneficial in patients with significant CKD. Change in renal function pre-implant does not predict subsequent change in renal function or mortality.

Table. Change in eGFR pre CRT implant and subsequent outcomes at 1 year

<table>
<thead>
<tr>
<th>Pre implant change in eGFR (ml/min/1.73 m²/year)</th>
<th>Post implant (1 year) change in eGFR (ml/min/1.73 m²/year)</th>
<th>Severe reduction (fall in GFR &gt;5)</th>
<th>Minor change (rise/fall by 5)</th>
<th>Significant improvement (increase &gt;5)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe deterioration (fall in eGFR &gt;5) N=74</td>
<td></td>
<td>N (%): 15 (20.3)</td>
<td>39 (52.7)</td>
<td>20 (27)</td>
<td>0.0067</td>
</tr>
<tr>
<td>Average change in eGFR of −29.6</td>
<td></td>
<td>Deaths: 4</td>
<td>4</td>
<td>3</td>
<td>0.0011</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean eGFR change</td>
<td>−13.9</td>
<td>0.8</td>
<td>11.6</td>
</tr>
<tr>
<td>Minor change (change in eGFR −5 to +5) N=31</td>
<td></td>
<td>N (%): 13 (41.9)</td>
<td>14 (45.1)</td>
<td>4 (12.9)</td>
<td>0.0111</td>
</tr>
<tr>
<td>Average change in eGFR of +0.8</td>
<td></td>
<td>Deaths: 1</td>
<td>3</td>
<td>1</td>
<td>0.0158</td>
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<tr>
<td></td>
<td></td>
<td>Mean eGFR change</td>
<td>−11.4</td>
<td>0.3</td>
<td>11.9</td>
</tr>
<tr>
<td>Significant improvement (rise in eGFR &gt;5) N=32</td>
<td></td>
<td>N (%): 13 (40.6)</td>
<td>16 (50)</td>
<td>3 (9.4)</td>
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<tr>
<td>Average change in eGFR of +18.4</td>
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<td>Deaths: 2</td>
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<tr>
<td></td>
<td></td>
<td>Mean eGFR change</td>
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<td>−2.3</td>
<td>10.7</td>
</tr>
</tbody>
</table>

*Presenting author
Heart failure with preserved ejection fraction (HFPEF) accounts for more than 50% of all heart failure cases. Both arterial hypertension and metabolic co-morbidities, such as overweight/obesity and type 2 diabetes, are very prevalent in HFPEF. Over the past decade, myocardial structure, cardiomyocyte function and intramyocardial signalling have been shown to be specifically altered in HFPEF. A new paradigm for HFPEF development is therefore proposed, which identifies a systemic proinflammatory state induced by metabolic co-morbidities as the cause of myocardial structural and functional alterations.

The new paradigm presumes the following sequence of events in HFPEF.

1. A high prevalence of co-morbidities such as overweight/obesity, diabetes mellitus, chronic obstructive pulmonary disease and salt-sensitive hypertension induce a systemic proinflammatory state.
2. A systemic proinflammatory state causes coronary microvascular endothelial inflammation.
3. Coronary microvascular endothelial inflammation reduces nitric oxide bioavailability, cyclic guanosine monophosphate content and protein kinase G (PKG) activity in adjacent cardiomyocytes.
4. Low PKG activity favours hypertrophy development and raises resting tension because of the hypophosphorylation of titin.
5. Both stiff cardiomyocytes and interstitial fibrosis contribute to high diastolic left ventricular (LV) stiffness and heart failure development.

The new HFPEF paradigm shifts emphasis from LV afterload excess to coronary microvascular inflammation. This shift is supported by a favourable Laplace relationship in concentric LV hypertrophy and by all cardiac chambers showing similar remodelling and dysfunction. Myocardial remodelling in HFPEF differs from heart failure with reduced ejection fraction (HFREF), in which remodelling is driven by loss of cardiomyocytes.

Hitherto, experimental studies have mainly tried to reproduce HFPEF in arterial hypertension models and have largely overlooked the prominent involvement of metabolic co-morbidities. A recent experimental study, however, investigated ZSF1 rats, which are first-generation hybrids between ZDF (Zucker Diabetic Fatty) and SHHF (Spontaneously Hypertensive Heart Failure) rats. Lean and obese ZSF1 rats are hypertensive as they have inherited the hypertension gene from male SHHF rats. Obese ZSF1 rats also inherit two different leptin receptor mutations from female ZDF and male SHHF rats. At 20 weeks of age, only obese ZSF1 rats had developed HFPEF. High myocardial stiffness was obvious in isolated cardiac muscle strips of the obese ZSF1 rats and could mainly be attributed to stiffer titin.

In summary, HFPEF and HFREF are distinct heart failure phenotypes. In HFPEF, myocardial dysfunction and remodelling are driven by coronary microvascular inflammation because of metabolic co-morbidities, whereas in HFREF they are driven by cardiomyocyte death.

References
Echocardiography beyond left ventricular ejection fraction

Alan Fraser (Cardiff University School of Medicine)

The diagnosis of heart failure with normal ejection fraction (HFNEF) is based on signs or symptoms of heart failure, preserved systolic function in a non-dilated left ventricle (ejection fraction >50% and end-diastolic volume index <97 ml/m²), and evidence of diastolic dysfunction.¹

The mechanisms which can impair left ventricular (LV) diastolic filling and increase filling pressures during exercise, and cause breathlessness, are multiple; they include abnormal ventricular–arterial coupling, increased late systolic loading, impaired early diastolic recoil and suction, volume loading, reduced compliance, and diastolic dyssynchrony. Normal changes on exercise that might be detected using echocardiography include an increase in the peak untwisting rate, a shortening of the LV isovolumic relaxation time (IVRT), an increase in the propagation velocity of mitral inflow (Vp), and increases in the early diastolic velocities of longitudinal myocardial lengthening (e') and mitral inflow (E) without any change in their ratio (E/e').

The E/e' ratio correlates with mean LV filling pressure but it has been evaluated less in HFNEF than in HFREF, and its utility in diagnosing HFNEF has been questioned. Technical factors are important and the recommended cut-off of >15 is specific but insensitive. This ratio should not be used alone to diagnose or exclude HFNEF. It can be combined with a left atrial volume index >40 ml/m², which also correlates with chronically elevated filling pressures. The most accurate non-invasive indicator of LV end-diastolic pressure in patients in sinus rhythm is the difference in duration between antegrade flow through the mitral valve and retrograde flow into the pulmonary veins during atrial systole (a-A >35 ms).

Protocols for diastolic stress testing should assess early diastolic relaxation and filling, and late diastolic filling and compliance, separately, as these may be differently affected by disease. Other diagnostic targets include ischaemia, and changes in heart rate and conduction.

Newer indices include the timing and amplitude of elastic recoil and untwisting, and the diastolic functional reserve index, defined as a change in e' velocity on exercise; reductions in long-axis systolic velocities on exercise (s') are also observed in HFNEF. Diagnosing ventricular–arterial interactions using tests of conduit arterial function and wave travel has discriminated between the effects of alternative treatments.

In clinical practice, it is important that diagnostic methods are reproducible, feasible and validated. More research is needed to identify which tests best identify therapeutic targets or predict outcomes.

Reference

Heart failure with normal ejection fraction – what treatment should we consider?

Martin Cowie (Imperial College London, Royal Brompton Hospital)

According to the most recent ESC guidelines on heart failure, ‘no treatment has yet been shown, convincingly, to reduce morbidity and mortality in patients with heart failure and preserved ejection fraction. Diuretics are used to control sodium and water retention and relieve breathlessness and oedema. Adequate treatment of hypertension and myocardial ischaemia is also considered to be important, as is control of the ventricular rate in patients with atrial fibrillation’.¹ The results of low dose mineralocorticoid antagonist therapy in this group of patients will be presented at the American Heart Association Scientific meeting in early November 2013, but are not available at the time of writing this abstract. Should this randomised trial (TOPCAT; NCT 00094302)² be positive, this will be the first morbidity and mortality trial to provide evidence of benefit. If neutral, then testing the neurohormonal hypothesis would appear to have been unsuccessful for this group of patients. The conclusions of this presentation will not be written until days before the meeting...

References
How to manage pulmonary hypertension in heart failure

Luke Howard (National Heart & Lung Institute, London)

Pulmonary hypertension and right ventricular impairment carry significant prognostic implications for patients with heart failure. Understanding the pathophysiology behind raised pulmonary artery pressures explains in large part why trials of pulmonary vasodilator treatment have been unsuccessful in improving outcomes in pulmonary hypertension secondary to heart failure. Elevations in left atrial pressure lead not only to passive rises in pulmonary artery pressure, but also to disproportionate decreases in pulmonary artery compliance compared with pulmonary arterial hypertension. It is not clear why some patients further remodel their pulmonary circulation and others do not, but there is growing opinion that the diastolic pulmonary artery pressure to pulmonary wedge pressure difference may better define those who do and lead to better selection of patients for clinical trials of pulmonary vasoactive treatment.

Treatment of pulmonary hypertension in the presence of heart failure remains focused on the reduction of left atrial pressure and the identification of other potential treatable causes of pulmonary hypertension such as lung disease and pulmonary embolic disease. Concern remains over the use of beta-blockers in patients with significant right ventricular dysfunction, and added caution is required when using these drugs.

On the other side of the heart, it is vitally important to understand how the left ventricle changes in response to precapillary pulmonary hypertension, and not to confuse this with primary left ventricular myocardial disease. This becomes particularly troublesome when trying to unpick patients who may be suffering from both a primary cause of precapillary pulmonary hypertension as well as primary left ventricular disease. Rare diseases, after all, may present alongside common ones.

Further reading


Acute heart failure trials update

John McMurray (BHF Cardiovascular Research Centre, Glasgow)

The abstract for this presentation was not submitted before going to press.
How to approach the hypotensive patient?
Roy Gardner (Golden Jubilee National Hospital, Glasgow)

The abstract for this presentation was not submitted before going to press.

When to consider cardiac resynchronisation therapy in the very sick?
Peter Cowburn (Southampton University Hospitals NHS Trust)

Cardiac resynchronisation therapy (CRT) improves outcomes for patients with New York Heart Association II–IV symptoms, left ventricular ejection fraction ≤30% and a prolonged QRS. Typically CRT is undertaken as an elective procedure on stable patients who have been medically optimised. However, CRT refines the failing heart and offers an immediate haemodynamic benefit which has the potential to help the very sick. CRT can be a challenging and prolonged procedure, which, together with the administration of contrast, can carry significant risk to the sick patient. It is therefore important that the patient is stable and euvoalaemic at the time of the procedure and has the clear potential to benefit from CRT (QRS ≥150 ms). Careful patient selection, lead positioning and optimal medical therapy are fundamental to achieving a good outcome. Outcome data will be discussed including my own experience of undertaking CRT in inotrope-dependent patients.¹

Reference

Who to consider for a left ventricular device?
Steve Shaw (Wythenshawe Hospital, Manchester)

For simplification, ventricular assist devices (VADs) can be split into short-term and long-term models. For heart failure patients, the application of each has a common goal – the attempt for the patient to stabilise and achieve future heart transplantation. It is fair to note that a proportion of patients recover whilst on mechanical circulatory support, meaning heart transplantation is not necessary. However, these patients tend to be an exception rather than a rule. For these reasons, VADs are currently funded through the activity of transplant centres and are utilised in patients who are likely to be suitable for future transplant. UK guidance on which patients are suitable for heart transplantation has been published previously.¹ All heart failure specialists managing patients in the UK should make themselves familiar with this document, and also with their closest centre.

Short-term devices (e.g. Centrimag) are utilised in very ill heart failure patients with cardiogenic shock. The goal is to salvage the patient from imminent death through restoration of adequate organ perfusion pressure. They are intended to support a patient for a short time period measured in days to weeks, and do this through an extracorporeal circuit. Long-term devices, such as the Heartmate II and the Heartware HVAD, are implantable, enabling the patient to be ambulatory, and can potentially support a patient for several years. Their goal within the current funding arrangement in the NHS is very specific. They are to bridge transplant-listed patients to a future transplant if it appears the patient is unlikely to survive the expected wait.

All VADs carry an appreciable risk of mortality and morbidity, including infection, embolic stroke and major haemorrhagic events. For this reason the benefits of a VAD must outweigh the risks, which is why they are implanted only into patients with end-stage heart failure.

Reference
Who should receive an ICD?

Derek Connelly (Golden Jubilee National Hospital, Glasgow)

Implantable cardioverter defibrillators (ICDs) are indicated in selected patients with chronic (≥3 months) left ventricular systolic dysfunction, as well as in selected patients with a history of life-threatening sustained ventricular arrhythmias and in patients with certain inherited conditions that predispose to sudden cardiac death. The place of ICDs in patients with acute heart failure is less well defined. In general, we should avoid implanting ICDs within the first 40 days post myocardial infarction, and in the presence of acutely decompensated heart failure, since (a) the implant risks may be higher in the acute setting, and (b) some patients may experience substantial recovery of left ventricular function on optimal medical therapy, so that in some cases ICDs might not be required in the longer term.

Nevertheless, there are some patients who will require ICD implantation in the setting of acute heart failure. The most unequivocal indication is in patients who present with sustained ventricular tachycardia or ventricular fibrillation, not due to a transient or reversible cause. Such patients should generally receive an ICD implant during their index hospitalisation.

Some patients may present with ‘acute heart failure’ in the setting of known chronic severe left ventricular systolic dysfunction; these patients may already be taking appropriate medical therapy, and may be candidates for ICD implantation. Furthermore, some of these patients may have clinical and electrocardiographic indications for cardiac resynchronisation therapy (CRT), and may even require CRT in the acute setting in order to stabilise their clinical status; if it is expected that CRT will improve their functional status then in many cases a CRT-defibrillator will be justified.

A much more difficult question is how to manage patients with acute heart failure who may be at significant risk of sudden cardiac death within the first 3 months, but who are not yet considered candidates for ICD therapy. These patients will require close follow up between the index hospitalisation and the 3-month review, and should be reassessed urgently if severe symptoms such as syncope develop during that time. Some investigators have used technologies such as the ‘wearable’ defibrillator as a bridge to ICD implantation, but the evidence for this approach is not yet fully established and further studies are needed to define which patients might be likely to benefit from such devices.
**Amyloid and the heart**

*Carol Whelan (Royal Free Hospital, London)*

Systemic amyloidosis is a relatively rare multi-system disease caused by the deposition of misfolded protein in various tissues and organs. It may present to almost any specialty and diagnosis is frequently delayed. Cardiac involvement is a leading cause of morbidity and mortality, especially in primary light chain (AL) amyloidosis and in both wild-type and hereditary transthyretin amyloidosis. The heart is also occasionally involved in acquired amyloid A (AA) amyloidosis and other rare hereditary types. Clinical phenotype varies greatly between different types of amyloidosis, and even the cardiac presentation has a great spectrum. The incidence of amyloidosis is uncertain, but it is thought that the most frequently diagnosed AL amyloidosis has an annual incidence of 6–10 cases per million population in the UK and USA. Wild-type transthyretin amyloid deposits, which predominantly accumulate in the heart, are very common at autopsy in the elderly, and whilst the associated clinical syndrome known as senile systemic amyloidosis (wild-type ATTR) is diagnosed rarely in life, there is increasing evidence that this disorder is much under-diagnosed, and that with increasing longevity and improved diagnostic methods it may be identified as a substantial public health problem.

Cardiac amyloidosis, irrespective of type, presents as a restrictive cardiomyopathy characterised by progressive diastolic and subsequently systolic biventricular dysfunction and arrhythmia. Key 'red flags' to possible systemic amyloidosis include nephrotic syndrome, autonomic neuropathy (postural hypotension, diarrhoea), soft tissue infiltrations (macroglossia, carpal tunnel syndrome, respiratory disease), bleeding (e.g. cutaneous such as periorbital, gastrointestinal), cachexia and genetic predisposition (family history/ethnicity). Initial presentations may be cardiac with progressive exercise intolerance and heart failure. Other organ involvement, particularly in AL amyloidosis, may cloud the cardiac presentation (nephrotic syndrome, autonomic neuropathy, pulmonary or bronchial involvement). Pulmonary oedema is not common early in the disease process, but pleural and pericardial effusions and atrial arrhythmias are often seen. Syncope is common and a poor prognostic sign. Cardiac amyloidosis remains challenging to diagnose and to treat. Key 'red-flags' that should raise suspicion include clinical features indicating multi-system disease and concentric left ventricular thickening on echocardiography in the absence of increased voltage on ECG; the pattern of gadolinium enhancement on cardiac MR (CMR) appears to be very characteristic. Confirmation of amyloid type is now possible in most cases through a combination of immunohistochemistry, DNA analysis and proteomics. Unlike other causes of heart failure, supportive treatment is mainly focused on diuretics therapy. Whilst developments in chemotherapy have greatly improved the outlook in AL amyloidosis, the prognosis of patients with advanced cardiac involvement remains very poor. Senile cardiac amyloidosis is probably greatly under-diagnosed, but CMR and DPD scintigraphy (a bone tracer that detects amyloid uptake within the heart) show great potential to address this unmet need in the ageing population. A variety of novel specific therapies are on the near horizon, with potential to both inhibit new amyloid formation and enhance the clearance of existing deposits.

**References**


**Further reading**


**Peripartum cardiomyopathy**

*Mark Petrie (Golden Jubilee National Hospital, Glasgow)*

Peripartum cardiomyopathy is heart failure occurring towards the end of pregnancy or in the months following delivery. The anticipated happy time around the birth of a new baby is shaken by this diagnosis. Dr Petrie will discuss pitfalls in diagnosis and what women and their families should be told with regard to their personal prognosis and future pregnancies. He will describe optimal pharmacological and device management. Dr Petrie will encourage the audience to enter patients into the ESC Heart Failure Association’s peripartum cardiomyopathy registry.
BIOGRAPHIES

Dr Nicholas Banner
Dr Nicholas Banner is Consultant in Cardiology, Transplant Medicine and Circulatory Support at the Royal Brompton and Harefield NHS Foundation Trust, Harefield Hospital, London, and an Honorary Senior Lecturer at Imperial College, London. His clinical and research interests are centred on the care of patients with advanced heart failure, including those who have undergone heart transplantation or mechanical circulatory support. He is a Fellow of the Royal College of Physicians of London and also of the ESC. He is a former member of the Board of Governors of the International Society for Heart and Lung Transplantation and has also been Chair of their Education Committee. He is Deputy Chair of the NHS Blood and Transplant’s Cardiothoracic Transplant Advisory Group and Chair of the CTAG Audit Committee. His is a Past President of the Cardiology Section of the Royal Society of Medicine, London, UK. His is a Member and Past Co-Chair of the European Society of Organ Transplantation’s Thoracic Committee.

Dr John Baxter
Dr John Baxter is a Consultant Geriatrician and Clinical Lead for heart failure at Sunderland Royal Hospital. He is a past Board Member of the BSH and is a Committee Member of the British Geriatric Society, Cardiovascular Section. He is a Clinical Advisor to the Heart Failure Group of the National Council for Palliative Care.

Dr Gerry Carr-White
Dr Carr-White is a Consultant Cardiologist and Clinical Lead for heart failure and inherited cardiac diseases at Guy’s and St Thomas’ NHS Foundation Trust. He is the South London Cardiac Network lead for heart failure and sits on the national clinical reference group for cardiology, advising NHS England on service specifications in heart failure and inherited cardiac diseases. His training was at St Thomas’ Hospital and the Brompton Hospital, London, where he undertook a PhD on cardiac mechanics in ventricular dysfunction. His ongoing research interests involve the accurate imaging assessment of patients with heart failure and inherited cardiac diseases.

Dr Parminder Chaggar
Parminder Chaggar graduated from the University of Sheffield Medical School in 2003 and is a Cardiology SpR in the East of England Deanery, subspecialising in heart failure and devices. Currently, he is undertaking a fellowship in advanced heart failure and devices in the North West Heart Centre, Wythenshawe Hospital, Manchester.

Professor Andrew Clark
Professor Andrew Clark is professor of clinical cardiology in the University of Hull. He was educated at Pembroke College, Cambridge, and trained in medicine at the Westminster Medical School. He trained in heart failure at the National Heart and Lung Institute and the Glasgow Western Infirmary. He has published widely on aspects of heart failure, and is co-editor of the Oxford Textbook of Heart Failure. His research interests are in exercise physiology, the possible role of oxygen therapy for heart failure and the natural history of heart failure. He is the current Chair of the BSH.

Professor John GF Cleland
Professor John Cleland qualified in medicine in 1977 at the University of Glasgow. After a period of postgraduate training and an introduction to research, he was appointed from 1986 to 1994 first as a Senior Registrar and subsequently as Senior Lecturer in Cardiology and Honorary Consultant Cardiologist at St Mary's Hospital, Paddington, and the Hammersmith Hospital, London. In 1994, Professor Cleland was awarded a Senior Research Fellowship by the British Heart Foundation to transfer to the Medical Research Council's Clinical Research Initiative in Heart Failure. Professor Cleland was appointed to the Chair of Cardiology at the University of Hull from 1999 to 2013, and at Imperial College, London from 2013 onwards.
Professor Cleland's main field of interest is in heart failure, extending from its epidemiology, detection and prevention, through the development and implementation of guidelines for the application of current knowledge, to large randomised trials to study new (and old) treatments for heart failure. Particular current interests include the role of myocardial hibernation contributing to heart failure and its treatment (including beta-blockers and revascularisation), ‘diastolic’ heart failure, vascular dysfunction, the potential deleterious effect of aspirin in heart failure, ventricular resynchronisation, telemonitoring, implantable haemodynamic monitoring devices, co-morbidities including diabetes, anaemia, atrial fibrillation and renal dysfunction, and new interventions for acute decompensated heart failure. Active programmes for the assessment of heart failure and its optimal management using cardiac impedance, magnetic resonance, computer tomography and advanced electrophysiology are also in place.

Dr Derek T Connelly
Derek Connelly qualified in medicine at the University of Glasgow in 1984. After early training in medicine and cardiology in Glasgow, he moved to the Royal Brompton Hospital, London, in 1989 for a research post in cardiac electrophysiology. He then moved to the Cardiothoracic Centre – Liverpool in 1992 as senior registrar in cardiology. He was appointed Senior Lecturer and Consultant Cardiologist there in 1997, and moved back to a consultant cardiologist post in Glasgow in 2004.
His main interests are radiofrequency ablation for cardiac arrhythmias, particularly for atrial fibrillation, and device implantation, particularly biventricular devices (cardiac resynchronisation therapy). From 2005 to 2008 he was president of Heart Rhythm UK, and he was a trustee of the Arrhythmia Alliance since its foundation in 2004 until 2012.

Dr Peter Cowburn
Dr Peter Cowburn is a Consultant Cardiologist with a specialist interest in heart failure at University Hospital Southampton. His MD thesis was undertaken in Glasgow, studying the haemodynamic effects of endothelin and endothelin receptor antagonists in patients with chronic heart failure (CHF). Following SpR training in the Wessex region, he completed an 18-month heart failure/device fellowship in Toronto, Canada, where he trained in cardiac resynchronisation therapy (CRT). He reported the first case series of inotrope-supported CRT and has an interest in the haemodynamic and renal effects of CRT. He was Deputy Chair of the BSH in 2007–9, having served as a Councillor to the Board in 2005–7. He represented the BSH as a clinical expert for the NICE CRT appraisal process in 2006–7.
At Southampton General, he helped establish a novel nurse-led inpatient heart failure service, which has led to a dramatic reduction in inpatient mortality. He has also helped set up an inpatient ultrafiltration programme, the first in the UK. He was a member of the working group who published guidelines for the referral and assessment of adults for cardiac transplantation (Heart 2011). He was one of the document reviewers for the ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012.

**Professor Martin R Cowie**

Professor Martin Cowie is Professor of Cardiology at the National Heart & Lung Institute, Imperial College, London, UK and Honorary Consultant Cardiologist at the Royal Brompton Hospital, London. A founding member and a past-chairman of the British Society for Heart Failure, Professor Cowie has also been a Board member (and Chair of the Education Committee) of the Heart Failure Association of the European Society of Cardiology (ESC). He is the Specialty Advisor for Cardiovascular Interventions to the National Institute for Health and Care Excellence (NICE), and sits on its Acute Heart Failure Guideline Development Group. He is a member of the Cardiovascular Round Table and the EU Affairs Committee of the European Society of Cardiology.

Professor Cowie’s studies and reviews have been featured in a variety of peer-reviewed journals, including The Lancet, British Medical Journal, JAMA, Circulation, European Heart Journal, Heart and the European Journal of Heart Failure. He has contributed chapters to many books, including the Oxford Textbook of Medicine, and has written a book for patients entitled ‘Living with Heart Failure – a guide for patients’.

His research interests centre on health technology assessment, remote monitoring and new diagnostic and treatment approaches for heart failure.

**Professor Henry Dargie**

Professor Henry J Dargie graduated in medicine from Glasgow University and trained in medicine and nephrology in Glasgow and clinical pharmacology and cardiology at Hammersmith Hospital in London.

He is an honorary consultant cardiologist at the Western Infirmary and an honorary senior research fellow at the University of Glasgow. Most recently he was Director of the Scottish Advanced Heart Failure Service which incorporates the national heart transplant and ventricular device services.

His clinical and research interests have included the epidemiology, imaging and clinical pharmacology of heart failure. He has led a number of large clinical trials in cardiovascular disease and serves as chairman or member of the Data Monitoring Committees of several studies in cardiovascular disease.


As Chair of the BSH he promoted the setting up of the National Audit of heart failure in the UK of which he now chairs the academic group.

He has published 330 papers on cardiovascular medicine in peer-reviewed journals.

**Dr Ceri Davies**

Dr Ceri Davies has been a Consultant Cardiologist and General Physician at Barts Health NHS Trust since 2005. After a period of research into heart failure at the Royal Brompton Hospital, his clinical training took place in NE London and Cambridge. His specialist interests are the management of heart failure and advanced non-invasive cardiac imaging (cardiac computed tomography and cardiac magnetic resonance imaging). He retains an interest in general cardiology and continues to take part in the general medical on-call rota at the Royal London Hospital.

**Professor Darrel Francis**

Darrel’s special interest is in how we as a cardiovascular research community get things completely wrong and what we can do to prevent it. He applies this interest to developing and improving methods for measurement in clinical practice and in research. Fellows in his group are forewarned of the dangers that easily entrap researchers (Pubmed 22285446, 23825524) and are encouraged to find fault with each other’s research mercilessly to encourage good experimental design in all their work.

One of their recent reports was that almost all so-called side effects of beta blockers in heart failure were not actually more common with drug than placebo, and many (including depression) were actually reduced (Pubmed 23796325).

Last year his group claimed that the reports of reliable prediction of CRT response by mechanical dysynchrony were mathematically impossible (23058073). They also pointed out that under even partially-blinded conditions, current echo protocols do not permit reproducible assessment of aortic stenosis severity (22575631), and have proposed improved methods for mitral regurgitation (22217482) which do not require cheating.

This year his group formally pointed out to the ESC (23904357) that its reassurance to cardiologists that the peri-operative beta
blockade guidelines were correct despite the discrediting of the DECREASE family of studies, may be responsible for ongoing deaths at a rate of >100,000 per year.

Unwillingly Darrel has been cast into the role of stem cell sceptic, just for pointing out claims that are obviously arithmetically impossible or factually contradictory (23830344).

His writing has been criticised as "excessively direct" and "unnecessarily bold", which he misinterprets as compliments, when seeking better care for patients. If his recent prediction (24038167) that the Symplicity 3 blinded trial of renal denervation for hypertension will be a dramatic disappointment is incorrect, today's lecture may become his last public appearance.

Professor Alan Fraser
Professor Alan Fraser is Professor of Cardiology at the Wales Heart Research Institute, Cardiff University, and Consultant Cardiologist at the University Hospital of Wales. He qualified in Edinburgh and was clinical research fellow at the Thoraxcentre in Rotterdam in the Netherlands. He is a Past-President of the European Association of Echocardiography and currently chairs the Task Force on Medical Devices of the ESC. His research interests include heart muscle disease and the pathophysiology and diagnosis of heart failure. He is a member of the FP7 MEDIA research network studying heart failure with preserved ejection fraction, and the Committee on Heart Failure with Preserved Ejection Fraction of the Heart Failure Association of the ESC.

Dr Roy Gardner
Roy Gardner is the lead Consultant Cardiologist for the Scottish National Advanced Heart Failure Service based at the Golden Jubilee National Hospital in Clydebank. He has a specialist interest in advanced heart failure, cardiac transplantation, ventricular assist devices and complex devices. He is an honorary Senior Clinical Lecturer at the University of Glasgow, and has an active research profile in heart failure and complex devices. As well as being an author/editor for two Oxford University Press books on heart failure (The Oxford Specialist Handbook of Heart Failure and The Oxford Textbook of Heart Failure), Roy is also on the ESC curriculum committee for advanced heart failure.

Dr Kevin M Goode
Dr Goode has been involved in the field of telehealth applied to heart failure for over 8 years at the University of Hull, working closely with industry. He was instrumental in Hull's first telehealth service pilot and is committed to the appropriate and effective evaluation of telehealth services across the UK. An engineer by background, with strong computational and statistical skills, he has led and contributed to research into predicting decompensated heart failure using telehealth data from the TEN-HMS and MyHeart studies. He is an interdisciplinary researcher working for the Centre for Telehealth (centrefortelehealth.org) and is an editor for the British Journal of Health Informatics and Monitoring (bjhim-online.org).

His currently leading and involved in research in the following telehealth areas:
- predictive algorithms for telehealth service improvement and evaluation
- the evaluation of telehealth services using propensity score matching
- developing a framework for telehealth device evaluation
- identification of barriers to and pitfalls of telehealth
- case-load simulation to assess the impact of new sensor technologies and alerting algorithms on the decision making of healthcare professionals.

For more information on Dr Goode's research please visit http://www2.hull.ac.uk/hsc/aboutus/staffcontactlist/kevingoode.aspx.

Professor Sian Harding
Professor Sian Harding obtained her PhD in pharmacology from King's College, London, in 1981. She became Professor of Cardiac Pharmacology at the National Heart and Lung Institute, a Division of the Imperial College Faculty of Medicine, in 2002. Her work has been funded by the BHF, the Wellcome Trust, the Medical Research Council, the Biochemical and Biophysical Research Council, the NC3Rs, Pfizer, GSK and SmithKline Beecham. Professor Harding is Past-President of the European Section of the International Society for Heart Research and has been elected Fellow of both the American Heart Association and the ESC. She is PI on the first UK gene therapy trial aimed at improving cardiac contractility, organised jointly at Harefield and Papworth Hospitals. Professor Harding has been a member of the Nuffield Council on Bioethics and of the Scientific Advisory Board of ‘Stem Cells for Safer Medicines’, and is now Director of the Imperial British Heart Foundation Cardiovascular Regenerative Medicine Centre.

Dr Suzanna Hardman
Dr Suzanna Hardman is a Consultant Cardiologist with an Interest in Community Cardiology at the Whittington Health, London, a newly integrated care organisation, where she leads the Heart Failure Services and related research, and is an Honorary Senior Lecturer at University College London. She has worked closely with the community for many years to ensure consistent high-quality care for patients with heart failure, irrespective of where they present.

Dr Hardman has represented the BSH in various contexts in the UK and Europe. A longstanding member of the BSH, she has been elected Councillor, Treasurer, Deputy Chair, Chair and is currently a Board Member as immediate Past-Chair of the Society.

She has been very involved with advanced training in heart failure from curriculum development through implementation of pan London & other heart failure training programmes, and advising the London Specialist Training Committee and Royal Society of Medicine on heart failure-related issues. She continues to work with the BCS, HFA and others on a wide range of heart failure issues.

Dr Hardman was a member of the NICE Guideline Development Group for the partial update of Chronic Heart Failure Guideline (2010) and the related Quality Standards (2011). She is also a member of the recently convened Guideline Development Group for Acute Failure. The Heart Failure Audit is an initiative which Dr Hardman is heavily committed to, currently providing support through a number of the National Audit committees, and is committed to using this data to drive change in the delivery of higher-quality heart failure care, and heart failure research. She is currently leading work on UK heart failure standards for the BSH.
**Dr Luke Howard**

Dr Luke Howard is a Consultant Respiratory Physician at the National Pulmonary Hypertension Service (London) at Hammersmith Hospital, Imperial College Healthcare NHS Trust and an honorary Clinical Senior Lecturer at Imperial College London. Hammersmith Hospital is one of the national referral centres for pulmonary hypertension and sees over 1000 patients per annum. He has a specific interest in iron physiology in pulmonary hypertension, running a BHF-funded multi-centre study of intravenous ferric carboxymaltose in iron-deficient patients with idiopathic pulmonary arterial hypertension. He also leads the clinical exercise laboratory and has an interest in how exercise can add value to cardiopulmonary haemodynamic measurements and echocardiography in the diagnostic evaluation of patients with breathlessness, as well as in understanding the pathophysiology of established disease.

**Dr Dominic Kelly**

Dominic graduated from Liverpool medical school in 2000. He also holds a first class BSc in pharmacology. After junior doctor years in Liverpool and Manchester, he worked as a BHF research fellow at the University of Leicester where he gained his MD for his work investigating the effects of matrix metalloproteinases on left ventricular function and prognosis post-myocardial infarction. He then underwent cardiology SpR training in the Wessex region. He has been a Consultant Cardiologist at Hampshire Hospitals NHS Foundation Trust since January 2013 where he has a subspeciality interest in heart failure and is the lead cardiologist for pacing and advanced cardiac devices. He was previously a trainee representative on the Board of the BSH.

**Dr Paul Kalra**

Dr Paul Kalra is a Consultant Cardiologist at Portsmouth Hospitals NHS Trust with a subspecialty interest in heart failure, including the implantation of implantable cardioverter defibrillator and cardiac resynchronisation therapy devices. He is current Deputy Chair of the BSH. He is interested in medical education and research, and has in excess of 75 peer-reviewed publications. He is UK Chief Investigator for a worldwide epidemiological study in patients with coronary artery disease (CLARIFY), which has recruited almost 35,000 subjects (nearly 2500 in the UK). He also has a clinical and academic interest in patients with cardio-renal disease. He was co-organiser of the UK’s first national Cardio-Renal Conference in 2006; this has now developed into a very successful annual meeting (now in its 8th year) with around 150 delegates.

A previous role within the BSH was as Councillor (2009–11), during which time he was programme director for the National Trainees meeting for Heart Failure 2010 and (co) 2011, and co-programme director of the BSH Annual Autumn Meeting in November 2010. He was Treasurer of the BSH from 2011 to 2013. He has ongoing responsibilities for the British Cardiovascular Society (member of the Knowledge Based Assessment Board & Standard Setting Group) and the ESC (member of the MCQ question setting and review group).

**Dr Rob Howlett**

GPsi in cardiology – 2½ days per week. BSE accredited in transthoracic echocardiography. Work closely with local heart failure teams; also work in secondary care trust and provide own community based cardiology and echo services. Particular interest in heart failure.

**Ms Dawn Lambert**

Dawn Lambert is the lead nurse for the Heart Failure Service at Portsmouth Hospitals NHS Trust.

Dawn began her career as a qualified nurse at the cardiac unit in St. Mary’s Hospital, Portsmouth, and then the coronary care unit at Chichester, where she developed a keen interest in heart failure. Continuing in cardiology, she gained a valuable understanding of the benefits of exercise working with the cardiac rehabilitation team at the Royal Haslar Hospital, Portsmouth.

In 2006 Dawn was appointed the BHF Community Heart Failure Nurse for Eastleigh and Test Valley South. This new post supported patients over a large geographical area in Southern Hampshire and had a significant impact on heart failure admissions and re-admissions. After three years in the community, ready for a new challenge, Dawn was enticed back to Portsmouth to help set up the new secondary care specialist device service for cardiac resynchronisation therapy patients and, in 2013, became the nursing lead for secondary heart failure services.

Dawn’s most recent achievements include establishing a patient support group in conjunction with the Cardiomyopathy Association. She has also recently been appointed as one of two nurses to the board of NICOR to bring a nursing perspective to the National Audit.

**Mrs Annie MacCallum**

I am the Head of Specialist Services at Gloucestershire Care Services NHS Trust. A heart failure specialist nurse with experience in acute hospital care initially and ten years in community heart failure care, I am responsible for a countywide multidisciplinary Heart Failure Service providing community echo, GPSI clinics and heart failure specialist nurse follow up for patients at all stages in their disease.

I am a champion for the role of the specialist nurse in my own organisation defining the academic requirements, the skills, decision making and participation in audit to demonstrate improved outcomes for patients in providing evidence based management. Keen to support specialist nurse education, I have helped launch and develop the programmes for the annual BSH Heart Failure Nurse Study Days. I am an Observer to the Board of the BSH and an Affiliate Board Member of the British Association for Cardiac Prevention and Rehabilitation.

**Mrs Jayne Masters**

Jaye Masters is the Nursing Lead for the Heart Failure Service at University Hospital Southampton NHS Trust.

Jaye qualified from the University Hospital of Wales in 1986 and went on to gain nursing experience in several areas before specialising in heart failure.

Jaye was appointed a BHF Community Heart Failure Nurse in the New Forest in 2005 and went on to develop a successful service that went on to be fully funded by the Primary Care Trust. In 2008 Jayne was appointed to lead a new inpatient heart failure service at Southampton General Hospital. The service, which sees heart failure patients in all areas of the hospital, has been instrumental in improving outcomes for patients admitted to the Trust with heart failure, particularly mortality.

Jaye was appointed an Observer to the Board of the BSH in 2011 and a Councillor in 2013, and is also a member of the NICE acute heart failure clinical guideline group.

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Jaye was appointed an Observer to the Board of the BSH in 2011 and a Councillor in 2013, and is also a member of the NICE acute heart failure clinical guideline group.
Professor Theresa McDonagh
Theresa McDonagh is a Consultant Cardiologist and Clinical Lead for Heart Failure at King’s College Hospital, London. After completing her medical education at the University of Edinburgh Medical School in 1987, Professor McDonagh was appointed Research Fellow in Cardiology at the Western Infirmary, Glasgow, in 1991, and the Lecturer at the CRI in Heart Failure at the University of Glasgow (Honorary Senior Registrar), in 1994. In 1999, she was appointed a Senior Lecturer (Honorary Consultant Cardiologist) at the University of Glasgow and Glasgow Royal Infirmary, running the Heart Failure Service, and the cardiologist involved in the Heart Transplant Programme. She then spent 7 years as a Consultant Cardiologist with an Interest in Heart Failure at the Royal Brompton Hospital, London, before taking on her current role.

Her research interests are in clinical heart failure, in particular the epidemiology of heart failure and left ventricular dysfunction, and the role of biomarkers in both the diagnosis and prognosis of heart failure, and in the delivery of heart failure care. She is also the Clinical Lead for the National Heart Failure Audit.

Dr Hugh F McIntyre
Oxford University and Westminster Medical School. Consultant Physician (Conquest Hospital, Hastings) and Senior Lecturer (Brighton and Sussex Medical School). Trust Lead for Heart Failure, for Complex and Intermediate Care, and Strategic Lead for Frailty.

SE AHSN Regional Lead for Acute Heart Failure and for Elderly/Frailty, SE Cardiac SCN Steering group and Member of E. Sussex Senate and Integrated Care Pioneer Bid team. Heart failure GDG member (2008–10), Chair of Heart Failure Quality Standards Group (2010–12) and Standing Chair of NICE Quality Standards Advisory Committee (2012–). Member of the NICE Multi-morbidity Project Group and Social Value Judgement Steering Groups.

Professor John McMurray
John McMurray attended Manchester University from where he graduated Bsc (Hons) in 1980 and MB ChB (Hons) in 1983. He undertook a period of postgraduate research at the University of Dundee, with award of his research MD in 1990. He subsequently trained in Edinburgh and Glasgow, and was appointed as Consultant Cardiologist in Edinburgh in 1993 before moving to Glasgow in 1995. He is now Professor of Medical Cardiology and convener for clinical research in the Institute of Cardiovascular & Medical Sciences at the University of Glasgow. He is also Lead Consultant Cardiologist at the Western Infirmary, Glasgow.

Professor McMurray served as the inaugural Eugene Braunwald Scholar in Cardiovascular Disease at the Brigham and Women Hospital, Boston, and visiting Professor of Medicine, Harvard University, Boston, Massachusetts, USA 2010/2011. He is immediate Past-President of the Heart Failure Association (HFA) of the ESC.

His primary research interests are in heart failure, coronary heart disease, atrial fibrillation and the cardiovascular consequences of diabetes and chronic kidney disease, with a focus on clinical trials, epidemiology and health services research. He also has an interest in socioeconomic determinants of health outcomes and health economics.

Professor McMurray’s main research activity is clinical trials and he is, or was, the principal investigator, member of the executive committee or steering committee member in a number of large trials in heart failure, other cardiovascular diseases, renal disease and diabetes. He has also participated in many data monitoring/safety committees. He chairs the event adjudication group at Glasgow University which has served as the endpoint committee for many trials.

He has published approximately 500 original papers, reviews and book chapters, and is the primary author or editor of thirteen books.

Professor McMurray was the lead author of the WHO and first SIGN guidelines on the management of heart failure, a member of the 2008 ESC heart failure guideline Task-Force, and Chair of the 2012 Task-Force. He was also co-chair of the KDIGO anaemia guideline committee, is a member of the 2013 ACC/AHA heart failure guideline committee and is a member of the NICE acute heart failure guideline committee. Professor McMurray was recently appointed to NICE (appraisal committee A).

He sits on the editorial board of several leading cardiovascular journals, including European Heart Journal and European Journal of Heart Failure and is also a member of the editorial board of the New England Journal of Medicine.

Dr Jim Moore
I studied medicine as an undergraduate in Edinburgh before moving to Gloucestershire to work as a GP principal.

Throughout my medical career I have maintained an interest in cardiology and cardiovascular disease, particularly those aspects that are relevant to primary care. I was closely involved in the development of the primary care-based Gloucestershire Heart Failure service, where I continue to work as a GPwSI. I represent primary care in the cardiovascular arena, both at local and regional level. I am presently an Observer on the Board of the BSH.

Dr Angus Nightingale
Dr Angus Nightingale is a Consultant Cardiologist at the Bristol Heart Institute where he leads the Heart Failure Team. He runs an advanced heart failure clinic and community diagnostic clinics and works closely with the Heart Failure Specialist Nurses (the key ingredient for excellent heart failure care). He trained in Cambridge, London, Plymouth and Bristol before doing research in Cardiff and Oxford with Professor Frenneaux looking at the role of endothelial function in muscle metabolism (discovering that high-dose vitamin C did not improve fatigue and breathlessness in heart failure patients).

After completing his cardiology training in 2003 he left the UK for a Consultant post in Adelaide, Australia, where he set up a stress echo service and continued research in heart failure and aortic valve disease. He hurriedly came back to Bristol when his children starting wanted to play cricket for Australia!

His splits his time between clinical work and research into autonomic dysfunction. He is involved in research in hypertension and heart failure, looking at novel ways to reduce sympathetic activation and augment vagal reflexes. He is currently running trials looking at modulating the chemoreflex (carotid body), vagal nerve stimulation, renal denervation and deep brain stimulation.
Professor Walter J Paulus
Professor Walter Paulus is currently Professor of Physiology in the Department of Physiology of the Institute for Cardiovascular Research (ICaR-VU) at the VU University Medical Center Amsterdam in the Netherlands. He has been Associate Director of the Cardiovascular Center, O.L.V. Hospital, Aalst, Belgium, since 1883.

After obtaining his MD (summa cum laude) from the University of Antwerp, Belgium, in 1977, he completed a period of training in internal medicine at Middelheim General Hospital, Antwerp, followed by a cardiology fellowship at the Brigham and Women's Hospital, Harvard Medical School, Boston, USA. He received his Board Certification in Cardiology in 1983 before completing a PhD in cardiovascular physiology from the University of Antwerp in 1984.

Professor Paulus is currently Chairman of the Scientific Committee of the Interdisciplinary Institute of the Netherlands, and a past-Chairman of the ESC Working Group on Myocardial Function and the Study Group on Diastolic Heart Failure, Heart Failure Association of the ESC, and a past-member of the ESC Executive Scientific Committee and the Board of the Heart Failure Association of the ESC. In 2010, he was Coordinator of the European Commission FP7 Health Large Collaborative Project on Diastolic Heart Failure (MEDIA).

He was appointed a Fellow of the ESC in 1995, an Honorary Torgny Sjostrand Lecturer at the Swedish Academy of Medicine in 2008, an Honorary Fellow of the Hungarian Society of Cardiology in 2011, and an Elite Reviewer for the Journal of the American College of Cardiology in 2011.

He has published widely and, since 2004, has been Lead Editor, together with Drs MH Crawford and JP Dimarco, of the second and third editions of Cardiology, published by Elsevier. Professor Paulus is currently a member of the Editorial Boards of Circulation, Heart Failure, European Journal of Heart Failure and Basic Research in Cardiology.

Dr Pierpaolo Pellicori
I am an Italian cardiologist currently working as a clinical research fellow in heart failure at the Academic Department of Cardiology at Hull York Medical School, under the supervision of Professor John Cleland and Professor Andrew Clark.

In the past three years I have combined both research and clinical duties. I have helped with the local organisation and conduct of a large multi-centre epidemiological research project in heart failure funded by an FP7 grant (SICA-HF) and I have also produced a substantial body of personal research which has been published in high impact, peer-reviewed journals. I have also been recognised by the ESC and the American College of Cardiology for the standard of my research. My main area of interest is novel imaging modalities in heart failure.

I am eager to pursue a career in academic clinical cardiology. Although I have finished my training and am eligible to apply for a consultant post in the UK, I feel it important to continue with my period of research at present to maximise my potential and I am grateful to all my colleagues who have supported my activities since arriving in the UK.

Dr Mark Petrie
Mark Petrie is a Consultant Cardiologist in Glasgow. He sees patients in two weekly heart failure clinics and manages patients with severe, acute heart failure in a heart failure unit. He also has an interest in cardiac and coronary intervention.

Dr Nigel Rowell
I have been a GP and clinical assistant in cardiology in Middlesbrough for 24 years and involved with commissioning for 19 years. Eight years ago I was invited to join the Board of the BSH as an Observer and have since been back as a Board Member and an Observer once more. In 2010 I was appointed as a National Clinical Advisor in Heart Failure in Primary Care to NHS Improvement.

I have been a Network Primary Care lead for the past three years. I am currently a Middlesbrough CCG Board Member and run a community assessment clinic for breathless patients with a raised BNP as part of the James Cook University Hospital heart failure team.

My main interests are BNP, ski-touring and a boat my wife knows nothing about.

Dr Dargoi Satchi
I am a heart failure cardiologist at the University Hospital of North Staffordshire. I have the pleasure of working within a fantastic department and hospital, who are proud to serve our local and wider community. I am also just as surprised as you are that I was asked to be part of this impressive event.

Dr Steve Shaw
I’m a Consultant Cardiologist at Wythenshawe Hospital in Manchester, with a subspecialty interest in advanced heart failure, mechanical circulatory support and cardiac transplantation.

Dr Ahmad Shoaib
I completed my general medical training in Allied & DHQ Hospitals Faisalabad, Pakistan. I worked as a specialist registrar at the Punjab Institute of Cardiology Lahore in 2008, a 450 dedicated cardiology bed teaching hospital. In 2009, I was part of a team who established the first heart failure clinic at the Faisalabad Institute of Cardiology in Pakistan, a newly established 350 bed tertiary care cardiology hospital, which was very successful and highly appreciated by cardiologists and patients due to its excellent and dedicated service. This was the first time I strongly felt that heart failure is a very complex condition, has very high mortality, and is most demanding branch of cardiology for future research.

Since June 2012, I have been working as a Clinical Research Fellow in the Cardiology Department of Castle Hill Hospital, Hull. I started my MD in cardiology in October 2012 at Hull York Medical School under the supervision of Professor John Cleland and Professor Andrew Clark. My main area of research is different presentations of acute heart failure patients and their consequences. I am also a Sub-Investigator of the observational study “OPERA-HF”, an Observational Study to Assess & Predict the In-Patient Course, Risk of Readmission and Mortality for patients hospitalised for or with Heart Failure.
Professor Iain Squire
Professor Iain Squire qualified from Glasgow University in 1987. He trained first at Glasgow, where he held the position of Lecturer, and then at the University of Leicester, where he was initially Lecturer then Senior Lecturer in Medicine & Therapeutics. He was awarded a personal Chair in April 2009, and is also Honorary Consultant Physician at the University Hospitals of Leicester NHS Trust.

Professor Squire has responsibility for the 19-bed coronary care unit at Glenfield Hospital, Leicester, and is one of two consultants running the outpatient heart failure service there. He is Vice Chair of the NICE Technology Appraisals Committee A.

Professor Squire has held the positions of Councillor, Treasurer and Deputy Chair on the Board of the BSH, and is currently Chair-Elect.

His research interests include: natriuretic peptides and other cardiac neuropeptides; the epidemiology of heart failure; prognostic markers in heart failure and acute coronary syndromes. Professor Squire has authored over 140 papers in peer-reviewed journals.

Dr Jackie Taylor
After studying medicine at Glasgow University, Jackie Taylor trained and accredited in general medicine and geriatric medicine, developing her interest in heart failure at this formative time of her career. She became a Lecturer in Geriatric Medicine, is a Consultant in Medicine for the Elderly at Glasgow Royal Infirmary and is acting Associate Medical Director for the speciality for NHS Greater Glasgow and Clyde (GGC).

Dr Taylor chairs the Heart Failure Sub-Group of the Cardiac Managed Clinical Network for GGC and is responsible for developing and delivering the Heart Failure Strategy. She is an Observer to the Board of the BSH and Secretary of the Cardiovascular Division of the British Geriatrics Society.

From a clinical perspective, Dr Taylor’s main interest is the development of comprehensive multi-professional services for heart failure patients and, in particular, in improving the organisation of care. She has developed a heart failure clinic and day hospital programme tailored to the needs of older patients.

Dr Martin Thomas
Dr Martin Thomas is a Consultant Cardiologist at University College Hospitals NHS Trust. He has a specialist interest in heart failure and device therapy and is clinical lead for the ultrafiltration service. He graduated from University College Cardiff with an honours degree in pharmacology and then studied medicine at the University of Southampton and qualified in 1992. He completed his MD thesis on the clinical problem of heart failure with preserved systolic function at Imperial College London. He undertook a senior fellowship in advanced heart failure and cardiac transplantation at the Royal Perth Hospital in Western Australia before taking up his current post in 2009.

Dr Carol J Whelan
Dr Carol Whelan was appointed in October 2009 as Consultant Cardiologist at the Royal Free Hospital, London, with an interest in imaging, heart failure and, in particular, cardiac amyloidosis. She was promoted to Clinical Lead for Heart Failure in 2011. She has an interest in transthoracic, transoesophageal and stress (exercise and dobutamine) echocardiography. She is actively involved in teaching and is the Clinical Lead for Cardiology for the medical student teaching programme at the Royal Free. She has been appointed an Honorary Senior Lecturer at UCL in recognition of her work as the cardiologist for the National Amyloidosis Centre at the Royal Free Hospital.

There, she supervises an MD student.

Previously, she undertook a period of organised research training with Professor John McMurray obtaining an MD degree titled “Relaxin: a new cardiovascular hormone? Comparative potency, mechanisms of action and interactions”. She has published these and other research findings and presented at national and international meetings. She has also written book chapters and reviews on secondary prevention of myocardial infarction and current management of heart failure, and has published widely on cardiac amyloidosis.

Dr Simon Williams
Simon Williams is the clinical lead for heart failure at Wythenshawe Hospital, Manchester. He specialises in all aspects of heart failure: community services, in patient multi-disciplinary work, cardiac transplant and ventricular assist device assessment, and complex pacing. Dr Williams is also an honorary senior lecturer at the University of Manchester, where he and his mates write the odd article in cardiology magazines. He is the Treasurer of the BSH and will be presenting the accounts on the Friday morning of the annual meeting with a hangover.

Dr Donah Zachariah
I graduated from Trivandrum Medical College, Kerala, India, in 2002 and commenced further training in UK in 2005. I am a Wessex Cardiology Trainee and have taken time out of clinical training for dedicated research. My area of interest is cardio renal disease and I am currently involved in several projects that aim to improve our understanding of the complex relationship between cardiovascular disease and chronic kidney disease. My abstract is based on the results of one such study.
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Boston Scientific is dedicated to transforming lives through innovative medical solutions that improve the health of patients around the world. We will push the boundaries of today’s innovation that lead to tomorrow’s medical solutions. Our heritage of discovery drives our passion for transforming lives and we are committed to helping patients live healthier, longer lives. Our Cardiac Rhythm Management (CRM) division provides solutions for treating irregular heart rhythms and heart failure, and protecting against sudden cardiac arrest.

Beyond CRM, Boston Scientific products and technologies are used to diagnose or treat a wide range of medical conditions, including heart, digestive, pulmonary, vascular, urological, women’s health, and chronic pain conditions. We continue to innovate in these areas and are extending our innovations into new geographies and markets.

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BRITISH HEART FOUNDATION (BHF)

For over 50 years the British Heart Foundation has pioneered research that’s transformed the lives of people living with heart and circulatory conditions. Our work is central to the discovery of vital treatments, improvement of patient services, and communicating vital health information to help the UK fight for every heartbeat.

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BRITISH SOCIETY FOR HEART FAILURE (BSH)
The BSH is a multi-disciplinary society and membership is open to all healthcare professionals involved with the diagnosis, management or science of heart failure.

The aims of the BSH are as follows:

- to increase knowledge and promote research about the diagnosis, causes, management and consequences of heart failure amongst healthcare professionals, with the intention of delaying or preventing the onset of heart failure and improving care for patients with heart failure
- to provide expert advice to healthcare professionals, patient or government organisations, including the National Health Service, when appropriate and as requested.

At present the BSH has 1,000 members and eight companies that are Friends of the BSH. The BSH Board consists of the following members: Professor Andrew Clark (Chair), Dr Suzanna Hardman (Past-Chair), Professor Iain Squire (Chair-Elect), Dr Paul Kalra (Deputy-Chair), Dr Simon Williams (Treasurer), Dr Roy Gardner, Mrs Jayne Masters and Professor John McMurray as Councillors.

The Observers to the Board are as follows: Mrs Amanda Crundall-Goode, Dr Ceri Davies, Mrs Annie MacCallum, Dr Jim Moore, Dr Jackie Taylor and Dr Lindsey Tilling.

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EDWARDS LIFESCIENCES
Edwards Lifesciences is the global leader in the science of heart valves and haemodynamic monitoring. Driven by a passion to help patients, the company partners with clinicians to develop innovative technologies in the areas of structural heart disease and critical care monitoring, enabling them to save and enhance lives.

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GAMBRO LUNDIA AB
Every day, Gambro's products save, sustain and improve the lives of patients worldwide through innovative products and therapies. Gambro are proud to demonstrate the Aquadex™ FlexFlow system at the 16th Annual Meeting of the British Society for Heart Failure.

This device provides a safe and effective way of removing excess salt and water from patients through ultrafiltration. The Aquadex™ portfolio can positively impact the length of hospital stay and also readmissions.

We look forward to talking to you more about Gambro and our latest innovations during the meeting.

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HEARTWARE, INC.
HeartWare is a global medical device company dedicated to delivering safe, high-performing and transformative therapies that enable patients with heart failure to get back to life. The company's innovative technologies are creating advances in the miniaturization of Ventricular Assist Devices (VADs) leading to less invasive surgical procedures and increasing the patient population who may be suitable for VAD therapy. HeartWare's breakthrough innovations begin with the HVAD® Pump, designed to be implanted next to the heart in the pericardial space avoiding the more invasive surgical procedures required with older LVAD technologies. The HVAD Pump is commercially available around the world.

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LIFE BIOMEDICAL
At Life Biomedical we focus on bringing novel and innovative life science and clinical products to the UK.

We are proud to present Critical Diagnostics’ Presage® ST2 test and Aspect-LF® point of care ST2 test. ST2 is a clinically proven cardiac biomarker for use in risk stratification of patients with heart failure.

Some vital facts and figures about ST2:

- Patients with high ST2 levels are at an increased risk of morbidity and mortality from their heart failure
- ST2 is superior to the natriuretic peptides in the risk stratification of patients with acute or chronic heart failure
- ST2 guided heart failure management can help personalise medical therapy, improve clinical outcomes and reduce hospital admissions
- The Presage® ST2 assay is FDA approved and CE marked for use in the clinical setting
- ST2 has been recommended for use in the updated 2013 ACCF/AHA Heart Failure Guidelines.

Visit our stand to find out more about how the Presage® and the Aspect-LF® ST2 tests can help you improve the management of your patients with heart failure.

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MEDTRONIC
Medtronic is the global leader in medical technology, alleviating pain, restoring health and extending life for millions of people around the world. Every three seconds, somewhere in the world, another life is improved by a Medtronic product or therapy. For more information visit www.medtronic.co.uk or follow us on Twitter @medtronicUK.

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NATIONAL INSTITUTE FOR CARDIOVASCULAR OUTCOMES RESEARCH (NICOR)
National Heart Failure Audit
The National Heart Failure Audit is managed by the National Institute for Cardiovascular Outcomes Research (NICOR) within the Institute of Cardiovascular Science at University College London. It has been developed in partnership with the British Society for Heart Failure and is commissioned by the Healthcare Quality Improvement Partnership (HQIP).

The purpose of the audit is to measure the quality of care and outcomes for patients with an unscheduled admission to hospital with heart failure, enabling comparisons between Trusts and Health Boards.

The audit measures performance against national guidelines and standards for the treatment and management of heart failure. The dataset consists of 59 core data items and has recently been updated to ensure it stays in line with contemporary NICE guidance and quality standards.

97% of NHS Trusts and Welsh Health Boards participated in the audit in 2012/13, and submitted data on 43,894 unscheduled admissions to hospital of patients with a primary diagnosis of heart failure.

The audit’s findings continue to show that access to specialist medical and nursing care is the gatekeeper to optimal care for heart failure patients, and underline the need to develop specialist in-patient services for heart failure patients. The National Heart Failure Audit has shown a reduction in both in-hospital and one-year mortality for people admitted to hospital with acute heart failure during the 2012/13 audit cycle, when compared with the same outcomes for the 2011/12 cohort.

A research group, HALO, has been established to develop research use of the data and to allow external research groups access to the data.

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NOVARTIS UK LTD
Novartis UK is the UK affiliate of Swiss-based Novartis AG – one of the largest and most widely respected healthcare companies in the world.

In the UK Novartis employs over 3,000 people across eight sites, including Novartis UK headquarters in Frimley, Surrey. These sites are responsible for research, development, sales, marketing and manufacturing of products used in the UK and worldwide.

Our portfolio focuses on healthcare sectors that are growing rapidly, reward innovation, and enhance the lives of patients. Our strategy is to provide healthcare solutions that address the evolving needs of patients and societies worldwide.

Novartis is one of the global healthcare industry’s biggest investors in research and development (R&D).

- Novartis UK invests £1.5 million per week on research and development.
- By 2016 Novartis will undertake more clinical trials in the UK than any other company.
- The Novartis worldwide headquarters for respiratory research, based at Horsham, West Sussex, is a £42 million purpose built facility. The largest dedicated respiratory centre in Europe, it spends £20 million per year on R&D.
- Novartis UK was awarded Best Clinical Research Company in the Pharma Times, UK Clinical Research Awards 2011.

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PFIZER LTD
About the Bristol-Myers Squibb/Pfizer Collaboration
In 2007, Bristol-Myers Squibb and Pfizer entered into a worldwide collaboration to develop and commercialise, an oral anticoagulant discovered by Bristol-Myers Squibb. This global alliance combines Bristol-Myers Squibb’s long-standing strengths in cardiovascular drug development and commercialisation with Pfizer’s global scale and expertise in this field.

About Bristol-Myers Squibb
Bristol-Myers Squibb is a global biopharmaceutical company whose mission is to discover, develop and deliver innovative medicines that help patients prevail over serious diseases.

Pfizer: Working Together for a Healthier World™
At Pfizer, we apply science and our global resources to improve health and well-being at every stage of life. We strive to set the standard for quality, safety and value in the discovery, development and manufacturing of medicines. Our diversified global health care portfolio includes medicines and vaccines, as well as many of the world’s best-known consumer healthcare products. Every day, Pfizer colleagues work to advance wellness, prevention, treatments and cures that challenge the most feared diseases of our time. Consistent with our responsibility as one of the world’s premier innovative biopharmaceutical companies, we also collaborate with health care providers, governments and local communities to support and expand access to reliable, affordable health care around the world. For more than 150 years, Pfizer has worked to make a difference for all who rely on us. In the UK, Pfizer has its business headquarters in Surrey and is a
major supplier of medicines to the NHS. To learn more about our commitments, please visit us at www.pfizer.co.uk.

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**RESMED (UK) LTD**

ResMed are the sponsors of the Serve-HF multi-centre international study of the use of the adaptive servo-ventilation PaceWave algorithm for the treatment of heart failure and its impact on mortality and morbidity. Recruitment has now closed at over 1300 patients and we have entered the follow up phase with results expect in approximately the next two years. We partner with a number of clinical groups within the NHS and are a leading developer and provider of cutting-edge technology for the identification, diagnosis and treatment of sleep disordered breathing and respiratory insufficiency in different patient populations.

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**SERVIER LABORATORIES LTD**

Servier Laboratories is the UK subsidiary of The Servier Research Group, a French research based pharmaceutical company established in 1954 by Dr Jacques Servier. Created in 1963 with only two people, the UK subsidiary was the first subsidiary outside France. In just over fifty years, The Servier Research Group has developed in stature from a small family-owned, provincial pharmacy employing nine people to a multinational operation, established in 140 countries and with over 20,000 employees worldwide.

Servier is now an independent foundation. Unlike many other pharmaceutical companies Servier is not registered on any stock market and therefore is not beholden to shareholders.

Servier is dedicated to the development of truly innovative drugs and reinvesting as much as 25% of turnover in Research & Development.

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**SUNSHINE HEART**

The C-Pulse Heart Assist System is an extra-aortic balloon pump using counter-pulsation technology to treat moderate to severe heart failure (Class III/IVa). It is placed outside the bloodstream, the patient has the ability to disconnect from the system, and can be performed minimally invasively. It is designed to improve heart function by increasing coronary blood flow, decreasing afterload and increasing cardiac function. C-Pulse’s goal is to halt the progression of heart failure. The FDA feasibility clinical study results showed promising results with the reduction of HF classification in the majority of patients. A post-CE Mark study is underway in Europe.

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**THORATEC**

Thoratec is the world leader in mechanical circulatory support with the broadest product portfolio to treat the full range of clinical needs for patients suffering from advanced heart failure. The company’s products include the HeartMate LVAS and Thoratec VAD, with more than 20,000 devices implanted in patients suffering from heart failure. Thoratec also manufactures and markets the CentriMag and PediMag / PediVAS product lines. Thoratec is headquartered in Pleasanton, California. For more information, visit www.thoratec.com.

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Wisepress are Europe’s principal conference bookseller. We exhibit the leading books, sample journals and digital content relevant to this meeting. Books may be purchased at the booth, and we offer a postal service. Visit our online bookshop for special offers and follow us on Twitter for the latest news @WisepressBooks.

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Advance notice

6th BSH Heart Failure Day for Training and Revalidation

20 March 2014, Beardmore Hotel & Conference Centre, Glasgow

This training day programme has been designed by Dr Roy Gardner, Dr Colette Jackson and Dr Simon Williams to meet the educational needs of the heart failure component of the core curriculum in cardiovascular medicine, as well as the needs for advanced training in heart failure. It will provide an in-depth discussion around particularly challenging and often controversial management issues that will be relevant to trainees in internal medicine, care of the elderly specialists and GPs with a special interest in heart failure. The day has been structured to provide a balance of carefully selected talks and interactive case based sessions.

4th BSH Heart Failure Nurse Study Day

21 March 2014, Beardmore Hotel & Conference Centre, Glasgow

This is the fourth year we will be holding this study day. It is designed to educate and interest heart failure nurses and will be of interest to nurses, both early in their role and those with more experience. The day aims to provide evidence-based knowledge from leading UK specialists in heart failure management, and in-depth discussion of particularly challenging and controversial management issues facing nurses caring for patients with heart failure.

European Heart Failure Awareness Day

9 May 2014

This is a Europe-wide day to raise the awareness of heart failure. The initiative is led by the European Society of Cardiology (ESC)/Heart Failure Association (HFA) and is supported by the BSH. More details will be available shortly and we would be pleased to hear of the activities you might be planning locally.

British Cardiovascular Society Annual Conference

2–4 June 2014, Manchester Central, Manchester

The BSH will be involved with heart failure-related sessions at the conference.

17th BSH Annual Autumn Meeting 2014

27–28 November 2014, Queen Elizabeth II Conference Centre, London

For more information about the above events please visit the BSH desks in the exhibition area or www.bsh.org.uk
Queen Elizabeth II Conference Centre, London
Benjamin Britten Lounge
16th BSH Annual Autumn Meeting, 28–29 November 2013
Exhibition Plan

Healthcare professionals and company staff only are allowed inside the exhibition area outlined with a dotted line.
And also in chronic heart failure (NYHA II)

Add Inspira

Lifesaving

Add life (NYHA II)

Add life

Preferential information for patients with post-MI heart failure (LVEF ≤40%) or chronic heart failure (NYHA II, LVEF ≤30%)

www.inspra.co.uk

References:

Date of preparation: November 2013 867249

Preferential information for patients with post-MI heart failure (LVEF ≤40%) or chronic heart failure (NYHA II, LVEF ≤30%)