The Methodology and Rationale for the Northern Ireland Public Access Defibrillation (NIPAD) Trial

56th Annual General Meeting of the Irish Cardiac Society

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Friday, 7th October 2005
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8.30 Registration
8.50 Welcome
Dr. Peter Crean, President

Session 1: Heart Failure/Imaging (9.00–10.30)
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Dr. Mark Harbinson

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For: Dr. Ken McDonald
Against: Dr. Gary McVeigh

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Heart Failure Unit, St Vincent’s University Hospital, Dublin

2 Impact of heart failure aetiology on response to cardiac resynchronisation therapy beyond two years
Gordon BJ, Lockhart C, Chew EW
Cardiology Unit, Belfast City Hospital, Lisburn Road, Belfast

3 Cardiac CT (16MDCT): A new gold standard for the detection of coronary artery anomalies
Donnelly PM¹, Higginson JDS¹, Hanley PD², McMechan S¹, Cochrane D¹
¹Cardiology and ²Radiology Depts Ulster Hospital Belfast

4 Aortic regurgitation - quantification by real-time 3D echocardiography
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Dept of Cardiology, King’s College Hospital, London

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Heart Failure Unit, St Vincent’s University Hospital, Dublin

6 Primary care direct access to a hospital based heart failure disease management program is associated with reduced hospitalisation: 3-year follow up of 534 patients
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7 Flexibility in response to clinical deterioration is an important facet of a hospital based heart failure clinic
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Heart Failure Unit, St Vincent’s University Hospital, Dublin

8 Diastolic and Systolic Heart failure patients derive similar benefit from a hospital based disease management program: 3 year follow up of 438 patients
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Heart Failure Unit, St Vincent’s University Hospital, Dublin

9 Clinical evidence of ACE/Aspirin interaction in patients admitted for NYHA Class IV heart failure: 12-month follow-up of 401 patients
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Heart Failure Unit, St Vincent’s University Hospital, Dublin

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Heart Failure Unit, St Vincent’s University Hospital, Dublin

11 Cardiac CT (16MDCT): A New technique for the assessment of coronary artery bypass grafts
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¹Cardiology and ²Radiology Depts Ulster Hospital Belfast

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University College Hospital Galway

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Beaumont Cardiology & RCSI, Dublin

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Dept of Paediatric Cardiology, Royal Belfast Hospital for Sick Children, Belfast,
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Heart Failure Unit, St Vincents University Hospital, Dublin

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Nenagh Hospital, Nenagh, Co. Tipperary

34 The estimation of NT-pro-BNP levels by a pocket-sized ECG interpretation prototype – a pilot study
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Nenagh Hospital, Nenagh, Co. Tipperary

35 Angina in an 8 year old girl
‘Grant B,’ Wilson C,’ Gladstone DG,’ ‘Rooney M, Casey FA
‘Depts of Paediatric Cardiology, Cardi-thoracic Surgery, and Cardiology, Royal Group of Hospitals, Belfast
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Dept of Cardiac Surgery, CREST, St James’s Hospital, Dublin 8

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Dept of Surgery, The Royal College of Surgeons in Ireland

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University of Glasgow, Glasgow, United Kingdom; ‘ISD, Edinburgh, United Kingdom; ‘University of Liverpool, Liverpool, United Kingdom

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Dept of Cardiology, Beaumont Hospital, Beaumont Rd, “Dept of Clinical Medicine, Trinity College, Dublin

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Dept of Cardiology, Birmingham Heartlands and Solihull Hospital NHS Trust, Bordesley Green East Birmingham UK B9 5SS

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Regional Medical Cardiology Centre, Royal Victoria Hospital, Belfast and Queen’s University of Belfast, UK

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University College Hospital Galway

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Chairman
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Heart Failure Unit, St Vincents University Hospital, and Conway Institute, University College Dublin, Dublin

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Abulhul E, Spiers P, O’Loughlin C, Ledwidge M, McDonald K
Heart Failure Unit, St Vincent’s Hospital and St James Hospital, Dublin

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Division of Cardiology, Cardiac Catheterization Laboratory, University of North Carolina at Chapel Hill, NC, USA

51 Predictive value of 16-Multidetector Computed Tomography (MDCT) for the detection of obstructive coronary disease

Donnelly PM, Higgins JDS, Hanley PD, McMechan S, Cochrane D, Workman A
Cardiology and Radiology Depts Ulster Hospital Belfast ‘N’ Regional Medical Physics Agency

17.15-18.00 ANNUAL GENERAL MEETING

18.00 Stokes Lecture: Mesenchymal stem cells: prospects for cardiac regeneration
Prof. Tim O’Brien

19.00 Reception

20.00 Annual Dinner

Saturday, 8th October 2005
Great Southern Hotel, Killarney, Co. Kerry

Session 5: Percutaneous Coronary Intervention/ Acute Coronary Syndrome (9.00-10.30)

Chairman
Dr Peter Kearney

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For: Prof. David Foley
Against: Dr. Colm Hanratty

9.30-10.30 Oral Presentations

52 Long term follow-up after Sirolimus Eluting Stent (SES) implantation in real world practice

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53 Rapid, safe and effective management of acute chest pain in a dedicated chest pain assessment unit at St James’s Hospital, Dublin

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St. James’s Hospital, Dublin 8

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Royal Victoria Hospital and Craigavon Area Hospital

55 The hospital burden of suspected acute coronary syndromes: recent trends

Murphy NF, MacIntyre K, Chalmers, Capewell JS, McMurray JJV
University of Glasgow; Information and Statistics Division, Edinburgh; University of Liverpool

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Heart Failure Unit, St Vincent’s University Hospital, Dublin

57 A nurse-led heart failure service can reduce hospital admissions and optimise evidence-based pharmacological management
Mulholland P, Hutchinson G, Chew EW
Heart Failure Service, Regional Cardiology Centre, Belfast City Hospital Trust

58 Predictors of excess mortality post myocardial infarction in females
Neill J, Owens C G, Adgey AAJ
Royal Victoria Hospital Belfast

59 Trends in Myocardial Infarction
Kumar M, Sharif M, Khan MSH, Harbinson MT, Trouton TG, Mathew T
Antrim Area Hospital, N. Ireland

60 The influence of age on presentation, management and long term follow up of acute myocardial infarction. A prospective consecutive case study over 12 years
Quillinan N, O'Rourke K, Cheuk Chi Fan, Sullivan P
Mallow General Hospital, Mallow Co. Cork

61 Safety of percutaneous coronary intervention carried out as an out-patient procedure
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62 Effect of anticoagulation therapy on intra-aortic balloon pump complications and outcomes in CAGB and PCI patients
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63 Are patients post-PCI safe to transfer?
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64 Implantation of drug-eluting stents in diabetic patients: a comparative analysis
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65 A comparison of sirolimus-eluting stents and paclitaxel-eluting stents in different lesions in the same patient
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66 Teleophysiologic device intervention in heart failure: actual need for CRT and AICD in a community heart failure population
O’Hanlon R, Lange S, O’Loughlin C, Ledwidge M, McDonald K
Heart Failure Unit, St Vincent’s University Hospital, Dublin

67 Cardiology Audit and Registration Data Standards (CARDS) Electrophysiology Project - European initiative to develop data standards for cardiac electrophysiology
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68 Survival of patients with out of hospital cardiac arrest who had rapid defibrillation with an automatic external defibrillator compared to those who received late or no defibrillation
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70 Identifying Cardiac Risk Factors in volunteers attending community screening programmes in Western Regional Health Authority
Kelly P, Babiker A, Johnson N, Gibson J, Nash P, Crowley J, Daly K
University College Hospital Galway

71 Homocysteine, Apolipoprotein B/AI ratio and the Metabolic Syndrome are predictors of cardiovascular risk using the SCORE system: The European Concerted Action Project
Leong T, Fitzgerald A, McGorrian C, Graham I
On Behalf of the European COMAC Group

Session 6: Electrophysiology (11.00-12.30)

Chairman
Dr Gerry Fahy

11.00-11.30
Debate: All WPW pathways should be ablated
For: Dr Richard Sheahan
Against: Dr Michael Roberts
Fluid restriction in the management of decompensated heart failure: Influence of admission serum sodium

**Background**

Preliminary data previously presented from our unit indicated that fluid restriction did not improve the management of patients hospitalised with decompensated heart failure (DHF). However, it remains unknown whether benefit can be seen in the subgroup of patients presenting with low serum sodium.

**Aim**

The purpose of this analysis is to ascertain whether serum sodium influences response to this intervention.

**Methods**

This is a prospective randomised study where patients admitted with Class IV heart failure are assigned to either fluid restriction (FR) or free fluid (FF) within 24 hours of admission. Patients in both groups monitor and record their fluid intake on a daily basis with assistance form a heart failure nurse specialist. Patients in fluid restriction (FR) arm are limited to one litre of fluid in a 24 hour period. Compliance with fluid intake is measured on daily basis. The primary end-point is time to clinical stability (CS) defined as stable dry weight, off intravenous therapy for DHF for at least two days, on to clinical stability (CS) defined as stable dry weight, off intravenous therapy for DHF for at least two days, on to clinical stability (CS) defined as stable dry weight. The primary end-point is time to CS defined as stable dry weight, off intravenous therapy for DHF for at least two days, on to clinical stability (CS) defined as stable dry weight. Time to discontinuation of intravenous therapy (TIV) is a pre-specified secondary end-point. Both time points are assessed by heart failure cardiologist blinded to the patient intervention.

**Results**

In this ongoing study, 63 patients have been randomised to fluid restriction (age 75.4 ± 10.1 yrs, male 41.8%, ischaemic 75.9%) and 30 patients to free fluid (age 73.4 ± 12.9, male 51.7%, ischaemic 53.6%). In the FR arm daily compliance was 88 ± 12%. There was a significant difference in average daily fluid intake between the groups (FR: 1.04 ± 1.34 mL/kg, FF: 1.45 ± 1.34 mL/kg, p= 0.001). There was no significant difference in time to CS between groups (FF: 6.2 ± 7.3 days vs. FR: 5.5 ± 2.2 days, P=NS) or in TIV (FF: 3.0 ± 5.9 days vs. FR: 2.6 ± 4.6 days, p=NS). There was no significant difference in serum sodium levels between groups at baseline or on reaching clinical stability. Preliminary data previously presented from our unit indicated that fluid restriction did not improve the management of patients hospitalised with decompensated heart failure (DHF). However, it remains unknown whether benefit can be seen in the subgroup of patients presenting with low serum sodium.

**Conclusion**

These data demonstrate that fluid restriction does not influence time to CS in patients admitted with DHF. Furthermore, there is no influence of admission serum sodium on the clinical impact of fluid restriction. Because of lack of evidence of benefit and difficulty in compliance for patients, fluid restriction should not be a routine strategy in the management of this patient population.

Impact of heart failure aetiology on response to cardiac resynchronisation therapy beyond two years

**Aim**

Aetiology of heart failure does not seem to affect clinical response or survival up to two years after cardiac resynchronisation therapy (CRT). Our aim was to determine if this applies beyond two years of CRT.

**Methods**

All patients who had CRT at our centre before January 2005 were included (n=61). Data on aetiology, mortality, symptoms and hospitalisations was determined by chart review, patient interview and General Practitioner contact. Heart failure was classified as ischaemic (ICM) or idiopathic dilated (DDM).

**Results**

Thirty-eight had ICM (34 male/4 female, mean age 63.9) and 23 had DCM (22 male/1 female, mean age 66.6). Mean time from implant was 38.9 months in the ICM group and 57.2 months in the DCM group. Significantly more patients died in the ICM group (17/38 vs 5/23, p=0.005). Mean time to death was 21.8 months in the ICM group and 18.8 months in the DCM group. Both groups showed significant overall improvements in functional class but there were more hospitalisation episodes for heart failure after implant in the ICM group.

**Conclusion**

Clinical benefits of CRT extend beyond 2 years. The presence of ischaemic heart disease is an important determinant of long term survival. This may have implications for patient selection.
3 Cardiac CT(16MDCT). A new gold standard for the detection of coronary artery anomalies

Background
Coronary artery anomalies are traditionally discovered coincidentally at invasive coronary angiography or at post-mortem. Many anomalies are thought to be benign but there are those that are strongly associated with sudden cardiac death and myocardial infarction. Cross-sectional imaging techniques such as MRI/MDCT facilitate accurate visualisation of coronary artery anatomy and the relationship to adjacent non-coronary structures.

Method
We retrospectively reviewed 218 selected patients who underwent multidetector computed tomography (MDCT) coronary angiography from Aug 2003-Mar 2005. Coronary artery origin and course were defined using 3D volume rendered and planar reconstruction techniques. Comparison was made with conventional catheter angiography.

Results
MDCT images were unequivocal in defining coronary artery origin and course. The incidence of coronary artery anomalies in this series was 0.9%. Interestingly both cases were malignant left main stem anomalies. One of these was directly attributed as the cause for chest pain and resulted in surgical intervention. Invasive catheter angiography results were ambiguous, and often the course of the anomalous artery could not be accurately defined. We will also review our experience in patients with anomalies referred to us from Antrim, Craigavon, and Altnagelvin Area Hospitals, many of which were found to be benign but one, another malignant left main stem resulted in surgical intervention.

Conclusions
16MDCT is a fast, accessible, non-invasive imaging technique that is highly sensitive in determining the origin and course of coronary artery anomalies. With 19% of sudden cardiac deaths in athletes attributed to coronary anomalies, we recommend that MDCT be considered the screening investigation of choice in this sub-group.

4 Aortic Regurgitation - Quantification by Real-time 3D Echocardiography

Background
Current 2D echocardiographic methods of aortic regurgitation (AR) quantification yield variable results, being subject to geometric assumptions and haemodynamic factors. Having previously validated flow quantification using real-time 3D colour Doppler, we assessed its applicability to AR quantification.

Methods
24 consecutive, unselected patients with AR of varying severity underwent 2D and 3D colour Doppler imaging at the level of the aortic valve, and left ventricular inflow and outflow tracts. 3D echocardiographic qualitative grading of AR severity was done on a 4-point scale by an experienced observer and quantified using jet height/left ventricular inflow tract (LVOT) height ratio and pressure half-time measurements. 3D datasets were acquired from the apical window and viewed with mip-map rendering to allow qualitative assessment of the regurgitant jets without tissue cropping. 3D colour Doppler flow quantification of AR, expressed as the regurgitant fraction derived from LVOT and mitral stroke volumes, was performed offline using dedicated software.

Results
Adequate 2D and 3D colour Doppler images were obtained from all patients. Correlation between 2D and 3D imaging qualitative assessment of AR severity was good (weighted kappa = 0.64). Aortic regurgitation quantification was also well correlated between the two methods (r = 0.7, p = 0.0003), although eccentric jets tended to be underestimated by 2D analysis.

Conclusion
3D colour Doppler provides a simple, objective quantification of aortic regurgitation, particularly in the presence of eccentrically directed jets, which are not easily amenable to 2D analysis.

5 Defining a new outlook for survivors of class IV heart failure admission three-year follow-up of 477 patients managed in a hospital based disease management program

Background
Historically the outlook for survivors of class IV heart failure admission was poor. We previously reported on the short term reduction in emergency admissions in this population within a hospital based heart failure (HF) disease management programme (DMP). However, there are few data on the long term morbidity and mortality of patients managed in such programmes.

Methods
Since the initiation of our programme, patients surviving admission with NYHA class IV HF have been followed in a multidisciplinary hospital-based DMP. To help maintain clinical stability, patients attending for follow up at 2, 6, 12, 26 and 52 weeks following discharge and annually thereafter, in addition, patients receive weekly phone calls throughout the first 3 months on non-clinic weeks and are instructed to contact the clinic for weight gain or symptomatic deterioration at any stage during follow up. We report on mortality, HF hospitalisations, emergency non-HF hospitalisation and unscheduled visits to the HF unit for management of developing clinical deterioration.

Results
477 age 69±11.9 years, 64.8% male, 83.2% systolic dysfunction, 67.9% ischaemic, 25.6% diabetics, 24% chronic obstructive lung disease) managed in the DMP have been followed for a mean of 177 months (range 1 to 712 months). Kaplan Meier survival probabilities at 1, 2 and 3 years are presented in the Table.

6 Primary care direct access to a hospital based heart failure disease management program is associated with reduced hospitalisation three-year follow up of 524 patients

Background
It has been shown that a 3 month, multidisciplinary, hospital based disease management programme (DMP), comprising of intensive patient education, close clinical follow-up in addition to optimal medical care, can significantly reduce short term emergency hospitalisations. Although extension of this intensive programme from 3 to 6 months has been shown to provide no clinical benefit on longer term follow up, ongoing primary care direct access (PCDA) to the heart failure (HF) service may be critical in reducing longer term morbidity.

Aim
To examine if a PCDA facility reduces the incidence of hospitalisations in a HF DMP.

Methods
For patients surviving admission with NYHA class IV HF our DMP consisted of intensive in-hospital education followed by scheduled clinic visits at 2, 6 and 12 weeks and weekly phone calls throughout the first 3 months on non-clinic weeks. Subsequently, patients were reviewed annually at the clinic. Patients and family doctors were advised to contact the clinic directly in the event of suspected early clinical deterioration (PCDA). We evaluated mortality, emergency HF Hospitalisations, emergency non-HF hospitalisations and episodes of PCDA in 477 patients who were enrolled onto the intensive DMP over the
Flexibility in response to clinical deterioration is an important facet of a hospital based heart failure clinic

Background
Disease management programs (DMP) are effective in reducing morbidity associated with heart failure. Compared to other formats a hospital based program has the advantage of facilitating immediate response to early clinical deterioration (CD) in a setting that provides medical assessment and flexibility in therapeutic interventions; minimizing use of other services such as the emergency room (ER). Our heart failure unit (HFU) encourages patient / carer / general practitioner contact by telephone (Unscheduled Contact: UC) with features of CD. Such contact is triaged by the Clinical Nurse Specialist who decides whether the patient needs to be seen that day at the HFU (Unscheduled Visit: UV).

Aim
This report describes the appropriateness of UC (HF related or not), the outcome of UC and the impact of subsequent UV on the workload of a HFU.

Methods
Case records from the HFU for 2000 were reviewed. All UC by telephone was analysed and defined as CD. UC were noted if the contact was made 2 hours after hours. UC were referred to the HFU for clinical review, 6% referred to the GP and 5% to the ER. UVs represented 20% of patient contact in the HFU in 2000 (600 out of 3000 total contacts). 80% of UC demonstrated evidence of CD confirmed by physician examination, with 95% of such episodes resolving at out patient level requiring 2 visits per patient. In 8% of cases, patients required an increase in oral diuretic, in 10% the administration of intravenous diuretic and in 1% the administration of intravenous inotrope.

Conclusion
UC, the result of patient / carer / GP education, is appropriate in the majority of cases and often reflects CD. Clinical management of CD is effective in minimizing hospitalisation and the use of other facilities such as the ER. These data underline the inherent flexibility of a hospital-based HFU in the triage of emerging clinical deterioration.

Fernando K, O’Loughlin C, Ledwidge M, McDonald K
Heart Failure Unit, St Vincent’s University Hospital, Dublin

Diastolic and Systolic Heart failure patients derive similar benefit from a hospital based disease management program three-year follow up of 438 patients

Background
Disease management programmes (DMP) have been repeatedly shown to reduce morbidity and mortality in heart failure (HF). However, many reported programmes have excluded HF patients with preserved systolic function (PSF) heart failure.

Aim
This report compares the long term outcomes of HF patients with PSF and reduced systolic dysfunction (SDF) enrolled into our hospital-based DMP.

Methods
Patients surviving admission with NYHA class IV HF enrolled in a multidisciplinary hospital based DMP were followed up in the clinic 2, 6 and 12 weeks following discharge and are reviewed at least annually thereafter. In addition patients receive weekly phone calls throughout the first 3 months on non-clinic weeks and are instructed to contact the clinic for weight gain or symptomatic deterioration at any stage during follow up. We report on mortality, HF hospitalisations, emergency non-HF hospitalisation and emergency unscheduled visits without hospitalisation (UV) to the HF service for management of clinical deterioration (LD).

Conclusion
These data highlight similar long term morbidity and mortality outcome in patients PSF and SDF. The hospitalisation rate and high use of unscheduled emergency visits among patients with PSF HF underlines the need for this group to be included in DMP for HF.

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Clinical evidence of ACE/Aspirin interaction in patients admitted for NYHA Class IV heart failure 12-month follow-up of 401 patients

Background
The majority of heart failure (HF) patients have ischemic heart disease (IHD) and are frequently treated with anti-platelet therapy such as aspirin. However, concern has recently been expressed about a possible negative clinical impact of aspirin in patients with HF. One putative mechanism for such an impact is the attenuation of clinical benefit derived from ACE inhibition.

Aim
This retrospective report evaluates the clinical impact of ACE inhibitor /ARB therapy where indicated. All patients were followed up in the HF clinic at 2, 6, 12 and 52 weeks following discharge. We report on mortality, emergency hospitalisations and unscheduled visits not requiring hospitalisation (UV) to the HF service for management of clinical deterioration in patients discharged on ACE inhibitors alone (ACE) versus those discharged on ACE inhibitor and Aspirin (ASP).

Results
The ACE and ASP groups consisted of 155 patients and 246 patients respectively. The average aspirin dosage was 86 mg ± 12 mg. The ACE group was younger (66.8 ± 12.0 years vs. 70.0 ± 12.2 p<0.01), had a lower ejection fraction (EF) (39.6% ± 12.1% versus 45.3% ± 12.0%, p=0.009) and had a lower proportion of patients with ischemic heart disease (IHD) (75.1% versus 52.1%, p=0.001). In addition, the ACE

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Coronary artery bypass grafts are usually the best suitability to proceed to the next dose. Following undergoing routine BB titration in the setting of a period of two hours to record symptomatic haemodynamic changes (HC: Heart rate remaining >50bpm and/or systolic BP<90mmHg after 2 hours). These data strongly suggest that patient observation following dose escalation of Beta-blocker Therapy is not necessary. The practice of two-hour observation following dose escalation of Beta-blocker Therapy is not necessary. The practice of two-hour observation following dose escalation of Beta-blocker Therapy is not necessary.

**Background**

Beta-blockers (BBs) are of proven benefit in heart failure (HF). While multifactorial, the complexity of the recommended titration process likely contributes to their underutilisation. The major endpoint of death and/or all cause emergency hospitalisation (p=0.120), HF admission (p=0.64) and the combined endpoint (death, hospitalisations) for age, EF and IHD did not provide any significant difference between the two groups, there was a trend to higher event rates in the ASC group (p=0.070).

**Conclusion**

The practice of two-hour observation following dose escalation of Beta-blocker Therapy is not necessary.

**Assessment of the feasibility of using hand-held echocardiography with contrast for emergency requests in the ITU or CCU setting**

**Background**

The advent of hand-held echocardiography devices (lap-top sized) has allowed for rapid assessment of cardiac structure and function at the bedside, on patients in ICU/CCU who are critically unwell. This avoids the logistic difficulties of moving cumbersome standard echo machines to the bedside. Current modern handheld ultrasound systems have capabilities similar to the more traditional large standard echo machines to the bedside. Current modern handheld ultrasound systems have capabilities similar to the more traditional large standard echo machines to the bedside. Current modern handheld ultrasound systems have capabilities similar to the more traditional large standard echo machines to the bedside. Current modern handheld ultrasound systems have capabilities similar to the more traditional large standard echo machines to the bedside. Current modern handheld ultrasound systems have capabilities similar to the more traditional large standard echo machines to the bedside.

**Methods**

Over a month period there were 52 requests for urgent echocardiography. 4 (65%) of these were from ITU or CCU setting. 0 (58%) of who were mechanically ventilated. 36 (69%) of the requests were made between 17:00 and 09:00. Mean BMI of the patients was 29.2kg/m2 and in 28 (53%) the indication was to assess LV and RV function. 10 (19%) requests were for assessment of potential cardiac sources of embolism. Contrast was used in 28 (54%) and the examination was satisfactory to answer the specific clinical question in 43 (85%). All studies were performed on the same day as the request was made.

**Conclusions**

Hand-held echocardiography with adjuvant contrast is feasible for the rapid bedside evaluation of cardiac function in critically unwell patients in the ITU/CCU setting.

**Cardiac CT (16MDCT). A new technique for the assessment of coronary artery bypass grafts**

**Background**

Coronary artery bypass grafts are usually the best treatment for patients with multi-vessel or left main stem obstructive coronary disease. However with occlusion rates for vein grafts of 12-20% in the first year, and 4% per year after 4 years, cardiologists understandably suspect graft disease/occlusion should patients present with further chest pain. At present, invasive catheter angiography is considered the investigation of choice. 16 multidetector computed tomography (16MDCT) is a fast non-invasive imaging technique which may facilitate accurate non-invasive assessment of coronary artery bypass grafts (CABG). Non-invasive 16MDCT coronary angiography can accurately detect bypass graft disease. This pilot study suggests a future role for this technique in the assessment of graft patency, thereby avoiding the need for a technically demanding and invasive catheter angiogram.

**Results**

Five patients were assessed (4 male and 1 female). Mean heart rate 62bpm (53-67) on beta blockade. Mean breath-hold 28s. All saphenous vein grafts (SVG) could be assessed accurately. One was totally occluded and two had significant disease. One LIMA graft was falsely identified as diseased. Coincidently one patient with normal bypass grafts was found on MDCT to have a large pulmonary embolus as a cause for their chest pain and troponin T rise. There were no peri-procedural complications.

**Conclusions**

Hand-held echocardiography with adjuvant contrast is feasible for the rapid bedside evaluation of cardiac function in critically unwell patients in the ITU/CCU setting.

**Coronary artery bypass grafts (CABG).**

As part of a pilot study five patients with previous CABG surgery presenting with chest pain were assessed using both 16MDCT coronary angiography and invasive catheter angiography. MDCT was carried out prior to the conventional angiogram which was subsequently performed by investigators blinded to the results of the MDCT scan. Written informed consent was obtained from all participants for both procedures.

**Background**

Invasive coronary angiography remains the gold standard for the investigation of choice. 16 multidetector computed tomography (16MDCT) is a fast non-invasive imaging technique which may facilitate accurate non-invasive assessment of coronary artery bypass grafts (CABG). While multifactorial, the complexity of the recommended titration process likely contributes to their underutilisation. The major endpoint of death and/or all cause emergency hospitalisation (p=0.120), HF admission (p=0.64) and the combined endpoint (death, hospitalisations) for age, EF and IHD did not provide any significant difference between the two groups, there was a trend to higher event rates in the ASC group (p=0.070).

**Conclusion**

The practice of two-hour observation following dose escalation of Beta-blocker Therapy is not necessary.

**Results**

287 dose titration visits have been assessed, encompassing both first exposure to BB and subsequent titrations (mean age 63 ± 13.86 years, 62 % male). No patient was deemed unsuitable for beta blocker was not stopped in any of these cases. Mean HR and SBP prior to DE were 75 ± 12 bpm and 129 ± 77 ± 17/12 mmHg. Only three visits were complicated by events occurring in different patients (event rate: 1%). One related to fatigue, on related to dizziness and one asymptomatic bradycardia. The beta blocker was not stopped in any of these cases.

**Conclusions**

These data strongly suggest that patient observation may not be required following DE and that adhering to this practice standard consumes significant resources without major benefit. Consideration of remote titration in the patient’s home with access to a help line may be a more practical approach to this issue and aid in more effective use of important therapy.

**Cardiac CT (16MDCT). A new technique for the assessment of coronary artery bypass grafts**

**Background**

Coronary artery bypass grafts are usually the best treatment for patients with multi-vessel or left main stem obstructive coronary disease. However with
A virtual reality toolkit for the diagnosis and assessment of myocardial infarction size and location

The size and location of a myocardial infarction is determined by the changes on the 12 lead ECG, peak levels of cardiac enzymes and wall motion abnormalities on transthoracic echo. We have developed a software system that takes standard electrocardiogram (ECG) input and interprets this input along with user-defined and automatically defined markers (deviation of the ST segments from the isoelectric line) to diagnose myocardial infarctions (MI). These surface ECG changes are then automatically represented within a 3D volumetric model of the heart.

Over a period of six months 30 patients were monitored using a digital ECG system and this information was used to test and develop our system. It was found that the STEMs (ST segment Elevation MI) were successfully diagnosed, however NSTEMI (Non-STEMI), although correctly interpreted, were more ambiguous due to the fact that T wave abnormalities are sometimes seen on normal resting ECGs. We also studied a cohort of normal ECG from control subjects and the digital analysis interpreted these ECGs as normal. A standard voxel-count metric was developed so a numeric can be derived from the 3D infarct model generated from the 12 lead ECG.

Data will be available correlating this novel method of estimating infarct size with standard techniques involving cardiac enzymes and transthoracic echocardiography.

We envisage this digitised ECG analysis with 3D representation of the infarct could be clinically useful in several possible ways; (i) a diagnostic tool for clinicians, (ii) a teaching tool for students and (iii) an educational tool for the patient.

Safety and Tolerability of High Dose Statin Therapy in a Non-selected Cohort of Patients with Acute Coronary Syndrome

Aim

Patients presenting with acute coronary syndrome (ACS) who are treated with high intensity statin therapy have fewer adverse coronary events. We sought to determine the safety and tolerability of high dose atorvastatin in a real-life cohort of ACS patients.

Methods

Patients admitted to our coronary care unit with a diagnosis of ACS are routinely treated with high intensity statin therapy. Patients have fasting lipid levels monitored using a digital ECG system and this information was used to test and develop our software system. An investigator (AD) sought to determine the safety and tolerability of high dose atorvastatin in a real-life cohort of ACS patients.

Patients admitted to our coronary care unit with a diagnosis of ACS are routinely treated with high intensity statin therapy. Patients have fasting lipid levels monitored using a digital ECG system and this information was used to test and develop our software system. An investigator (AD) sought to determine the safety and tolerability of high dose atorvastatin in a real-life cohort of ACS patients.

Results

Of 55 consecutive patients, 41 were male, mean age 66.5 ± 12.3 years. Admission diagnosis was non-ST elevation ACS in 35 cases and ST elevation myocardial infarction in 20. Of 50 patients (91%) who underwent coronary angiography, 42 had percutaneous revascularisation and 5 underwent bypass grafting.

Mean total cholesterol at baseline was 4.4 ± 1.24 mmol/L.

Four patients died in hospital. Of those surviving, 43 were discharged on atorvastatin 80 mg, 9 on less intensive statin therapy and treatment with statin was withheld in one case.

Of the 42 patients discharged on high dose atorvastatin, 2 died (both of sudden cardiac events), 5 were unaccounted for and 36 patients were still taking their prescribed dose of atorvastatin at time of 3 month follow up. Four patients noted non-specific muscle pains and 1 patient had an unexplained elevation in CK (2 x normal). Four patients had elevated serum ALT (≥ 1 x normal). Compared with baseline, serum total cholesterol was reduced by 0.84 mmol/L (p<0.001).

Conclusion

A real-life cohort of patients with ACS, high dose statin therapy was well tolerated and safe, after short term follow up.

Autopsy findings in Sudden Cardiac Death

Background

Out-of-Hospital Sudden Cardiac Death (OHSCD) remains a significant public health problem despite a reduction in Coronary Artery Disease (CAD) mortality over the last 30 years. We prospectively ascertained the causes of OHSCD by autopsy examination.

Methods

Prospective data were collected (1st August 2003 to 31st July 2004) for OHSCD in Belfast from 2 sources Emergency Medical Services (EMS) patient report forms and Autopsy forms. We examined all cardiac arrests attended by the EMS using the Utstein style. Cases were defined as OHSCD if they satisfied WHO criteria, i.e. witnessed arrest of cardiac aetiology within 1 hour of symptom onset or unWitnessed arrest where the victim had been seen alive and asymptomatic within 24 hours. We manually searched the autopsy reports for each OHSCD. Severe CAD was defined as ≥70% stenosis in at least 1 of the 3 main coronary arteries.

Results

There were 300 OHSCD’s for which no autopsy reports were available. Of the 110 cases, 70% were male, mean age 62±10 years. Sixty six of the 110 cases (60%) had no known past history of cardiac disease. One hundred and three (91%) cases had severe CAD, 28 (25%) healed Myocardial Infarction (MI); 26 (24%) acute MI; 28 (25%) coronary artery thrombus and 4 patients ruptured MI. Fifty three (49%) patients had left ventricular hypertrophy. Seven patients (6%) had no significant CAD, of these 2 had alcoholic cardiomyopathy, 2 ruptured thoracic aneurysms, 1 myocarditis, 1 amyloid heart disease and 1 morphologically normal heart. Fifty seven percent of those with severe CAD had no premonitory history of cardiac disease.

Conclusions

CAD remains the principal cause of OHSCD with 94% of cases with severe CAD despite only 40% having a known history of cardiac disease. For 57% of the cases OHSCD was the first presentation of CAD.

Assessment by echocardiography of cardiac morphology in Irish athletes

Aim

Athletic training is associated with characteristic morphological changes commonly described as ‘Athlete’s Heart’. The purpose of this study was to evaluate using echocardiography elite Irish athletes involved in a variety of sporting activities, competing at national or international level.

In total, 154 subjects were studied, average age 22 ± 3.7 years. Average findings included the following: • left ventricular internal dimensions in diastole (LVIDd) 1.14 ± 0.28 cm, • ejection fraction (calculated by fractional shortening) 62% ± 7.2% • interventricular and septal thickness (diameter at the mid ventricular level) 10.1 ± 2.2 mm. Substantial enlargement in left ventricular diastolic cavity dimensions, i.e. LVIDd > 6 cm., was found in 14(9%) subjects, all male. This was associated with normal left ventricular systolic function in all cases. In this group, when EGGs were available, 75% (6/9) of ECGs were abnormal with 44% (4/9) demonstrating left ventricular hypertrophy (Romhilt-Estes criteria).

Measurement of left ventricular cavity dimension, left ventricular wall thickness and left ventricular systolic function was available in all subjects. ECG recordings were also available in 80 (52%) patients. Average findings included the following: • left ventricular internal dimensions in diastole (LVIDd) 5.2 cm ± 0.5 cm. • interventricular wall thickness in diastole (LVIDd) 1.14 cm ± 0.28 g. • ejection fraction (calculated by fractional shortening) 62.8 ± 7.2%

Conclusion

Left ventricular wall thickness was increased (± 1.3cm) in 54 (35%) subjects. The majority were male.
Demographic and temporal trends in out-of-hospital Sudden Cardiac Death in Belfast

Background
There has been a reduction in coronary artery disease mortality over the last 30 years. Any change in the incidence of Out-of-Hospital Sudden Cardiac Death (OHSCD) is uncertain. In 1966 there were 297 OHSCD’s in Belfast.

Methods
Prospective data were collected (1st August 2004) from 3 sources: Emergency Medical Services (EMS) forms, Death Certificates and Autopsies. We examined all arrests using the Utstein style including EMS Call to Response Interval (CRI). Sudden Cardiac Death was defined using WHO criteria. Resuscitation was defined as admission alive, and survival as discharged alive.

Results
There were 300 OHSCD’s, 197 (66%) male mean age 68 years (±SD ±14), (range 27-96), mean age of females 72 years (±SD ±13), and males 65 years (±SD ±14). Of OHSCD’s 234 (78%) occurred at home, 47 (15.7%) in public places and 19 (6.7%) in nursing homes. Two hundred and seventy nine (93%) were attended by the EMS. Rhythm on EMS arrival was Ventricular Fibrillation (VF) in 75(27%). Mean CRI was 8min (±SD ±3). In those attended by the EMS, resuscitation was 9.7% and survival 7.2%. Mean CRI for survivors was 5min (±SD ±2) and non survivors 8min (±SD ±2). (P<0.001). Ninety one (30%) OHSCD’s were witnessed; of these 48 (53%) had VF on EMS arrival. The survival rate for witnessed VF arrests was 20/48 (41.7%). All 20 survivors were witnessed, had VF as presenting rhythm and CRI ≤7min. The European Age-Standardised Incidence Rate for OHSCD was 122/100,000 (95% CI 111-135) for males and 41/100,000 (95% CI 36-46) for females.

Conclusions
Despite a 37% reduction in heart attack mortality in Ireland over the last 20 years, the incidence of OHSCD in Belfast has not fallen over the last 8 years. In this study, 78% of OHSCD’s occurred at home. The percentage of cases with VF (27%) was low, possibly due to prolonged CRI, confirmed by the higher percentage of VF (53%) among witnessed arrests.

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Temporo-profile of stent based adenovirus mediated gene therapy

Introduction
Vascular gene therapy requires the combination of a therapeutic gene product, an appropriate vector for introduction of these genes into the cells and a device for mechanical delivery of vectors to the target cells. Polymer coated stents represent an ideal platform for localized delivery of appropriate genes to the vessel wall over a prolonged duration. Adenovirus has emerged as the vector of choice in many in vivo applications because of its ability to be concentrated to very high titres, its broad host range and high infectivity. At present it is not known whether adenovirus can be eluted off a stent over a long duration thereby prolonging gene expression.

Aim
The aim of this study was to evaluate a percutaneous method of vascular gene delivery via adenovirus coated stents and to assess the optimal time point of this trans-gene expression.

Methods
Phosphorylcholine (Hi Matrix) stents were coated with adenovirus carrying LacZ gene at a titre of 3 x 109 p.f.u.s. These stents were deployed in the right iliac arteries of NZW rabbits. Access was attained via RCA prior to stent deployment, a balloon injury was performed. Five time points (3, 7, 14, 21, 28 days) were assessed for LacZ expression using the X-gal stain.

Results
We successfully demonstrated the ability to deliver marker genes to the vascular wall percutaneously via adenovirus coated stents. Expression was observed at all 5 time points. At 3 days post-stenting expression was observed in the vessel wall which was in direct contact with the stent. A prolonged expression was seen up to 28 days. The expression peaked at 21 days and was predominantly seen in the neointimal cells.

Conclusion
These results have shown that a prolonged expression of genes can be achieved with adenovirus using stents. This method of delivery has therapeutic implications for many human cardiovascular diseases.

Objective
To assess the prevalence of left ventricular diastolic dysfunction (LVDd) in newly diagnosed Essential Hypertension. We hypothesised that LVDd may be associated with parallel stiffening of the large arteries.

Methods
We studied 65 patients (32 men, 33 women, mean age 48±2) with newly diagnosed hypertension (> 140/90 mm-Hg clinic or > 155/85 Ambulatory). The following measurements of left ventricular diastolic function were determined: transmitral E and A peak velocities (m/s), and their ratio, deceleration time of E wave (ms), and isovolumic relaxation time. Pulsed tissue Doppler imaging (TDI) was performed in the 4-chamber view. Early E and Late A diastolic waves and their ratio were measured as diastolic tissue indexes. The aortic pressure waveform (APW), particularly for augmentation index (AIx, height of the late systolic peak/pulse pressure) a marker of arterial stiffness was obtained through applanation tonometry.

Results
Phosphorylcholine (Hi Matrix) stents were coated with adenovirus carrying LacZ gene at a titre of 3 x 109 p.f.u.s. These stents were deployed in the right iliac arteries of NZW rabbits. Access was attained via RCA prior to stent deployment, a balloon injury was performed. Five time points (3, 7, 14, 21, 28 days) were assessed for LacZ expression using the X-gal stain.

Conclusion
These results have shown that a prolonged expression of genes can be achieved with adenovirus using stents. This method of delivery has therapeutic implications for many human cardiovascular diseases.

Implementation of a nurse led acute chest pain team favourable impact on patient care

Introduction
The first national nurse led Acute Chest Pain Team (PIT) providing 14 hr cover 7 days a week was implemented in the Belfast City Hospital (BCH) in March 2004. The recent regional audit of thrombolytic therapy for ST elevation myocardial infarction (STEMI) in Northern Ireland reported a median door to needle time (DNT) of 45 mins. The aims of the CPT were to: 1) reduce door-to-needle times in patients presenting with STEMI, 2) streamline in patients presenting with STEMI, 3) facilitate management of these patients. We present the in-hospital outcome data for the first 12 months.

Aims
The aim of this study was to compare the risk factor profile and outcomes of patients with a discharge diagnosis of ST elevation myocardial infarction (STEMI) and non-ST elevation myocardial infarction (non-STEMI) in the coronary heart attack Ireland registry (CHAIR) cohort.

Methods
CHAIR is a prospective registry of all patients admitted with suspected acute coronary syndrome (ACS) to eight hospitals in the Health Service Executive Area – Southern Area. Information is extracted from hospital notes by dedicated registration officers and stored in an electronic database.

Results
Data are available on 2021 patients with a discharge diagnosis of myocardial infarction, 865 (44%) with STEMI and 1656 (66%) with non-STEMI. Among the non-STEMI patients, 65% are male, 29% are current smokers, 46% have a history of coronary heart disease, 50% have hypertension, 10% have diabetes and 32% have a family history of heart disease. The average age of non-STEMI patients is 76 years. Among the STEMI patients, 66% are male, 41% are current smokers, 25% have a history of coronary heart disease, 35% have hypertension, 15% have diabetes and 33% have a family history of hypertension. The average age of STEMI patients is 66 years. For non-STEMI patients, in hospital mortality was 1%, 10% of patients were discharged home (with 19% scheduled for coronary intervention) and 14% were transferred to another hospital. For STEMI patients, in hospital mortality was 11%, 66% of patients were discharged home (with 22% scheduled for coronary intervention) and 17% were transferred to another hospital.

Conclusions
STEMI patients are younger, have a higher prevalence of current smoking and a lower prevalence of diabetes and hypertension than non-STEMI patients. A similar proportion of STEMI and non-STEMI patients die during their hospital admission.
Comparison of first and second acute myocardial infarction recent trends in incidence and case-fatality

Introduction
Recent studies have shown that the incidence of first acute myocardial infarction is falling and survival after first events is improving. Nothing, however, is known about contemporary trends in either the incidence of, or prognosis after, a second myocardial infarction. The aim of this study was to describe case-fatality following a second myocardial infarction, compared to a first myocardial infarction, and to evaluate whether, after a second event, patients have experienced similar improvements in survival to those suffering a first myocardial infarction.

Methods
Using the Scottish Linked Morbidity Record Database we identified all patients with a first or second myocardial infarction between 1990 and 2000. We compared baseline characteristics and analysed case-fatality up to 5 years. We used multivariate modelling at 0 days and 5 years to examine factors affecting prognosis in men and women and to determine trends over time.

Results
There were 110,226 admissions with a first myocardial infarction, and 9,664 with a second myocardial infarction. The median interval between a first and second myocardial infarction was 2 years. While the number of admissions with a first myocardial infarction decreased by 28%, the number with a second fell by 53%. Overall crude case-fatality following a first myocardial infarction (second myocardial infarction) was 20.1% (21.4%) and 28.4% (30.6%) at one year and five years respectively. Overall median survival following a first myocardial infarction (second myocardial infarction) was 8.8 (6.6) years in men and 4.3 (5.8) years in women. After a first (second) myocardial infarction, adjusted 30-day case-fatality fell by 38% (31%) in men and 24% (17%) in women. After a first (second) myocardial infarction, adjusted longer-term case-fatality fell by 27% (30%) in men and 25% (17%) in women.

Conclusion
The striking decline in second infarctions is likely to reflect improvements in secondary prevention. Short-term case-fatality has improved less after a second myocardial infarction than after a first myocardial infarction but there has been a comparable improvement in longer-term survival. Despite this, this prognosis remains much worse after a second than first myocardial infarction and every effort should be made to prevent recurrent infarction.

Pulmonary Vein Isolation using 3 dimensional mapping safety, feasibility and clinical outcomes... the follow up

Introduction
The pulmonary veins have been identified as the principle source of triggers of atrial fibrillation. A number of methods have been used to electrically isolate the veins from the rest of the atrium, including surgery, direct ablative and catheter based techniques. We investigated one of these, an electro-anatomically guided catheter based technique using the CARTO mapping system.

Methods
A 3D shell of the left atrium was created with the aid of the CARTO mapping system following transeptal puncture. Tubular models of the pulmonary veins were constructed as well as the mitral valve annulus. Circumferential ablation lines were created around the left and right sided pulmonary veins. A roof line along the mitral valve was also created. 33 patients underwent the procedure between Sept 2003 and March 2005. All patients had troublesome symptomatic atrial fibrillation resistant to medical and electrical therapy.

Results
33 patients underwent PV-28 male; 31 had structurally normal hearts; 1 had an ASD and a DCM. Paroxysmal atrial fibrillation was the indication in 30(91%) of patients. Age ranged from 22-72 years. The procedure was well tolerated by all patients. There were no adverse events in patients are awaiting review and have not been included in the results. 6(18%) patients had a repeat procedure because of symptom recurrence. Average follow up was 6 months, range 6 weeks to 14 months. On review 9 patients(27%) were symptom free, 5(15%) had improved symptoms and 6(18%) reported no change in symptoms. No patient had worse symptoms post procedure. Holter monitoring revealed 9 patients to be maintaining sinus rhythm; 2 were in atrial fibrillation and 6 patients were in atrial fibrillation 1-5% of the time. 2 patients who were in atrial fibrillation had reported an improvement in symptoms, 2 patients maintaining sinus rhythm reported no change in symptoms.

Late revascularisation after sirolimus-eluting stents a major caveat or an incidental finding?

Introduction
Initial data on the long term results of sirolimus eluting stents (SES) in selected cohorts are reassuring. However, whether these will also apply to general clinical practice, remains to be defined.

Methods
We identified all patients who underwent target lesion revascularisation (TLR) greater than one year after the index procedure. Among this group we identified patients who had had a normal follow up angiogram at 9 months. Late revascularisation...
Late loss (mm) was significantly lower in SES group normally distributed (p<0.001 for SES, p=0.00 for distributions were skewed to the right and were not distributed in both groups (p=0.48). Late loss in SES and PES (respectively, p=0.96 and p=0.44) was similar in the two groups, respectively, 1.75 (0.51–5.12) and 1.82 (0.62–5.12). EVL was higher non-restenotic late loss measured in both groups (p=0.05 for SES, p=0.43 for PES), but it was significantly lower (p=0.002) after SES implantation (0.14±0.9) compared to PES (0.27±0.44).

Conclusions
Both SES and PES may have a bimodal pattern of late loss distribution. In lesions not prone to significant restenosis, SES is correlated with lower late loss compared to PES (appearing as the "zero late loss"). However, binary angiographic restenosis is similar in the two groups. Late loss may not be a sufficiently reliable marker of the true efficacy of these devices.

Anterior Leaflet prolapse treated by artificial chordae or chordal transfer: a comparative analysis of its use in 474 patients undergoing mitral reconstruction over 20 years

Background
Surgical valve repair offers distinct advantages over replacement of the incompetent mitral valve in term of survival. The development of polytetrafluoroethylene (PTFE) artificial chordae has expanded the technique of mitral valve reconstruction. Anterior leaflet prolapse can be treated by both chordal transfer or the use of artificial chordae.

Aims
To compare the durability and medium term survival of patients who underwent anterior leaflet reconstruction by use of artificial chordal and chordal transfer technique with orthodox techniques.

Methods
From a series of 474 mitral valve reconstructions performed between October 1983 and December 2003, 45 patients with anterior leaflet prolapse were treated either with artificial chordae (n=29) and chordal transfer (n=16) technique. These groups were compared with the overall survival and freedom from reoperation rates for primary mitral valve repair without these techniques (n = 429). The mean follow up was 84 (±56) months. The mean age was 52 (±19) years. Survival and reoperation rates were calculated using the method of Kaplan & Meier.

Results
The overall hospital mortality (30 day) was 5.16% (15/294), with an early mortality (30 day – 1 year) of 2.3% (11/474) and a late mortality (1 year) of 7.8% (37/474). Looking at the outcome in each group, there were no hospital deaths in either the artificial chordal and chordal transfer groups. However the hospital mortality among other patients was 5.4% (25/429). The early death rate among artificial chordal chordae patients was 3.4% (12/354), there were no early deaths in the chordal transfer group and among other patients the rate was 2.3% (10/429). There were no late deaths in the artificial chordal group, but the late death rate among chordal transfer patients was 18.7% (3/16) and among other techniques 7.9% (4/429). The 5 year survival rates in the artificial chordal group was 96.9%, 85% in the chordal transfer group and 90.5% in the standard mitral reconstruction group. During follow up, patients from both artificial chordal and group required re-operation. This gives a 5 year freedom of re-operation rate of 96% in the artificial chordal group, 90.9% in chordal transfer group, and 95.3% in standard mitral reconstruction group.

Conclusion
Artificial chordae in combination with other repair techniques, provides similar or better medium term survival and freedom from re-operation rates over chordal transfer technique and standard mitral reconstruction technique. We suggest the utilisation of artificial chordae in mitral repair should be increased.
Heart murmurs in children can telemedicine differentiate innocent from pathological?

Introduction
Clinical examination by a paediatric cardiologist is the most useful means of initial evaluation of referred paediatric murmurs. In this study, we sought to determine whether remote assessment of heart murmurs by telemedicine was as accurate as ‘hands on’ auscultation.

Aims
To assess the accuracy of ‘live’ remote stethoscopy in the assessment of heart murmurs in children.

Methods
Consecutive new patients aged between 6 months and 17 years referred for assessment of a heart murmur were consented. Two groups of patients were studied. In the first group, all children were examined independently by two blinded consultant paediatric cardiologists (ABM ‘face-to-face’ (FF)). In the second group, all children were examined ‘face-to-face’ by one cardiologist, and then evaluated by the second cardiologist remotely using an electronic stethoscope, with heart sounds and video images transmitted ‘live’, utilizing an on site 56kbps telemedicine system (TM).

Results
75 patients were enrolled with 39 in group 1 (FF/FF), and 36 in group 2 (FF/TM). In group 1, there was strong agreement between clinical examination and echocardiographic assessment for presence/absence of heart disease (sensitivity A = 1.00, specificity A = 0.93, sensitivity B = 1.00, specificity B = 1.00). There were no cases of heart disease missed by TM assessment (sensitivity = 1.00, specificity = 0.93). Echocardiography was requested in 90% of the patients assessed by TM, with a 25% request rate in the FF controls.

Conclusion
Remote stethoscopy appears to provide an accurate method for evaluating children referred for assessment of a murmur. It may be a useful modality for supplying an outreach outpatient service.

Stenting of the coarctation of the aorta

Background
Our purpose is to describe the experience of one centre with patients undergoing percutaneous stenting of coarctation of the aorta, including native coarctation and residual stenoses in previously surgically repaired coartations.

Methods
Since 2000, 9 patients have undergone catheterisation for percutaneous stenting of coarctation of the aorta (35% male, age range 17-56 years). 3 had native coarctations, 6 had residual stenosis after previous surgical repair during childhood. 4 were performed for resistant hypertension uncontrolled, 5 were performed for symptomatic relief (symptoms including exertional chest pain and dyspnoea). 22% had mild LVH on echocardiography, 67% had mild-moderate LVH, 11% had moderate to severe LVH. 11% had associated severe calcific aortic stenosis, 22% had concomitant bicuspid aortic valve. There was significant reduction in the diameter at the site of coarctation in all: the average coarctation diameter pre-procedure was 8mm, post-procedure the average diameter was 5mm. While minor worsening was seen in most cases (28%) these were all haemodynamically insignificant. All procedures were performed without significant complications (minor complications included groin haematoma in 38%). At median follow up of 36 months all patients had resolution of their symptoms and/or improved blood pressure control, without evidence of restenosis.

Conclusions
Congenital and post-operative coarctation stenting resulted in stable improvement in clinical status. Only minor complications were experienced. Percutaneous stenting of coarctation of the aorta thus can be deemed an effective and safe treatment option for native and residual post repair coarctation.

BNP as a predictor of early clinical deterioration post discharge values in excess of 1000pg/ml indicate a high risk group

Background
Patients discharged from hospital following management of a Class IV heart failure admission are at high risk of early clinical deterioration (EDC). Despite the effectiveness of disease management programs (DMP), this remains a high risk group. BNP levels have a prognostic impact in this population, but little is known regarding the value of discharge b-type natriuretic peptide (BNP) in highlighting those individuals at particular risk of EDC managed by DMP in the 3 months following discharge.

Aim
To evaluate the influence of BNP levels at time of discharge following a class IV HF admission in predicting EDC in the 3 months following discharge.

Methods
In this prospective study all patients following a Class IV HF admission had a BNP measurement on discharge following a class IV HF admission in predicting EDC in the 3 months following discharge.

Results
BNP levels were obtained in 194 patients (63% male, mean age 69.2±12.1 yrs, 65 % ischaemic aetiology). The mean BNP value at discharge was 673.2 ± 562.2 pg/ml (90% of HF ADs, 14 HF admissions, 45 acute non-HF admissions) and 61 unscheduled clinical contacts occurred in 81 patients. Multivariable analysis identified BNP (cut off =1000pg/ml, 75th percentile) as an independent predictor of EDC and mortality (OR=2.024, CI: 1.067-4.046, p=0.039) controlling for the effects of age (OR=1.047, CI: 1.018-1.077, p=0.001) and gender (p=0.058).

Conclusion
These data indicate that discharge BNP levels are a valuable predictor of EDC. In particular patients with values >1000pg/ml are twice as likely to experience EDC and may require closer clinical follow up following discharge.

Comparison of a clinical scoring system with brain natriuretic peptide (BNP) levels for the prediction of the in-hospital mortality of heart failure patients

Background
The ability of the clinical model of Lee et al. (JAMA 2003;290: 2358-67) to estimate mortality in patients with heart failure has never been compared with brain natriuretic peptide (BNP) levels.

Aims
comparison of Lee et al 30 day mortality risk score with BNP levels for the prediction of in-hospital mortality of patients with heart failure.

Subjects
408 consecutive patients with BNP levels greater than 100 pg/ml admitted to hospital as medical emergencies.

Results
The 34 patients (8%) who died in hospital had higher BNP levels (832 ± 435 vs. 551 ± 422 pg/ml, p=0.003) and 30-day mortality risk scores (107 ± 8 vs. 86 ± 23 points; p<0.001) than surviving patients. There were no significant differences between the area under for the receiver operator curves (ROC) of the 30-day risk score and the ROC for BNP levels (94% vs. 68%) Logistic regression analysis revealed the risk score and BNP levels were independent predictors of mortality.

Conclusions
The 30 day risk score of Lee et al and BNP levels are comparable yet independent predictors of the in-hospital mortality of heart failure patients.
Angina in an 8 year old girl

An 8 year old girl presented with a history of recurrent left sided chest pain associated with dyspnoea and pallor. This had been increasing in frequency and was now occurring at rest. Background history revealed a 3 month history of decreasing energy levels and weight loss. Initial investigations revealed elevated inflammatory markers and normal cardiac enzymes. Resting electrocardiogram revealed evidence of myocardial ischemia.

Post operative recovery was uneventful. She was commenced on prednisolone and high dose aspirin, with further immunosuppressive therapy in the form of pulsed intravenous cyclophosphamide. A further cardiac catheterisation study after one year of immunosuppressive therapy showed some extension of the stenoses beyond the ostia to the proximal part of both coronary arteries. However, all 3 bypass grafts were widely patent. She continues on immunosuppressive therapy 2 years following presentation. To our knowledge this is the youngest report of this unusual presentation of Takayasu’s Arteritis.

Conclusion

It is apparent that over as little as four years, patients referred to the cardiac surgeon are older, have higher operative risk, have more co morbidities, are more urgent and they will do worse.
Superior Statin survival statistics: mediated by more than cholesterol reduction in the transplant population?

Aims Renal complications following cardiac surgery are associated with very high morbidity and mortality. Patients with elevated creatinine preoperatively are at a higher risk of developing renal complications after cardiac surgery. However, limited literature is available on patients who develop renal complications with normal renal function preoperatively.

Methods 1808 consecutive patients with normal preoperative creatinine levels, who underwent cardiac surgery from 1/1/2002 to 31/12/2004, were included in this study. Data was acquired from patient analysis and tracking system (PAT'S) and the hospital notes. 400 of these patients developed significant renal dysfunction requiring renal replacement therapy (RRT) were compared with the total population.

Results

<table>
<thead>
<tr>
<th>TOTAL POPULATION</th>
<th>RENAL DYSFUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>1408</td>
</tr>
<tr>
<td>Age</td>
<td>61.7 ± 10.7</td>
</tr>
<tr>
<td>Female</td>
<td>27.4%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>12.8%</td>
</tr>
<tr>
<td>Diabetis</td>
<td>12.4%</td>
</tr>
<tr>
<td>Euro score</td>
<td>4.73 ± 3</td>
</tr>
<tr>
<td>LVEF &lt;50%</td>
<td>97.59 ± 49.1</td>
</tr>
<tr>
<td>X-Clamp time</td>
<td>31.39 ± 4.87 min</td>
</tr>
</tbody>
</table>

Conclusion

In our study, we identified that older female patients with compromised LV function are at a higher risk of developing renal impairment postoperatively. More over, patients with high euro score and long cardio-pulmonary bypass time are at a higher risk of developing renal impairment postoperatively.

Background HMG CoA reductase inhibitors have proven benefit in the prevention of cardiovascular pathology and are utilised in the management of hyperlipidaemia associated with immunosuppression used in human cardiac transplantation. However, the observed benefits are greater than might be expected from changes in lipid levels alone, and pravastatin treatment is associated with a reduction in rejection episodes. This suggests effects beyond cholesterol reduction. We hypothesised that pravastatin had immunological effects and aimed to assess the effects of pravastatin on neutrophil function.

Methods Human neutrophils were isolated from healthy control volunteers to assess the in vitro effects of pravastatin on neutrophil function. We hypothesised that pravastatin had immunological effects and aimed to assess the effects of pravastatin on neutrophil function preoperatively.

Results

Pravastatin (5µM) decreased neutrophil reactive oxygen species production significantly (P<0.05). However pravastatin had no effect on the neutrophil adhesion protein CD11b or on the rate of spontaneous apoptosis. Neutrophil infiltration of the allograft can influence subsequent infiltration of the graft by the lymphocytes, which is the major focus of the rejection process.

Conclusion

Our observation of statin mediated neutrophil function suppression may help explain the survival benefits of statin treatment in the transplant population.
Age and sex specific trends in short and long term case fatality following a first myocardial infarction 1990-2000

Introduction
Studies have shown that case fatality following hospitalisation with a first myocardial infarction is improving. However it is not known whether these trends are similar in men and women and in different age groups. Little is known about contemporary trends in short and longer term prognosis of men and women in different age groups following hospitalisation with a first myocardial infarction. The aim of this study was to describe and compare trends in short and longer term case-fatality following hospitalisation with a first myocardial infarction, in men and women and in different age groups between 1990 and 2000.

Methods
Using the Scottish Linked Morbidity Record Database we identified all patients hospitalised with a first myocardial infarction between 1990 and 2000. We calculated sex specific case fatality at 30 days, one year and five years. We used multivariate modelling at 0 and multivariate logistic regression analysis was employed.

Results
Between 1990 and 2000 there were 110,226 hospitalisations with a first myocardial infarction. During this time crude 30 day case fatality fell by 19% in men and 8% in women and five year case fatality by 9% in men and 5% in women. Our study followed a first myocardial infarction were greater in younger than in older individuals and in men than in women (95% decline in men and 47% in women aged 65-74 years). Falls in adjusted one year and five year case-fatality excluding 30 days were similar in men and women but greater in younger than in older individuals.

Conclusion
There have been greater improvements in short term than in longer term survival following a myocardial infarction. Decline in short term case fatality has been greater in men. Improvements in survival have been more marked in younger age groups. This may reflect differences in treatment and in secondary prevention between different age groups and men and women.

Diagnostic yield of selective renal angiography in patients undergoing coronary angiography

Objective
Renal artery stenosis (RAS) can cause refractory hypertension, recurrent pulmonary oedema and renal failure. It is a progressive disease and is the cause of renal atrophy. The purpose of our study was to evaluate the prevalence of renal artery stenosis in high-risk patients referred for coronary angiography.

Methods
Following coronary angiography, high risk patients underwent selective renal angiography with a right Judkins catheter. High risk was defined by any one of the following: hypertension, unexplained pulmonary oedema, impaired renal function (creatinine level >120 μmol/l) or the presence of multivessel coronary artery disease. During an 18 month period, data from 246 patients (195 males and 89 females, mean age 65.5 +/- 9.6 years) was analyzed. Univariate and multivariate logistic regression analysis was performed.

Results
Of 246 patients, 64 (26%) had RAS: 23 patients (9.4%) had mild RAS (≤50%), 13 patients (5.3%) had moderate RAS (50-70%) and 28 patients (11.6%) had severe RAS (≥70%). Univariable predictors of RAS were age ≥ 65 years (p = 0.002), impaired renal function (p = 0.012) and the presence of multivessel coronary artery disease (p < 0.001). There was a stronger association of RAS with 2 / 3 vessel CAD as compared with single vessel or non-obstructive CAD (odds ratio 4.2, 95% confidence interval 2.09-8.37). The multivariable predictors of RAS were impaired renal function and coronary artery disease. There were no procedure related complications associated with selective renal angiography.

Conclusion
Selective renal angiography has a high diagnostic yield for the presence of RAS when performed in conjunction with coronary angiography in patients at risk of RAS, especially in patients older than 65 years with impaired renal function and multivessel coronary artery disease. Our data suggests that selective renal angiography is safe and should be considered in high risk patients undergoing coronary angiography.

Six month clinical outcomes following a pragmatic approach to the use of drug eluting stents

Purpose
The exclusive use of drug eluting stents (DES) is being advocated as a superior coronary interventional strategy. Such an approach would incur a substantial financial burden. The aim of this study was to determine outcomes after percutaneous coronary intervention (PCI) when a selective approach to DES based on clinical indication was employed.

Methods
All PCI cases at Belfast City Hospital in the period January-December 2004 were included (n=872). Suggested criteria for DES were vessel diameter ≤3mm, lesion length ≤20mm, diabetes mellitus, proximal LAD lesion or clinical need at the discretion of the consultant. Patients were followed up clinically for 6 months to determine target lesion revascularisation (TLR).

Results
Drug eluting stents were deployed in 23.5% of lesions. Six month follow up data is available for the period January-April 2004 (n=299). Follow up data for the entire 12 month period (n=872) will be available for presentation in July 2005. 22/259 had a clinical indication for repeat coronary angiography. 15/259 required TLR (5% 10PCI/CABG).

Conclusion
A recent meta-analysis of 11 trials involving paclitaxel and sirolimus drug eluting stents with clinical follow up of 6-12 months revealed a pooled TLR rate of 4.2% in those exclusively receiving DES. This compares favourably with our combined results. In real world daily cardiology practice we suggest a pragmatic use of drug eluting stents is an appropriate interventional strategy with an acceptable rate of clinical events and target lesion revascularisation.

They think it’s all over… it is now! - A comparison of drug eluting and bare metal stents in multivessel coronary artery disease

Aim
Stent implantation has been shown to be a reasonable alternative to CABG in selected patients with multivessel coronary disease. The advent of drug eluting stent (DES) technology has led to reduced restenosis and improved event free survival compared to bare metal stents (BMS). Our aim was to compare outcomes between DES and BMS, in a high risk population undergoing multivessel stenting (MVS).

Methods
One hundred and twenty patients were studied from the Beaumont Stent Registry, who underwent MVS between May’95 and February’05. Sixty patients were revascularised using BMS exclusively and sixty with DES. Patient demographics, procedural details, clinical and angiographic follow up were recorded. Two year outcomes were analysed.

Results
Mean age was 64.4 years (DES) and 70.1 years (BMS). Diabetics accounted for 15% and 13% in the DES and BMS cohorts respectively. 15% of the DES group had previous stenting versus 0% of the BMS group. Ostial (18% vs 21%) and bifurcation (30% vs 15%) lesions were treated a total of 193 lesions treated per group. Mean lesion length was 27.2mm and 22.9mm in DES and BMS groups respectively. Mean stent diameter was 3.9mm in DES group and 3.5mm in BMS group. There were 5 episodes of subacute stent thrombosis (SAT), 4 in the DES cohort (a related to non-compliance). Angiographic follow up, for symptom evaluation or as a routine in high risk patients, was 245% (DES) and 31% (BMS). MACCE rates at 18 month follow up were 6.7% for DES and 17% for BMS. Instant restenosis, (requiring re-PCI or CABG) rates were 21% for DES and 22% for BMS. Clinical follow up was available in 87% of the DES population (mean - 25 months) and in 92% of the BMS population (mean – 27 months). 97% were symptom free in both groups.

Conclusions
Despite treating patients with more complex anatomy, a substantial proportion of stent restenosis and smaller vessel size, DES were associated with less ISK and target lesion revascularization than BMS. The higher frequency of SAT in the DES may be spurious as 2 patients were non-compliant, but emphasizes the need for close attention to anti-platelet therapy, especially in high risk patients.

Drug eluting stents were deployed in 23.5% of lesions. Six month follow up data is available for the period January-April 2004 (n=299). Follow up data for the entire 12 month period (n=872) will be available for presentation in July 2005. 22/259 had a clinical indication for repeat coronary angiography. 15/259 required TLR (5%, 10PCI/CABG).

Conclusion
A recent meta-analysis of 11 trials involving paclitaxel and sirolimus drug eluting stents with clinical follow up of 6-12 months revealed a pooled TLR rate of 4.2% in those exclusively receiving DES. This compares favourably with our combined results. In real world daily cardiology practice we suggest a pragmatic use of drug eluting stents is an appropriate interventional strategy with an acceptable rate of clinical events and target lesion revascularisation.
Experience of primary percutaneous coronary intervention for ST elevation Myocardial Infarction in a district general hospital

Introduction
Primary percutaneous coronary intervention (PCI) has been shown to be superior to thrombolytic therapy in the treatment of acute ST elevation Myocardial Infarction (STEMI). Primary PCI can be delivered in a district general hospital or patients could be transferred to a tertiary centre. Comparable outcomes can be achieved with either modality provided door to intervention times are under 90 minutes and clinical experience is sufficient to maintain expertise. We present our two year data of primary PCI in a large district hospital (900 beds with a single catheter laboratory and a throughput of 270 interventional procedures per year covered by off-site cardiac surgery.

Methods
From November 2002, primary PCI was offered to all thrombolysis eligible patients admitted on weekdays from 09:00 to 17:00. After April 2004 the service was extended to around the clock, 7 days a week. Non thrombolysis eligible STEMI patients were also managed by PCI but data for these patients is not included here.

Results
137 patients were treated in the two year period (89 males, mean age 67 years). Procedural success (stent delivered to target lesion) was 95%. Abciximab was used in 93% of cases. In hospital mortality was 9 patients (6.6%) of whom 5 presented in cardiogenic shock. Median door to coronary device time was 86 minutes (range 25 – 286). 71% and 53% of patients had door to device times of less than 120 and 90 minutes, respectively. Median length of hospital stay was 5 days. In our centre patients receiving thrombolysis for STEMI in the years 2000 – 2004 had a median hospital length of stay of 8 days and in hospital mortality of 7.3%.

Conclusion
In the contemporary era of interventional cardiology it is possible to introduce and sustain a primary PCI service for STEMI in a district general hospital setting. This was delivered with no additional staffing requirement and with acceptable 24 hour ‘door to coronary device’ times and mortality.

Frequency of COX-2 inhibitor use among patients with stable and unstable coronary artery disease

Recent data have highlighted the acute coronary complications of cyclooxygenase 2 (COX-2) inhibitor therapy. We sought to determine the prevalence of COX-2 inhibitor use among patients attending with suspected stable ischaemic heart disease and those with acute coronary syndromes.

Records from 300 patients assessed in the rapid access chest pain clinic (RACPC) and 47 patients admitted with acute coronary syndromes (ACS) from July through September 2004 were reviewed. Demographic data and prescribed medications were recorded.

Among patients attending the RACPC, 52% were male, 102 (34%) had hypertension, 28 (9%) were diabetic, 66 (22%) were current smokers and 165 (69%) had hypercholesterolaemia. Six patients (2%) were taking a COX-2 inhibitor. Exercise stress testing was carried out in 206 (69%). The final diagnosis was stable angina in 58 patients (20%), non cardiac chest pain in 187 (63%) and results were equivocal in 49 (16%). COX-2 inhibitor use did not differ between diagnostic groups. Among 47 patients admitted with ACS, 47% presented with ST elevation MI, 35% with non-ST elevation MI and 18% with unstable angina. Seventy percent were male with an average age of 65 years (range 41 to 96). Twenty-one (55%) had hypertension, 10 (21%) patients had diabetes, 28 (60%) were current smokers and 21 (45%) patients had hypercholesterolaemia. Four patients (9%, 3 celecoxib, 1 rofecoxib) were taking COX-2 inhibitors at the time of admission (≥6.15, df = 1, P < 0.02 compared with RACPC group).

COX-2 inhibitor usage was uncommon among patients attending the RACPC and slightly more common among those admitted with ACS. Ongoing analysis of a larger number of ACS patients will help clarify the potential role of COX-2 inhibitor prescription on acute coronary events in this population.
Identifying Cardiac Risk Factors in volunteers attending a community screening programme and assessment of compliance with and efficacy of educational advice received, at six-month follow-up

**Purpose**

The objective of this study was to determine whether the identification of cardiac risk factors and provision of specific educational advice to volunteers who attended a community screening programme resulted in a subsequent improvement in their cardiac risk factor profile.

**Methods**

This was an observational study performed by the West of Ireland Cardiology Foundation (CROI). All subjects (n=566) voluntarily attended a community screening programme. Each individual had BMI screening. 116 (82.8%) were deemed to have adhered to the educational advice received. There was a median weight reduction of 0.45kg in the overall group. In those volunteers who did adhere to the educational advice, there were significant improvements in relation to serum lipid profile (median reduction in total cholesterol and LDL of 0.6mMol/l and 0.6mMol/l respectively) and blood pressure measurements (median reduction in systolic blood pressure of 7mmHg). Lifestyle score according to Grampian scale exhibited a median reduction of 9 compared to only 3 points in the non-adherence group.

**Conclusions**

This pilot study emphasizes the value of screening for modifiable cardiovascular risk factors in the community and the prospect of improvement that can happen at primary care level.

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Diastolic heart failure is associated with elevated serum markers of collagen turnover

**Background**

The pathophysiology of diastolic heart failure (DHF) is poorly understood. Reduced ventricular compliance has been demonstrated but the aetiology of this abnormality is unclear. One potential explanation is an active fibrotic process producing increased ventricular stiffness compromising filling.

**Methods**

To address this hypothesis we measured serum markers of collagen turnover in 31 patients with DHF. DHF was defined by dyspnoea, at least one hospitalisation for HF, Doppler indices of diastolic dysfunction with normal left ventricular systolic function (UFE < 45%) and elevated brain natriuretic peptide (BNP). Triage, Biosite). This group was compared with 27 patients with controlled heart failure and UFE < 45% without evidence of DHF. Procollagen III amino terminal (PINP) and procollagen I amino terminal (PIIINP) were measured by immunoassays. Metalloproteinase (MMP I) and its tissue inhibitor (TIMP I) were assayed by ELISA.

**Results**

Between groups F(1, 50) = 9.489, p = 0.00. There were no significant differences in any of the other groups in measurements of MMP or TIMP. However, p = 0.0001. There was no difference between the two groups in measurements of MMP or TIMP. However, PIINP was significantly greater in DHF (5.8 ± 3.3 vs. 5.9 ± 2.2 µg/L, p = 0.001) and there was also trend towards an increase in PINP in the DHF group (3.1 ± 2.0 vs. 4.1 ± 2.9 µg/L, p = 0.07). Controlling for the age difference PIINP remains significantly different between groups (F(1, 50) = 4.49, p = 0.035).

**Conclusions**

These data demonstrate serological evidence of an active fibrotic process in patients with proven DHF. This observation may help explain the pathophysiology of DHF and may open up new avenues of therapeutic intervention.

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Statin therapy in patients with heart failure and normal cholesterol reduces brain natriuretic peptide

**Background**

There is increasing evidence that benefits of statin therapy may be seen in patients with normal cholesterol. Most work is required to understand the mechanism of statin benefit in this setting.

**Results**

Both S and R groups had similar demographic characteristics (72.5 ± 8.5 vs. 71.2 ± 10.5 vs. 74.9 ± 6.3% male, NYHA 2.0 ± 0.3 vs. 1.9 ± 0.6), respectively except for a higher proportion of R group patients with ischaemic aetiology (76% vs. 36%, p = 0.007). All patients in both groups received ACEI/ARB therapy and 79% and 82% of S and R groups respectively were taking beta blockers. At 3 months there was a significant reduction in BNP observed in the S group (63 ± 599 pg/ml to 310 ± 370 pg/ml, p = 0.04) but not in the R group (63 ± 318 pg/ml to 60 ± 598 pg/ml, p = 0.74). Using repeated measures ANOVA controlling for ischaemic aetiology, this difference remained significant (F(1,49) = 4.6, p = 0.04). No significant differences were observed between the S and R groups in terms of hsCRP, TnF-alpha or IL-6 (all p > 0.05).

**Conclusion**

This report demonstrates a significant reduction in BNP with a marker of disease progression, with use of atorvastatin in stable HF patients with no nitroglycerin or nitrates. Further work is required to understand the mechanism of statin benefit in this setting.
Effect of angiographic contrast media on left anterior descending artery lumen diameter in patients undergoing intracoronary stenting

Introduction
Wide observer variability exists in the angiographic estimation of mean coronary lumen diameter (MLD) of patients undergoing percutaneous coronary intervention (PCI). This affects stent sizing and procedural outcome. Animal studies have showed that angiographic contrast media affects vasomotor tone. Whether contrast media causes vasoconstriction in humans with a reduction in MLD in the setting of PCI and stenting is unknown.

Methods
We examined the effect of iohexol (Omnipaque) on lumen diameter in12 patients with atherosclerotic disease of the proximal left anterior descending artery (LAD) prior to PCI using intravascular ultrasound (IVUS). Fractional Flow Reserve (FFR) was measured using a Wave wire.

Results
There were 7 men and 5 women, with a mean age of 63 years (range 37-86). Cypher stents were deployed in 33% and Taxus stents were used in 67%. Mean stent size was 3.22 mm and 3.62 mm respectively and a mean of 0.6 stents were used per patient. The mean percent lesion stenosis was 72.2% on QCA. The mean FFR was 0.88 at baseline, 0.69 with adenosine, 0.67 with contrast, 0.68 with a mixture of contrast and adenosine and 0.99 after stenting. The mean LD at the level of the lesion was 2.36mm (2.26-2.43) at baseline and 2.19mm (2.11-2.33) with contrast. The cross sectional area fell from 4.21mm$^2$ to 3.87mm$^2$ with CM. The proximal MLD fell from 4.35 mm to 4.39mm and CSA from 15.8mm$^2$ to 14.8mm$^2$, while the distal MLD changed from 3.84 to 3.64mm and CSA from 11.54 mm$^2$ to 10.54mm$^2$ after injection of CM.

Conclusion
Angiographic contrast media has significant effects on coronary vasomotor tone. It causes vasoconstriction of atheromatous segments of the proximal LAD artery and a significant reduction in MLD. It also induces maximal hyperemia presumably through an effect on the microvasculature.

Predictive value of 16-multidetector computed tomography (MDCT) for the detection of obstructive coronary disease

Background
Coronary angiography remains the gold standard in diagnostic coronary artery imaging. However it is invasive, with a small associated morbidity and mortality, and is unavailable in many district general hospitals. 16MDCT, a new non-invasive imaging technique, is challenging its position as a reliable, reproducible and accessible imaging modality for the detection of significant coronary disease.

Methods
We studied the diagnostic accuracy and limitations of 16-MDCT coronary angiography in 152 patients undergoing routine coronary angiography. The Regional Ethics Committee granted approval and written patient informed consent was obtained to undergo both investigations. A 16-MDCT scanner with 0.42s gantry rotation time, and 0.75mm slice thickness underwent both investigations. A 16-MDCT scanner with 0.42s gantry rotation time, and 0.75mm slice thickness was used. The mean heart rate at scan initiation was 60bp (range 45-80bp). The mean scan duration was 21s.

The mean effective radiation dose per patient was 10.1mSv. A total of 1588 segments were assessed, or nine segments per patient (3 RCA, 1 LMS, 3 LAD). 2 LCX, 1,1128 segments were evaluable (82.5%). The sensitivity and specificity of 16 MDCT for these segments was 95% and 96% respectively. Positive predictive value 90% and negative predictive value 98%. Of the 240 non-assessable segments (17%), coronary calcification and ventricular ectopy limited assessment in 178, coronary artery motion (17), elevated heart rates (18), small vessel size (22), noisy images (3) and stent artefact (2).

Conclusions
16MDCT can be performed routinely in a district general hospital. The ability to accurately detect significant disease in the prognostically important main coronary arteries coupled with a high negative predictive value make it an attractive non-invasive imaging tool. Access to cardiac MDCT in a district general hospital would facilitate rapid coronary imaging and the appropriate triage of low and intermediate risk patients for invasive coronary angiography.
**Session 5: Percutaneous Coronary Intervention/Acute Coronary Syndrome**

### 52 Long term follow-up after sirolimus eluting stent (SES) implantation in real world practice

**Objective**
Randomized clinical trials have demonstrated the efficacy of SES compared to bare metal stents (BMS) in reducing restenosis and improving clinical outcome in selected patients. Our aim was to evaluate the performance of sirolimus eluting stents in real-world clinical practice.

**Methods**
Between May 2002 and May 2003, one hundred consecutive patients, presenting with stable or unstable angina and considered at increased risk of restenosis, were treated with SES (sometimes in combination with BMS) for single or multivessel CAD. Patient demographics shown in Table 1. Patients underwent repeat angiography at 9-12 months and clinical follow up at 1, 6, 12 and 24 months.

**Results**
Procedural success was 99%. 295 stents were used (mean 2.9 per patient), of which 78% SES (n = 260). Periprocedural results have previously been reported. Twelve month angiographic follow up is now available in 85% and clinical follow up in 97%. Instent restenosis requiring re-PCI was present in 1.7% of SES patients was reproducible in real world clinical practice.

**Conclusion**
The well documented benefit of SES in selected patients was reproducible in real world clinical practice. Mixing BMS with SES increased need for TVR and is not recommended.

**Table 1**

<table>
<thead>
<tr>
<th>PATIENT DEMOGRAPHICS</th>
<th>TARGET VESSEL</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Mean Age</td>
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<tr>
<td>Male/Female</td>
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<tr>
<td>Ex-smokers</td>
<td>38/RCA</td>
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<td>Hypertension</td>
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<td>46/Intermediate</td>
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<td>Diabetes mellitus</td>
<td>17</td>
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<td>Family history of CAD</td>
<td>53</td>
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<tr>
<td>Renal Failure</td>
<td>8%</td>
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<tr>
<td>PreVIOUS CABG</td>
<td>25</td>
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**53 Rapid, Safe and Effective Management of Acute Chest Pain in a dedicated Chest Pain Assessment Unit at St James’s Hospital, Dublin**

**Background**
Chest pain is the second most common complaint seen in the Emergency Department. International figures show that up to 8% of these patients are inappropriately discharged. Inappropriate discharge is associated with five-fold increase in mortality (26%). To address this problem we established a 4-bedded fully monitored Chest Pain Assessment Unit located immediately adjacent to the Emergency Department. The model utilised includes continuous ST-segment and arrhythmia monitoring, rapid turnaround cardiac biomarkers and exercise stress testing prior to discharge after 12 hours. Finally the patients returned for a further clinical review after 48 hours.

**Methods and Results**
Over a 2 year period 1,629 patients were admitted to the CPAU. 57% were male and 43% female. The mean age was 69 and 54 years respectively. 73% of patients were safely discharged within 12 hours of assessment. 15% of patients had an abnormal assessment and were transferred to the Cardiology service. 12% of patients had other medical conditions such as pulmonary emboli accounting for their chest pain and were managed appropriately.

Of those who were transferred to the cardiology service 64% of these underwent early (within 48 hours) diagnostic angiography. 60% of these had abnormal results. 47% of males and 35% of females with abnormal angiographic studies went on for PTCA. 42% of males and 64% of females were managed medically. 12% of males and 2% of females went on for coronary artery bypass surgery respectively. Of those patients discharged with a negative assessment 100% had a negative 48 hour Troponin T test. There were no adverse events from early EST, although all patients had a negative 12 hour Troponin prior to their EST.

**Conclusion**
We have demonstrated that the implementation of a designated chest pain assessment unit, which is run collaboratively between the Emergency Medicine and Cardiology Service allows for enhanced acute care for patients presenting with chest pain of possible cardiac origin, together with safe early discharge.
The hospital burden of suspected acute coronary syndromes recent trends

**Objective**
To describe the changing burden of suspected acute coronary syndrome on the hospital sector of the National Health Service in Scotland between 1990 and 2000.

**Design**
Retrospective cohort study using the Scottish Morbidity Record Database.

**Setting**
Scotland (population 5.1 million).

**Patients**
All 209,759 emergency hospitalisations with suspected acute coronary syndrome in the Scottish population aged 18 years and over between 1990 and 2000.

**Main Outcome Measures**
Number of emergency hospitalisations, individuals and readmissions with acute myocardial infarction, angina and chest pain. Length of stay, total bed days and revascularisation rates.

**Results**
Between 1990 and 2000, there were 177,279 hospitalisations for acute myocardial infarction, 71,937 for angina and 124,133 for chest pain. The number of hospitalisations increased by 43% from 26,269 in 1990 to 38,285 in 2000. Length of stay declined by an average of 3 days and overall number of bed days occupied by suspected acute coronary syndrome fell from 300,304 in 1990 to 225,031 in 2000. There was a marked increase in coronary revascularisation rates in individuals over the study period from 1.6% to 9.5% for AMI and 6.4% to 12.4% for angina in men.

**Conclusions**
Hospitalisations for suspected acute coronary syndromes have risen despite a fall in admission rates for AMI. Rates of revascularisations have also increased dramatically. The burden of suspected acute coronary syndromes as measured by bed-occupancy has not increased because of a reduction in length of stay. The burden of suspected acute coronary syndrome could be reduced by strategies targeting non-cardiac chest pain.

**Background**
The cornerstone of pharmacological management are Beta blockers, Angiotensin Converting Enzyme Inhibitors, Aldosterone Antagonists and Diuretics. Nurse-led heart failure services in some studies have demonstrated a reduction in hospital admissions, more timely optimisation of evidence-based pharmacological management coupled with greater independence and compliance.

**Method**
This study prospectively recorded the number of planned and unplanned clinic visits of the patients attending the service to determine if the service has any impact on reducing admissions to hospital. All patients had left ventricular systolic dysfunction on echocardiograph with an ejection fraction less than 40%. All patients were educated regarding diagnosis, weight management, medication compliance and how to identify early signs of decompensation. All patients had the 24 hour Advice Line Number, Heart Failure Nurse bleep number and had direct access to the Heart Failure office for clinical examination, chest x-ray, biochemical markers, medication adjustment (if appropriate) and, if necessary, hospital admission.

**Results**
530 patients attended the service from 2003/2004. These patients were reviewed at the Nurse-led clinic for timely up-titration of evidence based pharmacological management, clinical examination and re-education every two weeks until stable, then 6-monthly thereafter: at the end of this period the number of patients on optimal therapy increased from 38% to 59% (p<0.001).

**Conclusion**
Our study demonstrates that it is possible to promote the independence of heart failure patients, whilst, at the same time achieving optimal therapy through timely nurse-led clinic visits. There is also the potential for avoiding unnecessary hospital admissions with early recognition of heart failure symptoms and temporary increase in diuretics.

A Nurse-led Heart Failure Service can reduce hospital admissions and optimise evidence-based pharmacological management

**Background**
Quality of Life (QOL) measures are increasingly recognised as important prognostic factors in the management and treatment of HF patients. One such measure is the Minnesota Living with Heart Failure (HF) questionnaire (LIhFE). This disease specific QOL measure has been used to demonstrate treatment effectiveness and has been shown to be reliable and valid within a variety of contexts. This study aims to establish the clinical utility of this measure in predicting long-term mortality and morbidity within a HF patient population as well as demonstrating the benefits of an established multidisciplinary programme (MDP).

**Methods**
This is a Retrospective analysis of HF patients who completed a MDP of 3 months with annual follow-up over a period of 3 years. Endpoints: Time to all acute hospitalisations, HF and Non HF, Unscheduled clinic contact (UC), and Death. Changes in pre and post MDP QOL scores. Instrument Administration: Immediately pre and post the MDP (0 & 12mths).

**Statistical Analysis**
Baseline demographics:
Mean ± SD, Frequencies and percentages: Univariable & Multivariable analysis: t-test, Repeated Measures ANCOVA, chi square and Proportional Hazards Model & Multivariable analysis: t-test, Repeated Measures ANCOVA, chi square and Proportional Hazards Model

**Results**
20 patients completed the LIhFE at baseline (age 69 ± 12 yrs; median 71 yrs) (Male 142 (61%); LVEF: 59 ± 19% (22%); NYHA Functional Class I–II=74 (80%), III–IV=26 (30%)), Internal Consistency measures at baseline and post MDP

**Conclusions**
The LIhFE QOL instrument demonstrates internal consistency within this HF population. The significant reduction in scores indicates that this instrument is useful in detecting the effectiveness of an intervention. Higher baseline levels of QOL were found to be a significant independent predictor of mortality. Demonstrating the overall clinical utility of this measure within a DMP.

Establishing the clinical utility of the living with heart failure quality of life measurement instrument in the management of heart failure patients

**Background**
Quality of Life (QOL) measures are increasingly recognised as important prognostic factors in the management and treatment of HF patients. One such measure is the Minnesota Living with Heart Failure (HF) questionnaire (LIhFE). This disease specific QOL measure has been used to demonstrate treatment effectiveness and has been shown to be reliable and valid within a variety of contexts. This study aims to establish the clinical utility of this measure in predicting long-term mortality and morbidity within a HF patient population as well as demonstrating the benefits of an established multidisciplinary programme (MDP).

**Methods**
This is a Retrospective analysis of HF patients who completed a MDP of 3 months with annual follow-

**Results**
were, -0.91 and -0.93 respectively. Average pre and post QOL Total (Range 0-160), Physical (Range 0- 40) and Emotional (Range 0-25) dimension scores respectively were (N=85), Total: 49.3±26.1, 29.7±9.9, P<0.001; Physical: 23.8±12.4, 14.2±10.3, P<0.001; Emotional: 10.5±7.3, 7.0±5.5, P<0.001. Controlling for Gender, Age, NYHA class and EF levels, baseline LIhFE scores were significant independent predictors of mortality (LIhFE HR=1.021, CI 1.004:1.038, P<0.001, Age: HR=1.069, CI: 1.039:1.101, P<0.001). None of the LIhFE dimensions were significant predictors of acute HF admissions, acute non HF admissions or unscheduled contact with the clinic.

**Predictors of excess mortality post Myocardial Infarction in females**

**Background**
Research suggests that women have higher early mortality post acute myocardial infarction (AMI) than men. Potential factors to explain this disparity include delay to presentation, less aggressive medical and interventional strategies, and more severe disease at coronary catheterization in women. We aimed to assess these factors in our patient population.

**Methods**
Consecutive patients (n=214) presenting to coronary care in the Royal Victoria Hospital between January
59

**Trends in Myocardial Infarction**

The incidence and mortality of acute myocardial infarction (AMI) has decreased. However, the relative incidence of ST elevation (STEMI) vs. non-STEMI elevation myocardial infarction (NSTEMI) has not been studied. We prospectively assessed the incidence of STEMI and NSTEMI and investigated factors that may account for this type of presentation.

**Methods**

Consecutive patients admitted with a diagnosis of AMI (n=145) to a large district general hospital between February and July 2004 were studied.

**Results**

Fifty-four patients presented with a diagnosis of STEMI and 91 with NSTEMI (86 men, 59 females, mean age 68.4±12.6 years, range 40-90). The groups (STEMI vs. NSTEMI) were comparable with regards to age (66.1±SD1.2 vs. 69.8±SD12.0 years), sex (5/54; 65% vs. 51/91; 56%), hypertension (24/54; 44% vs. 49/91; 54%), dyslipidemia (17/54; 31% vs 29/91; 32%), and current smokers (10/54; 19% vs 29/91; 22%, p=0.001) was significantly more in patients with NSTEMI. Similar results were noted for the use of prior antithrombotic therapy (Aspirin 71/54; 91% vs 25/91; 33% p=0.01), clopidogrel 0/145 vs 6/54, p=0.01) in patients with no previous history of MI (n=108). In a multiple logistic regression analysis in all patients (all univariate predictors included), prior aspirin use was the only independent significant predictor of the type of presentation.

**Conclusion**

Non ST elevation MI is twice as common as ST elevation MI. Prior antithrombotic therapy may significantly affect the type of presentation.

**Patients undergoing scheduled diagnostic coronary angiography in our hospital routinely undergo pre-assessment including history, examination and routine lab analysis. 3-5 days in advance. Those in whom significant coronary disease was suspected were prepared for possible follow-up on (ad-hoc) coronary intervention, if logistically possible, or rescheduled PCI as an out patient procedure. PCI procedures were performed by 2 experienced operators. All patients were examined a 4 hr post procedure. CPK and cardiographs performed and reviewed by a registrar or consultant and were discharged home or transferred for admission by 4pm. Telephone contact was made with patients on the day following procedure.

**Methods**

Patients undergoing scheduled diagnostic coronary angiography in our hospital routinely undergo pre-assessment including history, examination and routine lab analysis. 3-5 days in advance. Those in whom significant coronary disease was suspected were prepared for possible follow-up on (ad-hoc) coronary intervention, if logistically possible, or rescheduled PCI as an out patient procedure. PCI procedures were performed by 2 experienced operators. All patients were examined a 4 hr post procedure. CPK and cardiographs performed and reviewed by a registrar or consultant and were discharged home or transferred for admission by 4pm. Telephone contact was made with patients on the day following procedure.

**Results**

Of 53 patients accepted for DCS, intervention was deemed not necessary in 2 (due disease regression, 1 due to symptom remission). Of the remaining patients, 18 (43%) were male, mean age 65 +/- 10.8 and mean distance resident from the hospital was 10.9 km (range 10 to 85 km). 35 patients underwent single vessel coronary stenting, 7 multivessel stenting and 3 underwent renal artery stenting. The mean number of lesions treated was 1.65. Using ACC/AHA Guidelines for PCI classification, 20 lesions were low risk, 28 moderate risk and 17 high risk. 34 lesions were treated with Taxus stents, 23 with...
Effect of anticoagulation therapy on intra-aortic balloon pump complications and outcomes in CABG and PCI patients

Background
Anticoagulation (AC) with heparin is recommended after intra-aortic balloon pump (IABP) insertion to minimize thromboembolic complications. However, AC may increase the risk of bleeding and mortality especially in higher risk patients. To determine this risk we evaluated the safety and efficacy of AC therapy in IABP patients undergoing revascularization in the benchmark Registry.

Methods
We analyzed bleeding and in hospital mortality outcomes in 296 patients who had an IABP inserted and underwent either PCI or CABG. Clinical demographics, mortality (as a function of clinical indices such as shock, taken at admission or before IABP insertion) and overall predicted in hospital mortality for each patient were compared between patients who did and who did not receive AC therapy.

Results
CABG was performed in 13,842 IABP patients of whom 8,814 were receiving AC therapy. PCI was performed in 6,049 IABP patients of whom 4,489 were receiving AC. The observed in hospital mortality among all IABP patients was 20.8% in CABG and 17.4% in PCI patients. The rate of major bleeding was 0.7% in CABG and 1.5% in PCI group. Overall, AC therapy was associated with a trend towards lowering mortality (19.7% vs. 20.5%, p=0.095) but no more bleeding (2.5% vs. 2.3%, p=0.005). There was lower mortality in CABG (14.6% vs. 17.6%, p=0.069) and in PCI (16.8% vs. 19.3%, p=0.039) patients who were taking AC therapy. Bleeding was common more in PCI patients (1.7% vs. 1.0%, p=0.05) on AC while CABG patients on AC had much lower bleeding risk (0.5% vs. 1.1%, p=0.005).

Conclusion
AC therapy is associated with a reduction in in-hospital mortality in IABP patients undergoing PCI or CABG. However, AC therapy is associated with a significant increase in bleeding events in PCI patients compared with CABG patients.

Are patients post-PCI safe to transfer?

Objective
The advent of femoral arteriotomy closure devices post-PCI has obviated the need for patients to be monitored in CCU. Currently the number of PCI cases performed/day is dictated by bed availability, a substantial number of these are transfers from other hospitals. The purpose of this study was to determine whether patients post-PCI had complications in the first 24 hours which would prevent them being transferred back to their referring hospital on the same day.

Methods
180 consecutive PCI cases were prospectively audited over 6 months at UCHG. Each patient had demographic, clinical, angiographic and procedural details collected. Intra-operative complications, femoral arteriotomy closure complications, and any adverse events post-PCI were recorded. Cardiac enzymes were measured pre and 18 hours post-PCI and telemetry on each patient was reviewed until discharge.

Results
Of the 180 PCI cases, 158(86.6%) were male. Mean (SD) age was 68 (11.9) yrs, 36(20%) were diabetic and 78(43.3%) were transfers from other hospitals. 77(40%) patients presented with a myocardial infarction. The number of patients who had PCI within the first 24 hours post MI was 121(70.2%). A majority of patients 14/180(7.3%) had normal left ventricular function. Target vessel was the LAD in 88/180(48.8%), LCX in 54/180(30%) and RCA in 49/180(27.2%) of cases. Multi-vascular PCI accounted for 37/180(20.5%) of cases. The most common type of target lesion was a class C lesion in 77/180(42.7%) of cases. PCI was successful in 172/180(95.3%) of cases and 8 patients had an in-therapeutic complication which required CCL admission. The femoral arteriotomy was closed with the ‘StarClose’ device in 154/180(85.4%). This device failed in 1 case, but there were no cases of haematoma or pseudoaneurysm formation. 24 hours post PCI in this group in uncomplicated PCI cases, excluding those which were performed within the first 24 hours post MI, there were no arrhythmias or prolonged episodes of cardiac pain post PCI which required intervention.

Conclusions
The ‘StarClose’ device is reliable and safe. No patients who underwent uncomplicated PCI more than 24 hours post MI had complications post procedure that would have prevented transfer to another hospital.

Implantation of drug-eluting stents in diabetic patients: a comparative analysis

Purpose
Diabetes is known to be an important independent predictor of events following percutaneous intervention. There is some data from randomised studies of Drug Eluting Stents (DES) compared to bare Metal Stents suggesting that paclitaxel eluting stents (PES) may perform better than sirolimus eluting stents (SES) in diabetic patients. In light of this we compared the outcomes of PES and SES implantation in diabetic patients.

Methods
127 diabetic patients treated with a single type of DES in an aleatory fashion in de-novo lesions (219 lesions) between March 2003 and February 2004 formed the study group. Both groups were similar for angiographic and clinical variables. The endpoint was per-patient in-hospital and follow-up major adverse cardiac events (MACE) defined as a composite of death, myocardial infarction (MI) and target vessel revascularisation, including target lesion revascularisation.

Results
The MACE rates in PES and SES groups were 23.9% and 36.7% respectively (relative increase 65%, adjusted HR 0.65 [0.31-1.30], p=0.16) and the lesion-based TLR rates were 14.2% and 21.4% (adjusted HR 0.66 [0.31-1.21], p=0.24). In the PES diabetic subgroup 15 patients (16%) underwent follow-up angiography and the restenosis rate per lesion was 19.3%, in the SES group 44 patients (71%) underwent angiographic follow-up and restenosis was found in 28.8% patients (Odds Ratio 0.58 [0.20-1.65], p=0.25).

Conclusions
While there are no statistically significant differences between both stents possibly due to the relatively small sample size, the raw data suggests a benefit for PES in our diabetic patients which concurs with previous data.

Background
Coronary artery disease is known to be a major cause of morbidity and mortality in diabetic patients. The advent of drug-eluting stents (DES) has improved on the disappointing results of bare metal stents (BMS) and has provided a major advance in managing drug-resistant coronary disease. The majority of the DES trials have excluded diabetic patients, and there are no large randomised trials comparing DES in diabetic vs. non-diabetic patients. Furthermore, the impact of diabetes on the different DES is not well understood. Since diabetes is known to be an important predictor of events following percutaneous intervention, DES outcomes in diabetic patients are of considerable clinical importance.

Methods
180 consecutive PCI cases were prospectively audited over 6 months at UCHG. Each patient had demographic, clinical, angiographic and procedural details collected. Intra-operative complications, femoral arteriotomy closure complications, and any adverse events post-PCI were recorded. Cardiac enzymes were measured pre and 18 hours post-PCI and telemetry on each patient was reviewed until discharge.

Results
Of the 180 PCI cases, 158(86.6%) were male. Mean (SD) age was 68 (11.9) yrs, 36(20%) were diabetic and 78(43.3%) were transfers from other hospitals. 77(40%) patients presented with a myocardial infarction. The number of patients who had PCI within the first 24 hours post MI was 121(70.2%). A majority of patients 14/180(7.3%) had normal left ventricular function. Target vessel was the LAD in 88/180(48.8%), LCX in 54/180(30%) and RCA in 49/180(27.2%) of cases. Multi-vascular PCI accounted for 37/180(20.5%) of cases. The most common type of target lesion was a class C lesion in 77/180(42.7%) of cases. PCI was successful in 172/180(95.3%) of cases and 8 patients had an in-therapeutic complication which required CCL admission. The femoral arteriotomy was closed with the ‘StarClose’ device in 154/180(85.4%). This device failed in 1 case, but there were no cases of haematoma or pseudoaneurysm formation. 24 hours post PCI in this group in uncomplicated PCI cases, excluding those which were performed within the first 24 hours post MI, there were no arrhythmias or prolonged episodes of cardiac pain post PCI which required intervention.

Conclusions
The ‘StarClose’ device is reliable and safe. No patients who underwent uncomplicated PCI more than 24 hours post MI had complications post procedure that would have prevented transfer to another hospital.
A comparison of sirolimus-eluting stents and paclitaxel-eluting stents in different lesions in the same patient

**Purpose**
Both currently available drug-eluting stents (DES) have been shown to be superior to bare-metal stents. However, there is no data on the safety and efficacy of the combination of both stents in the same patient. We compared the outcome of polymeric paclitaxel-eluting stent (PES) and sirolimus-eluting stent (SES) in different lesions in the same patient.

**Methods**
Between March 2003 and June 2004, 84 patients were treated with a combination of both SES and PES in 278 lesions. The safety end-point was the peri-procedural MI or at follow-up. The TLR rate is similar between the two devices and comparable to the TLR rate of similar patients treated with a single type of DES in our institution.

**Results**
The rate of peri-procedural MI was 5.9% and no in-hospital deaths or repeat revascularisations occurred. At 1 year there were no cardiac deaths, 2 non-cardiac deaths (1 for cancer, 1 for car accident), and 1 non Q-wave MI. No episodes of stent thrombosis were documented. The per-lesion analysis showed a TLR rate of 16.1% (97/588) after SES implantation, and of 15.5% (24/180) after PES (p=0.80).

**Conclusions**
Implantation of different types of DES in the same patient is safe, without major adverse events either peri-procedurally or at follow-up. The TLR rate is similar between the two devices and comparable to the TLR rate of similar patients treated with a single type of DES in our institution.

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**Background**
Recent clinical trials have supported the prophylactic use of AICD in heart failure patients with LVEF <35% and also confirmed the role of CRT in patients with LBBB, reduced ejection fraction (<5%) and also confirmed the role of CRT in the management of the routine heart failure population.

**Aim**
This report estimates the actual need for these interventions by applying the present clinical indications to our heart failure population.

**Methods**
Consecutive patients attending our heart failure clinic underwent clinical assessment including NYHA classification, recording of medical therapy, and cumulative stent thrombosis. We compared the outcome of polymeric paclitaxel-eluting stent (PES) and sirolimus-eluting stent (SES) in different lesions in the same patient.

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The rate of peri-procedural MI was 5.9% and no in-hospital deaths or repeat revascularisations occurred. At 1 year there were no cardiac deaths, 2 non-cardiac deaths (1 for cancer, 1 for car accident), and 1 non Q-wave MI. No episodes of stent thrombosis were documented. The per-lesion analysis showed a TLR rate of 16.1% (97/588) after SES implantation, and of 15.5% (24/180) after PES (p=0.80).

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Implantation of different types of DES in the same patient is safe, without major adverse events either peri-procedurally or at follow-up. The TLR rate is similar between the two devices and comparable to the TLR rate of similar patients treated with a single type of DES in our institution.

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**Purpose**
A comparison of sirolimus-eluting stents and paclitaxel-eluting stents in different lesions in the same patient.

**Methods**
Between March 2003 and June 2004, 84 patients were treated with a combination of both SES and PES in 278 lesions. The safety end-point was the peri-procedural MI or at follow-up. The TLR rate is similar between the two devices and comparable to the TLR rate of similar patients treated with a single type of DES in our institution.

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**Conclusions**
Implantation of different types of DES in the same patient is safe, without major adverse events either peri-procedurally or at follow-up. The TLR rate is similar between the two devices and comparable to the TLR rate of similar patients treated with a single type of DES in our institution.

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**Background**
Recent clinical trials have supported the prophylactic use of AICD in heart failure patients with LVEF <35% and also confirmed the role of CRT in patients with LBBB, reduced ejection fraction (<5%) and also confirmed the role of CRT in the management of the routine heart failure population.

**Aim**
This report estimates the actual need for these interventions by applying the present clinical indications to our heart failure population.

**Methods**
Consecutive patients attending our heart failure clinic underwent clinical assessment including NYHA classification, recording of medical therapy, most recent hospitalisation for HF, ECG and echocardiography to determine if CRT or AICD are clinically indicated (CI) or not (NCI). Patients with already applied CRT or AICD were counted as CI.

**Results**
One hundred and seventy-eight patients were assessed (mean age 72 ± 10 yrs, male 64.4%, ischaemic aetiology 65%, 83% LVEF <45%) from a total patient base of 902. Seventy-two patients (40%) had LVEF <35% and could be considered for AICD. With regard to CRT, 30 (31%), from 98 patients had LBBB, 24 of whom had LVEF <35%. Only 6 of this group had NYHA III symptoms on maximal medical therapy, representing 5.9% of the total population.

**Conclusion**
These data indicate that the need for AICD in the routine heart failure population is considerable. Improved definition of those likely to derive benefit may focus the future use of this expensive therapy. However, based on present clinical indications a small group require CRT, highlighting only a niche role for CRT in the management of the routine heart failure population.
Survival of patients with out of hospital cardiac arrest who had rapid defibrillation with an automatic external defibrillator compared to those who received late or no defibrillation

Methods
All patients with an out of hospital cardiac arrest who received cardio-pulmonary resuscitation and were brought to the emergency department of the Mater Misericordiae University Hospital (a tertiary referral centre in Dublin, Ireland) were included in this study. Data was collected prospectively for a two year period from 1st January 2003 to 31st December 2004. Information was collected from patient records, medical and paramedical staff, patients’ relatives and AED interrogation.

Results
A total of 488 patients were brought to the emergency department after out of hospital cardiac arrest. Age ranged from 17-99 years (mean 62 years, SD 19 years), of these 273 (71%) were male and 15 (30%) were female. The majority of patients (n=265, 68%) suffered cardiac arrest in their own homes, but an important minority collapsed in a public place (n=103, 21%). There was no known history of cardiac disease in the majority of cases (n=323, 83%). A past history of cardiac disease was present in 98 patients (20%). The remaining 27 (5%) patients reported chest pain prior to cardiac arrest but had no previous history of cardiac disease. The majority of resuscitation attempts were unsuccessful (n=352, 91%). Of the 96 (39%) patients who survived initial resuscitation attempts, only 15 (3.4%) survived to be discharged home from hospital. Defibrillation was attempted in 74 (16%) patients in this study; the majority (n=61, 16%) were initially defibrillated in the emergency department. Of the 105 patients who suffered cardiac arrest in a public place, 15 (15%) who had rapid access to an AED were defibrillated. Of the 15 patients who survived to hospital discharge, 7 had been initially defibrillated using an AED. Overall survival in patients defibrillated initially with an AED was 54% (71/134) compared to 1.6% (6/75) in those not defibrillated with an AED, including 61 patients who received late defibrillation on arrival in the emergency department.

Conclusion
Out of hospital cardiac arrest carries a poor prognosis. In this single-centre study, survival to hospital discharge occurred in 54% (71/134) of patients initially defibrillated with an AED compared with 1.6% (6/75) of patients not rapidly defibrillated with an AED. These data indicate that rapid public access defibrillation with an AED has an important role in survival from out of hospital cardiac arrest.

Plasma B-Natriuretic Peptide prior to Cardioversion predicts maintenance of sinus rhythm at 1 month

Methods
Twenty four consecutive patients had BNP levels; two tracings (ECC) performed prior to and following CV. Anti arrhythmic therapy was recorded. Detailed recording of left atrial (LA) dimensions, left ventricular function (LVEF) and doppler indices of diastolic function were noted. Follow up was scheduled at 28 days post CV or earlier if patients reported recurrence of symptoms. Two sample t-test and paired t-test were used to compare parameters.

Results
Mean age of patients 65.1 years. Male: Female ratio was 1:6.1. Mean BNP levels fell significantly following cardioversion (mean BNP difference 14.12pg/ml vs. 389.99pg/ml, p<0.001). Mean age was significantly lower in the patients who maintained sinus rhythm compared to those who reverted to AF (mean BNP 180.79pg/ml vs. 389.99pg/ml, p<0.001). Mean age was significantly different between the maintenance and recurrence groups (mean age 61.64 yrs vs. 68.28 yrs, p<0.001). Traditional predictors were analysed i.e. LA size, UVEF duration and amiodarone use pre-cardioversion.

Conclusion
In view of the current controversy of rhythm versus rate control for AF, this prospective study demonstrates a possible novel use for BNP in predicting successful maintenance of sinus rhythm following electrical cardioversion. This may therefore prove useful in patient selection for elective cardioversion.

Identifying Cardiac Risk Factors in volunteers attending community screening programmes in Western Regional Health Authority

Purpose
The objective of this study was to identify cardiac risk factors in volunteers who attended community screening programmes and to promote awareness about modifying these risk factors.

Methods
This observational study was performed by the West of Ireland Cardiology Foundation (KROI). All subjects (n =376) voluntarily attended community screening programmes. Each individual had BMI, blood pressure measurement, an assessment of dietary and exercise habits, smoking status, alcohol consumption, cardiovascular, stroke and peripheral vascular disease Framingham risk score, a lifestyle assessment score according to the Grampian scale, fasting glucose, total cholesterol and lipoprotein profile measurement. Participants then received educational advice tailored to their specific cardiovascular risk factors.

Results
A total of 376 individuals were assessed. Of these 1760 (46.5%) were male. Male: Female ratio was 1:4 (51% vs. 49%). Median age was significantly lower in the maintenance group (51% vs. 5.82 months) in the success group (p< 0.001). UVEF was significantly higher in the recurrence group (27% vs. 20%, p<0.001). Amiodarone use prior to CV was not significantly different between both groups.

Conclusion
Individuals who attended this screening programme, particularly those with secondary prevention risk factors, were overweight, had sub-optimally controlled blood pressure and had a low compliance rate with anti-platelet therapy. Overall, lipid control was within accepted goals and compliance with statin therapy was comparatively high.
Homocysteine, Apolipoprotein B/AI ratio and the Metabolic Syndrome are predictors of cardiovascular risk using the SCORE system

Background
The attributable risk of conventional risk factors for cardiovascular disease (CVD) ranges from 50-92% in various studies. The added value of newer risk markers to CVD risk assessment remains unclear because of their wide diversity. Furthermore, it is unclear whether they contribute independently to risk assessment.

Methods
We used patients recruited in The European Concerted Action Project: Homocysteinaemia and Vascular Disease (COMAC) to examine possible associations of homocysteine (Hcy), cysteine, apolipoproteins (Apo) and the metabolic syndrome (MS) with CVD. COMAC is a multicentre case-control study with 750 cases with CVD and 800 age- and sex-matched controls without CVD. All conditional logistic regression models are stratified by centre and adjusted for either age, sex and conventional risk factors, or the SCORE function. In the multivariate analyses, only either Apo B & AI or B/AI ratio were included in the regression model. The MS was defined using NCEP guidelines with BMI ≥ 30 as a proxy for waist circumference.

Results
Of the total 1550 patients, 400 were excluded due to missing components of one of the 559 with CVD, 283 (53%) had coronary heart disease (CHD), 160 (33%) had cerebrovascular disease and 122 (22%) had peripheral vascular disease (PVD) (overlaps exist). Table 1 shows the OR for all CVD in both univariate and multivariate analyses. Table 2 shows the multivariate OR for the sub-types of CVD. The effects of Hcy, Apo B/AI ratio and the MS remain independent after the addition of the SCORE function into the multivariate model.

Conclusions
Homocysteine, the metabolic syndrome and Apolipoprotein B/AI ratio are independent predictors of CVD beyond conventional risk factors, and the SCORE system. The effect of risk markers such as cysteine and Apolipoprotein B/AI ratio may vary between the sub-types of CVD.

Table 1

<table>
<thead>
<tr>
<th>Score</th>
<th>Univariate OR</th>
<th>P Value</th>
<th>Multivariate OR</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raised Homocysteine (≤ 12 µmol/L)</td>
<td>1.99 (1.48, 2.37)</td>
<td>&lt;0.001</td>
<td>1.95 (1.42, 2.69)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Apo B (≤ 0.1 mmol/L increase)</td>
<td>1.05 (1.00, 1.10)</td>
<td>0.04</td>
<td>1.04 (0.99, 1.10)</td>
<td>0.10</td>
</tr>
<tr>
<td>Apo AI (≤ 0.1 mmol/L increase)</td>
<td>0.95 (0.90, 0.99)</td>
<td>0.02</td>
<td>0.96 (0.92, 1.01)</td>
<td>0.12</td>
</tr>
<tr>
<td>Apo B/AI ratio (≤ 0.1 unit increase)</td>
<td>1.10 (1.04, 1.16)</td>
<td>&lt;0.001</td>
<td>1.10 (1.01, 1.19)</td>
<td>0.01</td>
</tr>
<tr>
<td>Cysteine (≤ 50 µmol/L increase)</td>
<td>1.12 (0.94, 1.32)</td>
<td>0.26</td>
<td>0.98 (0.79, 1.21)</td>
<td>0.83</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>2.13 (1.96, 2.30)</td>
<td>&lt;0.001</td>
<td>1.80 (1.29, 2.48)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Score</th>
<th>Univariate OR</th>
<th>P Value</th>
<th>Multivariate OR</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raised Homocysteine (≤ 12 µmol/L)</td>
<td>1.60 (1.08, 2.38)</td>
<td>P=0.02</td>
<td>2.28 (1.64, 3.17)</td>
<td>P=0.001</td>
</tr>
<tr>
<td>Apo B (≤ 0.1 mmol/L increase)</td>
<td>1.05 (0.99, 1.10)</td>
<td>&lt;0.05</td>
<td>0.99 (0.92, 1.06)</td>
<td>P=0.09</td>
</tr>
<tr>
<td>Apo A (≤ 0.1 mmol/L increase)</td>
<td>0.97 (0.88, 1.07)</td>
<td>P=0.09</td>
<td>0.98 (0.89, 1.07)</td>
<td>P=0.03</td>
</tr>
<tr>
<td>Apo B/AI ratio (≤ 0.1 unit increase)</td>
<td>1.11 (1.05, 1.17)</td>
<td>P=0.38</td>
<td>1.09 (0.99, 1.19)</td>
<td>P=0.08</td>
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<tr>
<td>Cysteine (≤ 50 µmol/L increase)</td>
<td>1.45 (1.09, 1.94)</td>
<td>P=0.01</td>
<td>0.69 (0.49, 0.98)</td>
<td>P=0.04</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>1.98 (1.21, 3.20)</td>
<td>P=0.003</td>
<td>1.42 (0.80, 2.69)</td>
<td>P=0.21</td>
</tr>
</tbody>
</table>

72 Causes of Sudden Death in an Irish population: a retrospective post-mortem analysis

Introduction
Despite the fact that a substantial proportion of the population die suddenly, there is a remarkable lack of data on the prevalence and cause of sudden death in Ireland. To define the cause of sudden death in an Irish population we reviewed the autopsy reports of a population undergoing postmortem examination over a 15 year period at Connolly Hospital between 1987 and 2002.

Methods
A total of 1,999 autopsies were performed between January 1987 and December 2002. Causes were assigned due to ineligibility of 277 (41%) were performed because of unexpected or sudden death. Sudden death was defined as death occurring within an hour of onset of symptoms. Causes involving trauma, suicide or poisoning were omitted from further analysis. Direct cause of death was noted and where determined the dominant pathological findings were noted.

Results
Of the 777 autopsies included in this study, 538 (69%) were male. Postmortem findings as to the cause of death were as follows: 608 (75%) cardiac, 50 (6.4%) respiratory, 37 (4.8%) intracranial bleed, 35 (4.7%) pulmonary embolus, 24 (3%) aortic aneurysm rupture, 19 (2.4%) gastrointestinal and 7 (0.9%) epilepsy.

Specific causes of death among the 608 subjects in the cardiac group were subanalysed. 124 (20.4%) had evidence of a new MI, 94 (15.5%) had evidence of an old MI, 390 (64%) had no evidence of infarction but all and coronary disease of varying severity. Severely pulmonary edema was recorded in 99 (16.5%), 40 (6.6%) had LV wall rupture, 16 (2.6%) had valvular disease, 2 (0.3%) had endocarditis, 2 (0.3%) had HCM, 4 (0.7%) DCM, 2 (0.3%) RVCA, 1 congenital heart disease and 2 cardiac sarcoid, as the principle cause of death. Only 40 cases in the cardiac group had normal coronaries. All of these and significant valvular disease or cardiomyopathy. A possible mechanical cause of death was documented in 172 (28%) of cases, therefore lethal ventricular arrhythmias were the presumed mechanism of death in 72%.

Conclusion
40% of deaths in this autopsy series occurred suddenly. Cardiac disease was by far, the most common cause of sudden death. Ventricular arrhythmias, which are potentially treatable with rapid access defibrillation, were the presumed mechanism of death in 72% of those patients who died suddenly of cardiac disease.

73 Left ventricular multisites pacing study

Background
The role of biventricular pacing in patients with aberrant conduction and heart failure has been established in recent randomised trials. The potential adverse impact of chronic right ventricular apical pacing on left ventricular remodelling has been a source of concern. The role of biventricular pacing and pacing at more than one left ventricular site in the cardiac function of patients with preserved intraventricular conduction has yet to be determined. Cardiac resynchronisation therapy has been implemented through transvenous systems. Limited by access techniques, the anterior wall is the most paced site, as the anterior venous route is the largest and easiest coronary vein to access, it is probably not the most beneficial site.

Objectives
We aimed to determine the acute haemodynamic effects of multisite pacing at more than one left ventricular site and compare it to conventional biventricular and DDD pacing in patients with normal QRS duration.

Methods
We compared eight pacing modes in 20 patients with narrow QRS (<120ms) who underwent elective coronary artery bypass graft surgery (CABG). Epicardial leads were positioned during surgery in the right atrium (RA), right ventricle (RV) and three leads in the left ventricle (LV) (apex, mid anterior wall and mid posterior wall). Cardiac index, systemic and pulmonary vascular resistance indices, pulmonary artery wedge pressure, arterial blood pressure, pulmonary artery pressure and central venous pressure were measured with Swan-Ganz and radial arterial catheters.

Conclusion
Biventricular pacing, with left ventricular stimulation from two sites, significantly improves the cardiac index in comparison with conventional biventricular pacing stimulating single left ventricular site, in patients with normal QRS duration and preserved left ventricular function. Biventricular pacing, implemented with either approach, is not better than conventional dual chamber pacing in this cohort.
Energy setting of biphasic shocks for direct current cardioversion of atrial fibrillation

**Background**
No consensus currently exists regarding energy selection and the use of biphasic waveforms for DC cardioversion (DCC) of atrial fibrillation (AF). The aim of this study was to compare the safety and efficacy of 2 DCC energy protocols for AF.

**Methods**
A total of 206 patients who were referred for elective DCC of AF were randomised to energy protocol A (200J/150J/200J/200J) or protocol B (200J/200J/200J) or protocol B (200J/200J/200J). All patients had electrode pads placed in the right infraclavicular and apical positions and were treated with a Heartstream XL defibrillator. Transcutaneous impedance (TTI) was calculated by the defibrillator for each shock.

**Results**
Of the 206 patients, 134 were male, mean age was 67±10 years and BMI was 28±5 kg/m2. The median duration of AF was 6 months (IQR 4-6). Both groups were well matched for baseline characteristics, drug treatment and aetiology of AF. Success was achieved by shock 1 in 50/100 (50%) patients in A versus 71/106 (69%) in B (p=0.006), after 2 shocks in 79/100 (79%) A versus 87/106 (82%) B and after 3 shocks in 87/100 (87%) A versus 93/106 (88%) B. By shock 4 success was 88/100 (88%) in A, Mean number of shocks was 1.84 A versus 1.10 B (p<0.001). Mean cumulative energy was 243 J A and 300 J B (p<0.001). Mean duration of procedure was 8.21 (SD±5.24) 61 minutes for A and 8.14 (SD±5.29) minutes for B.

**Conclusion**
First shock success was significantly higher when starting at 200J (protocol B). There is no statistically significant difference in efficacy between subsequent shocks. Fewer shocks are required if protocol B is employed.

A novel rectangular biphasic waveform from a radiofrequency defibrillator compared with a conventional waveform for the transvenous cardioversion of chronic atrial fibrillation in patients

**Purpose**
The optimal waveform for the transvenous direct current cardioversion (DCC) of atrial fibrillation (AF) is unknown. A novel rectangular biphasic waveform (6/6ms: duration, phase 2 peak voltage 50% of phase 1) delivered from a radiofrequency (RF) powered defibrillator was compared with a conventional capacitor based exponential biphasic waveform of equivalent duration and voltage.

**Method**
Patients with chronic AF (fully anticoagulated) were randomised to receive either the RF or a conventional trapezoidal waveform (Ventritex HVS-02). Defibrillation electrodes were positioned in the right atrial appendage (cathode) and distal coronary sinus (anode). All shocks were R-wave synchronised. Phase 1 peak voltage was increased in stepwise progression (anode). All shocks were R-wave synchronised. Phase 1 peak voltage was increased in stepwise progression (anode). All shocks were R-wave synchronised. Phase 1 peak voltage was increased in stepwise progression (anode). All shocks were R-wave synchronised. Phase 1 peak voltage was increased in stepwise progression (anode). All shocks were R-wave synchronised. Phase 1 peak voltage was increased in stepwise progression (anode).

**Results**
Patients (n=22, 15 male) received 119 shocks (RF=62, conventional=57). Mean age was 62 (±13.2) years, mean BMI was 30 (±7) and mean duration of AF was 10.2 (±11.1) months. The groups were matched in terms of age, gender, BMI, duration of AF, aetiology, drugs and echocardiographic features.

The RF waveform performed significantly better than the conventional waveform for the cardioversion of chronic AF (9 of 12 patients (75%) versus 2 of 10 patients (20%) success, p = 0.01). The mean leading edge voltage for the RF was 216V (Range 100-300) and for the conventional waveform was 270V. No significant arrhythmias, sinus pauses or episodes of hypotension occurred. There was no elevation of cardiac enzymes.

**Conclusions**
The novel biphasic waveform has a superior efficacy at a lower voltage compared with the conventional waveform in the transvenous cardioversion of AF. There were no arrhythmias, haemodynamic complications or elevation of markers of myocardial injury. Use of this waveform may improve the efficacy of implantable devices for the treatment of AF.