should also be considered in patients with inadequate clinical response to monotherapy (ESC/ERS 2009). We aim to assess the use of modern advance treatments in 'real-life' patients and their impact on survival.

Methods A retrospective review of all incident cases of idiopathic, heritable and anorexigen-associated PAH diagnosed between 1st January 2001 and 31st December 2009 in our unit. Baseline and follow-up data were collected from case notes and local pulmonary hypertension database.

Results 94 incident cases were diagnosed (62% female) with median age of 63 years. 36% (n=34) of patients were on combination therapy. All except one patient were started on monotherapy, with second agent added at later stage. The median time from initiation of monotherapy to introduction of the second agent was 244 days. 25% had prostanoids; 51% endothelin receptor antagonists and 81% phosphodiesterase type-5 inhibitor at some point of their treatment. The median survival is 5.63 years. We performed further analysis on the 28 patients who have died by censor date. Only seven patients were on prostanoids and eight patients on combination therapy. Possible explanations for low proportions of dead patients on prostanoids and/or combination therapy are outlined in Abstract P31 Table 1.

Abstract P31 Table 1 Possible explanations why prostanoids or combination therapies were not started

	Number of dead patients (total=28)
Already on prostanoids	7
Died from unrelated causes	6
Prostanoids considered but felt inappropriate, for palliation only	5
No documented explanation	3
Treatment optimised less than 4 months before death	2
Clinically improving at last clinic review before death	2
Sudden unexpected death	1
Lost to follow up	1
Poor compliance, frequent non-attendance of clinics	1

Conclusion Our results demonstrate improved survival compared to pre-advance therapy era. Apart from proven efficacy of various PAH specific treatment, several other factors may also influence the treatment decision for individual patient.

P32 DELIVERING PULMONARY HYPERTENSION SERVICES—5 YEAR EXPERIENCE FROM A SATELLITE CENTRE

doi:10.1136/thx.2010.150961.32

¹S Sturney, ²S Redcliffe, ¹H Davies, ¹G Robinson, ¹J Easaw, ¹J Suntharalingam, ²G Coghlan. ¹Royal United Hospital, Bath, UK; ²Royal Free Hospital, London, UK

Introduction There are currently no National Commissioning Group (NCG) designated Pulmonary Hypertension (PH) centres in the South West. As a result patients can travel up to 300 miles to access specialist care. In 2005, a satellite service was developed at the Royal United Hospital (RUH), Bath in conjunction with the Royal Free, London. Initially the service simply provided a follow up service for patients known to the Royal Free. Since 2007 the service has fully investigated and managed new referrals locally, with supervision from the Royal Free. Patients have typically only needed to travel to an NCG centre for initiation of parenteral prostanoid therapy or for pulmonary endarterectomy (PEA).

Aim This abstract describes the first 5 years of activity by the RUH satellite PH service.

Results As of 1st July 2010, 147 new referrals have been received, increasing steadily from 7/year in 2005–2006 to 57/year in 2009–2010. Referrals originated from 7 specialities across 12 PCTs, with 48.6% from outside the immediate catchment area. 43 patients were diagnosed with Pulmonary Arterial Hypertension (PAH) (including 34 with Connective Tissue Disease-related PAH), 21 with Chronic Thromboembolic Pulmonary Hypertension (CTEPH) (including 15 referred for PEA surgery), 13 with PH associated with lung disease, 24 with PH associated with left heart disease. PH was excluded in 45 cases. 62 have received PH-specific medication; 38 monotherapy and 24 combination therapy (including 7 intravenous, 1 subcutaneous and 2 nebulised prostanoid therapy). Survival data for the 38 treated WHO Group 1 PAH patients compares favourably with published data for NCG designated centres; 89.5% at 1 year (95% CI 74.2% to 96.6%), 82.3% at 2 years (95% CI 65.9% to 92.2%) and 77.2% at 3 years (95% CI 60.3% to 88.6%). 489 journeys were made to the RUH and only 60 to NCG centres, saving approximately 56 000 patient miles. A recent patient survey indicated high levels of satisfaction, with 94.4% stating they would rather continue follow-up locally.

Discussion These results suggest that a comprehensive PH specialist service can be delivered locally in a way that is more convenient for patients whilst still maintaining national standards of care.

P33 IRON DEFICIENCY INDEPENDENTLY PREDICTS SURVIVAL IN IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

doi:10.1136/thx.2010.150961.33

CJ Rhodes, LS Howard, M Busbridge, D Ashby, E Kondili, JSR Gibbs, J Wharton, MR Wilkins. Imperial College London, London, UK

Objectives Characterise the iron status of patients with idiopathic pulmonary arterial hypertension (IPAH) and its clinical importance.

Abstract P33 Figure 1

Methods Circulating markers of iron status and erythropoiesis were determined in 135 patients with IPAHA and correlated with clinical indices and survival.

Results Iron deficiency, defined by raised plasma soluble transferrin receptor (sTfR) levels (>28.1 nmol/l) was present in ~63% of patients with IPAHA. Iron, ferritin and transferrin saturation levels were also reduced (Abstract P33 Figure 1); whereas mean haematocrit and haemoglobin levels were similar to healthy controls and red cell distribution width was increased. Levels of the master iron regulator hepcidin, which inhibits the dietary uptake and decreases serum iron, were raised (50.5 vs 34.4 ± 3.0 ng/ml; $p=0.04$) despite the presence of iron deficiency in the majority of patients. Hepcidin correlated inversely with sTfR and erythropoietin (EPO) levels as would be expected, but not with IL-6, the most important inflammatory stimulus for hepcidin expression. After adjusting for iron status, hepcidin levels were significantly higher in IPAHA compared with healthy controls ($p=0.001$). Plasma sTfR levels increased with WHO class ($p<0.05$), showed a weak but significant correlation with 6MWD ($R=-0.25$, $p=0.03$) and growth differentiation factor-15 ($R=0.281$, $p=0.01$) and independently predicted survival after adjustments for 6MWD, WHO class and NT pro-BNP levels ($p=0.022$).

Conclusions A significant proportion of IPAHA patients are iron deficient and this relates to disease severity and outcome. Hepcidin levels are inappropriately high in IPAHA and may be driving iron deficiency.

P34 CHARACTERISING T CELL SUB-POPULATIONS IN PULMONARY HYPERTENSION

doi:10.1136/thx.2010.150961.34

¹AJ Shepherd, ¹K Hopkinson, ²DG Kiely, ²CE Elliot, ²R Condliffe, ³DC Crossman, ¹AG Pockley, ¹A Lawrie. ¹University of Sheffield, Sheffield, South Yorkshire; ²Royal Hallamshire Hospital, Sheffield, South Yorkshire; ³NIHR Cardiovascular Biomedical Research Unit, Sheffield, South Yorkshire

Introduction Pulmonary arterial hypertension (PAH) is characterised by an increase in pulmonary vascular resistance which leads to right ventricular failure and death. Given that PAH is associated with HIV (in which CD4⁺ lymphocytes are depleted), and that athymic rats demonstrate heightened pulmonary vascular remodelling in the SUGEN model, suggests that inflammation plays an important role in disease pathogenesis. T cells might therefore dampen rather than accentuate PAH.

Hypothesis Reduced CD4⁺ T cell numbers and/or an increase in the prevalence, activation and function of naturally-occurring immunoregulatory T (Treg) cells are a "second hit" in the pathogenesis of PAH.

Methodology The T cell subset composition (CD3⁺, CD4⁺, CD8⁺) and prevalence of Treg cells (CD4⁺CD25^{bright}, CD4⁺CD25^{bright}CD127^{dim}, CD4⁺CD25^{bright}CD127^{dim}Foxp3⁺, CD4⁺CD25^{bright}Foxp3⁺) in the peripheral blood of patients with suspected PAH attending the Pulmonary Vascular Disease Unit and corresponding controls (healthy, no PAH at right heart catheterisation with and without SSC) were determined using multiparameter flow cytometry. The activation status (CD69 expression) of T cell subsets was also determined.

Findings Peripheral blood CD3⁺ T cells show heightened activation in patients with PAH compared to controls. The proportion of circulating CD4⁺ T cells is reduced in patients with Idiopathic PAH (IPAHA), and CD4⁺T cells are less activated in patients with limited and diffuse PAH associated with systemic sclerosis (PAH-SSc). The proportion of circulating CD8⁺ T cells is higher in patients with diffuse PAH-SSc, and CD8⁺ T cells are more activated in patients

with IPAHA than in their controls. The proportion of CD4⁺CD25^{high}FoxP3⁺ Treg cells is decreased in patients with limited SSC-PAH compared to controls, and compared with controls, these cells are less activated in IPAHA and limited SSC-PAH.

Conclusions These data indicate that circulating T cell subset profiles are altered in patients with PAH and a changing T cell subpopulation profile might therefore be a potential biomarker of disease or provide insight into future therapeutic targets. Studies to determine the influence of disease progression on T cell subpopulations, the functional properties of Treg cells in patients with PAH and the interaction of these cells with pulmonary artery endothelial cells in vitro are currently underway.

P35 ELEVATED TRICUSPID REGURGITATION JET VELOCITY ON ECHOCARDIOGRAM IN SICKLE CELL DISEASE IS ASSOCIATED WITH RAISED INFLAMMATORY MEDIATORS AND LOW STEADY STATE HAEMOGLOBIN BUT NOT OTHER MARKERS OF HAEMOLYSIS

doi:10.1136/thx.2010.150961.35

¹H Ranu, ¹E Connell, ¹C Hunt, ¹F Boa, ²J Lee, ²L Brown, ¹F Willis, ¹H Buyck, ¹BP Madden. ¹St George's Hospital, London, UK; ²St George's Medical School, London, UK

Introduction and Objectives Pulmonary hypertension (PH) in Sickle cell disease (SCD) is defined as tricuspid regurgitation jet velocity ≥ 2.5 m/s on trans thoracic echocardiogram. It is an important complication of SCD and is associated with significant mortality. Haemolysis with impairment of the nitric oxide pathway is felt to play a major part in its pathogenesis. We have examined the association of haemolytic markers and inflammatory cytokines in haemoglobin SS (HbSS) adults with PH (TRV ≥ 2.5 m/s) and without PH (TRV < 2.5 m/s). Cytokines studied included interleukin 8 (IL-8), which may have a role in promoting adhesion of sickled red cells to vascular endothelium and stem cell factor (SCF), which acts on erythroid progenitor cells.

Methods 32 adult HbSS patients (mean age 37 years $\pm$ 11.6, median 37 years) were recruited at steady state defined as 2 weeks or more following an acute crisis. Serum levels of haemolytic markers (haemoglobin, lactate dehydrogenase LDH, bilirubin), asymmetric dimethylarginine (ADMA a naturally occurring nitric oxide synthase inhibitor), SCF and IL 8 were measured.

Results Results are given in Abstract P35 Table 1 and expressed as mean $\pm$ SD. TRV was significantly correlated with Hb ($p=0.003$ $r=-0.51$), ADMA ($p<0.05$, $r=0.35$), IL 8 ($p=0.009$, $r=0.48$) and SCF ($p=0.006$, $r=0.51$).

Abstract P35 Table 1 Values for haemolytic and inflammatory markers in SCD patients with TRV < 2.5 m/s and TRV ≥ 2.5 m/s

	No PH (TRV < 2.5 m/s)	PH (TRV ≥ 2.5 m/s)	p value
TRV m/s	1.88 $\pm$ 0.44	2.74 $\pm$ 0.27	<0.001
Haemoglobin g/dl	10.1 $\pm$ 1.4	8.3 $\pm$ 1.3	0.001
LDH U/l (0–175)	403 $\pm$ 97	463 $\pm$ 154	0.66
Bilirubin μ mol/l (0–17)	51 $\pm$ 31	32 $\pm$ 10	0.11
ADMA μ mol/l	0.778 $\pm$ 0.137	1.007 $\pm$ 0.239	0.012
SCF pg/ml	167.6 $\pm$ 81.5	313.6 $\pm$ 156.7	0.013
IL 8 pg/ml	12.96 $\pm$ 4.01	35.80 $\pm$ 32.16	0.015

Conclusion PH in SCD is associated with lower haemoglobin and ADMA but not other markers of haemolysis. There is a significant association of TRV with IL 8 and SCF, which has not been previously described in adults. Inflammatory mediated endothelial dysfunction is likely to also play an important role in the