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	Novo Lecture	Nordisk Lecture
1976	D.K.O'Donovan	
1977	S. Bloom	
1978	J.H.S. Robertson	
1979	A.G. Cudworth	
1980	D.A.D. Montgomery	
1981	Peter Watkins	
1982	G. Joplin	
1983	D.R. London	
1984	A.X. Bertagna	
1985	Malcolm Nattrass	Laurence Kennedy
1986	Brian Frier	JB Ferriss
1987	Maurice Scanlon	TJ McKenna
1988	D.A. Heath	AB Atkinson
1989	J. Ward	GH Tomkin
1990	R. Volpe	KD Buchanan
1991	Michael Besser	PPA Smyth
1992	R.V. Ragontte	DH Hadden
1993	Bruce Weintraub	David Powell
1994	Oscar Croffard	Patrick Bell
1995	Robert Lindsay	Brian Sheridan
1996	C.R.W. Edwards	Rosemary Freaney
1997	Stephanie Amiel	David McCance
1998	Robert Turner	Randle Hayes
1999	Ian Hay	Sean K Cunningham
2000	Stephen O'Rahilly	Michael Cullen
2001	Andre Lacroix	Daphne Owens
2002	J. Tuomilehto	Chris Thompson
2003	Tony Weetman	John Nolan
2004	R.V. Thakker	RGR Firth
2005	P.M. Stewart	FMP O'Harte
2006	Kevin Docherty	CH Walsh
2007	Lynnette Nieman	Timothy O'Brien
2008	Ken Ho	Donal O'Shea
2009	Daniel J. Drucker	Steven Hunter
2010	Joseph G. Verbalis	James Gibney
2011	Thomas A. Buchanan	Maria Byrne
2012	Beverly M.K. Biller	Fidelma Dunne
2013	Mark McCarthy	Diarmuid Smith

Lifetime Acheivement Award

2012	David Hadden
2013	T Joseph McKenna

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Friday 14th November 2014

1 pm to 1.45 pm Poster Viewing session

1.50 pm Welcome and introduction
Prof Tim O'Brien
President, Irish Endocrine Society

Friday Oral presentations

2.00 pm OC1. A randomized, double-blind, placebo-controlled of vitamin D for Irish children with asthma: baseline data
Hutchinson K[1], Kerley C[2], Elnazir B[3], Couglan D[3], Greally P[3], Rochev Y[4], Faul JL[2]
[1]Biomnis Ireland, Sandyford, Dublin 18, Ireland, [2]Asthma Research Centre, Connolly Hospital, Dublin 15, Ireland, [3]Adelaide and Meath Hospital, Tallaght, Dublin 24, Ireland, [4]NCBES, National University of Ireland, Galway, Ireland

2.15 pm OC2. TRAIL reduces constitutive and stimulated IL-6 release from human aortic endothelial cells
Forde H,[1] Davenport C,[1] McLoughlin A,[2] Hynes L,[3] Smith D,[1] and Cummins PM[2]
[1]Department of Diabetes and Endocrinology, Beaumont and RCSI Medical School, Beaumont, Dublin 9, [2]School of Biotechnology and Centre for Preventative Medicine, Dublin City University, Glasnevin, Dublin 9, [3]Department of Health Psychology, National University of Ireland Galway, Newcastle, Galway.

2.30 pm OC3. Targeting GPR120 by novel lipid agonists in a glucagon secreting cell line and mouse pancreatic tissue
Gormley NM, Flatt PR, McKillop AM
Biomedical Sciences Research Institute, University of Ulster, Coleraine, Northern Ireland

2.45 pm OC4. Impact of postoperative magnesium levels on early hypocalcaemia and permanent hypoparathyroidism after thyroidectomy
Garrahy A[1], Murphy MS[1], Sheahan P[2]
[1]Department of Endocrinology and Diabetes, South Infirmary Victoria University Hospital, Cork, [2]Department of Otolaryngology, Head and Neck Surgery, South Infirmary Victoria University Hospital, Cork

3.00 pm OC5. Early post-operative PTH as a predictor of recurrent primary hyperparathyroidisim in patients undergoing minimally invasive parathyroidectomy
Stroisceau A[1], McCartan DP[1], Evoy D[1], Gibbons D[2], Skehan S[3], McDermott EW[1], Prichard RS[1]
[1]Departments of Breast and Endocrine Surgery, [2] Pathology and [3]Radiology, [4]St Vincent's University Hospital, Elm Park, Dublin 4

3.15 pm OC6. Alterations in thyroid hormone levels following growth hormone replacement are incompletely explained by changes in the activity of 5′deiodinase enzymes in subcutaneous fat
Glynn N[1], Kenny H[2], Quisenberry L[3] Halsall DJ[4], Thompson CJ[1], O'Gorman D[2], Lado-Abeal J[3], Agha A[1]
[1]Department of Endocrinology, Beaumont Hospital & RCSI Medical School, Dublin 9, [2]School of Health and Human Performance, Dublin City University, [3]Division of Endocrinology, Texas Tech University Health Science Center, Lubbock, Texas, USA, [4]Department of Clinical Biochemistry, Addenbrooke's Hospital, Cambridge, UK

3.30–4.25 pm Coffee and Poster display

4.30 pm OC7. Topical Application of CD362 + Human Mesenchymal Stem Cells (Cyndacel-M) Seeded in Excellagen™ Scaffold Augments Wound Healing in a Diabetic Wound Model
Patil SB[1], Chen X[1], Watson L[2], Loftus P[2], O'Flynn L[2], Chandler LA[3], Rubanyi GM[3], Elliman SJ[2] and O'Brien T[4]
[1]Regenerative Medicine Institute (REMEDI) and Biosciences Research Building, National University of Ireland, Galway, Ireland, [2]Orbsen Therapeutics, Orbsen Building, National University of Ireland, Galway, Ireland, [3]Cardium Therapeutics, San Diego, CA 92121 USA, [4]Regenerative Medicine Institute (REMEDI) and Biosciences Research Building, National University of Ireland, Galway, Ireland and Department of Medicine, Galway University Hospital (GUH), Galway, Ireland

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4.45 pm **OC8. Insulin upregulates AKR1C3 expression in female adipose tissue: in vivo and in vitro evidence for adipose androgen generation in polycystic ovary syndrome (PCOS)**
O'Reilly MW, Gathercole LL, Capper F, Arlt W, Tomlinson JW
Centre for Endocrinology, Diabetes and Metabolism (CEDAM), University of Birmingham, Edgbaston, Birmingham B15 2TT

5.00 pm **39th Annual Novo Lecture**

'Pheochromocytoma and paraganlgioma in 2014: Towards better diagnosis and treatment'

Karel Pacak, MD, PhD, DSc

Senior Investigator

Chief, Section on Medical Neuroendocrinology
Professor of Medicine
Eunice Kennedy Shriver NICHD, NIH
Bethesda, Maryland 20892-1109 USA
Saturday 15th November 2014
8.30–9.25 am Annual General Meeting

Saturday Oral presentations

9.30 am **OC9. Audit of follow up of Differentiated Thyroid Cancer Patients**
Todd A, Rea T, Bell PM, Hunter SJ, McCance DR, Mullan KM, Courtney CH
Dept of Endocrinology, Royal Victoria Hospital Belfast, UK

9.45 am **OC10. Metformin in Gestational Diabetes Mellitus. Outcomes in an Irish Cohort**
Hameed A[1], Ryan G[2], McCarthy A[1], Daly S[2], Kinsley B[1]
Mater Misericordiae University Hospital[1], Coombe Women and Infants University Hospital[2], Endocrinology department, Mater Misericordiae University Hospital, Dublin[1], Obstetrics department Coombe Women and Infants University Hospital, Dublin[2]

10.00 am **OC11. Oral Glucose Tolerance Test in Gestational Diabetes—Possible utility in identifying those who will need pharmacotherapy**
McHugh C[1], ODonoghue D[2], Adebayo G[1]
[1]Sligo Regional Hospital, [2]NUIG

10.15 am **OC12. Effects of the "Croí Clann" structured lifestyle modification programme on anthropometric and metabolic characteristics in severely obese adults**
Crowe C[1], Gibson I[2], Cunningham K[1,2], Kerins C[2], Costello C[2], Windle J[2], Jones J[2], Finucane FM[1]
[1]Bariatric Medicine Service, Galway Diabetes Research Centre, HRB Clinical Research Facility, Ireland, [2]Croí, the West of Ireland Cardiac Foundation, Galway, Ireland

10.30 am **30th Annual Nordisk Lecture**

'Exploring the Chronic Care Model: a (diabetes) research journey'

Dr Sean F. Dinneen, MD, FRCPI
Consultant Endocrinologist, Galway University Hospitals
Head of School of Medicine, NUI Galway

11.00–11.30 am **Coffee/poster presentation session**

11.30 am **OC13. Glucose-dependent insulinotropic polypeptide (GIP) exerts beneficial effects on human osteoblastic-like SaOS2 cells**
Mansur SA, Flatt PR, Irwin N
School of Biomedical Sciences, University of Ulster, Coleraine, United Kingdom

11.45 am **OC14. The prevalence rate and rate of uptake of screening for gestational diabetes mellitus (GDM) in primary versus secondary care**
Tierney M[1], O'Dea A[1], Glynn L[2,3], Carmody L[2], McGuire B[2,4], Dunne F[1,2]
[1], [2]Galway Diabetes Research Centre, National University of Ireland, Galway,chool of Medicine, National University of Ireland, Galway, [3] Discipline of General Practice, National University of Ireland, Galway, [4]School of Psychology, National University of Ireland, Galway

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12.00 am **OC15. The effects of insulin analogues and liraglutide on markers of vascular calcification in vitro and on coronary artery calcification in patients with type 2 diabetes mellitus**

Davenport C[1], Mahmoud WA[2], Forde H[1], Ashley DT[1], Agha A[1], McDermott J[2], Sreenan S[2], Thompson CJ[1], McGrath F[3], McAdam B[4], Cummins PM[5], Smith D[1]

[1]Department of Academic Endocrinology, Beaumont Hospital, Co Dublin, [2]Department of Diabetes and Endocrinology, Connolly Hospital, Blanchardstown, Co Dublin, [3]Department of Radiology, Beaumont Hospital, Co Dublin, [4]Department of Cardiology, Beaumont Hospital, Co Dublin, [5]School of Biotechnology and Centre for Preventive Medicine, Dublin City University, Co Dublin

12.15 pm **OC16. Glycaemic control in Patients with Type 1 Diabetes Mellitus post transition to Young Adult Diabetes care**

Melvin A, Yogonathan S, Condren A, Hannon C, Byrne MM, Hatunic M, McQuaid SE

Dept of Endocrinology, Mater Misericordiae University Hospital, Dublin 7

12.30 pm **OC17. Can obese patients on antipsychotic medications achieve weight loss in an unmodified general population lifestyle-intervention weight management programme?**

Mat A[1], Breen C[1], Dunlevy C[1], O'Shea D[1,2]

[1]Weight Management Services, St Columcille's Hospital, Loughlinstown, Co Dublin, Republic of Ireland, [2]Department of Endocrinology, St Vincent's University Hospital, Elm Park, Dublin 4, Republic of Ireland

12.45 pm **OC18. Stable peptide analogues of dogfish glucagon possess novel dual agonist activities and show promising acute anti-diabetic actions in normal and diabetic mice**

FPM. O'Harte, M.T. Ng, AM Lynch, PR Flatt

School of Biomedical Sciences, University of Ulster, Coleraine, N. Ireland

13.00 pm **Presentation of Irish Endocrine Society O'Donovan Medal (best oral presentation) and Montgomery Medal (best poster presentation)**

Close of meeting

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Oral Presentations

OC1 A randomized, double-blind, placebo-controlled of vitamin D for Irish children with asthma: baseline data

Hutchinson K[1], Kerley C[2], Elnazir B[3], Couglan D[3], Greally P[3], Rochev Y[4], Faul JL[2]

[1]Biomnis Ireland, Sandyford, Dublin 18, Ireland; [2]Asthma Research Centre, Connolly Hospital, Dublin 15, Ireland; [3]Adelaide and Meath Hospital, Tallaght, Dublin 24, Ireland; [4]NCBES, National University of Ireland, Galway, Ireland

Vitamin D deficiency (VDD) and asthma-incidence/severity share many common risk factors. Vitamin D has a number of biological effects that are likely important in regulating key mechanisms in asthma, including immunomodulatory effects as well as altering airway hyperresponsiveness, pulmonary function, airway smooth muscle-remodeling and response to anti-asthma therapy. Thus, VDD may result in increased prevalence and severity of childhood asthma.

In Winter 2013–2014 we recruited 43 children (23 male), aged 5–15 (mean 8.7 years) with a mean body mass index (BMI) of 19.9 kg/m^2 (13–32.6) all previously diagnosed with asthma. We assessed vitamin D status (25[OH]D), markers of calcium homeostasis, immune function and inflammation as well as asthma control and pulmonary function. These children were randomized to either 2,000 iu vitamin D3/day or placebo for 15 weeks.

Mean 25(OH)D was 51 nmol/L (24–80). According to the *Institute of Medicine* guidelines, 21 children had deficient 25(OH)D levels (<50 nmol/L), while 22 had sufficient 25(OH)D levels (>50 nmol/L). There was no significant difference in demographics, serum markers or self-reported measures of asthma control between the VDD group and the vitamin D sufficient group. However, pulmonary function was significantly higher in the vitamin D sufficient group, including forced vital capacity FVC% (66 vs. 96 %; $p = 0.03$) and forced expiratory volume FEV1% (93 vs. 102 %; $p = 0.03$). Negative correlation was found between IgE and vitamin D levels ($p = 0.03$).

Our preliminary, baseline data indicate that vitamin D deficiency may predispose to decreased immune function and increased airway obstruction with a decrease in reported quality of life.

OC2 TRAIL reduces constitutive and stimulated IL-6 release from human aortic endothelial cells

Forde H[1], Davenport C[1], McLoughlin A[2], Hynes L[3], Smith D[1], Cummins PM[2]

[1]Department of Diabetes and Endocrinology, Beaumont and RCSI Medical School, Beaumont, Dublin 9; [2]School of Biotechnology and Centre for Preventative Medicine, Dublin City University, Glasnevin, Dublin 9; [3]Department of Health Psychology, National University of Ireland Galway, Newcastle, Galway

Evidence suggests that tumour necrosis factor-related apoptosis-inducing ligand (TRAIL), a member of the tumour necrosis factor (TNF) superfamily, may be involved in the pathogenesis of cardiovascular disease (CVD), possibly through a complex interplay with osteoprotegrin (OPG) and receptor activated nuclear factor kappa B (RANKL). Interestingly, observational studies have demonstrated lower serum levels of TRAIL, in parallel with higher serum cytokine levels, in patients with newly diagnosed type-2 diabetes mellitus (T2DM) and CVD burden. This concurs with other recent in vivo findings suggesting that TRAIL may exhibit vasoprotective effects towards the endothelium, although the mechanism of TRAIL-mediated vasoprotection remains poorly understood. The aim of this study therefore was to characterise the effect of TRAIL on proinflammatory cytokine release from vascular endothelial cells in vitro under both non-stimulated and injurious conditions. Primary-derived human aortic endothelial cells (HAECs) were initially treated with recombinant human TRAIL (0–200 ng/ml, 24 h) and monitored for IL-6 release by ELISA ($n = 3$). The effect of TNF-α (0–100 ng/ml, 24 h) on IL-6 release was also monitored in the absence and presence of TRAIL (100 ng/ml). TRAIL significantly reduced IL6 release from HAECs, with up to 60 % reduction at 200 ng/ml. This occurred in parallel with increasing cell viability. Furthermore, TNF-α induced the release of IL-6 from HAECs in a dose-dependent manner, with TRAIL significantly attenuating this effect at the higher TNF-α concentrations (50–100 ng/ml). In conclusion, TRAIL may impart protective effects on the vascular endothelium in-part through reduction in proinflammatory cytokine release.

OC3 Targeting GPR120 by novel lipid agonists in a glucagon secreting cell line and mouse pancreatic tissue

Gormley NM, Flatt PR, McKillop AM

Biomedical Sciences Research Institute, University of Ulster, Coleraine, Northern Ireland

G-protein coupled-receptor-120 (GPR120) is a promising anti-diabetic target with beneficial effects on glucose homeostasis. GPR120 has recently been identified on pancreatic β-cell however its role in the α-cell is unknown.

GPR120 expression was examined by double immunohistochemical staining in pancreatic tissue from normal and high fat fed (HFF) NIH-Swiss mice and in a glucagon secreting cell line (α-TC1.9). Mechanistic and molecular studies using GPR120 agonists, examined intracellular Ca^{2+} and GPR120 mRNA expression in α-TC1.9 cells. Cytotoxicity was determined by measurement of LDH release.

GPR120 was co-localised with glucagon in mouse pancreatic islets and in the α-TC1.9 cell line. Histological studies of pancreatic tissue revealed an increase in GPR120 expression in HFF mice ($p < 0.05$), compared to lean control mice. In mechanistic studies, the endogenous GPR120 agonist DHA increased intracellular Ca^{2+} by 4.2-fold ($p < 0.001$) whilst synthetic agonist GW-9508 induced a 3-fold increase ($p < 0.05$) in the α-TC1.9 cell line at 5.6 mM glucose. At 16.7 mM glucose, DHA and GW-9508 augmented intracellular Ca^{2+} by 5.0-fold ($p < 0.01$) and 2.6-fold ($p < 0.05$), respectively. No cytotoxicity was observed at both concentrations. At 5.6 mM glucose, GW-9508 increased glucagon mRNA expression ($p < 0.05$) in α-TC1.9 cells while DHA had no effect when compared to glucose alone. At 16.7 mM glucose, DHA ($p < 0.05$) and GW-9508 ($p < 0.05$) increased glucagon mRNA expression. GPR120 agonists had no effect on GPR120 mRNA expression, compared to glucose alone.

These studies indicate that GPR120 is present and active in pancreatic α-cells and has a role in islet function which may have therapeutic potential for type-2 diabetes and obesity related diseases.

OC4 Impact of postoperative magnesium levels on early hypocalcaemia and permanent hypoparathyroidism after thyroidectomy

Garrahy A[1], Murphy MS[1], Sheahan P[2]

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[1]Department of Endocrinology and Diabetes, South Infirmary Victoria University Hospital, Cork; [2]Department of Otolaryngology, Head and Neck Surgery, South Infirmary Victoria University Hospital, Cork

Postoperative hypocalcaemia is a common occurrence after thyroidectomy. Magnesium is known to modulate serum calcium levels and hypomagnesemia may impede correction of hypocalcaemia. The purpose of the present study was to investigate whether hypomagnesemia after thyroid surgery has any impact on early post-thyroidectomy hypocalcaemia and/or permanent hypoparathyroidism.

A retrospective review of a prospectively maintained database of patients undergoing total thyroidectomy or completion total thyroidectomy at our institution, with postoperative magnesium levels available, was carried out. The incidence of biochemical and symptomatic hypocalcaemia and permanent hypoparathyroidism was correlated with postoperative hypomagnesemia and other risk factors.

Of 243 total or completion total thyroidectomies, 201 had postoperative magnesium levels available and were included in the study. 26 patients (13 %) developed postoperative hypomagnesemia. On univariate analysis, parathyroid hormone (PTH) levels ($p < 0.0001$), hypomagnesemia ($p = 0.002$), cancer diagnosis ($p = 0.008$), central neck dissection ($p = 0.02$), and inadvertent parathyroid resection ($p = 0.02$), were significantly associated with hypocalcaemia. On multivariate analysis, only hypomagnesemia ($p = 0.05$) and hypoparathyroidism ($p < 0.0001$) remained significant. Significant predictors of permanent hypoparathyroidism on multivariate analysis were hypomagnesemia ($p < 0.0001$) and cancer diagnosis ($p = 0.03$). The only factor significantly predictive of hypomagnesemia was hypocalcaemia ($p = 0.05$).

Early post-thyroidectomy hypomagnesemia is a significant predictor of both early hypocalcaemia and permanent hypoparathyroidism. Further study is required to investigate whether aggressive treatment of hypomagnesemia in patients developing post-thyroidectomy hypocalcaemia may protect against development of permanent hypoparathyroidism.

OC5 Early post-operative PTH as a predictor of recurrent primary hyperparathyroidism in patients undergoing minimally invasive parathyroidectomy

Stroisceau A[1], McCartan DP[1], Evoy D[1], Gibbons D[2], Skehan S[3], McDermott EW[1], Prichard RS[1]

[1]Departments of Breast and Endocrine Surgery, [2]Pathology and [3]Radiology, St Vincent's University Hospital, Elm Park, Dublin 4

Introduction: Minimally invasive parathyroidectomy (MIP) has advantages over open parathyroidectomy for patients undergoing surgery for primary hyperparathyroidism due to single gland disease. The use of intra-operative PTH (IoPTH) monitoring during MIP to define operative success remains controversial. Furthermore, the technology is expensive and not universally available.

Aim: The aim of this study was to assess the role of percentage drop in early (day 1) post-operative PTH in predicting those at risk of recurrent disease in patients undergoing MIP without IoPTH.

Methods: All patients undergoing MIP from 2008 to 2013 were included. Recurrence was defined as hypercalcaemia occurring greater than 6 months post operatively with elevated calcium prior to 6 months classified as persistent hyperparathyroidism. PTH levels were assessed on the first post-operative morning.

Results: Over a 5-year period, 148 patients underwent a focused MIP with removal of a single parathyroid gland. Four patients (3 %) underwent re-operation within 6 months due to persistent symptoms (median PTH drop 9 %). Six patients (4 %) developed recurrent hypercalcaemia within the follow up period with 4 undergoing further surgery [median day 1 PTH drop (56 %)]. The median drop in PTH in those who did not recur was 86 % ($p < 0.001$ Kruskall–Wallis).

Conclusion: These results concur with a recent study demonstrating that early post-operative PTH values correlate well with risk of persistent and recurrent disease. The optimal threshold for defining those at greatest risk of recurrence and who require close biochemical follow up has yet to be elucidated.

OC6 Alterations in thyroid hormone levels following growth hormone replacement are incompletely explained by changes in the activity of 5′deiodinase enzymes in subcutaneous fat

Glynn N[1], Kenny H[2], Quisenberry L[3], Halsall DJ[4], Thompson CJ[1], O'Gorman D[2], Lado-Abeal J[3], Agha A[1]

[1]Department of Endocrinology, Beaumont Hospital and RCSI Medical School, Dublin 9; [2]School of Health and Human Performance, Dublin City University; [3]Division of Endocrinology, Texas Tech University Health Science Center, Lubbock, Texas, USA; [4]Department of Clinical Biochemistry, Addenbrooke's Hospital, Cambridge, UK

Alterations in the hypothalamo-pituitary-thyroid axis have been reported following growth hormone replacement. It has been speculated that growth hormone increases the peripheral deiodination of T4 to T3, which is mediated by the D2 isoenzyme of 5′deiodinase.

The aim of the study was to examine the relationship between changes in the serum concentration of thyroid hormones and 5′deiodinase activity in subcutaneous fat, before and after growth hormone replacement.

We performed a prospective study of 20 hypopituitary adult men before and after routine growth hormone replacement. Serum TSH, thyroid hormone (freeT 4, total T4, free T3, total T3 and reverse T3) and thyroid binding globulin levels were measured before and after growth hormone substitution. Changes in hormone levels were compared to the activity of D1 and D2 deiodinase isoenzyme expression in subcutaneous fat.

The mean daily dose of growth hormone was 0.34 ± 0.11 mg. Following growth hormone replacement, fT4 levels declined as expected (-1.09 ± 0.44 pmol/L, $p = 0.02$). Reverse T3 levels also fell (-3.44 ± 1.42; $p = 0.03$) and fT3 levels increased significantly ($+0.34 \pm 0.15$; $p = 0.03$). In subcutaneous fat, however, D2 enzyme activity declined and D1 activity remained unchanged following growth hormone substitution. Serum TSH and thyroid binding globulin were unchanged by growth hormone therapy.

Differences in serum thyroid hormone levels, induced by growth hormone replacement, are not fully explained by variation in the activity of 5′deiodinase activity, when measured in subcutaneous fat.

OC7 Topical application of CD362+ human mesenchymal stem cells (cyndacel-M) seeded in Excellagen^{TM} scaffold augments wound healing in a diabetic wound model

Patil SB[1], Chen X[1], Watson L[2], Loftus P[2], O'Flynn L[2], Chandler LA[3], Rubanyi GM[3], Elliman SJ[2], O'Brien T[4]

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Non-healing foot ulcers are a major complication in diabetic patients. Mesenchymal stem cells (MSCs) are known to promote angiogenesis with improved wound healing. Biomaterials may increase enhance therapeutic efficacy of cells. Orbsen Therapeutics has identified a novel antibody ($CD362^+$) which can be used to prospectively FACS-isolate $CD362^+CD45^-$ MSC from human bone marrow with enhanced MSC/MNC purity ratios of up to 1/4.

In this study, 1 million of $CD362^+$, $CD362^-$ and plastic adherent human MSCs were seeded in an Excellagen^{TM} matrix and applied to cutaneous wounds in an alloxan-induced diabetic rabbit ear ulcer for a 1 week period. Statistical analysis between groups revealed that the wounds treated with an Excellagen-$CD362^+$ cell treatment demonstrated increased percentage wound closure with more prominent neovasculature. In stereological analysis, significantly increased surface density, length density and reduced radial diffusion distance was observed in the Excellagen-$CD362^+$ cell treated wound groups in comparison to untreated wounds. A subsequent study compared the beneficial effects of a combination treatment (IV delivery of cells at 2×10^6 cells/kg plus topical treatment) to topical treatment alone. A slight increase was observed in percentage wound healing in combination versus topical treated animals but this difference was not significant. There was no lowering of blood glucose levels in the combination treated animal groups over the 7 day study period. Hence, with improved wound healing potential and augmenting angiogenesis, topical treatment with these specifically selected $CD362^+$ MSCs seeded in an Excellagen^{TM} matrix may lead to a new therapeutic product to treat non-healing diabetic foot ulcers.

OC8 Insulin upregulates AKR1C3 expression in female adipose tissue: in vivo and in vitro evidence for adipose androgen generation in polycystic ovary syndrome (PCOS)

O'Reilly MW, Gathercole LL, Capper F, Arlt W, Tomlinson JW

Centre for Endocrinology, Diabetes and Metabolism (CEDAM), University of Birmingham, Edgbaston, Birmingham B15 2TT, UK

Insulin resistance and hyperandrogenism are the cardinal features of polycystic ovary syndrome (PCOS). Women with insulin receptor (INSR) mutations develop severe hyperandrogenism. Insulin may drive adipose testosterone (T) generation from androstenedione (A) through aldoketoreductase type 3 (AKR1C3) in PCOS. In this study we studied the effect of insulin on AKR1C3 activity in vivo and in vitro.

10 PCOS women, 10 controls and 3 INSR mutants underwent oral DHEA challenge; serum androgens were sampled every 30 min for 4 h. Additionally, paired subcutaneous (SC) and omental (OM) fat samples were obtained at abdominal surgery from 38 women. AKR1C3 expression was measured by rtPCR. Serum and cultured cell media androgen levels were measured using LC/MS.

PCOS patients had higher A levels than controls and INSR mutants ($p = 0.01$ and $p = 0.005$ respectively). However, AUC for testosterone was higher in INSR mutants after DHEA than in PCOS and controls (874.2 vs 425 and 375.2, $p < 0.001$ for both). AKR1C3 mRNA expression was significantly higher in SC than OM adipose tissue ($p = 0.004$). AKR1C3 expression correlated positively with BMI in SC fat ($R = 0.51$, $p = 0.006$). Insulin significantly increased AKR1C3 expression in differentiated SC adipocytes ($p = 0.04$). Insulin exposure significantly increased T generation from A in cultured SC cell media compared to control ($p < 0.001$).

We have found in vivo and in vitro evidence of modulation of AKR1C3 activity by insulin in PCOS. Insulin and obesity may drive adipose androgen generation by increasing AKR1C3 activity in female SC adipose tissue. Selective AKR1C3 inhibition may offer a novel therapeutic target in PCOS.

OC9 Audit of follow up of differentiated thyroid cancer patients

Todd A, Rea T, Bell PM, Hunter SJ, McCance DR, Mullan KM, Courtney CH

Department of Endocrinology, Royal Victoria Hospital, Belfast, UK

Guidelines for the management and follow-up of patients with differentiated thyroid cancer were published by the British Thyroid Association in 2007 with target 100 % compliance in centres providing treatment and follow up. We carried out a retrospective audit of patients presenting between 2007 and 2011.

Thirty-eight patient's charts (8 male/30 female) were reviewed. The median age was 48 years (range 21–80). All patients had a tumour size greater than 1 cm and underwent total thyroidectomy. Of these 26 patients had papillary carcinoma, 11 follicular and 1 patient had mixed papillary/follicular carcinoma. In keeping with guidance, all patients were considered for ^{131}I ablation and 37 (97 %) proceeded to treatment. Of these 37, all had a post ablation scan and reassessment at 6–12 months with either whole body scan or stimulated thyroglobulin, meeting the ideal standard. All 38 patients were commenced on levothyroxine, aiming for TSH suppression. However in only 86 % of cases was the GP informed of this target. Adequate suppression was achieved in 37 patients and intermittent suppression noted in the remaining patient. All patients were followed up within 2–3 months of ^{131}I and 37/38 patients followed up as recommended thereafter, the remaining patient not attending follow up. In those patients who attended follow up all had TSH level, thyroglobulin and clinical examination of neck performed in keeping with guidelines.

In conclusion, while communication with primary care could be improved, the management of differentiated thyroid cancer patients is generally in keeping with accepted national standards.

OC10 Metformin in gestational diabetes mellitus. Outcomes in an Irish cohort

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Metformin (MF) use in Gestational diabetes mellitus (GDM) is increasing. Studies to date suggest that its use is safe and effective (MiG Trial). MF use in GDM results in a reduction in the proportion of GDM requiring insulin therapy. The use of MF in GDM commenced in our service in March, 2013.

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This retrospective review reports on pregnancy outcomes of the first 50 GDM pregnancies treated with MF. Outcomes are compared with 50 randomly chosen GDM pregnancies treated with insulin in 2012 (prior to the introduction of MF). We compared a number of maternal and fetal variables in the MF treated group (MFG) with the insulin treated group (IG).

Results: Mean weight and BMI at booking was higher in MFG compared to IG (86 ± 16 kg vs 78 ± 18 kg, p 0.01 and 33 ± 13 vs 30 ± 7 kg/m^2, p = 0.1). The mean weight gain during pregnancy did not differ significantly between groups (6.8 ± 5 vs 7.5 ± 4.7 kg, p 0.5). FPG in diagnostic OGTT was lower in MFG (5.2 vs 5.8 mmol/l, $p < 0.05$) as were 1 and 2 h values ($p < 0.01$) and HBA1c at diagnosis (35 ± 3 vs 39 ± 6 mmol/mol ($p < 0.01$).

Rate of macrosomia (birth weight >4 kg), polyhydramnios, caesarian section, gestation at delivery and birth weight at delivery (3.4 ± 0.6 vs 3.5 ± 0.4 kg did not differ between groups. Reported rates of ante partum haemorrhage were higher in the MFG (5 cases) vs. no cases in IG and NNICU admits were 4 cases in MFG compared to zero cases in IG. There were no Intrauterine or Neonatal Deaths in either group.

Based on 50 cases metformin use appears safe and effective for GDM when compared to insulin therapy. The higher rates of antepartum haemorrhage and NNICU admission noted in the metformin group merits further review.

OC11 Oral glucose tolerance test in gestational diabetes—possible utility in identifying those who will need pharmacotherapy

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Objective: To determine if glucose concentrations during oral glucose tolerance testing (OGTT) allow identification of women who will subsequently fail dietary therapy alone for gestational diabetes.

Methods: Retrospective observational study of all women diagnosed with GDM from 2008 to 2012 screened using a 75 g oral glucose tolerance test (OGTT) between 24 and 28 weeks gestation based on risk factor identification.

Results: 287 pregnancies: 157 managed on diet alone, 130 received pharmacotherapy with insulin and/or metformin in addition to diet. Those requiring pharmacotherapy had a higher fasting serum glucose 5.22 ± 0.69 mmol/L compared to diet 4.67 ± 0.44 mmol/L ($p < 0.001$), no difference in 1 or 2 h concentrations (diet: 1 h 9.7 ± 0.14, 2 h 8.37 ± 0.13, pharmacotherapy: 1 h 10.12 ± 0.21 (p = 0.22), 2 h 8.46 ± 0.2 mmol/L p = 0.67). They were diagnosed earlier [diet; 27.42 ± 0.26, pharmacotherapy; 25.85 ± 0.4 weeks ($p \leq 0.001$)], had a higher BMI at booking [diet; 29.24 ± 0.53 kg/m^2, pharmacotherapy; 32.16 ± 0.86 kg/m^2 (p = 0.001)], and had at least one previous foetal loss [diet; 65 (42 %) in the diet group, 87 (50 %), (p = 0.022)]. There was no difference in Hba1c after 20 weeks gestation (diet group 5.38 ± 0.12, pharmacotherapy 5.61 ± 0.05 %, p = 0.3), maternal age, blood pressure, gestation at delivery, baby weight, Apgar scores.

Conclusions: A fasting serum glucose >5.8 mmol/L at diagnostic OGTT indicates high risk of failure of dietary intervention alone for gestational diabetes and merits close monitoring of these women.

OC12 Effects of the "Croí Clann" structured lifestyle modification programme on anthropometric and metabolic characteristics in severely obese adults

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Lifestyle modification is fundamental to obesity treatment, but few studies have described the effects of structured lifestyle programmes specifically in bariatric patients. We sought to measure changes in this cohort after a group-based, fully supervised 8 week programme, incorporating tailored weekly exercise sessions and educational workshops.

Weight, height, waist circumference, blood pressure, HbA1c, fasting glucose and lipid profiles as well as functional capacity (Incremental Shuttle Walk Test) and questionnaire-based anxiety and depression scores were compared in per-protocol analyses using a paired *t* test.

Of 109 bariatric patients enrolled, 100 completed the programme. Mean age was 48.8 ± 11.9 years. 38 % were male. Results are shown in the table (mean ± SD). There were no changes in blood pressure, fasting glucose or HbA1c (data not shown).

Bariatric patients completing this programme had improved adiposity, fitness, lipid profiles and mental health, but not blood pressure or glycaemia. Further assessment in a pragmatic randomized controlled trial seems warranted.

	Pre-Programme	Post-Programme	P
BMI (kg m^{-2})	45.7 ± 8.5	44.7 ± 8.7	<0.001
Functional capacity (MET)	5.9 ± 1.9	6.6 ± 2.4	<0.001
Depression score	7.7 ± 3.8	5.5 ± 4.3	<0.001
Total cholesterol (mmol/l)	4.6 ± 1.2	4.4 ± 1	0.025

OC13 Glucose-dependent insulinotropic polypeptide (GIP) exerts beneficial effects on human osteoblastic-like SaOS2 cells

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Glucose-dependent insulinotropic polypeptide (GIP) is an incretin hormone, with the classical biological action of stimulating insulin secretion following food intake. However, recent studies have shown that this hormone may play a direct role in the maintenance of bone strength and integrity. Therefore, the present study has investigated the effects of native GIP, and a long-acting GIP analogue namely [D-

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Ala^2]GIP, on insulin-like growth factor-1 (IGF-1) secretion, transforming growth factor-β (TGF- β) release and alkaline phosphatase (AlkP) activity in human SaOS-2 cells. For experimentation, SaOS-2 cells (1×10^5) were incubated with GIP peptides (10^{-12}–10^{-6} M) for 8 h, and IGF-1 and TGF-β levels measured using ELISA. For AlkP activity, cells were incubated with GIP peptides for 24 and 72 h and AlkP production measured indirectly using 4-methyl umbelliferyl phosphate. Both native GIP and [D-Ala^2]GIP significantly stimulated IGF-1 secretion ($P < 0.01$) at all concentrations examined. In harmony, both peptides significantly ($P < 0.01$ to $P < 0.001$) induced TGF-β release, but only [D-Ala^2]GIP was effective at the lowest concentration (10^{-12} M) tested. AlkP activity in SaOS-2 cells was enhanced after 24 h incubation with [D-Ala^2]GIP (10^{-10}–10^{-6} M, $P < 0.01$) and native GIP (10^{-6} M, $P < 0.01$) when compared to control cultures. Moreover, following a 72 h incubation, [D-Ala^2]GIP was significantly ($P < 0.05$ to $P < 0.01$) more potent than native GIP in terms of augmenting AlkP activity at all peptide concentrations examined. In conclusion, native GIP, and particularly longer acting analogues, have clear anabolic effects on human bone cells that merit further investigation for the treatment of bone-related diseases.

Acknowledgments: These studies were supported by 2012 Irish Endocrine Society Basic Science Award to Dr. N Irwin entitled 'Harnessing the potential of gastric inhibitory polypeptide (GIP) for treatment of bone disorders'.

OC14 The prevalence rate and rate of uptake of screening for gestational diabetes mellitus (GDM) in primary versus secondary care

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Gestational diabetes mellitus (GDM) is common, occurring in approximately 12 % of pregnancies in Ireland. Previous research in the Irish setting reported only a 44 % uptake of universal GDM screening in the secondary care setting. The aims of this study were to examine if the uptake rate of screening differed when offered in the primary versus secondary care setting and to examine prevalence rates in both settings.

Seven hundred and eight-one pregnant women were recruited from three antenatal clinic sites along the Irish Atlantic seaboard. Each was randomly allocated to have a 2-h, 75 g oral glucose tolerance test in either the primary or secondary care setting. Chi square analyses were used to determine if associations existed between screening locations.

Overall uptake of screening among the sample was 88.3 %. Women in the secondary care group were significantly more likely ($p < 0.001$) to attend for their randomised screening location appointment than those in the primary care group. Prevalence among this sample was found to be 7.0 %. Women were no more likely ($p = 0.194$) to incur a positive result in the primary or secondary care setting.

Within the context of this study, due to the significantly lower uptake rate, the primary care setting does not appear to be a suitable alternative. The higher uptake rate than that previously reported may be due to increased knowledge and awareness among clinicians and pregnant women while the lower prevalence rate may be due to the potential non-consent to the study of women who were of higher risk for GDM.

OC15 The effects of insulin analogues and liraglutide on markers of vascular calcification in vitro and on coronary artery calcification in patients with type 2 diabetes mellitus

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Vascular calcification (VC) exerts detrimental effects upon the vasculature. The aims of this research were to examine the effects of insulin analogues and liraglutide on VC in human aortic smooth muscle cells (HASMCs) and in vivo in a type 2 diabetes population.

HASMCs were exposed to insulin glargine (1 or 10 nmol/l) or liraglutide (30 or 300 nmol/l) for 3 days, after which alkaline phosphatase (ALP) activity in the cell media was measured via colorimetric assay, and levels of Runx2 and bone sialoprotein (BSP) mRNA (osteogenic genes) were measured via PCR. A prospective, observational study was conducted in which coronary artery calcification (CAC) scoring was performed via CT in patients with type 2 diabetes pre-, and 16 months post-, the commencement of either insulin analogues or liraglutide, and in a control group on oral hypoglycemic medications only.

Exposure to insulin glargine, but not liraglutide, was associated with increased ALP activity in HASMCs (mean ± SEM: 3 ± 0.2 versus 0.8 ± 0.4 IU for 1 nmol/l versus control, $p < 0.0001$, and 2.5 ± 0.12 versus 0.8 ± 0.4 IU for 10 nmol/l versus control, $p < 0.0001$). Runx2 and BSP mRNA expression also increased significantly in HASMCs exposed to insulin ($p < 0.01$ for increased expression with insulin for both genes), but not liraglutide. In the clinical study, 101 patients were recruited. Exposure to insulin (but not liraglutide) was associated with greater progression of CAC scores over the study timeframe (median [25th–75th centiles]: +65 [2–309] versus +4 [−21 to 66] for insulin versus controls, $p < 0.0005$).

In these preliminary data, a promotion of VC was observed at the cellular and systemic levels following exposure to insulin.

OC16 Glycaemic control in patients with type 1 diabetes mellitus post transition to young adult diabetes care

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Introduction: Young adults with diabetes represent a challenging patient group to manage, with glycaemic control frequently suffering following transition to adult diabetes care.

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Objective: To assess the characteristics of young adults with Type 1 Diabetes Mellitus who have transitioned to adult focused diabetes care.
Methods: Data was reviewed retrospectively on 133 patients (70 males) registered to the multidisciplinary Young Adult Diabetes service between October 2010 and April 2014. Demographic and clinical parameters were analysed in addition to HbA1c at initial and recent clinic attendances.
Results: Mean (±SEM) age of patients attending the service was 21.4 ± 0.2 years with the mean age of first attendance 17.4 ± 0.2 years. Mean duration of diabetes was 10.7 ± 0.5 years. Mean HbA1c of 9.1 ± 0.2 % at baseline was unchanged at follow-up, 8.9 ± 0.2 %. Mean HbA1c among males and females was 8.5 ± 0.2 % and 9.2 ± 0.3 %, respectively ($p = 0.063$). Multiple Daily Injections (MDI) were utilised by 74.4 %, 18.8 % received Continuous Subcutaneous Insulin Infusion (CSII) with similar HbA1c between groups (mean HbA1c 8.7 ± 0.2 % and 8.7 ± 0.3 %). A statistically significant difference was observed in patients on twice-daily insulin regimes (mean HbA1c 10.7 ± 1.2 %) compared to MDI and CSII ($p = 0.003$ and $p = 0.007$, respectively). Mean HbA1c between those attending >50 % of appointments compared to those attending <50 % of scheduled appointments was 8.7 ± 0.1 % and 9.8 ± 0.6 %, respectively ($p = 0.045$).
Conclusion: Overall, glycaemic control in this cohort was comparable to reports in similar groups. Poor control (HbA1c >9 %) was particularly evident among females, those attending fewer than 50 % of appointments and patients prescribed mixed insulin. Efforts to further engage these groups is ongoing.

OC17 Can obese patients on antipsychotic medications achieve weight loss in an unmodified general population lifestyle-intervention weight management programme?

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Many antipsychotics s are obesogenic and contribute to significant weight gain. However, patients on antipsychotics are often excluded from the general population lifestyle-intervention weight management trials. We aim to determine if weight loss is possible for antipsychotic-medicated patients when enrolled in an unmodified lifestyle-intervention weight management programme. We examined the data from 37 antipsychotic-medicated participants (AP) and 74 matched control participants (CP) attending the Weight Management Service, St Columcilles Hospital, Loughlinstown to determine weight change outcomes. Dietary and activity behaviours at baseline for a sub-cohort of AP participants were also reported. Results were expressed as mean ± standard deviation (SD) and a Mann–Whitney *U* test was used to assess differences between cohorts. The mean weight of the AP group at enrolment was 140.5 ± 31.3 kg with a mean BMI of 49.7 ± 10.8 kg/m^2. Nineteen participants in the AP group lost weight (mean weight loss −8.7 ± SD kg). There was no difference in weight outcomes in the AP group compared to the CP (−1.2 ± 12.1 kg vs. −2.1 ± 8.9 kg; $p = 0.339$). At baseline, the AP group ate fast food 1.7 ± 1.2 times/week, fresh fruit 1.0 ± 1.4 times/day and reported 2.5 ± 3.0 missed breakfasts/week. Baseline gait speed was lower in AP group (0.99 ± 0.2 m/s vs 1.09 ± 0.34 m/s in programme cohort) and improved slightly to 1.01 ± 0.3 m/s. We conclude that modest weight loss can be achieved in patients on long-term antipsychotics enrolled into an unmodified weight management programme designed for the general population. Typical dietary strategies such as encouraging breakfast consumption and reducing fast food and increased physical activities are relevant to this cohort of patients.

OC18 Stable peptide analogues of dogfish glucagon possess novel dual agonist activities and show promising acute anti-diabetic actions in normal and diabetic mice

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Novel analogues were synthesised based upon the dogfish glucagon peptide HSEGT FTSDY SKYMD NRRAK DFVQW LMNT which shares 86 and 48 % sequence homology with human glucagon and GLP-1, respectively. The dose-dependent effects (10^{-12} to 10^{-6} M) of D-Ala^{2-} dogfish glucagon (Pep-N) and D-Ala^{2-} dogfish glucagon with a C-terminal exendin extension (Pep-C) were tested in vitro and in vivo. Pep-N and Pep-C caused potent stimulation of cAMP production (3.5 to 4.5-fold) in glucagon- as well as GLP-1-receptor transfected cell lines ($p < 0.01$ to $p < 0.001$, Students *t* test) compared to 5.6 mM glucose controls. Furthermore, these showed dose-dependent 6.3- and 5.8-fold increases ($p < 0.001$, 10^{-6} M) in insulin secretion from BRIN-BD11 cells compared to glucose controls. Following an intraperitoneal glucose tolerance test (ipGTT) in healthy NIH Swiss mice, Pep-N and Pep-C (25 nmol/kg) produced a significant reduction ($p < 0.001$) in glucose induced hyperglycaemia ($AUC_{0–60min}$ 55 and 66 %), respectively. This was accompanied by significant 2.5- and 3.5-fold rises ($p < 0.001$) in the integrated plasma insulin $AUC_{0–60min.}$ When Pep-N and Pep-C were administered by injection 4 h in advance of an ipGTT, they demonstrated potent anti-hyperglycaemic actions, indicating relatively long-acting stability in vivo. Following an acute ipGTT in diabetic NIH Swiss mice fed a high fat diet (HFD 45 % fat) for 16 weeks, both Pep-N and Pep-C (25 nmol/kg) produced significant reductions ($p < 0.05$, 17 and 19 % $AUC_{0–60min}$) in hyperglycaemia, accompanied by significant 1.9- and 2.7-fold elevations in insulinotropic responses ($p < 0.01$ and $p < 0.001$), respectively. Thus these dual agonist peptides display promising anti-diabetic actions that could be exploited for diabetes therapy.

Poster Presentations

P1 Social Jetlag, personality and glycaemic control in type 2 diabetes

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Circadian rhythms are endogenously generated daily cycles that may be influenced by external cues such as light, and such rhythms are important in the temporal regulation of metabolism. One expression of inter-individual differences in circadian rhythms is the expression of chronotypes, in which individuals may exhibit differences in diurnal preferences (e.g. morningness of eveningness) for certain activities. Further, given the societal demands of working schedules there may be a misalignment between internal circadian time and externally imposed time cues, a phenomenon which has been termed "social jetlag". The aim of this study was to investigate the impact of

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chronotype on glycaemic control in type 2 diabetes. The Munich Chronotype Questionnaire (MCTQ) was administered to outpatients at the diabetes centre in Connolly Hospital (n = 100). The Big Five Inventory was also administered to assess personality type. Clinical measures were also obtained, specifically Hba1c levels as a measure of glycaemic control. There was a small positive correlation between the mid-sleep on MCTQ and Hba1c ($r = 0.200$, $p = 0.046$). A positive medium correlation between Hba1c levels and measures of social jetlag on MCTQ was also found ($r = 0.388$, $p < 0.001$), as was a correlation between the neuroticism domain of the Big Five and Hba1c levels ($r = 0.267$, $p = 0.007$). Partial correlation reveals that controlling for neuroticism does not affect the relationship between social jetlag and Hba1c levels, suggesting that the influence of social jetlag and personality domains on glycaemic control are independent of each other.

P2 Role of the endocrine pancreas in the development of cystic fibrosis-related diabetes

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Cystic fibrosis is an autosomal recessive disease characterised by mutations in the Cystic Fibrosis transmembrane-conductance regulator (CFTR) gene. These mutations alter fluid secretion in the lungs and other organs and the majority of patients die from pulmonary disease. CF-related diabetes (CFRD) is the most significant co-morbidity, accelerating lung decline. Recent evidence has implicated a role for CFTR in the development of the endocrine pancreas. This study will address the hypothesis that loss of functional CFTR contributes to the development of CFRD through beta-cell dysfunction and apoptosis.

BRIN-BD11 and MIN6 cells were used. Native CFTR was silenced using siRNA and cell viability assessed using MTT assay. Acute glucose-induced insulin secretion was evaluated by exposing cells to rising D-glucose concentrations. Insulin release was measured using ELISA.

There was no significant difference in cellular viability between control and CFTR-deficient cells. Control cells showed a dose-dependent increase in glucose-induced insulin release. Whilst a significant difference in glucose-induced insulin secretion was not observed at basal glucose concentrations, CFTR-deficient cells displayed a significant impairment in insulin response to intermediate and high concentrations of glucose.

CFTR appears to play a significant role in the function of pancreatic beta-cells. Future work will examine how specific CFTR mutations affect beta-cell function and survival.

P3 Cardiovascular safety of DPP-4 inhibition in patients with type 2 diabetes mellitus: endothelial progenitor cells as an early marker of long-term cardiovascular risk

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Endothelial progenitor cells (EPCs) are circulating bone-marrow derived cells which promote post-natal vasculogenesis. Studies have demonstrated a link between EPC number and function and future cardiovascular risk. DPP-4 inhibitors are effective glucose-lowering agents, but their long-term cardiovascular safety has not been extensively tested. We aimed to evaluate the long-term cardiovascular safety of Saxagliptin (SAX, a DPP-4 inhibitor) versus Gliclazide Modified Release (GLC) using EPC number and function as surrogate markers of cardiovascular risk. T2DM patients requiring treatment intensification after metformin were randomized to either SAX (n = 7) or GLC (n = 11). EPC number and adhesion capacity were measured before and 6 months after treatment. At 6 months, weight had increased in the GLC group compared to baseline (87.9 ± 14.9 vs 86 ± 14.7 kg, $p = 0.008$) with no change in the SAX group (84.5 ± 9.6 vs 84.2 ± 10 kg, $p = 0.8$). There were no statistically significant changes in mean HbA1c, total or LDL cholesterol. There were no changes in median EPC number [SAX: 35 (28–38) vs 35 (21–54) cells/HPF, $p = 0.5$ and GLC:39 (28–46) vs 25 (22–46) cells/HPF, $p = 0.24$] or adhesion capacity [SAX: 0.3 (0.17–0.65) vs 0.2 (0.17–0.86), $p = 1.0$, GLC: 0.32 (0.14–0.84) vs 0.27 (0.1–0.67) fluorescence units, $p = 0.9$] in either group. In summary, we found no difference in EPC number or function in patients treated with SAX versus GLC for 6 months. These results may suggest a similar cardiovascular safety profile of SAX to GLC, a well-established treatment for T2DM.

P4 [Lys-5]-substitution enhanced the insulinotropic effects of Hymenochirin-1B isolated from the skin secretion of *Hymenochirus boettgeri*

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Our previous studies showed that Hymenochirin-1B significantly stimulated insulin release from the clonal pancreatic beta cell line, BRIN-BD11. In this study, we investigated the effects of a [Pro 5] → [Lys 5] substitution on the insulinotropic effects of the peptide using BRIN-BD11 and Swiss TO mice with diet-induced insulin resistance. Acute insulin-release studies were performed in Krebs–Ringer bicarbonate buffer supplemented with 5.6 mM or 16.7 mM glucose in the absence and presence of purified synthetic peptides (0–3 μM) and known modulators of insulin secretion. Insulin-release was measured by radioimmunoassay and membrane potential by a fluorometric assay using FLEXstation™. Cytotoxicity was assessed by measuring LDH-release using a commercially available kit (Promega). Blood glucose concentration was measured using an Ascencia Contour Blood Glucose Meter (Bayer, Newbury, UK). At 5.6 mM glucose, the substituted analogue (P5K) significantly stimulated non-toxic insulin-release at concentrations ≥3 ρM (2.2-fold, $^{**}P < 0.01$). Similar effects were observed at concentrations ≥1 nM ($^{*}P < 0.05$) observed of Hymenochirin-1B. In absence of extracellular calcium, stimulation was reduced by 75 %. Insulinotropic effects of P5K (1 μM) were inhibited by co-incubation with 50 μM verapamil (48 %, $^{***}P < 0.001$) and 300 μM diazoxide (87 %, $^{***}P < 0.001$). Insulinotropic effect of P5K (1 μM) was augmented in the presence of 30 mM KCl (2.8-fold, $^{***}P < 0.001$), 200 μM IBMX (2.2-fold, $^{***}P < 0.001$) and 200 μM tolbutamide (1.2-fold, $^{***}P < 0.001$). P5K induced membrane depolarization by 4.2-fold at 5.6 mM glucose. Intraperitoneal administration of P5K (75 nmol/kg bw) with 18 mmol/kg glucose significantly enhanced insulin-release (2.0-fold, $^{***}P < 0.001$) and improved glucose tolerance (46.8 %, $^{***}P < 0.001$). In conclusion, P5K is a novel peptide-analogue with

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insulin releasing and glucose lowering actions of potential use in treatment of diabetes.

P5 Value of biphasic insulin 50/50 at mealtimes in type 2 diabetes

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Many patients with type 2 diabetes (T2D) eventually require insulin therapy. There are multiple approaches to insulin therapy: once-daily basal, biphasic insulin twice daily or thrice daily; or quick-acting at mealtimes with basal insulin once or twice daily. Biphasic regimens have the advantage of using the same insulin with a reduced number of daily injections compared to basal-bolus regimens.

Using our computerised diabetes database, we searched for T2D patients treated with Humalog Mix 50/50 (HM50) thrice daily. The sample was divided into those "stepping up" from twice daily biphasic insulin (Group 1) and those "stepping down" from basal-bolus regimens (Group 2). We compared the following variables: weight, daily insulin dose, and glycohaemoglobin (HbA_{1c}).

60 patients met inclusion criteria: group 1 ($n = 25$); group 2 ($n = 35$). Mean follow up was 16 ± 7.6 months in group 1 and 26.6 ± 14.4 months in group 2. In group 1, HbA_{1c} improved significantly (87.0 ± 19.1 mmol/mol vs 75.7 ± 17.3 mmol/mol, $p < 0.007$) without significant change in daily insulin dose (74.1 ± 44.4 units vs 82.6 ± 55.4 units, $p = 0.4$) or weight (91.5 ± 23.1 kg vs 92.8 ± 21.7 kg, $p = 0.6$). In group 2, HbA_{1c} improved significantly (78.8 ± 11.5 mmol/mol vs 73.9 ± 12.5 mmol/mol, $p = 0.008$) with a significant reduction in daily insulin dose (115.1 ± 50 units vs 98.4 ± 45.4 units, $p < 0.001$), and without weight change (100.1 ± 12.4 kg vs 102.2 ± 12.4 kg, $p = 0.08$).

Switching to HM50 thrice daily from either a basal-bolus regimen or biphasic insulin twice daily improved HbA_{1c} without weight change. Those switching from basal-bolus reduced significantly daily insulin dose. We conclude that biphasic insulin thrice daily is advantageous in T2D.

P6 Phenotypic variability of maternally inherited diabetes and deafness and clinical implications of diagnosis in a tertiary referral centre

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Maternally inherited diabetes and deafness (MIDD) is a rare form of diabetes accounting for <1/% of all diabetes. A diagnosis of MIDD has implications for clinical management. We present the phenotypic variability in a cohort of patients with a 3243A>G mutation. Patients suspected to have MIDD underwent geno/phenotyping, which included a 75 g OGTT with simultaneous measurement of insulin, C-peptide, OGIS and AUC calculation. Data are presented as mean and SEM.

Table 1 Clinical and biochemical characteristics of individuals with mitochondrial diabetes

Gender M:F	5:12
Number diagnosed with diabetes (N)	14
Age at diagnosis of mitochondrial mutation (years)	41.9 ± 2.9
Age at diagnosis of diabetes (years)	29.9 ± 2.7
BMI (kg/m^2)	23.6 ± 1.6
N	17
AUC glucose (mmol/l × min)	41.7 ± 8.7
AUC insulin (pmol × min)	$9{,}906.5 \pm 194$
AUC C-peptide (pmol × min)	$6{,}967 \pm 1{,}478$
OGIS ($ml/min/m^2$)	316 ± 44.3
Insulin treatment (%)	57
OHA (%)	29
Diet (%)	14
Lactate level (mmol/l)	2.8 ± 1.3
Sensorineural deafness (%)	55.6
Microalbuminuria (%)	28
Opthalmopathy (%)	11.1
Neuropathy (%)	11.1
Cardiomyopathy (%) (left ventricular hypertrophy)	22.2
Mean HbA_{1c} (mmol/l)	48

The mean duration of diabetes prior to confirmation of MIDD was 12 years. Despite the duration of diabetes these patients had significant C-peptide secretion in response to oral glucose. 61.2 % of patients are treated with Co-enzyme Q10, metformin was discontinued in 38 %, appropriate referrals to cardiology/nephrology/neurology was initiated and genetic screening of relatives was advised. The degree of heteroplasmy in this cohort ranged from <2 to 59 % and correlated with disease severity.

A diagnosis of MIDD is important for the management of the disease and the screening of family members and future generations.

P7 The effectiveness and safety of continuous subcutaneous insulin infusion in a large adult cohort over a 10 year period

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The benefits of continuous subcutaneous insulin infusion (CSII) in the short term have been proven but long term studies are limited. The purpose of this study was to evaluate the effectiveness and safety of

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CSII in a large adult cohort of patients in the Mater Misericordiae Hospital over a decade.

Approximately 300 patients with T1DM have commenced CSII in the Mater hospital. To date, a retrospective chart review of 197 individuals is complete. Each patient is managed by the same multidisciplinary team. At 6 monthly intervals clinical parameters are recorded. Data is expressed as mean/SEM, $p < 0.05$ was deemed significant.

The principal indications for CSII commencement were; recurrent hypoglycaemia; 38 % and suboptimal control; 29.4 %. There was an improvement in HbA_{1c}; with the most significant reduction at 6/12 post initiation (65 ± 12 vs 57 ± 9 mmol/l, $p < 0.0001$).

There was no difference in BMI over time. There was a significant reduction in the total units of insulin per kg at 6 months post initiation (0.7 ± 0.23 vs 0.55 ± 0.17 units per kg, $p < 0.0001$). The incidence of severe hypoglycaemic episodes decreased significantly (328 vs 62, $p < 0.0001$).

Sub-analysis revealed that patients aged >30 years at initiation had a lower incidence of DKAs using CSII ($p = 0.0004$). Also, patients with diabetes >10 years had a lower HbA_{1c} at 6 months (64.7 ± 11 vs 57 ± 9, $p < 0.0001$). There was satisfaction with CSII usage with a discontinuation rate of 4.9 %.

In conclusion, analysis of a large cohort treated with CSII in one centre over a decade demonstrated improvements in parameters including HbA_{1c} and severe hypoglycaemia incidence. Patients with long standing T1DM and those greater than the age of 30 years at initiation benefitted the most from CSII.

P8 An audit of diabetes management in long term care facilities

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Despite the increasing prevalence of diabetes with age, there are very few published guidelines regarding diabetes management in the elderly. In addition, only a handful of diabetes prevalence studies have been conducted worldwide among nursing homes and as such, the available data on this subject are limited. The aims of this audit is to (a) conduct a literature review on the current best practice in geriatric diabetes management; (b) calculate the point prevalence of diabetes among 23 nursing homes in the catchment area of Connolly Hospital, Ireland (approximately 1,400 residents); and (c) determine what diabetes management practices are employed in these homes. A questionnaire was emailed to the directors of nursing of 23 nursing homes in the Connolly Hospital catchment area.

18 out of 23 nursing homes participated in the survey. The point prevalence of diabetes among 968 residents was 14.15 %. 27 % had Type 1 diabetes. 2.69 % of all patients were on insulin. 12 nursing homes had standard nursing care plans, 8 had a care plan for management of hypoglycaemic events, 13 had guidelines for blood glucose monitoring, 6 had in-house diabetes management training programs, and 4 had clinical audit tools already in place. Care plans and clinical audit tools should be implemented and utilised in all care centres. A more detailed follow-up study should be conducted to assess the true prevalence of diabetes, assess and analyse glucose profiles, evaluate symptoms and complications of hypo- and hyperglycaemia and medical management of diabetes.

P9 Influence of adiposity on insulin requirements and glycaemic control in children and adolescents with type 1 diabetes

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While excess body fat is associated with insulin resistance, the influence of adiposity on insulin requirements in young people with type 1 diabetes (T1DM) is not well established. We sought to determine whether standardised body mass index (zBMI) influenced total daily-, quick acting- and basal-insulin dosing (TDI, QA and BI, respectively) and HbA1c in a cohort of 136 T1DM patients aged 2–20 years attending our university hospital-based diabetes clinic.

Mean age was 13.4 ± 4.2 years with a mean duration of diabetes of 5.7 ± 4.22 years. 52.2 % were female, 97.8 % were Caucasian and 32 % were overweight or obese. Mean zBMI was 0.55 ± 1.04, zBP was 0.43 ± 1.1 and HbA1c was 77 ± 17.8 mmol/mol. Mean TDI, QA and BI doses were 47.5 ± 30, 25.6 ± 17.6 and 22 ± 15.9 units per day, respectively. Among lean, overweight and obese patients, mean TDI was 44.4 ± 25.6, 46.7 ± 7.6 and 73.5 ± 47.6 units, respectively (ANOVA $p = 0.004$).

In linear regression modelling, there were strong and statistically significant associations between zBMI as the exposure and TDI, QA and BI doses as outcomes. Each unit rise in zBMI was associated with an increase of 8.6 ± 2.4, 5 ± 1.4 and 3.5 ± 1.3 units of TDI ($p < 0.001$), QA ($p < 0.001$) and BI ($p = 0.007$), respectively. These associations were similar after adjusting for age, sex and HbA1c.

Increased BMI is associated with higher insulin requirements in young people with T1DM, with obese patients requiring approximately 60 % more insulin than lean ones. Given its strong association with insulin dose, adiposity appears to be an important determinant of metabolic health in young T1DM patients.

P10 Screening for coeliac disease and thyroid dysfunction in patients with type 1 diabetes attending the diabetes day centre at Galway University Hospital—an audit

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Patients with type-1 diabetes (T1DM) have an increased risk of developing other autoimmune conditions. The ADA recommends screening for coeliac disease (CD) and thyroid dysfunction (TD) in patients with newly-diagnosed T1DM. We audited the screening practice for CD and TD in patients with T1DM attending Galway University Hospital.

Using DIAMOND we identified patients with T1DM who presented for the first time between January and December 2013. We included all patients ≥18 years. Patients were considered screened if they had anti-tissue transglutaminase antibody titres and thyroid function tests available on the laboratory system. We analysed the data using descriptive statistics.

43 patients presented for their first review during the study period. 53.5 % were males and the mean age was 31.8 years (SD ± 12.8). Only 14 (32.6 %) were screened for CD and 32 (74.4 %) for TD. Of the 14 screened for CD, one had a positive result. Of the 32 screened

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for TD, five had subclinical hypothyroidism and 3 had hyperthyroidism. These patients did not have a previous diagnosis of TD.

21 (48.9 %) of the 43 patients were newly diagnosed patients. 12 (57.1 %) were males and the mean age was 33.5 years (SD ± 12.9). In this group, 11 (52.4 %) were screened for CD and 16 (76.2 %) for TD.

We found the screening rate for CD and TD in patients with TIDM attending our Unit was low with less patients screened for CD. We hope that highlighting this deficiency will increase awareness of best practice and lead to universal screening for CD and TD in all patients.

P11 Awareness of hypoglycemia in a questionnaire-sampled diabetes clinic at Cork University Hospital, Ireland

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Hypoglycaemia awareness underlies safe use of insulin and sulphonylureas. Unrecognised hypoglycaemia has detrimental health effects and serious implications for patients' lifestyle in particular relating to driving regulations. We sampled diabetic clinic patients from February to May 2014 using a validated hypoglycaemia assessment [1]. The study aimed to assess patients' subjective awareness of hypoglycaemia and influencing factors.

Overall, 86 questionnaires were analyzed on patients ranging 16.3–91.0 years. Patients were deemed aware or unaware of their hypoglycemic status.

The aware cohort included 69 (80.2 %) patients with a mean age of 44.8 years (SD = 28.4 years) and mean duration of 17.1 years (SD = 12.0 years). This cohort had 39 (56.5 %) patients on basal bolus, 26 (37.7 %) on sulphonylureas, and 4 (5.8 %) on premix regimens. Overall, 31 patients reported moderate hypoglycemic episodes in the last 6 months and 1 reported a severe episode in the last year. The unaware cohort included 9 (13.0 %) patients with a mean age of 49.7 years (SD = 13.8) and mean duration of 30.7 years (SD = 11.3 years). Regimens included 7 (77.8 %) patients on basal bolus, 1 on sulphonylureas (11.1 %) and 1 (11.1 %) patient on premixed insulin. Overall 7 (77.8 %) patients reported moderate hypoglycemic episodes in the last 6 months and 4 (44.4 %) reported severe episodes in the last year. The unaware group had a longer duration since diagnosis ($p = 0.0063$) and higher occurrence of severe episodes ($p = 0.0024$).

Discussion regarding hypoglycaemia and early identification of deteriorating awareness is essential for safe diabetic management and prevention of severe events.

Reference: [1] Clarke WL, Cox DJ, Gonder-Frederick LA, Julian D, Schlundt D, Polonsky W (1995) Reduced awareness of hypoglycemia in adults with IDDM: a prospective study of hypoglycemic frequency and associated symptoms. Diabetes Care 18(4):517–522

P12 Diabetic ketoacidosis at Tallaght Hospital—biochemical and outcome measures of DKA presentations over a 2 year period

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Introduction: There is a paucity of information in the literature regarding diabetic ketoacidosis (DKA) presentation and management. We carried out an audit of all patients presenting to Tallaght Hospital with DKA between January 2012 and December 2013. Here we present the biochemical features and outcome measures found.

Methods: Patients discharged with primary diagnosis of DKA (from HIPE coding) were analysed, and included if the diagnosis was confirmed. Information was collated on a standard proforma and analysed using Microsoft Excel.

Results: Sixty-six patients were included in the analysis (previously described). Severity of acidosis varied widely (average pH 7.17 and HCO3 12); only 4 patients required ICU care (6 %). Diagnosis was made utilising urinary ketone measurement in 95 % of cases, with capillary ketone measurement only available in 5 %. Blood gas measurement was primarily venous (80 %) as per guideline, and 100 % of patients were treated according to the hospital's DKA guideline. Long-acting insulin was continued in only 28 % of patients. Average time on IV insulin was 41 h, with no correlation with any demographic or physiologic parameters detected. Average length of stay was 4.9 days, with age and presenting laboratory glucose correlating positively with this ($P < 0.05$). Hypoglycaemia occurred in 53 % of patients during their admission, and hypokalaemia in 46 % (severe in 4.5 %).

Discussion: DKA is a serious diabetic complication, with guideline-driven management paramount. New guidelines based on capillary ketone measurement are being introduced, and reduction in hypoglycaemia, hypokalaemia, and reduced time on IV insulin and overall length of stay should be improved.

P13 Diabetic ketoacidosis at Tallaght Hospital—demographics and presenting features of DKA over a 2 year period

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Introduction: There is a paucity of information in the literature regarding diabetic ketoacidosis (DKA) presentation and management. We carried out an audit of all patients presenting to Tallaght Hospital with DKA between January 2012 and December 2013. Here we present the predominant demographic, clinical, and presenting features seen.

Methods: Patients discharged with primary diagnosis of DKA (from HIPE coding) were analysed, and included if the diagnosis was confirmed. Information was collated on a standard proforma and analysed using Microsoft Excel.

Results: Sixty-six patients met criteria for DKA and were included; average age 35.9 years (range 17–86 years), male:female ratio 41:59, average HbA1c was 10.9 %. The average time since diagnosis of diabetes was 11.1 years and average total insulin dose 52 units (minimum 22, maximum 192 units). Seventy percent were taking basal-bolus insulin, 17.5 % BD-mixed insulin, and 9 % on CSII. Most common presenting symptom was nausea and vomiting (88 % of patients) while 13.6 % of patients had reduced GCS on presentation. The average duration of symptoms prior to presentation was 2.5 days, with 65 % suffering symptoms for 24 h or less prior to attendance at hospital. The most common cause of DKA was missed insulin (48.5 % of cases), not uncommonly in association with the use/misuse of alcohol (17 %), with infection a factor in 20 % of cases.

Discussion: DKA is a serious diabetic complication, affecting a wide range of patients with Type 1 diabetes. Understanding the demographics and presenting features allows us counsel our patients on recognizing and avoiding this potentially life-threatening condition.

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P14 Diabetes UK children's summer care events: the 2013 Northern Ireland experience

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Diabetes UK Northern Ireland has been running children's summer holiday events for over 30 years. For many children it is an important step for managing their diabetes. This event caters for children aged 7–12 and is packed with fun and adventure activities. Doctors, nurses and dietitians provide daily supervision of diabetes management and education.

In 2013, 28 children attended the summer care event and for 15 it was their first experience of a care event. The mean age was 9 years 9 months (range 7.9–11.9) and the average duration of diabetes was 3 years 8 months (6 months–8.6 years). 26 children had attended a carbohydrate structured education program and just under a third of the children were on CSII therapy. Activities included Canoeing, team challenges, scavenger hunts, baking and rock hopping.

Specific diabetes education goals were decided by the children themselves at the start of the event. These included injection sites, hypoglycaemia, carbohydrate estimation and CSII therapy including temporary basal rates and pump site changes.

Feedback from parents after the holiday showed improvements in insulin adjustment, insulin injection technique, management of hypoglycaemia by the children and carbohydrate estimation. All parents felt that their child gained from the event.

This care event offers a unique opportunity for children to learn and understand what life can be with diabetes in a fun filled environment. Education is paramount and this information has been used to develop a workbook for the 2014 event.

P15 Sharing personalised clinical information with people with type 2 diabetes (T2DM) prior to their consultation: the effect on glycaemic control and diabetes management self-efficacy

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Aim: To measure the effect on glycaemic control and diabetes self-efficacy of sharing clinical results with T2DM out-patients prior to their consultation.

Methods: 136 participants were randomised to an intervention group who received a booklet with personalised clinical results, a 'dummy' group who received a booklet with no clinical results and a control group who received no written information. Self-efficacy was measured 6 weeks post consultation. HbA1c was measured between 2 and 11 months (mean = 6 months) post consultation.

Results:

Table 1 HbA1c and diabetes self-efficacy: baseline and post-intervention mean and mean difference

	Control (n = 47)	'Dummy' (n = 44)	Intervention (n = 45)
HbA1c (mmol/mol)			
Baseline mean (SD)	61.3 (15.8)	62.6 (14.2)	59.7 (14.3)
Post-intervention mean (SD)	59.8 (14.5)	62.1 (13.7)	62.8 (18.6)
Mean difference (SD)	−0.5 (13.5)	0.2 (9.2)	2.9 (10.7)
Diabetes self-efficacy[a]			
Baseline mean (SD)	113.9 (22.2)	116.3 (24.6)	114.6 (21.4)
Post-intervention mean (SD)	115.8 (21.7)	117.1 (26.1)	116.5 (18.4)
Mean difference (SD)	0.2 (16.1)	0.3 (13.5)	3 (19.8)

[a] 0–150 scale, higher score, higher self-efficacy

An analysis of the change in HbA1c levels (mean 0.9 mmol/mol, sd 11.3) and self-efficacy (mean 1.2 sd 16.7) using an Analysis of Covariance, adjusting for baseline and patient characteristics, found no evidence of a significant group effect.

Conclusions: Sharing clinical results with T2DM out-patients prior to their consultation is not sufficient on its own to improve glycaemic control or diabetes self-efficacy.

P16 Management of glycaemia in patients in the non-critical care setting in Connolly Hospital

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The aim of this study is to compare current practice in an in-patient general hospital setting to recommendations produced by The Endocrine Society and American Diabetes Association (ADA) on glycaemic management of patients in the non-critical care setting. The study included all patients admitted to the hospital over a 5 day period. The glycemic management of the patients was benchmarked against 8 recommendations for the in-patient management of glycemia. Data were obtained from patient notes, bedside charts and hospital laboratory systems. Of 136 patients, only 23.5 % were documented as being assessed for a history of pre-existing diabetes on admission (recommendation #1). Additionally, just 60 % of patients had a laboratory blood glucose carried out on admission. Patients admitted with DKA and severe hyperglycaemia were managed appropriately. However, only 50 % of cases where glucose dropped to less than 5.6 mmol/l were responded to appropriately. Compliance with the recommended frequency of 'point of care' blood glucose

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testing was 44.7 % and fewer than 20 % of patients on continuous glucocorticoid therapy were monitored for steroid-induced hyperglycaemia. This study highlights some shortcomings in the in-patient management of glycemia in the non-acute setting in a general hospital and provides a rationale for the introduction of local guidelines to improve glycemia management in this context.

P17 The prevalence of impaired awareness of hypoglycaemia in people with type 1 diabetes attending the outpatient clinic

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Background: Hypoglycaemia is the commonest complication of insulin therapy. Patients with type 1 diabetes can develop impaired awareness of hypoglycaemia which significantly increases their risk of recurrent severe hypoglycaemia, affects quality of life and frequently prevents the attainment of good glucose control.
Aim: Determine the prevalence of impaired awareness of hypoglycaemia among people with type 1 diabetes attending clinic.
Methods: A questionnaire based on the internationally recognized 'Gold' and 'Clarke' validated questionnaires on hypoglycaemia awareness, was given to all type 1 patients attending clinic over a 4-week period. Awareness of hypoglycaemia was self-reported, with a scoring range of 1–7. Impaired awareness of hypoglycaemia (IAH) was defined as a score of 3–7.
Results: 78 patients completed the questionnaire. 49 (63 %) were male, age (mean ± SD) was 37 ± 15 years with a duration of diabetes of 13.6 (±10.4) years. Overall HbA1c was 67 (±13) mmol/mol. 31 % of patients reported impaired awareness of hypoglycaemia, 69 % reported always being aware. HbA1c for the IAH group was 66 (±12) versus 70 (±16) mmol/mol in the aware group ($p = 0.36$). Number of self-documented hypoglycaemia events (<3.9 mmol/l) without symptoms, in the previous month by the IAH group was 4 (±6) episodes versus 0 (±1) in the aware group ($p < 0.01$). Glucose threshold at which patients reported symptoms was significantly lower in the IAH group (2.96 ± 0.61 versus 3.45 ± 0.48 mmol/l, $p < 0.001$). Duration of diabetes was not statistically significant between groups ($p = 0.72$)
Conclusion: Impaired awareness of hypoglycaemia remains prevalent among type 1 patients. Patients have more episodes of asymptomatic hypoglycaemia, at lower plasma glucose levels, thereby increasing their risk of developing recurrent severe hypoglycaemia.

P18 An audit of hypoglycaemia awareness in the diabetes outpatient department: a focus on type 2 diabetes mellitus

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Background: Hypoglycaemia is associated with significant morbidity and mortality, particularly in elderly diabetes patients and may be a risk factor for increased cardiovascular morbidity and mortality.
Aim: Determine the awareness of hypoglycaemia among patients with type 2 diabetes mellitus attending the out outpatient clinic.
Methods: A questionnaire based on the internationally recognized 'GOLD' and 'Clarke' validated questionnaires on hypoglycaemia awareness was completed by patients. Awareness of hypoglycaemia was self-reported by patients, with a scoring range of 1–7. Impaired awareness of hypoglycaemia (IAH) was a score of 3–7.
Results: 55 patients with type 2 diabetes completed the questionnaire. 62 % (n = 34) were male, age was 64 ± 13 (mean ± SD) years with duration of diabetes 9.8 ± 6.5 years and mean HbA1c of 56 (± 14) mmol/mol.

17 patients (31 %) self reported IAH, while 38 patients reported awareness. HbA1c in the IAH group was 58 ± 12 compared to 55 ± 15 mmol/mol in the aware group ($p = 0.41$). Longer duration of diabetes was seen in the IAH group (13 ± 6.5 versus 8 ± 6 years, $p = 0.002$). 45 % of patients in the IAH group were insulin dependant compared to 24 % in the aware group and they self reported a higher frequency of hypoglycaemia events ($p = 0.002$). 9 (16 %) patients reported the onset of symptoms at a glucose level of ≤2.5 mmol/l, 4 of these were on insulin with 5 on a sulphonylurea in combination with metformin.
Conclusion: Prevalence of IAH was high in our study group with risk of hypoglycaemia associated with age and duration of diabetes.

P19 Closing the loop and challenges ahead: re-audit of hyperglycemia management in non-critical care hospitalised patients receiving enteral or parenteral nutrition

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Hyperglycemia in hospitalized patients on enteral or parenteral nutrition (EN/PN) is associated with adverse outcome. We have shown in the previous audit in 2012–2013 that there was poor compliance with the Endocrine Society Guidelines on the management of hyperglycemia in patients on EN/PN in a non-critical setting. This audit aimed to re-assess clinical practice 8 months after introduction of a protocol for the management of hyperglycemia in these patients.

A cross-sectional real time study was performed in non-critical care wards in May 2014. Continuous variables are expressed as means ± standard deviations and categorical variables as proportions. 20 patients were studied. The mean age of patients was 64.2 ± 15.9 years. The mean number of days patients were on EN/PN was 11.6 ± 18.6. 4 (20 %) had a prior history of diabetes mellitus. 11 (55 %) received point-of-care (POC) glucose testing, while on EN/PN, compared to 50 % in the previous audit. The number of times of POC monitoring per 24 h was 1.1 ± 1.5. Only 3 (15 %) of the patients had venous glucose levels and 4 (20 %) had HbA_{1c} tested. 18.2 % (2) of those tested had hyperglycemia >7.8 mmol/L persistently for >24 h. However the recommended actions were not taken for these patients.

Hyperglycemia management for patients on EN/PN has not improved despite the introduction of protocol. Focused education of multidisciplinary team involved and development of a robust clinical pathway are needed to improve clinical practice.

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P20 SGLT2 inhibitors in type 2 diabetes: an audit of early experience

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Introduction: SGLT2 inhibitors offer a novel approach to improve glycaemic control in patients with type 2 diabetes through inhibition of renal glucose reabsorption. Phase 3 clinical trials demonstrated consistent glucose lowering effects and weight loss. The objective of our audit was to evaluate the early effects of treatment with Dapagliflozin 10 mg in our clinic population.
Methods: Retrospective audit of clinical parameters in patients ($n = 30$, age 57.8 years, diabetes duration 9.6 years) who attended our hospital in the past year over a mean follow up interval of 143 days (27–311 days). 15 patients were previously treated with dual oral agents and 12 with insulin (16–540 units).
Results: We observed a significant improvement in glycaemic control with an HbA_{1c} fall from 85.9 (95 % CI 79.6–92.21) to 69.7 mmol/mol (95 % CI 63.43–75.9); $p < 0.01$. This was accompanied by a mean weight loss by 3.0 kg ($p < 0.01$). Baseline blood pressure (BP) was well controlled at 129/77 mmHg, however a fall in diastolic BP of 6 mmHg ($p = 0.02$) was noted. No significant correlations were observed between weight loss and other clinical variables. One patient discontinued therapy due to side effects (vulval candidiasis). Improvements in glycaemic control allowed for withdrawal of other agents in 3 patients including withdrawal of prandial insulin in 1 individual.
Conclusion: In conclusion, this audit of early experience with the SGLT2 inhibitor Dapagliflozin highlighted meaningful improvements in parameters of glycaemic control and weight loss in clinical practice. Longer-term follow up of drug efficacy in clinical practice are awaited.

P21 An audit of patients with cystic fibrosis-related diabetes (CFRD) before and after establishment of dedicated diabetes clinic in a cystic fibrosis unit

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Introduction: Cystic Fibrosis Related Diabetes (CFRD) is a common complication of Cystic Fibrosis (CF). Traditionally CFRD patients are seen in the general diabetes clinics, this arrangement however contributes to both poor clinic attendance and diabetes control. In June 2011 a dedicated out-patient clinic for CFRD patients was established within our hospital in a purpose built infection controlled unit.
Aim: To determine whether the new clinic improved attendance with subsequent improvements in diabetes control (HbA1c), pulmonary function (FEV1), body weight and patient satisfaction.
Method: Data was collected at 3 consecutive intervals: early 2009, mid 2011 at the time the new clinic opened and repeated 2 years later. A patient satisfaction questionnaire was completed by the CF patients. Clinic attendance improved by 20 % after the establishment of the new dedicated clinic (mean attendance pre and post was 54.36 % ($\pm$28.62) versus 74.73 % ($\pm$21.88); $p = 0.053$). Prior to the new clinic, diabetes control had deteriorated in the CFRD patients with a rise in the HbA1c from 7.59 ± 2.16 % to 8.08 ± 2.69 %. After clinic start there was a small improvement in diabetes control with a fall in the HbA1c to 7.84 ± 1.32 %. There was no significant change in FEV1 (mean change in FEV1 was -0.07 ± 0.45 L). Patient satisfaction was high.
Conclusion: Establishment of a dedicated CFRD clinic held within a purpose built infection controlled facility improved clinic attendance and reduced the DNA rate, which translated to a small improvement in diabetes control and high patient satisfaction.

P22 Sulphonylurea associated hypoglycaemia: are we seeing it too often?

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Background: Sulphonylureas are oral medications used to reduce blood glucose levels in Type II Diabetes. They bind to ATP dependent potassium channels on cell membrane of beta cells to potentiate insulin release from the pancreas. They have no role in Type I Diabetes as they rely on residual beta cell function. They are metabolized by the liver into less active metabolites and renally excreted. NICE recommend the addition of a sulphonylurea to metformin if HbA1c remains elevated >6.5 %. One of the most serious side effects is sulphonylurea associated hypoglycaemia.
Aim: The primary aim of this audit was to ascertain the commonest cause of hypoglycaemia in hospitalised patients. Secondary aims included a review of investigations into hypoglycaemia, assessment of lifestyle implications, driving and alcohol consumption patterns and staff knowledge of hypoglycaemia?
Method: Review of all patients notes with hypoglycaemia during admission to a district general hospital over a 6 month period. The diagnosis of hypoglycaemia was taken from coding references on discharge letters.
Results: Insulin related hypoglycaemia remained the commonest cause of hypoglycaemia in hospitalised patients accounting for 46 % of episodes. Sulphonylurea related hypoglycaemia was the second commonest cause accounting for 14 % of cases. Investigation into patients with hypoglycaemia was individualized and appropriate, usually led by an endocrinologist. Documentation of driving status and advice regarding driving was poorly documented in the medical notes.
Conclusion: Insulin remains the commonest cause of hypoglycaemia in hospitalised patients. While sulphonylureas account for a lesser proportion of hypoglycaemic cases, it is an event which is occurring too often and unnecessarily putting patients in vulnerable situations. Sulphonylureas should be stopped if they are the direct cause of hypoglycaemia and substituted for a DPP-4 inhibitor or thiazolidinedione in patients where hypoglycaemia is a concern. It is crucial to clearly document the driving status in the medical notes and provide driving advice as per DVLA guidelines.

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P23 The prevalence of diabetes and related complications in a nationally representative sample of adults aged 50 and over in Ireland

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The aim of this study was to investigate the prevalence of diabetes and its related complications in a nationally representative sample of older adults in Ireland. Cross-sectional analysis of a population-based sample of adults aged 50 years or over who participated in the first wave of The Irish Longitudinal Study on Ageing, (2009–2011). Self-report of doctor diagnosed diabetes, macrovascular and microvascular complications was used to determine overall prevalence. All analysis was weighted to provide population estimates. The Chi squared test assessed gender-specific differences in prevalence. Logistic regression analysis was carried out to explore independent associations between diabetes related complications and explanatory variables.

Type 2 diabetes prevalence was 8.5 % (95 % CI 7.5–8.7 %) and was higher among men ($p \leq 0.001$). Among participants with Type 2 diabetes, the overall prevalence of microvascular complications was 26.2 % (95 % CI 22.4, 30.0 %) with no evidence of gender-specific differences ($p = 0.6$). The overall prevalence of macrovascular conditions was 15.0 % (95 % CI 12.2–18.4 %) and was higher among men ($p \leq 0.001$). Longer duration since diagnosis, lower educational attainment, low levels of physical activity and a diagnosis of hypertension were independently associated with microvascular complications ($p < 0.05$). Increasing age, male gender and smoking were associated with macrovascular complications ($p < 0.05$).

Diabetes is a common condition among older people in Ireland with a high burden of microvascular and macrovascular complications. Diabetes prevalence is projected to increase; therefore effective prevention strategies are urgently needed to reduce the burden of complications.

P24 Outcomes of patients with Type 1 diabetes using insulin pumps—a Cork perspective

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The use of insulin pumps in adults has become more common in Ireland in recent years. An insulin pump offers many potential benefits to patients including reduced incidence of hypoglycemia, better glycemic control and improved quality of life. However, pump therapy requires extensive resources. With the expanding pump service at Cork University Hospital, it was timely to assess outcomes to optimise service delivery.

Aims were to assess a number of clinical outcomes and treatment satisfaction among patients with Type 1 diabetes who are using insulin pumps at Cork University Hospital.

A total of 32 suitable patients were identified. A retrospective chart review was undertaken. HbA1c levels were obtained from the CUH iLab system. Patients completed the validated Diabetes Treatment Satisfaction Questionnaires when they attended the hospital.

For all of the participants, initiation of pump therapy successfully addressed the primary reason for commencing same. 21 out of 24 people had a reduction in their HbA1c at 6 months. Of fourteen patients that had complete data for 6 and 12 months, six demonstrated improved HbA1c at 6 months, but failed to maintain this improvement at 12 months. A further three people had higher HbA1cs at 12 months than their baseline measurements. 30 out of 32 people demonstrated high treatment satisfaction on questionnaire analysis. 27 out of 32 people reported less frequent hypoglycemic episodes since using the pump.

P25 An audit of diabetic care in the outpatient clinic in a secondary care hospital

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Aim: This retrospective clinical audit was to review the management of glycaemia, blood pressure and serum lipids in a hospital outpatient diabetes clinic, with current International Guidelines.
Method: Data on 970 patients who attended diabetes clinic between Nov 2012 and Oct 2013 in a secondary care referral hospital, at Cavan and Monaghan. 132 patients with type 1 diabetes (mean age 34.4 [SD 12.8] years) and 830 patients with type 2 diabetes (mean age 64.4 [SD 12.0] years) and 8 patients of LADA (mean age 44.2 [SD 12.3] had undergone formal review of symptoms and complications.
Results: Glycosylated haemoglobin (HbA1c) of <53 mmol/mol was seen in 52 % of patients, 69 % had target blood pressure on antihypertensive agents. About 66 % of patients were treated with lipid-lowering agents; of these, about 66 % had total cholesterol of <4.5 mmol/L, 59 %had triglyceride level of <2 mmol/L and 60 % had low-density lipoprotein (LDL) cholesterol levels <2.6 mmol/L. Routine EEG was performed in 100 and 80 % of patients on Monaghan and Cavan site respectively. Of these, 14 % had abnormal EEG who had Cardiologist review/Coronary intervention. 85 % of patients were referred for routine retinal screening. Retinopathy was documented in 22 % of patients. About 60 % patients received aspirin treatment.
Conclusions: Overall, the audit highlighted that Cavan/Monaghan Hospital Group is providing a good level of diabetic care for our patients and compares favorably with international targets. However, key recommended actions have been identified for implementation to improve patient care and to maintain a continuous improvement process through effective monitoring.
Reference: [1]. Diabetes Care January 2014;37:S14–S80.

P26 Timing of access to secondary healthcare services and lower limb amputations in patients with diabetes; a case–control study

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Introduction: Patients with diabetes are at increased risk of lower limb amputation. Early referral from primary to secondary healthcare services for diabetes management is assumed to prevent the

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occurrence of amputation. The objective of this study is to investigate the association between timing of patient access to secondary healthcare services and the long-term outcome of amputation among patients with diabetes.

Methods: A case–control study was conducted in Ireland. Cases were 116 patients with diabetes who underwent a first major non-traumatic amputation. Controls were 348 patients with diabetes who were admitted to hospital for any other cause, frequency matched by gender, type of diabetes, year and hospital of admission. Data were collected for 7 years prior to the event year. Odds ratios (ORs) for amputation in patients with diabetes comparing early versus late referral from primary to secondary healthcare were calculated.

Results: Statistically significant risk factors associated with amputation in patients with diabetes included being single, chronic kidney disease, hypertension and hyperglycaemia. Documented retinopathy was a significant protective factor. In unconditional logistic regression analysis adjusted for potential confounders, there was no evidence of a reduced risk of amputation among patients referred earlier from primary to secondary healthcare for diabetes management.

Conclusions: Referral may need to occur earlier than the 7 year cut-off used in this study to demonstrate an effect on reducing amputation risk. The management of diabetes in primary care is also impacting on outcomes as seen by the counter intuitive finding of lower amputation risk among those with documented retinopathy. Efforts to improve diabetes care should be focussed on both primary and secondary healthcare services and promoting integration between the two healthcare settings.

P27 Type 1 diabetes and coeliac disease: an extra challenge to achieving optimal metabolic parameters

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The prevalence of coeliac disease (CD) is approximately 1 %, and in patients with T1DM rates between 0.6 to 16.4 % are reported. Many gluten-free foods necessary for management of CD have a high glycaemic index which may influence glycemic values, HbA1c, insulin requirements, lipid profile, weight, BMI and possibly the development of long-term diabetic complications. In this study we selected the subgroup of pts with T1D attending our service between June 2011 and June 2013 who have concomitant CD (n = 30). We did a cross-sectional analysis of clinic measurements of weight, BMI, BP, HbA1c, lipid profiles, albumin creatinine ratios and Tissue Transglutamine IgG antibody titres (TTG) (< 10U/ml as a marker of adherence to a gluten free diet), and compared them (except TTG) to those of the total cohort of patients with T1D (n = 905). The CD + T1D group consisted of 18 (60 %) females and 25 (83 %) adults (>18 years) and had a mean age of 37 (SD 19). The T1D group consisted of 431 (48 %) females and 798 (88 %) adults (>18 years) and had a mean age of 37 (17). HbA1c in the CD+ T1D group was 76.4 mmol/mol (SD 17.4) vs 70.3 (17.7) in the T1D group ($p < 0.05$). The HbA1c was greater in subgroup of the CD+ T1D patients who were non-compliant to GFD (66 ± 13.1 vs 81.2 ± 23.5 mmol/l). Lipid parameters were all more favourable in the CD + T1D group ($p < 0.05$) with no difference in the proportion using cholesterol lowering drugs (35 and 31 %). The CD + T1D group had a lower BMI 24 ± 4.7 vs 26.4 ± 6.8, $p < 0.005$). CD + T1D presents a challenge to achieving target HbA1c.

P28 Comparing the glucose challenge test and the oral glucose tolerance test in screening for gestational diabetes: a randomised clinical trial

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Hyperglycaemia during pregnancy is common and increases the risk of adverse maternal and fetal outcomes. Detecting gestational diabetes (GDM) permits optimisation of glycaemia which mitigates these risks.

We allocated randomly pregnant women to universal screening with the non-fasting 50 gramme glucose challenge test (GCT) or with the fasting 75 gramme oral glucose tolerance test (OGTT). We measured the change in glycated haemoglobin level (HbA1c) between 12 and 36 weeks of gestation.

We submit an interim analysis of data from this ongoing trial. 211 women (aged 31 ± 5 years, BMI 27 ± 6 kg/m^2) have been recruited. Data gathered at 36 weeks of gestation are available for 71 participants.

Parameter	GCT	OGTT	P value
Did not attend for screening, n (%)	3 (4.6)	6 (7.7)	0.451
Diagnosed with GDM, n (%)	5 (8.3)	5 (6.9)	0.764
Change in HbA1c (mmol/mol)	$+0.77 \pm 1.9$	$+0.97 \pm 3.4$	0.921
HbA1c rise >10 %, n (%)	2 (5.7)	6 (16.7)	0.145

P values calculated using Chi squared or Mann–Whitney *U* analyses

This is the first randomised clinical trial comparing the two screening methods. The GCT, which is more convenient for the patient and is less labour and resource intensive, performed as well as the OGTT.

P29 Maternal and infant outcomes of women with gestational diabetes mellitus (GDM) on diet treatment only compared to women with to normal glucose tolerance (NGT)

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Prevalence of GDM continues to increase worldwide. This study aimed to ascertain if a subset of GDM women treated with diet only have comparable outcomes to those with NGT, making them suitable for management in a less intensive setting such as primary care.

An observational retrospective cohort study utilizing the ATLANTIC DIP dataset comparing diet treated GDM women with NGT women was performed. The impact of BMI and GDM on the following maternal (C-section, polyhydramnios, pre-eclampsia) and infant outcomes (LGA, NICU admission, hypoglycemia and congenital malformations) was examined.

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GDM women had a higher risk of polyhydramnios (OR 3.06; 95 % CI 1.72–5.44) and C-section (OR 1.32; 95 % CI 1.06–1.66). GDM women with BMI >30 were twice likely to have a C-section (60.3 vs 31.6 %, $P < 0.05$). Infants of GDM mothers had a higher risk of hypoglycemia (OR 6.39; 95 % CI 3.34–12.3) and congenital malformations (OR 1.77; 95 % CI 1.37–2.29). LGA rate was lower in the GDM group (OR 0.74 95 % CI 0.59–0.94) but was greatest with BMI >30 (19.8 vs 12.9 %, $P < 0.01$) overall. Infants of GDM mothers were twice as likely to be admitted to NICU (OR 2.15; 95 % CI 1.72–2.67).

GDM treated with diet only is associated with a higher risk of adverse maternal and infant outcomes when compared to NGT and morbidities are further augmented by BMI >30. Thus all GDM women need to be managed in the high intensity multidisciplinary hospital environment.

P30 National vs international patients with gestational diabetes: differing metabolic profiles and C section rates

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Gestational diabetes (GDM) 12.4 % of pregnant women in Ireland and is associated with increased risk for adverse outcomes for mother and child.

There may be a greater prevalence of GDM in international patients in Ireland.

The aim of this retrospective study was to compare the age, weight, body mass index (BMI), metabolic profile, Caesarean section (CS) and neonatal unit (NNU) admission rates between the two groups at our regional maternity services.

Women are diagnosed using the IAPDSG International Association of the Diabetes and Pregnancy Study Group (2010) criteria with a 75 g glucose tolerance test, approximately 14.9 % have GDM diagnosed. We identified GDM in 369 from a screened population of 2576, 224 (60.7 %) were Irish and 145 (39.3 %) were international. Mann–Whitney *U* tests were applied as appropriate.

Irish mothers were significantly older: 33.2 vs 32.0 years ($p = 0.015$), heavier, 84 vs 69 kg ($p < 0.001$) and had a higher BMI, 31 vs 26 ($p < 0.001$). They had a higher fasting glucose: 5.4 vs 5.3 mmol/l ($p = 0.03$) but lower 2 h post load glucose 7.6 vs 8.5 mmol/l ($p = 0.019$). Insulin treatment was required in 25 vs 38 %. CS rate trended higher in Irish mothers 48 vs 44 % ($p = 0.048$). NNU admission rates were 19 vs 20 %. There were no neonatal/stillbirths.

International mothers form a major proportion of our GDM population and are less obese and have a different metabolic profile and require insulin more frequently from native mothers. Though CS rates were lower NNU admission rates were similar suggesting non-inferior outcomes.

P31 Comparing type 1 and type 2 diabetes in pregnancy—similar conditions or is a separate approach required?

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Pregnancy in women with Type 1 (T1DM) or Type 2 Diabetes (T2DM) is associated with increased risk. These conditions are managed similarly during pregnancy, and compared directly in analyses, however they affect women of different age, body mass index and ethnicity.

We assess if differences exist in pregnancy outcomes between T1DM and T2DM by comparing them directly and with matched controls. We also analyze the effect of glycemic control on pregnancy outcomes and create a predictive model for pregnancy outcome.

We include 323 women with diabetes and 660 glucose-tolerant controls. T2DM women had higher BMI, age and parity with a shorter duration of diabetes and better glycemic control. Preeclampsia occurred more in women with T1DM only. Rates of elective caesarean section were similar between groups but greater than in controls and emergency caesarean section was increased in women with T1DM. Maternal morbidity in T1DM was double that of matched controls but T2DM was similar to controls.

Babies of mothers with diabetes were more likely to be premature. Neonatal hypoglycemia was increased in both groups and contributed to a higher rate of admission to neonatal ICU. Adverse neonatal outcomes including stillbirths and congenital abnormalities were seen in both groups but were more common in T1DM pregnancies. Mean HbA1C values at which poor outcomes occur differed significantly between T1DM and T2DM. Glycaemic control did not predict poor maternal outcome in T2DM.

Conclusion: Pregnancy outcomes in T1DM and T2DM are different, as are the factors that contribute to these poor outcomes. This should be considered when planning and managing pregnancy.

Stable peptide analogues of dogfish glucagon possess novel dual agonist activities and show promising acute anti-diabetic actions in normal and diabetic mice.

P32 Screening for diabetic retinopathy in pregnancy: a time for change

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Pregnancy is associated with progression of diabetic retinopathy. Our aims were to evaluate if patients were receiving appropriate retinal screening during pregnancy and to assess the proportion who had progression of disease. Additionally we wished to identify factors influencing screening and disease progression.

We identified 341 women with pregestational diabetes from the Atlantic DIP database. This included 233 (68 %) with type 1 diabetes and 108 (32 %) with type 2 diabetes. Screening was deemed appropriate if it occurred at least twice during pregnancy in separate trimesters. Statistical analysis was performed using SPSS version 20.0 (IBM).

Appropriate screening took place in 191 (56 %) pregnancies, more commonly in women with Type 1 diabetes. Modelling by logistic regression identified attendance at pre-pregnancy care (PPC) as the only maternal factor significantly associated with receiving appropriate screening [odds ratio 4.01; CI 2.38; 6.75 ($p < 0.001$)].

On evaluation of those patients who received appropriate screening ($n = 191$), it was noted that 49 (26 %) had retinopathy progression during pregnancy. The decrease in HbA1c between 1st and 3rd trimesters [odds ratio 2.09; CI 1.11; 3.92 ($p = 0.02$)] and systolic blood pressure at booking [odds ratio 0.03; CI 1.03; 1.06 ($p = 0.05$)] were significant factors associated with retinopathy progression in pregnancy.

We demonstrate inadequate screening for diabetic retinopathy during pregnancy. Our study highlights the importance of participation in PPC as this is associated with appropriate screening for retinopathy in the subsequent pregnancy. As 26 % of women continue to demonstrate progression of retinopathy during pregnancy, there is urgent need to ensure adherence to screening protocols.

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P33 Is the use of a combination of insulin and metformin as safe as insulin alone in gestational diabetes

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Analogue insulin, NPH insulin and metformin have been shown to be safe in pregnancy. This study aims to determine the safety and efficacy of the use of insulin and metformin in combination in gestational diabetes. A retrospective observational study of all women diagnosed with gestational diabetes in a District General Hospital from 2008 to 2012. Women were screened using a 75 g OGTT between 24 and 28 weeks gestation. A positive OGTT was defined as a fasting glucose >5.8 mmol/L, 1 h >10.0 mmol/L and 2 h >7.8 mmol/L.

Results: 287 pregnancies with gestational diabetes during the study period with 3 foetal losses (27, 27, 31 weeks). There was no difference at baseline (antenatal booking) in mean body mass index (BMI, 30.54 ± 0.43, $p = 0.16$), systolic blood pressure(121 ± 0.7,72 ± 0.5 mmHg, $p = 0.14$), previous foetal losses (0.44 ± 0.05, $p = 0.23$), or maternal age (33.5 ± 0.3 years, $p = 0.09$). Diagnosis was made earlier in the metformin alone group (26.18 ± 0.48 weeks, $p = 0.024$) compared to the diet alone group (27.42 ± 0.26 weeks). Diastolic blood pressure was lower at baseline in the diet alone compared to the metformin group (71.1 ± 0.6 mmHg vs 71.7 ± 1.4 mmHg $p = 0.001$) and lower in the metformin compared to the insulin alone group (73.6 ± 1.3 vs71.7 ± 1.4 mmHg, $p < 0.001$). There was no difference in mean Hba1c after 20 weeks gestation ($p = 0.7$) in any group (insulin group 5.61 % $\pm$ 0.84, metformin 5.56 ± 0.72 %, insulin and metformin 5.68 ± 0.1 %, diet 5.47 ± 0.18 %). BMI at 32 weeks gestation was significantly higher in the metformin group than the diet groups (31.92 ± 0.97, 30.64 ± 0.58, $p = 0.001$). There was no difference between systolic BP at 34 weeks between the groups ($p = 0.054$). Diastolic BP is higher in the metformin group compared to the insulin group (78.3 ± 0.77,72.3 ± 1.2, $p < 0.001$) and compared to diet only (78.3 ± 0.77, 73.83 ± 0.75 $p = 0.001$). There was a correlation between BMI and diastolic BP at 34 weeks ($p = 0.038$, $R^2 = 0.031$) in these groups on regression analyses. There was no significant difference in gestation at delivery (39.3 ± 0.8 weeks $p = 0.22$), birth weight (3.55 ± 0.31 kg, $p = 0.64$) or Apgar score at 0 or 5 min (8.78 ± 0.6, 9.81 ± 0.3, $p = 0.58$, $p = 0.14$) between the groups. 47 received insulin alone ((12 received insulin glargine alone, 1 glulisine alone, 12 aspart alone, 6 glargine and glulisine, 13 glargine and aspart), 58 received metformin alone, 30 received metformin in combination with insulin and 154 were treated with diet alone). The mean total dose during pregnancy of metformin used in the metformin only group was 659.4 mg/kg/day for 7.58 weeks and commenced at 31.29 weeks gestation. The mean total dose of metformin in the metformin and insulin group was 1123.67 mg/kg/day for 8.22 weeks and commenced at 28.97 weeks gestation and the total dose of insulin used in this group was 4.16 units/kg/day of glargine, 4.5 units/kg/day of Aspart, 2.43 units/kg of Lispro and 0.79units/kg of Isophane for a mean of 7.41 weeks and commenced at a mean of 30.91 weeks gestation. The mean total dose of insulin was 3.92 units/kg/day of glargine, 6.43 units/k/day of glulisine, 6.54 units/kg/day of aspart for 6.67 weeks, commenced at 31.9 weeks gestation. This study shows the non-inferiority of insulin in combination with metformin in foetal and maternal outcomes and the link between maternal BMI and diastolic blood pressure during pregnancy.

P34 Screening for GDM in hospital practice: feasibility, lessons learned and outcomes

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GDM screening varies in Europe from universal screening of all pregnant women to high-risk groups only. Since 06/2012 Portiuncula Hospital screens all women identified (2,050 births/year), based on a set of high risk criteria.

The HAPO study correlated peri-natal outcomes with maternal glucose intolerance gradations. We adopted these criteria; any single abnormal value on a 2-h 75 g OGTT (fasting $\geq$5.1 mmol, 1 h $\geq$10, 2 h >8.5). Patients with GDM are taught glucose monitoring and seen weekly. Treatment included diet, metformin and/or insulin. We have evaluated data from 07/2012 to 10/2013).

805 patients were invited for an OGTT. 90.7 % accepted, 9.3 % declined. 15.3 % screened positive for GDM. 7.5 % patients had frank DM2.

104 sets of complete results are available 0.51 % had an abnormal fasting value, 65 % an abnormal 1 h value, and 25 % an abnormal 2 h value.

66 % had a single abnormal value; the frequent recurring single value was a 1 h value (34 %). 27 % had 2 abnormal values, mainly fasting and 1 h values. 7 % patients had 3 abnormal values (2 %) of abnormal 2 h values would NOT have been picked up on fasting or 1 h values.

We had a high prevalence of GDM with most diagnosed on 1 h and/or fasting values making this our test of choice.

Of the 104, 56 % managed on diet, 27 % on metformin, 11 % on insulin and 6 % on combined metformin/insulin therapy. The biggest babies were in the Glucophage arm. There was a relationship between higher A1c at diagnosis and required metformin/insulin therapy throughout pregnancy. There were no pregnancy losses.

P35 Exploring the mechanistic basis for the obesity paradox in patients undergoing percutaneous coronary intervention for coronary artery disease

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Increased adiposity is a risk factor for cardiovascular disease, but the association between body mass index (BMI) and cardiovascular morbidity and mortality is characterised by the 'obesity paradox', whereby obese patients with established cardiovascular disease have lower mortality than lean patients. The mechanistic basis for this is not known. We sought to determine whether BMI influences patterns of coronary artery disease (CAD) in adults undergoing percutaneous intervention (PCI).

We conducted a retrospective cohort study of 257 adults who had BMI measured during rehabilitation after PCI for CAD. Data were recorded regarding the degree of stenosis in each arterial territory and the number of affected territories. The Chi square test and logistic regression were used to determine whether these differed in lean compared to overweight and obese patients, or by BMI.

79.9 % of patients were male, 9.9 % were lean (BMI <25 kg m^{-2}), 35.8 % never smoked, 14.2 and 51.3 % had self-reported diabetes and

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hypertension, respectively and 76.6 % had a family history of CAD. 37 % of lean and 18.2 % of overweight/obese patients were female ($p = 0.039$). Age (61.4 versus 59.7, $p = 0.43$) and the mean number of affected vessels (2.6 versus 2.7, $p = 0.36$) were similar in both groups, while there were no differences in the anatomical location or severity of stenosis.

The influence of BMI on morbidity and mortality in patients with prevalent coronary artery disease does not appear to be mediated by differences in the location or severity of coronary artery plaques.

P36 Effect of 8 weeks of a milk-based intensive weight management programme on anthropometric and metabolic characteristics of severely obese adults

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Therapeutic options for bariatric patients are limited. A low-energy dietary (LED) regime based on meal replacement with semi-skimmed milk has shown therapeutic promise, but data on its effect size and feasibility are limited. We sought to quantify anthropometric and metabolic changes in this cohort after 8 weeks of a milk-based LED.

Patients received semi-skimmed milk, equivalent to approximately 1,200 kcal/day. Weight, height, body mass index and lipid profiles before and after 8 weeks in the programme were compared in per-protocol analyses using a paired *t* test.

Of 30 bariatric patients enrolled, 18 completed the first 8 weeks of the programme. Mean age was 52 (range 34–66) years. 56 % were female. Results in the table are mean ± SD.

There was significant weight loss and metabolic improvements, but attrition from the programme was high. The sustainability of these changes is unknown, but assessment of this intervention in a randomised controlled trial seems justified.

	Pre-programme	After 8 weeks	P
Weight (kg)	147.5 ± 28.1	130.8 ± 27	<0.001
BMI (kg m^{-2})	54.3 ± 7.6	48 ± 7.2	<0.001
Total cholesterol (mmol/l)	4.3 ± 1.1	3.7 ± 1.1	0.002
Triglycerides (mmol/l)	2.1 ± 1	1.6 ± 0.8	0.02

P37 Invariant natural killer T cells are required for the weight loss but not glycaemic effects of glucagon like peptide-1

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Glucagon-like peptide 1 (GLP-1) is a gut hormone used in the treatment of type 2 diabetes mellitus (T2DM), is currently under investigation as a weight loss agent and has anti-inflammatory actions. In the setting of the inflammatory condition psoriasis, we have reported that GLP-1 therapy regulates the invariant natural killer T (iNKT) cell, which is now implicated in the regulation of weight and metabolic health. We hypothesized that the iNKT cell plays a role in the effects of GLP-1 on metabolic health and body weight. In both obese humans with T2DM and mice fed a high fat diet (HFD), GLP-1 analogue therapy (Liraglutide) reversed numerical defects of iNKT cells associated with obesity. In murine adipose tissue, GLP-1 analogue therapy induced iNKT cell activation and cytokine production, particularly regulatory IL-10, both in vitro and in vivo. In obese wt mice, GLP-1 analogue therapy caused normalization of glucose homeostasis and induced rapid weight loss as expected. In obese mice that were deficient in iNKT cells ($CD1d^{-/-}$ and $Ja18^{-/-}$ mice), GLP-1 analogue therapy normalized glucose homeostasis but did not cause weight loss, despite expressing similar levels of hypothalamic full length GLP1R. Analysis of adipose tissue from obese wt mice revealed that GLP-1 analogue therapy induced an anti-inflammatory phenotype with increased IL-10 and Adiponectin but this did not occur in iNKTko mice. Our results indicate that iNKT cells are required for the weight loss but not glycaemic effects of GLP-1.

P38 Insulin alters the cytokine profile of circulating and adipose tissue T cells—a mechanism for insulin induced weight gain?

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Insulin, which is associated with weight gain, has been shown to disrupt immune cell function. It is now established that the immune system plays an important role in the regulation of adipose tissue. Several studies have identified specific immune populations (including regulatory and innate T cells) as having critical roles in the homeostasis of adipose tissue and bodyweight. Interleukin 10 (IL-10) is a regulatory cytokine, which is critical to the immune systems regulation of metabolism and weight. We hypothesized that insulin would impact both circulating and adipose tissue T cell cytokine production. We cultured human peripheral mononuclear blood cells (PBMC) with Insulin (38 pg/ml) and by flow cytometry show an increase in the frequency of circulating innate T cells producing IL-17, a inflammatory cytokine linked to T2DM, cancer and obesity. In human adipose tissue, treatment with insulin also increased the production of IL-17 (310 vs 375 pg/ml) whilst inhibiting the production of the regulatory cytokine IL-10 (306 vs 261 pg/ml), as seen by ELISA and flow cytometry. We have previously shown that Glucagon like peptide-1 (GLP-1), an insulin sensitizer used in the treatment of T2DM, impacts innate T cell function. We investigated the impact of GLP-1 on IL-17/IL-10 production and found that GLP-1 inhibits obesity-related increases in IL-17 whilst modulating IL-10 levels. Together this data provides evidence that insulin may interrupt immune cell regulation of adipose tissue and bodyweight through the modulation of cytokines, IL-10 and IL-17.

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P39 The prevalence of obesity and metabolic syndrome among inpatients at a forensic psychiatric hospital in the Republic of Ireland

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Patients in secure psychiatric units are at high risk of developing obesity due to complex interplay of factors including antipsychotic medications, restrictions on freedom and poor motivation to healthy lifestyle and physical activities. We aim to establish the prevalence of obesity and Metabolic Syndrome (MetS) in a secure forensic psychiatric hospital in the Republic of Ireland (ROI). We carried out a longitudinal study in the Central Mental Hospital (CMH), Dublin. National Cholesterol Educational Program, Adult Treatment Panel III (NCEP/ATP III) definition was used to diagnose MetS. Number of patients was 76 (males = 68 [89.5 %]). Mean age was 44.7 years (SD = 13.4). All were on antipsychotics. Duration of admission was longer in males (9.6 years [SD = 10.5] vs. 3.8 [SD = 2.9] in females) (p = 0.1232), mean was 9.2 (SD = 10.2). Mean weight at admission was 90.2 kg (SD = 17.7), BMI = 30.0 kg/m^2 (SD = 5.9); increased at time of study (TOS) to 98.3 kg (SD = 17.9), BMI = 32.8 (SD = 6.1). Average weight gain was 8.1 kg (p = 0.006). At admission, 24 (31.6 %) patients were overweight and 35 (46.0 %) were obese; at TOS, 9 (11.8 %) were overweight and 57 (75 %) were obese. Twenty-nine (37.2 %) patients met the criteria for MetS at admission, 44 (56.6 %) at TOS (the additional 15 met the criteria solely due to weight gain). Three had diabetes at admission, 14 (18.4 %) at TOS. We conclude that obesity and MetS are highly prevalent in CMH. Given that obesity is a significant contributor to MetS, patients in such institutions should receive appropriate weight management programme from time of admission. Urgent investment in dietetic and physiotherapy service is needed.

P40 An evaluation of Croí MyAction community lifestyle modification programme compared to standard care to reduce progression to diabetes/prediabetes in women with prior gestational diabetes mellitus (GDM)

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The purpose of this study is to evaluate a group-based lifestyle intervention programme for women with pre diabetes following gestational diabetes. We expect that the group based intervention through its educational and supportive approach will enable improvements in health behaviours, physical health and glucose function.

A total of 50 women with a history of gestational diabetes mellitus and persistent post-partum glucose dysfunction are randomly assigned to a control arm (n = 26) or to the Croí MyAction intervention group (n = 24). Croi MyAction is a 12-week, group based, lifestyle modification programme. The primary outcome variable is fasting plasma glucose. Secondary outcomes are: postprandial glucose tolerance, insulin resistance, lipid profile, weight, shape, diet and exercise levels. The role of mood, cognition and wellbeing are also explored.

Change analysis using t-tests reveal no significant effect of the intervention on health behaviours and consequently no effect on physical health or glucose function. The intervention did however have a positive effect on mood, cognition and wellbeing. Post trial qualitative interviews suggest, lack of priority given to one's own health and underestimation of health risk are the key barriers to healthy lifestyle change in this population. Participants report benefits to mood and confidence as a result of the intervention.

Overall, the effectiveness of lifestyle intervention in improving health outcomes in women with a recent history of gestational diabetes is limited. Optimal approaches for preventative measures in this population, remain to be determined.

P41 The impact of laparoscopic gastric bypass and sleeve gastrectomy on glycaemic control and medication use in type 2 diabetes mellitus

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Bariatric surgery results in significant metabolic improvements in obese type 2 diabetes, with laparoscopic Roux-en Y gastric bypass (GB) and sleeve gastrectomy (SG) the most promising procedures. We wished to examine the effects in an Irish setting.

Clinical and biochemical parameters of individuals with type 2 diabetes who underwent GB and SG were identified from the computerised bariatric database. Data was analysed using SPSS ver20.

Between 2008 and 2013, 74 (28 %) of 264 (176 GB and 88 SG) patients who underwent surgery had pre-existing diabetes, of whom 14 were diet-controlled. Forty six (62 %) were female with median age 51 (33–75) years. Median duration of diabetes was 36 (1–240) months.

	Pre-operatively	Post-operatively	P value
BMI (kg/m^2)	48.6 ± 7.0	34 ± 6.3	<0.001
Oral hypoglycaemic agents*	50 (67.6 %)	6 (9.5 %)	<0.001
Insulin*	10 (13.5 %)	3 (4.1 %)	0.004
HbA1c** (mmol/mol)	62.9 ± 18.2	45.3 ± 11.7	0.008

The mean number of hypoglycaemic agents required post-operatively fell from 1.5 to 0.3 (p < 0.001).

Significant glycaemic improvement with less medications was observed in the majority of patients, highlighting the potential role of bariatric surgery in this increasingly common subset of patients with type 2 diabetes.

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P42 Skin tags and the anthropometric and metabolic phenotype in severely obese adults: the STAMP cohort study

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Skin tags (acrochordons) are a phenotypic feature of insulin resistance, but the extent to which they predict an adverse metabolic profile in severely obese adults is not known. We sought to quantify prospectively differences in anthropometric and metabolic characteristics of severely obese adults with and without cervical or axillary skin tags.

Weight, height, blood pressure, fasting glucose and lipid profiles as well as a detailed dermatological assessment of the patient were undertaken after written informed consent. Differences between those with and without skin tags were measured using a two-sample *t* test.

98 bariatric patients were enrolled. Mean age was 50 ± 11.4 years. 31 % were male. Results are shown in the table (mean ± SD). There was a non-significant trend to heavier weight but paradoxically lower body mass index (BMI) in those with tags, but no differences in lipid profiles, possibly because they were twice as likely to be on statin therapy.

	Tags present (n = 15)	Tags absent (n = 83)	P
BMI (kg m^{-2})	46.1 ± 7.8	47.3 ± 6.4	0.53
Weight (kg)	131.2 ± 26.6	121.8 ± 15.3	0.06
Systolic BP (mmHg)	137.6 ± 15.5	124.4 ± 9.1	<0.001
Fasting glucose (mmol/l)	6.5 ± 2.4	5.1 ± 0.5	<0.001

P43 Awareness of adrenal crisis prevention in long-term steroid users

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Corticosteroids are potent anti-inflammatory and immunosuppressing agents. An abrupt stoppage or withdrawal of prolonged steroid therapy can precipitate an acute adrenal crisis.

Aim: To evaluate patients' awareness pertaining to precautions that should be taken when on a long-term corticosteroid therapy.

Methods: Patients were evaluated using a 12 point questionnaire following recruitment from endocrinology, nephrology, rheumatology, gastroenterology and respiratory clinics over the period of January to March 2014.

Results: 80 patients were enrolled. The most significant results comparing endocrine to non-endocrine patients is outlined in the following table:

Question	Endocrine (%) (n = 17)	Non-endocrine (%) (n = 63)	Difference (%)	P value
Aware of the sick day rules	59	5	54	<0.001
Aware to double the dose if sick	94	25	69	<0.001
Aware may need IV steroids if sick	76	29	48	<0.001
Aware need steroids for surgery	88	32	56	<0.001

There were no significant differences between the two groups in terms of having had IV steroids or being admitted for steroids recently.

Conclusion: Endocrine patients exhibited a significantly greater knowledge of precautions of steroid use. These findings highlight a lack of patient knowledge particularly in patients on the safe long-term use of corticosteroids. Patient education on this must be improved.

P44 The frequency of "incidental" phaeochromocytomas following imaging studies in Cork University Hospital

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The diagnosis of phaeochromocytoma (PC) is made clinically based on classical symptoms of catecholamine excess including hypertension, sweating, pallor, tachycardia and headaches and confirmed biochemically with plasma metanephrines or urinary catecholamines and metanephrines. Radiological studies are used solely for localisation purposes and to distinguish a PC from an extra adrenal paraganglioma (PGL). Indeed there is a risk associated with the intravenous administration of contrast for CT studies in patients with unopposed catecholamine production. We performed a retrospective review of all patients with known PC or PGL in our centre from 2008 to 2013, to determine the percentage of patients picked up incidentally due to imaging studies. A total of 20 patients were diagnosed with PC or PGL in this time period. 35 % (7/20) were diagnosed when biochemical screening was performed after an adrenal mass was found incidentally on imaging studies. The adrenal masses identified ranged in size from 2 to 7 cm with an average size of 3.5 cm. 86 % of this patient group were imaged with CT and one patient was diagnosed with a supra renal mass on ultrasound of abdomen. 86 % of this cohort had a history of uncontrolled hypertension on at least two antihypertensive agents. No patient had a catecholamine crisis secondary to intravenous contrast and all patients were reviewed by an endocrinologist after biochemical screening was carried out. This study highlights the importance of biochemical screening for PC in all patients with apparent adrenal incidentalomas and the value of a dedicated referral system as a safety net for this patient group.

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P45 Audit of thyroid nodule Thy classification system in a tertiary referral centre

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Fine-needle aspiration cytology (FNAC) is a widely utilised method of thyroid nodule evaluation. Non-diagnostic samples ('Thy 1') are significant as repeat FNAC is recommended.

Our aims were as follows. 1. To analyse results of FNAC's performed in the Bon Secours Hospital, Cork and determine the proportion of aspirates assigned to each thy class. 2. To evaluate nodule size and the proportion of multi-nodular versus single-nodular goitre. 3. To determine the frequency and outcomes of surgery.

A retrospective analysis of 149 patients who underwent thyroid FNAC between Nov 2011 and July 2013 was performed. Population was identified from pathology reports. Computerised data system was interrogated for demographical, radiological and pathological data. Results were analysed using SPSS software. A subsequent analysis of 118 patients undergoing FNAC between July 2013 and March 2014 was performed to examine the proportion of aspirates assigned to each Thy class.

Based on latest FNAC performed: 58 % of aspirates were Thy 2; 32 % were Thy 1. 38 % (n = 56) of patients underwent repeat FNAC. The mean size of nodules was 2.9 cm and 74 % were multinodular. 8 % of patients (n = 12) underwent surgery. Post-surgical histology: 41 % were follicular adenomas, 25 % were papillary carcinomas, 17 % were benign and 17 % were follicular carcinomas. 50 % of patients who underwent surgery had an FNAC of Thy 1 prior to surgery. Results of FNACs on subsequent analysis showed an improvement in the proportion of Thy1 aspirates to 26 %.

A number of factors may influence the proportion of non-diagnostic FNACs.

P46 A retrospective audit of cases discussed at the connolly hospital thyroid MDM between 01/01/12–31/12/13

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Fine-needle aspiration and cytology (FNAC) is used to assess thyroid nodules for malignancy. The British Thyroid Association guidelines recommend FNAC reporting with a "Thy" classification:

Thy1 non-diagnostic.
Thy2 benign.
Thy3 indeterminate.
Thy4 suspicious.
Thy5 malignant.

Diagnostic hemithyroidectomy is often recommended for patients with indeterminate Thy3 lesions. This approach is based on an expected positive predictive value of ≈20 % but the positive predictive value of cytological examination of such lesions is variable. It is essential to know the positive predictive value of such a result in our centre. To this end we performed a retrospective analysis all cases discussed at the Connolly Hospital Thyroid Multidisciplinary Meeting during a 2 year period between 01/01/12–31/12/13.

131 patients (86.2 % female) were discussed at the MDM.

111 FNACs were reviewed (13 Thy1, 70 Thy2, 24 Thy3, 4 Thy4, 0 Thy5).

Of 24 patients with a Thy3 nodule:

- 11 were benign.
- 1 was confirmed papillary thyroid carcinoma.

- 12 patients had surgical resection;
- 5 patients are awaiting surgery.
- 4 patients are for interval surveillance in lieu of surgical resection.
- 1 patient was reclassified as Thy2 after a repeat FNAC.
- 1 patient was reclassified as benign after a core biopsy.
- 1 other patient is awaiting a core biopsy to clarify diagnosis.

This yields a positive predictive value of 9 % which is lower than that which has been described in the literature by other institutions. If this trend is maintained then we may need to consider alternative strategies for the management of such patients, such as recommending interval ultrasonographic surveillance for the majority.

P47 Bisphosphonate use in women with breast cancer on aromatase inhibitor therapy

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Aromatase inhibitor (AI) therapy is used in the adjuvant treatment of women with oestrogen-receptor-positive breast cancer. AIs increase the risk of osteoporosis and fragility fractures. The American Society of Clinical Oncologists (ASCO) recommends that bone mineral density be screened annually in patients receiving AI therapy and that bisphosphonate therapy be commenced when T-scores are ≤ -2.5.

We assessed prospectively the practice of bisphosphonate use in 100 women with breast cancer, who were attending for a DXA scan. Mean (±SD) age was 64.1 (±7.5) years. 82 women were on AI therapy for 31.1 (±25.5) months. 8 women were taking the selective-oestrogen-receptor-modulator Tamoxifen and 22 women taking AI therapy and Tamoxifen.

Estimated daily dietary calcium intake was 809 (±365) mg and 74 % were taking calcium/vitamin D supplementation. The prevalence of bisphosphonate use was 15.5 % with a mean duration of 34.4 (±13.2) months. T-scores were as follows: spine −1.24 (±1.32), femur neck −0.91 (±1.12), and hip −0.57 (±0.92). T-score was ≤ -2.5 at spine (16 %), hip (2 %), and at femur neck (6 %). A fragility fracture was recorded in 19 patients: hip (n = 2), spine (n = 3), wrist (n = 9) and ribs, sternum, pelvis, metatarsal, phalanx (n = 1 respectively); 12/19 patients were not on bisphosphonate therapy at the time of fracture and 3/19 had a T-score of ≤ -2.5 at time of fracture.

Based on mean T-score findings, our results suggest that bisphosphonate therapy would not be recommended according to ASCO guidelines. However, the prevalence of fragility fractures in this population is quite high and may suggest that a higher T-score threshold coupled with fracture risk assessment is needed for guiding treatment.

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P48 Analysis of urinary iodine by the Sandell–Kolthoff reaction: in-house method development and optimization

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Recent evidence has shown a possible re-emergence of iodine deficiency across the UK and Ireland. We are currently assessing iodine nutritional status in school girls throughout Ireland and pregnant women living in N. Ireland using urinary iodine (UI) concentration. This will require the measurement of UI in a large number of samples. Our objective was to adapt and establish the microplate method of Ohashi (2001) in Belfast.

This is a simple and rapid method in which Ammonium persulfate is used for digestion and a specifically designed sealing cassette prevents loss of iodine vapour and cross-contamination. Absorbance is then read at 405 nm.

Standards were made using potassium iodate (0–500 μg/L, $R^2 = 0.9936$). The coefficient of variation (CV) was determined for pooled quality control (QC) urine samples containing high and low levels of iodine. Intra-assay CV's were <7 %. The inter-assay CV's for the low QC (mean 18.6 μg/L) was <20 % whilst the CV for the high QC (mean 94 μg/L) was <4 %.

We anticipate samples from our on-going studies will contain approximately 50–100 μg/L of iodine, in keeping with our high iodine pooled urine. The low QC may be below the limit of quantification (LOQ) for the assay. Further method development is required before finalising our standard operating procedure. Data suggests oven incubation for 90 min at 90 °C for digestion, and room temperature incubation for 20 min after addition of the colour reagent is optimal. Thus the method will have both accuracy and precision to rapidly assay a large number of samples.

P49 Levels of sufficiency and insufficiency: the vitamin D debate

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Vitamin D insufficiency is common in the UK and Ireland. However, the lack of national guidance on the indications for testing, interpretation of results and the correction of vitamin D deficiency has resulted in confusion among healthcare professionals and inconsistent practice.

We assessed 25(OH)D status in a cohort of 125 healthy volunteers to determine the prevalence of vitamin D insufficiency. Mean serum 25(OH)D concentration measured 42.8 nmol/l. We characterised individual vitamin D status dependent on the current clinical guidelines.

The National Osteoporosis Society Guidelines (2013) define deficiency, insufficiency and sufficiency to maintain bone health as a serum 25(OH)D concentration of less than 30 nmol/l, 30–50 nmol/l and greater than 50 nmol/l respectively. Using these criteria, 36, 34.4 and 29.6 % of patients were categorised into each of the respective groups.

The Endocrine Society Taskforce Guidelines (2011) define deficiency, insufficiency and sufficiency as a serum 25(OH)D concentration of less than 50 nmol/l, 52.5–72.5 nmol/l and greater than 75 nmol/l respectively. Using these criteria, 70.4 % of patients were deemed to be deficient, 20 % were classed as insufficient and 9.6 % as sufficient.

Supplementation with cholecalciferol is recommended for all patients who are deficient and selected patients in the insufficient group who have an increased fracture risk.

Supplementation is recommended in 36 % of the cohort when using the National Osteoporosis Society Guidelines compared to 70.4 % of the cohort using the Endocrine Society Guidelines. Although vitamin D supplementation is relatively safe and toxicity is rare, this obviously will have cost implications. Clear and consistent guidelines are required to standardise current practice.

P50 Imaging studies in primary hyperparathyroidism (PHPT): are we utilising technetium-99 m (^{99m} Tc) sestamibi scanning appropriately?

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^{99m}Tc sestamibi is indicated for the localisation of parathyroid adenomas pre-operatively and not for diagnosis of hyperparathyroidism. The aim of this study was to review the reason why patients with biochemically confirmed PHPT who had ^{99m}Tc sestamibi scanning did not progress to surgery.

Data on patients with PHPT who had ^{99m}Tc Sestamibi scanning from 2010 to 2012 were analysed retrospectively.

Of 91 patients (77 % female; mean age 66.3 ± 14.7 years; calcium corrected 2.8 ± 0.18 mmol/L; PTH 124 ± 48 ng/L (pre 2011), 19.2 ± 1.8 pmol/L (post 2011); 24 h urinary calcium 6.67 ± 4.5 mmol/24 h), 32 were listed for surgery and one died pre-operatively. Six patients had prior surgery. Of the 52 non-surgical patients, 12 had co-morbidities preventing surgery; 5 either declined surgery or failed to attend their surgical appointments. Four patients had active cancer prohibiting surgery and one patient was diagnosed with metastatic disease during pre-operative assessment.

Surgical opinion advised against blind neck exploration in 16 patients.

No reason was given on 14 patients who were managed medically.

Thus in 40 % there were predictable reasons for not proceeding to surgery. At a cost of two hundred euro per ^{99m}Tc sestamibi, over 10,000 euro was spent on the surgical work up of patients who did not progress to surgery.

Agreeing a single pathway for investigation and management of PHPT would reduce unnecessary investigations in patients unwilling or unsuitable for surgical intervention. This would have the additional benefit of cost reduction.

P51 The primacy of parathyroid hormone over fibroblast growth factor 23 in renal phosphorus handling

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Measuring serum fibroblast growth factor 23 (FGF23) is essential in chronic hypophosphatemia due to rare conditions such as X-linked

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hypophosphatemia (XLH) and tumour-induced osteomalacia (TIO). We sought to explore the relative roles of parathyroid hormone (PTH) and FGF23 on renal phosphorus handling.

We studied three groups: group 1, patients with FGF23-mediated hypophosphatemia (n = 16); group 2, patients with bone and mineral disorders (n = 37); group 3, patients with XLH and hypoparathyroidism post total parathyroidectomy (n = 2) and a patient with hypophosphatemic bone disease due to congenital renal tubular acidosis. We measured FGF23, PTH, renal phosphate threshold (TmP/GFR), ionised calcium, 25-hydroxyvitamin D (25OHD) and a panel of bone turnover markers in all patients, as well as genetic mutation analysis in patients with congenital hypophosphatemia.

In group 1, PHEX sequencing diagnosed XLH in 12 patients, 1 patient had autosomal dominant hypophosphatemic rickets (ADHR) secondary to a mutation in FGF23, 1 patient had no mutation currently known to cause congenital hypophosphatemia, and 2 patients had TIO. In the combined groups 1 and 2, following partial correlation analysis, there was a significant association between TmP/GFR and PTH ($r = -0.369$, $p = 0.008$) and with FGF23 ($r = -0.463$, $p = 0.001$). After adjusting for disease category, there was a significant correlation between TmP/GFR and PTH ($r = -0.357$, $p = 0.001$). Two patients in group 3 with XLH and hypoparathyroidism had normal TmP/GFR despite having marked elevation in FGF23.

We conclude that the dominant regulator of renal phosphorus handling is PTH and that the FGF23 effect on TmP/GFR is dependent on PTH secretion, in keeping with animal studies.

P52 Is there a difference in observed bone mineral density at diagnosis of overt or subclinical thyrotoxicosis?

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Introduction: Early thyrotoxicosis is associated reduced bone density. The aim of this study is to determine any difference between bone mineral density in those presenting with overt or subclinical thyrotoxicosis.

Methods: Retrospective observational study of bone mineral density (BMD) in individuals presenting with thyrotoxicosis from 2008 to 2013. BMD was assessed by bone densitometry using T, Z and total BMD within 1 year of first abnormal thyroid function results.

Results: 91 people were included: 64 women, 27 men. 49 had overt thyrotoxicosis at diagnosis (n = 15 aged 20–50 years, n = 34 aged >50 years), 40 had subclinical thyrotoxicosis (5 aged 20–50 years, 35 aged >50 years). The median age of those aged 20–50 years was 43 years (overt), 42 years (subclinical), and those aged >50 years 58.5 years (overt), 70 years (subclinical).

In those aged 20–40 years the mean TSH at diagnosis (n = 20) was 0.03 ± 0.02 U/mL, fT4 27.17 ± 2.5 pmol/L, and in the >50 years age (n = 69) mean TSH was 0.16 ± 0.04 pmol/L, fT4 21.46 ± 1.34 pmol/L.

There was no difference in BMD, T or Z scores in overt or thyrotoxic patients in any of the age ranges.

In the 20–50 years age group 4 had a Z score <−2.5, 2 in L1L4 and 2 femoral neck (all subclinical). 12 had Z scores between −2.5 and −1.0 (2 in L1L4 (2 overt) and 10 femoral neck (7 overt, 3 subclinical). Aged >50 years 30 had T scores <−2.5 (L1L4 (10 overt, 6 subclinical) 12 femoral neck (6 overt, 6 subclinical), 2 radius (subclinical), 84 had T scores −1.0 to −2.5 (L1L4 (7 overt, 12 subclinical), 64 femoral neck (35 overt, 29 subclinical) and 1 radius (subclinical).

Conclusion: There is no difference in Z score and T score between those who presented with overt thyrotoxicosis and those with subclinical thyrotoxicosis. There were a number with Z scores −2.5 to −1.0 which merit rescanning but overall the prevalence of lower T scores in those aged >50 years presenting with thyrotoxicosis was high and this was their first DEXA. This study highlights the importance of DEXA scanning in this population.

P53 Retrospective analysis of the vitamin D profiles of patients with primary hyperparathyroidism (PHPT)

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International guidelines advise measuring Vitamin D in patients with PHPT. Vitamin D is commonly low in these patients. The aim of this study was to analyse 25-hydroxy-vitmain D (25OHD) levels in a cohort of patients with PHPT.

Data on 91 patients with confirmed PHPT between 2010 and 2012 was analysed retrospectively. Vitamin D status was assessed by measuring 25OHD levels. Vitamin D deficiency was defined as <25 nmol/L, and insufficient as 25–50 nmol/L. Data are expressed as mean ± standard deviation.

Fifty-two (57 %) patients, (79 % female) had 25OHD concentration assessed (mean concentration 42.6 ± 23.4 nmol/L). Mean age was 66 ± 15 years; average corrected calcium 2.81 ± 0.19 mmol/L; mean PTH 98.4 ± 48.9 ng/L (pre 2011), 15.3 ± 7.6 pmol/L (2012).

Thirteen (25 %) patients had deficient levels of 25OHD; 21 (40 %) insufficient and 18 (35 %) were sufficient. Thirty-two (61.5 %) patients had corresponding DEXA scanning. Seven (22 %), 19 (59 %) and 6 (19 %) were classified as normal density, osteopenic and osteoporotic respectively. There was no significant difference in calcium or PTH levels between sufficient and deficient/insufficient groups).

The mean age of patients with 25OHD deficiency was 59.1 ± 18.1 years; corrected calcium 2.76 ± 0.09 mmol/L; PTH 127.5 ± 39.9 nmol/L (pre 2011), 13.4 ± 9.5 pmol/L (2012); all patients had either osteopenia or osteoporosis.

There was no significant seasonal variation in vitamin D levels between winter and summer months (42 + 23 nmol/L vs 43.3 + 23.5 nmol/L, p = NS).

In summary, vitamin D concentration was not measured in a significant proportion of patients with PHPT. Our study shows that vitamin D deficiency or insufficiency occurs in two thirds of our patients with PHPT.

P54 Rising trend in Vitamin D status in Ireland from 1993 to 2013: concerns for the future

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Assessing vitamin D status by measurement of total 25-hydroxyvitamin D (25OHD) has been possible since the early 1970s. Following fortification practices and availability of vitamin D supplements, we have noted great improvements in vitamin D status. We are now concerned about intakes in excess of requirement.

We extracted 25OHD results (n = 43,782) from our computerized laboratory system from May 1993 to December 2013. Monthly average (n = 248) and yearly average (n = 21) 25OHD were calculated. We conducted a time series analysis of the monthly averages using a simple sequence chart and a 4253H smoother in order to examine for trends, seasonality, and cycles. We used the univariate auto-regressive integrated moving average (ARIMA) in order to

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develop a forecasting model. After testing the ARIMA model, we applied it to forecasting 25OHD levels up to 2016. The stationary R-squared was chosen as the model fit statistic.

The change in yearly-average 25OHD was: Δ25OHD (nmol/L) = year × 0.68(nmol/L); r = 0.825, p < 0.001. Visual inspection of the sequence and 4253H smoother charts showed an upward trend, seasonality, but no cycles. The mean value of the residuals in the ARIMA model, following removal of outliers, was −0.03 (CI −0.84 to 0.78) nmol/L with a normal distribution (p = 0.200). After extending the ARIMA model to 2016, the stationary R-squared was positive at 0.337, indicating that the forecast model is suitable.

Our trend analysis of 25OHD from 1993 to 2013 demonstrates an upward rise. This confirms our concern of having a dual problem: at-risk groups with low 25OHD levels, and others with unnecessarily high 25OHD levels.

P55 Inferior petrosal sinus sampling in the diagnosis of ACTH-dependent Cushing syndrome: lessons from the Cleveland Clinic experience

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Inferior petrosal sinus sampling (IPSS) is used to distinguish ectopic ACTH syndrome and pituitary-dependent Cushing's disease (CD). The procedure is performed in the presence of ACTH-dependent Cushing syndrome when no definite adenoma (or a lesion <6 mm) is seen on pituitary MR. An inferior petrosal sinus to peripheral (IPS:P) ACTH ratio greater than two before, or greater than three after corticotropin-releasing hormone (CRH) administration indicates a pituitary source of ACTH. We highlight the inappropriate use of IPSS and the utility of prolactin measurements during IPSS testing.

A 41 year old female suspected of Cushing syndrome was referred with 'high levels' of cortisol directly to the interventional radiology department for IPSS testing. No accompanying biochemical or radiological investigations were provided. Subsequent IPSS showed evidence of suppression of the HPA axis. The second patient, a 59 year old male with ACTH dependent Cushing syndrome underwent initial IPSS at a different center which was interpreted as indicating likely ectopic ACTH production, however, an ectopic source of ACTH was not identified. Repeat IPSS with prolactin measurements at our center indicated pituitary ACTH production which was confirmed histologically.

These cases demonstrate that IPSS should only be considered when the diagnosis of ACTH dependent Cushing syndrome has been firmly established, furthermore IPSS should not be utilized as a 'diagnostic test' for Cushing syndrome. Secondly, prolactin measurements should be considered 'standard of care' during IPSS and may reduce false negative results in patients with Cushing's disease who do not demonstrate an appropriate central to peripheral ACTH gradient.

P56 Lipodystrophy in Diabetes … Look beyond the fat!

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Lipodystrophies are heterogeneous disorders (congenital or acquired) due to defective fat metabolism with phenotypes of partial or generalized subcutaneous fat loss, but classically absent subcutaneous fat. They are strongly associated with metabolic complications, including DM2, difficult glycemic control and profound Insulin resistance.

There are evolving phenotypes of DM2 and it is imperative to recognize characteristics that may flag different genotypes.

AA, 32 years was referred for poorly controlled DM2 (3 years duration) progressing rapidly to insulin. She was one of several siblings to consanguineous parents. Her brother (DM2) was referred elsewhere. Her sister was subsequently referred with the same issues. On exam she had strikingly thin limbs with no subcutaneous fat and significant muscle wasting. Her abdomen was visibly distended with truncal fat. She had distinctive bird-like facies with micrognathia. Her skin was mottled red in appearance, thin, hardened and she looked older than her stated age. She had thin wispy hair. She had NAFLD confirmed by ultrasound. (Her sister had the same appearance). AA's age at presentation, family history and phenotype suggested a DM variant.

Her fat distribution suggested an underlying genetic, autosomal recessive lipodystrophy familial partial lipodystrophy (supported by her consanguineous heritage). We have surmised mandibuloacral dysplasia/Adult 'progeroid' or a variant Werner's syndrome. Progeroid is a rare autosomal recessive disorder with a premature aging aspect.

Her brother (attending GUH) had a similar phenotype, presumed Adult progeroid but tested negative for progeroid, and was confirmed as having Werner syndrome. Our patient and her sister have consented to cascade genetic testing.

P57 Adding fuel to the fire!!

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We describe a case whereby a 67 year old male presented with a third nerve palsy following administration of a 6 monthly depot preparation of the GnRH agonist, buserelin, for treatment of prostate cancer. The patient known to have a pituitary macroadenoma had normal anterior pituitary function with morning testosterone concentrations of 16.8 nmol/L. Two days following administration of buserelin the patient experienced severe headache and nausea, followed 24 h later by onset of ptosis and ophthalmoplegia.

MRI brain and pituitary showed 0.5 cm enlargement of the pituitary gland with encroachment upon the right cavernous sinus and the optic chiasm. FSH levels increased from 57 IU/L prior to GnRH administration to 576 IU/L post-GnRH agonist while LH increased from 3.9 to 50 IU/L. Testosterone levels rose to 27 nmol/L. A diagnosis of functional gonadotrophinoma was made.

Due to prior left visual field defect, the patient proceeded to anterior hypophysectomy and debulking of the gonadotrophinoma. Histology demonstrated infarcted pituitary consistent with apoplexy. Post-operative FSH, LH and testosterone remained raised at 50.2 IU/L, 6.9 IU/L and 21.7 nmol/L respectively and did not decrease over a 3 month period signifying resistance to usual GnRH receptor downregulation seen following administration of high doses of these agents. This demonstrates their therapeutic inefficacy for prostate cancer in face of the underlying pituitary pathology in this case. The patient has since been switched to a GnRH antagonist for future therapy and is undergoing follow-up.

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In summary we present a case whereby GnRH agonist therapy in the presence of a previously unrecognized gonadotrophinoma. This resulted in pituitary apoplexy and persistently raised gonadotrophins and testosterone, thereby potentially worsening the prognosis for prostate cancer in this patient.

P58 Isolated pituitary macroprolactinoma in a 14 year old girl: a case study

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Familial isolated pituitary adenoma (FIPA) has become a recognised though uncommon entity. A heterozygous germline mutation in the aryl hydrocarbon receptor-interacting protein (AIP) gene has been found in 15–20 % of families presenting with FIPA. The majority of patients present at a young age with aggressive somatotroph, somatolactotroph or lactotroph macroadenomas.

We present the case of a 14 year old Irish female who had an incidental finding of a pituitary macroadenoma on CT brain following investigation for recurrent sinusitis. Her medical background included a 3 year history of autoantibody positive Type-1 diabetes mellitus. Her diabetes was poorly controlled with a HbA_{1c} of 76 mmol/mol. There was no family history available as the patient had been adopted at 10 months of age. At review she had no galactorrhea or headaches. Investigations revealed an elevated prolactin of 19,465 mIU/L. All other anterior pituitary hormone levels were normal. Bone age was estimated at 15 years $\pm$ 11 months. A pituitary MRI showed a 2 cm $\times$ 1.6 cm $\times$ 1.9 cm anterior pituitary adenoma abutting the optic chiasm. Formal visual field testing was normal. She was commenced on cabergoline with subsequent improvement in prolactin levels and tumour shrinkage. She had genetic counselling and sampling for the FIPA mutation.

This is an interesting case of a macroprolactinoma in a young Irish patient whose family history is unavailable. Although microprolactinomas are not particularly uncommon in this age group a macroprolactinoma in a teenager should provoke the acquisition of a detailed family history and consideration of testing for the FIPA mutation.

P59 Hypercalcaemia in pregnancy: a challenging case

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A 40 year old lady was admitted for evaluation of headache and blurred vision. She was gravida 1, para 0 and 30 weeks gestation at presentation. Biochemical evaluation revealed hypercalcaemia of 3.09 mmol/L which measured 3.23 mmol/L when adjusted for albumin. Phosphate was 0.78 mmol/L and creatinine measured 56umol/L. Serum parathyroid hormone (PTH) was inappropriately elevated at 200.8 ng/L. The patient was diagnosed with PTH-dependent hypercalcaemia and treated with intravenous fluids. She proceeded to urgent delivery by caesarean section and post delivery received intravenous bisphosphonate therapy.

A parathyroid ultrasound revealed no abnormalities. A sestamibi was contraindicated due to the patient's desire to breastfeed. Unable to locate an adenoma preoperatively the patient proceeded to an urgent neck exploration. The left superior parathyroid gland was enlarged and thus excised, however pathological analysis revealed a normal gland. The remaining parathyroid glands were identified and biopsied however, there was no evidence of parathyroid hyperplasia. The patient had persistent post-operative hypercalcaemia with corrected calcium ranging from 2.90–3.00 mmol/L.

CT neck and thorax revealed a soft tissue lesion in the anterior mediastinum. The patient subsequently underwent sestamibi scanning which demonstrated abnormal increased tracer uptake in the left upper mediastinum correlating with the abnormality on CT. On day 7 post delivery, surgical removal of an intrathymic parathyroid adenoma took place. Recovery was uneventful and resulted in normalisation of serum calcium which measured 2.43 mmol/L day one post procedure.

Severe hypercalcaemia in pregnancy may be life-threatening and can result in pregnancy loss. This case was further complicated by an ectopic, intrathymic parathyroid adenoma.

P60 Herpes simplex—an unusual cause of hypothalamic–pituitary dysfunction

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A 45 year old university professor was admitted with pyrexia and progressive delirium, associated with seizures, and ultimately required sedation and intubation. MRI brain showed increased signal areas involving the infundibulum, hypothalamus, subthalamic areas and optic radiation bilaterally. An initial sample of cerebrospinal fluid had a high protein only. EEG revealed encephalopathy. He was initially treated with intravenous methylprednisolone for a presumed autoimmune encephalopathy. Repeat lumbar puncture confirmed herpes simplex encephalitis and he was started on acyclovir. Assessment of sodium balance initially indicated inappropriate antidiuretic hormone, which responded to fluid restriction. Subsequently, serum sodium and urine output rose with inadequate urinary concentration, indicating the development of diabetes insipidus. Anterior pituitary profile revealed hypogonadotrophic hypogonadism and central hypothyroidism. He was treated with desmopressin and hormone replacement, including hydrocortisone.

Recovery was slow with residual deficits in episodic memory and anterograde amnesia. He was noted to have hyperphagia and dysthermia consistent with hypothalamic syndrome. Insulin tolerance testing, 5 months post-treatment, revealed persistent panhypopituitarism, with a flat response in cortisol and growth hormone under stress. He remains on hormone replacement and is slowly rehabilitating, with slow but steady improvement in cognitive function over time.

This case is an example of an unusual cause of hypothalamic–pituitary dysfunction. Viral encephalitis causing this condition has been rarely reported in the literature and in all documented cases the deficit has been permanent. We expect that our patient will require lifelong hormone replacement.

P61 Diabetes insipidus and degenerative cerebellar syndrome—is there a link?

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A 10 year old boy presented with polydypsia and polyuria. Diabetes mellitus was out-ruled and he was admitted for a water deprivation test, confirming diabetes insipidus. He was started on desmopressin and remained stable. Magnetic resonance imaging was normal. At 15 years old he was seen by a speech and language therapist

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regarding a speech impediment. Aged 24, he reported balance difficulties, progressive over the preceding 3 years. He was referred to neurology and, when seen, had developed a Rhomberg's negative broad-based ataxic gait with nystagmus and mild cognitive impairment. He was diagnosed with a degenerative cerebellar syndrome. MRI brain revealed volume loss in the cerebellum. Despite extensive investigations, no aetiology was identified.

Links between diabetes insipidus and cerebellar syndromes have been documented in a number of case reports. Langerhan's cell histiocytosis is implicated in a number of these cases and rarely familial links have been seen, but many have no clear aetiology. Hypogonadotrophic hypogonadism has been seen in association with cerebellar ataxia, with multiple case reports of familial links, and recently a causative genetic mutation has been identified. It is possible that a similar genetic link is involved in cerebellar syndrome associated with diabetes insipidus. This case illustrates the importance of awareness of the potential development of cerebellar syndrome to avoid delays in diagnosis and facilitate referral to appropriate services. Given the rarity of the condition, and the paucity of data available, identification of cases is vital to allow for further research.

P62 Double trouble: a TSH and GH co-secreting macroadenoma

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Thyrotropin (TSH)-secreting adenomas account for less than 1 % of all functioning pituitary adenomas. Approximately 15 % of these co-secrete GH. They are biochemically characterized by high concentrations of free T_4 in the presence of detectable TSH.

A 30 year old male was referred with abnormal thyroid function tests (TFTs) (fT_4 29.4 pmol/L; RR 12–22, TSH 4.23 mIU/L; RR 0.4–3.8). He had no family history of thyroidectomy or thyroid disease. He reported intermittent headache and a change in facial appearance and shoe size. Examination revealed an acromegalic facies and goiter.

Prolactin was normal. IGF1 was raised (1,004 μg/L; RR 115–307) and 2 h GH value after oral glucose tolerance testing was 2.14 μg/L. TSH alpha subunit was raised (9.53 IU/L; RR < 0.6) confirming the biochemical diagnosis of TSH and GH co-secreting tumour. MRI revealed a 4 cm pituitary macroadenoma.

Trans-sphenoidal resection of the tumour was unsuccessful, and the patient underwent a craniotomy with debulking followed by radiotherapy. IGF-1 fell within 1 month of the second surgery but TFTs did not change. Somatostatin analogue therapy was poorly tolerated due to GI upset leading to poor drug adherence.

Four years later, off treatment, IGF levels are low (21 μg/L) but TFTs remain abnormal (fT4 26.5 pmol/L, TSH 4.86 mIU/L). He has hypogonadotrophic hypogonadism and ACTH deficiency. A long acting somatostatin analogue has now been tried in an effort to improve adherence.

Management of TSH-omas often requires several treatment modalities, and this case demonstrates differing responses of TSH and GH secretion to treatment.

P63 Resistance to thyroid hormone syndrome from childhood to adulthood—variation in symptoms and thyroid function

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Resistance to thyroid hormone (RTH) is a rare autosomal dominant condition characterised by tissue-specific insensitivity to thyroid hormone. Eighty-five percent of cases are associated with TRß gene mutations.

A 2½ year old boy was referred with abnormal TFTs (fT4 30.4 pmol/L; RR 12–26, fT3 10.2 pmol/L; RR 3.7–8.5, TSH 2.34 mIU/L; RR 0.73–8.4) and behavioural problems. Review of family history revealed the index case's mother had undergone thyroidectomy. He and two of his three older brothers have subsequently been diagnosed with RTH. Genetic testing has confirmed a mutation in the TRß gene. They have learning problems but are growing normally.

The mother was diagnosed with RTH at age 3 (I431T mutation), with abnormal TFTs (fT4 29.7 pmol/L; RR 7.7–21, TSH 1.8 mIU/L; RR 0.6–4.3) and goitre. She was clinically hyperthyroid. Symptoms improved following beta-blocker and 3,3,5 triiodothyroacetic acid (TRIAC) treatment. She achieved a final height on the 75th centile, and weight below the 10th. Symptoms of hyperthyroidism off treatment abated in her late teens and she was then lost to follow-up. She was re-referred age 28 years with a thyroid nodule subsequently diagnosed with papillary thyroid cancer, follicular variant (pT2(m)).

This family describes the spectrum of RTH presenting across two generations. Clinical features result from tissue-specific resistance to thyroid hormone, with effects on learning and behaviour in childhood, and apparent spontaneous improvement in hyperthyroid symptoms beyond the second decade. In the mother's case, the condition was complicated by development of papillary thyroid cancer, with congruence of the latter with RTH being extremely rare.

P64 A case of parathyroid adenoma in a patient with Familial Hypocalciuric Hypercalcaemia

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A 57 year old male with symptoms of fatigue, joint pains and insomnia was found to have hypercalcaemia secondary to hyperparathyroidism with a corrected Calcium of 2.61 mmol/l (2.2–2.6 mmol/l) and a serum PTH of 86 pg/ml (10–65 pg/ml). Pre-

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operative work up demonstrated a parathyroid adenoma in the right upper position and he proceeded to surgery. The right upper parathyroid gland was excised and weighed 230 mg. Histology confirmed a parathyroid adenoma. All other parathyroid glands were identified intra-operatively and looked macroscopically normal.

Post-operatively, his symptoms remained unchanged and the corrected calcium increased to 2.87 mmol/l with a PTH of 59 pg/ml. He had no family history of hypercalcaemia. Further investigations revealed low 24 h urinary calcium level and a low urine calcium to Creatinine ratio. Genetic testing revealed a mutation in exon 4 of the Calcium sensing receptor (CaSR) which is pathogenic for Familial Hypocalciuric Hyercalcaemia (FHH). This case is an example of a rare phenomenon when a parathyroid adenoma develops in patients with FHH. There have been a small number of similar cases reported previously. In contrast to this patient, those reported, had symptomatic and biochemical improvement post excision of the adenoma. This patient has been commenced on Cinacalcet, a calcimimetic which binds to the calcium sensing receptor and inhibits the release of parathyroid hormone. Cinecalcet has been used effectively in two other reported cases of FHH.

Although FHH is rare, it is likely underdiagnosed, and should be considered as a differential diagnosis in patients who remain hypercalcaemic post removal of a parathyroid adenoma

P65 Acute symptomatic hyponatraemia following sodium picosulfate/magnesium citrate as bowel preparation for colonoscopy—a case series

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Oral purgatives such as sodium phosphate and sodium picosulfate/magnesium citrate (*Picolax*) combinations are commonly used as a preparation step for colonoscopies in Ireland. These substances can occasionally cause significant electrolyte disturbances including hyponatraemia. Although this is rare, if not treated promptly and appropriately, these electrolyte abnormalities can be associated with life threatening complications. We report cases of symptomatic hyponatraemia in three women aged 65–75 years, following ingestion of *Picolax* prior to colonoscopy. All three patients had documented previously normal electrolytes and all three required hospital admission for management of their electrolyte disturbance. The clinical presentations were variable and depended upon the severity of the hyponatraemia. Patient 1 presented with nausea and vomiting 7 h post *Picolax* ingestion. Plasma sodium was 124 mmol/l. She was diagnosed with mild symptomatic hyponatraemia, and treated with anti-emetics and slow intravenous infusion of 0.9 % Saline. Patient 2 developed acute confusion 8 h following ingestion of *Picolax*. Plasma sodium was 120 mmol/l and she was clinically dehydrated. She was also treated with intravenous 0.9 % Saline. Patient 3 presented with seizures and reduced consciousness, 48 h post *Picolax* ingestion. Plasma sodium was 111 mmol/l. As she had severe life threatening hyponatraemia with seizures, she was treated with boluses of 3 % hypertonic saline. Picolax should be avoided in any patient with an underlying predisposition to hyponatraemia. Guidelines on safe but adequate water intake during bowel cleansing are required and patients should be counselled on the symptoms of hyponatraemia to allow early intervention if required.

P66 Diagnostic dilemmas in a case of diabetes insipidus

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A 34 year old female presented in March 2012 with a short history of lethargy, weakness, polydipsia and polyuria. She was noted to be hypernatraemic (Na 156 nmol/l), serum osmolality was elevated at 324 mOsm/l with urine osmolality inappropriately dilute at 162 mOsm/l confirming the diagnosis of diabetes insipidus. She responded to desmopressin indicating this as cranial diabetes insipidus. She had secondary hypothyroidism (fT4 5.9, TSH 3.9), a normal short synacthen test (30 min cortisol 773 nmol/l) and oestradiol of 65 nmol/l with FSH 0.4 and LH <0.2. Prolactin was 2,966. Appropriate replacement therapy was commenced.

MR pituitary revealed an enhancing hypothalamic lesion measuring 1.5 × 1.0 × 1.7 cm with surrounding oedema. The pituitary itself appeared normal and no other intracranial abnormality was noted. Due to its anatomical position, biopsy was not performed. CSF contained inflammatory cells but was otherwise unhelpful diagnostically. Cross-sectional imaging revealed bony lesions in her right 10th and 11th ribs and left 7th rib in addition to right basal lung consolidation with effusion, raising the possibility of Langerhans cell histiocytosis (LCH) as a unifying diagnosis.

While no tissue diagnosis was possible, the clinical features were felt characteristic of LCH and systemic therapy with high dose corticosteroids and four cycles of cladribine was commenced. Subsequent to therapy, imaging revealed resolution of the mass lesion in the hypothalamus, although a small nodule of enhancement at the hypothalamic origin of the pituitary stalk remains along with a small region of high signal within the left hypothalamus.

Symptomatically she feels much improved. Recent endocrinological assessment indicates ongoing cranial diabetes insipidus and secondary hypothyroidism despite the radiological improvement.

This case highlights the need to be aware of rare diagnoses presenting with hypothalamic–pituitary disease and the challenges of confirming the diagnosis and subsequent treatment.

P67 Cushing's disease in a 7-year-boy due to corticotroph cell hyperplasia

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Cushing's disease (CD) is very rare in children and is invariably caused by a corticotroph adenoma. However, corticotroph cell hyperplasia has only been convincingly shown in two previous cases of paediatric Cushing's disease.

We report the case of a 7-year-old boy with Cushing's disease caused by corticotroph cell hyperplasia.

Our patient presented with a ten-month history of obesity, hirsutism and growth retardation. His height was 2.5SD below the mean and his weight was over 98th percentile for age. Examination revealed a cushingoid facies, central obesity, striae and hirsutism.

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Biochemical assessment showed raised 24-h urine free cortisol and mid-night salivary cortisol with failure to suppress serum cortisol following low dose dexamethasone. Baseline 9 am ACTH level was elevated. A peripheral CRH test showed a brisk rise in ACTH and cortisol consistent with Cushing's disease.

Pituitary MRI was normal. Bilateral inferior Petrosal Sinus Sampling with CRH stimulation showed a central-peripheral gradient greater than 3:1 at 10-min post-CRF confirming the diagnosis of pituitary dependant Cushing's.

The patient underwent endoscopic transphenoidal pituitary exploration. Abnormal tissue was resected from the left side of the pituitary. Histopathology revealed no adenoma but intense immunostaining for ACTH consistent with corticotroph hyperplasia. On the fourth post-operative day, am serum cortisol level was 39 nmol/l indicating early remission. Three months post-operatively he remained hypocortisolaemic on hydrocortisone with significant clinical improvement.

This case illustrates that paediatric Cushing' disease may be caused, albeit very rarely, by cortricotroph hyperplasia. Careful follow-up in necessary as the recurrence rate of this entity is not known.

P68 A case of drug induced acute hypopituitarism

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Ipilimumab is a new novel immune modulating agent for the treatment of metastatic malignant melanoma. It acts as a monoclonal antibody against the CD4 antigen of cytotoxic T lymphocytes. Lymphocytic hypophysitis has been reported in 0–17 % of patients involved in ipilimumab trials.

We present the case of a 46 year old gentleman who presented to the oncology outpatient clinic with extreme fatigue and weakness exactly two weeks after his third course of Ipilimumab. He had commenced treatment with Ipilimumab in April 2013 for treatment of metastatic stage 4 choroidal melanoma of his left eye, with lung metastases. The patient reported the gradual onset of an escalating and severe headache, followed by prolonged spells of weakness. His sodium on admission was 124 mmol/l. An endocrine were consul was sought and he was found to have hypopituitarism with a T4 of 6.9 pmol/l and a TSH of 1.50 miU/l. He had hypogonadotrophic hypogonadism and his cortisol at 30 min post ACTH stimulation was 117 nmol/l. Of note the patient had normal thyroid function tests in May 2013 with a T4 of 19.8 pmol/l and a tsh of 1.39 miU/l, indicating a rapid onset of hypopituitarism. The MRI pituitary was normal. The unifying diagnosis based on history and biochemistry was that of Ipilimumab induced lymphocytic hypophysitis and anterior hypopituitarism and the patient was commenced on replacement thyroxine and steroids. This case illustrates the importance of bearing drug induced causes of hypopituitarism in mind, particularly in the setting of an acute presentation.

P69 Two cases of pseudohypoparathyroidism type 2

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Pseudohypoparathyroidism (PHP) is the term used to describe states of parathyroid hormone (PTH) resistance. PHP manifests with hypocalcaemia, hyperphosphatemia, and elevated PTH levels. PHP type 1 encompasses rare congenital disorders caused by a deficiency of alpha subunit of Gs. PHP type 2 refers to acquired disorders such as hypomagnesaemia and vitamin D deficiency. We describe two cases of PHP type 2 that presented acutely.

A 55-year old woman presented for chronic management of venous ulcer on a background history of morbid obesity. She had hypocalcaemia (1.56 mmol/L), hyperphosphatemia (1.52 mmol/L), elevated PTH (386 ng/L; reference range: 15–65 ng/L), normomagnesaemia (0.8 mmol/L), and undetectable 25-hydroxyvitamin D (25OHD) (<10 nmol/L). Follow-up assessment after 5 months showed normocalcaemia (2.46 mmol/L), normophosphophataemia (1.15 mmol/L), normal PTH (59 ng/L) and sufficient 25OHD (52 nmol/L).

A 74-year old man presented with exacerbation of congestive heart failure treated with furosemide. He had marked muscle weakness. He had hypocalcaemia (1.65 mmol/L), hyperphosphataemia (1.48 mmol/L), hypomagnesaemia (0.57 mmol/L); elevated creatinine kinase (CK) (1610 IU/L; reference range 38–174), adequate 25OHD (36 nmol/L); and elevated PTH (534 ng/L). Following correction of hypomagnesaemia after 8 days, results showed normocalcaemia (2.22 mmol/L), normophosphataemia (1.12 mmol/L) normal CK (64 IU/L) and mild elevation in PTH (128 ng/L).

PHP type 2 may present with severe hypocalcaemia. It probably occurs more commonly that suspected. Patients with severe hypocalcaemia (<2.00 mmol/L) and hyperphosphataemia, in the absence of renal impairment, should have a PTH measurement. A high PTH, in that setting, gives a diagnosis of PHP type 2. Reversible causes should be sought.

P70 Beware amiodarone as risk factor for carbimazole induced agranulocytosis; recovery with Filgrastim

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Agranulocytosis is a rare and serious complication of Carbimazole. (risk $<1/10^6$ of population/year. It is associated with higher doses. We report 2 cases over 1 year in patients exposed to amiodarone.

Case 1. A 63 year old man with ischemic cardiomyopathy had been treated with amiodarone for atrial fibrillation for 3 years. 6 months after stopping he developed symptomatic thyrotoxicosis and started on carbimazole 60 mg per day. Thyroid T^c uptake was low. 3 months later he presented with sepsis and a neutrophil count of 0.010×10^9/l and was treated with Filgrastim and antibiotics. Granulocytes rose $>1.000 \times 10^9$/l on day 9 of treatment Thyrotoxicosis resolved after 3 months on prednisolone and potassium perchlorate.

Case 2. A 72 years female with atrial fibrillation, diabetes and ES renal disease previously on amiodarone for 2 years developed symptomatic thyrotoxicosis and treated with carbimazole 60 mg/day on a reducing regime. 2 months later she developed agranulocytosis and sepsis: neutrophil count: 0.010×10^9/l. She was treated with Filgrastim and antibiotics. Neutrophil count rose over 1.000×10^9 after 6 days. She became euthyroid after prednisone therapy.

Risk for carbimazole induced agranulocytosis may be dose related. There is little evidence amiodarone causes agranulocytosis. Amiodarone induced thyrotoxicosis is relatively unresponsive to antithyroid drugs and higher doses are usually employed. Our patients with higher risk factors for death may have had accelerated recovery with Filgrastim. We advise caution with high antithyroid drug doses in amiodarone induced thyrotoxicosis and suggest considering combined therapy early.

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P71 Severe osteoporosis as a presentation of concealed Swyer syndrome (pure gonadal dysgenesis)

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Swyer Syndrome (pure gonadal dysgenesis) is characterised by female phenotype with a 46 XY genotype due to a mutation of the SRY (Sex determining region) gene on the y chromosome.

A 28 year old presented with back pain after a road traffic accident and had a 2nd lumbar vertebral fracture and severe osteoporosis. The DEXA scan T score was −4.2. Procollagen Type 1 pro peptide and Osteocalcin levels were high. She had been in good health and denied any family illness. She was 180 cm tall and weighted 63 kg. Breasts were present though not fully developed. She had sparse pubic and axillary hair. The external genitalia were normal. She had high gonadotropins and low oestrogen and testosterone levels. She had normal serum calcium, phosphate, parathyroid hormone, and vitamin D levels. Coeliac and immunoglobulin screen was negative. She had no liver or renal disease.

The patient reported menstruating from age 14. Genotype was 46XY -normal male. PCR analysis confirmed the SRY locus on the y chromosome. MRI and ultrasound of pelvis showed a uterus, fallopian tubes, vagina and one streak gonad. Anti Mullerian factor was low.

Osteoporosis improved with a 29 % increase in T score over 2 years with recombinant parathyroid hormone. She menstruated for the first time on cyclical oestrogen. She is scheduled for gonadectomy for the risk of malignancy. Osteoporosis and tall stature were due to life long oestrogen deficiency. The patient later admitted she had concealed her condition for cultural reasons delaying early diagnosis and treatment.

P72 Case report: adrenocortical carcinoma with co-existing sarcoidosis

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A 30 year old male presented with unilateral testicular swelling. Ultrasound demonstrated bilateral testicular masses most consistent with an infiltrative process. CT TAP (thorax, abdomen and pelvis) was performed which demonstrated features consistent with pulmonary sarcoidosis, with widespread mediastinal lymphadenopathy, along with splenic infiltration. A large left sided adrenal mass measuring 10 × 8 × 7.5 cm in size was also noted. There was no radiological evidence of local metastasis. Bronchoscopy confirmed a diagnosis of sarcoidosis. Biochemical investigations revealed a non-functioning adrenal mass. Laparoscopic adrenalectomy was performed. Macroscopically, the tumour capsule was intact, with a rim of non-tumour adrenal tissue attached. Histology demonstrated atypical mitosis, capsular, sinusoidal and vascular invasion. The mitotic index was <5/HPF (high power fields). Ki67 staining was <10 %. Synaptophysin staining was positive, suggesting a tumour originating from the adrenal cortex. A Weiss score of 5/9 was calculated, indicative of ACC (adrenocortical carcinoma). The non-tumour adrenal gland tissue present, demonstrated non-caseating granulomata, consistent with sarcoidosis. Case reports of ACC with co-existing sarcoidosis have not been reported in the literature. Mitotane therapy is widely regarded as the adjuvant treatment of choice in prolonging disease-free progression. However, there is a paucity of prospective data available. Due to the presence of systemic sarcoidosis, radiological staging for disease recurrence will be challenging. Urinary steroid metabolite testing may have a major role to play in assessing for curative surgery and disease recurrence.

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