CalSoc 2020

caledonian society for endocrinology and diabetes

Dunkeld House

January 31st / February 1st

@CalSocEndo

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Contents

Programme of Events

Friday 31st January

Session 1

Chair: Dr Russell Drummond
Consultant Endocrinologist
Glasgow Royal Infirmary

14.30 – 15.15 **Adrenal surgery in Glasgow and the West of Scotland**
Dr Marie Freel / Miss Carol Watson
Consultant Endocrinologist / Consultant Endocrine Surgeon
Queen Elizabeth University Hospital

15.15 – 16.00 **Polycystic Ovary Syndrome: Long-term outcomes**
Professor Aled Rees
Professor of Endocrinology
Cardiff University

16.00 – 16.15 Coffee

16.15 – 17.00 **Adrenal Incidentaloma – the journey so far**
Professor Fahmy Hanna
Consultant Endocrinologist / Honorary Professor
University Hospital of North Midlands / Staffordshire University

17.00 – 17.45 **NES Digital Service x Endocrinology**
Ute Schauberger – NES Digital Service
Endocrine genetics
Paul Newey – University of Dundee
TEAMeD-5 Thyroid eye disease
Priya George – Ninewells Hospital

19.30 Dinner

Programme of Events

Saturday 1st February

09.20 – 09.30 CalSoc Annual General Meeting

Session 2

Chair: Dr Rohana Wright
Consultant Endocrinologist
Edinburgh Centre for Endocrinology & Diabetes

09.30– 10.15 **Management of thyroid disease before and during pregnancy**
Dr Kristien Boelaert
Reader
University of Birmingham

10.15 – 11.00 **Hypoparathyroidism: An overview**
Professor Graham Leese
Consultant Endocrinologist
Ninewells Hospital and Medical School

11.00 – 11.15 Coffee

11.15 – 12.30 **Abstract Presentations**
Tom Chambers
Rob Gifford
Charlotte Dewdney
Roby Rajan
Rebecca Haggarty / Nathan Smith
Pui San Yap

12.30 Lunch

Welcome to CalSoc 2020

Welcome to Dunkeld for the 39th winter meeting of the Caledonian Society for Endocrinology. This year's meeting once again contains a broad range of clinically relevant topics delivered by experts in their field. There is a focus on the adrenal gland to complement the first meeting of the multi-disciplinary Scottish Adrenal Group, being held just prior to CalSoc. We also welcome Ute Schauberger from NES Digital Service to provide an update on the national endocrine IT project, which is on course to deliver a product which will improve the process of endocrine care for both patients and clinicians.

Many thanks to our supporters from the pharmaceutical industry: Novo Nordisk, Abbott, Ipsen, Astra Zeneca and MSD. The meeting could not take part without their contribution and I would encourage you to visit their stands between sessions.

Dr Fraser Gibb
On behalf of the CalSoc Committee

CalSoc Committee

Dr Sam Philip
Consultant Physician and Honorary Clinical Lecturer
Aberdeen Royal Infirmary / University of Aberdeen

Dr Louise Clark
Consultant Physician
Hairmyres Hospital

Professor Graham Leese
Consultant Physician and Honorary Professor
Ninewells Hospital / University of Dundee

Dr Russell Drummond
Consultant Physician and Honorary Clinical Associate Professor
Glasgow Royal Infirmary / University of Glasgow

Dr Fraser Gibb (Secretary-Treasurer)
Consultant Physician and Honorary Senior Clinical Lecturer
Royal Infirmary of Edinburgh / University of Edinburgh

'Caledonian Society for Endocrinology & Diabetes Annual Meeting' has been submitted to the Federation of the Royal Colleges of Physicians of the United Kingdom for 6 category 1 (external) CPD credits. Approval pending.

Attendees

Prakash	Abraham
Muhammad	Al-Dalla Ali
Ganesan	Arunagirinathan
Sebastian	Aspinall
Sophie	Austin
Satinder	Bal
Nicholas	Barwell
Dhruti	Bhatt
Kristien	Boelaert
Raphael	Buttigieg
Ross	Cairns
David	Carty
Tom	Chambers
Min	Chong
Catriona	Clarke
Ruth	Cordiner
Marion	Devers
Charlotte	Dewdney
Anna	Dover
Russell	Drummond
Jane	Dymott
Catriona	Farrell
Amy	Frank
Marie	Freel
Priya	George
Fraser	Gibb
Robert	Gifford
Alex	Graveling
Fiona	Green
Saket	Gupta
Rebecca	Haggarty
Fahmy	Hanna
Rachael	Harte
Isabel	Howat
Emma	Johns
Pauline	Jones
Chris	Jones
Laura	Jordan
Christopher	Kelly
Brian	Kennon
Andrew	Kernohan

Jansher	Khan
Jan	Klepacki
Utkarsh	Kulkarni
Catriona	Kyle
Graham	Leese
Robert	Lindsay
Craig	Livie
David	Macfarlane
Sharon	Mackin
Iqbal	Malik
Rachel	Mauchlen
Claire	McDougall
Martin	McIntyre
Liz	McIntyre
Gerry	McKay
Kirsten	Mitchell
Babu	Mukhopadhyay
Bala	Muthukrishnan
Paul	Newey
Khwaja	Nizam ud din
Radzi	Noh
Colin	Perry
Sam	Philip
Roby	Rajan
Aled	Rees
Stuart	Ritchie
Ute	Schauberger
Karen	Smith
Chris	Smith
Nathan	Smith
Mark	Strachan
John	Terrace
Sandeep	Thekkepat
Craig	Thurtell
Nyo Nyo	Tun
Victoria	Tyndall
Carol	Watson
Anna	White
Kirsty	Wood
Rohana	Wright
Pui San	Yap

Ute Schauberger

Biography

Ute is a Service Designer with a background in social anthropology and design innovation. At NDS, she ensures health and care professionals and the people they care for are central to how new products and services are made, and lead on understanding how the National Digital Platform can be best integrated into health and care workers' workflows. Before joining NDS, Ute worked as part of the Digital Health and Care Institute team at The Glasgow School of Art, where she explored how design innovation approaches can address complex issues around health and care.

NES Digital Service x Endocrinology – Background Paper

1. During CalSoc 2020, Ute Schauberger of the NES Digital Service (NDS) will be sharing highlights and next steps of the work that NDS have been progressing. This is a short background paper to provide context ahead of that session.

2. A Scottish Parliament inquiry into Technology and Innovation in Health and Social Care (2018) stated that 'it is no longer acceptable in this age that our health service is still using multiple incompatible systems and various platforms' and 'it is an area that must be tackled urgently to ensure appropriate medical care can be given in the right place at the right time'.

3. Following the inquiry, the Scottish Government's Digital Health & Care Strategy (Apr 2018) committed to a new approach to deliver a Scottish health and care 'national digital platform' through which relevant real-time data and information from health and care records, and the tools and services they use, is available to those who need it, when they need, wherever they are, in a secure and safe
way.

4. NES was chosen to host the team who will deliver this work and as a result the NES Digital Service was founded. NDS is a team of currently 35 people based in Edinburgh with skillsets including: software development, technical architecture service design, clinical informatics, information governance and policy.

5. While the first two NDS delivery teams are working in the areas of anticipatory care planning and technical integrations, we spent much of 2019 meeting different clinical specialisms and interest groups to assess candidates for future product development. It was in that context that we engaged with the opportunity for better systems for endocrinology via Fraser Gibb.

6. Within NDS the Product team headed up by Rohan Gunatillake leads on validating and working on future opportunities, employing a design-led approach to avoid jumping to solutions too quickly before fully understanding the problem and context for different user communities. We decided to prioritise Endocrinology and assigned our first service designer Ute Schauberger to start an initial piece of design research starting in October to define the opportunity from an NDS perspective.

7. The reasons we chose Endocrinology for this stage were that a) there is an active clinical community keen to work in a new way, b) that community had already explored the scope in good detail and c) given that NDS is most interested in creating components that can be used again and again elements of a endo-focussed product were likely to be portable across other contexts which had similar patterns of outpatient populations, people with chronic conditions, improved communication between primary care and secondary care etc.

Ute Schauberger

8. We held a design kick-off event in Edinburgh on October 23rd with a group of largely secondary care clinicians. In that session we explored the experience of care from a secondary care, primary care and patient perspective. The group also explored the future state that they were most interested in moving towards and hopes and fears for the engagement with NDS. A common fear raised was that although it was recognised that NDS was a new kind of team within NHS Scotland, there was a risk that the work wouldn't go thorough to fruition.

9. Activities from October to December included desk research and interviews with people covering the following perspectives: consultants, nurses, GPs, patients, and service managers. This led to a key set of insights, and a range of assets including a design brief against which to enter the next phase of the design process.

10. We have decided to progress the opportunity to the next stage where we work up a series of prototypes. The NDS house style is to design for and with the people who will use the products we make and so will continue to seek involvement with the community we've already engaged as well as grow that community to take into account different user types and perspectives.

11. At this stage we are targeting making what we call high-fidelity prototype for the summer. High-fidelity means that the prototype appear and function as similar as possible to the actual product. Development of a live service requires important additional elements such as data protection agreements, integration into territorial board systems and clinical safety sign-off. While these elements will be covered as part of implementation planning, restricting development to a prototype means that we can test product/context fit while minimising formal governance processes.

12. The decision to take the work to live production will then depend on the success of the prototype as well as NDS capacity and formal inclusion in our delivery plan as outlined by Scottish Government. The alignment with and scalability across the Modernising Patient Pathways Programme agenda is likely to be a key factor in the latter.

13.We are due to send a set of insights and materials to everyone we've engaged with so far and so if you'd like to receive that, have any questions or wish to log your interest in being involved in shaping the ongoing work (we would love to have you) please contact:

ute.schauberger@nes.scot.nhs.uk
rohan.gunatillake@nes.scot.nhs.uk

nds.nhs.scot

Thank you.

NES Digital Service x Endocrinology

INTERVIEW - ENDOCRINOLOGY NURSE, GGC

November 2019

Endocrinology Nurses have a great overview as they work across areas and with many different consultants.

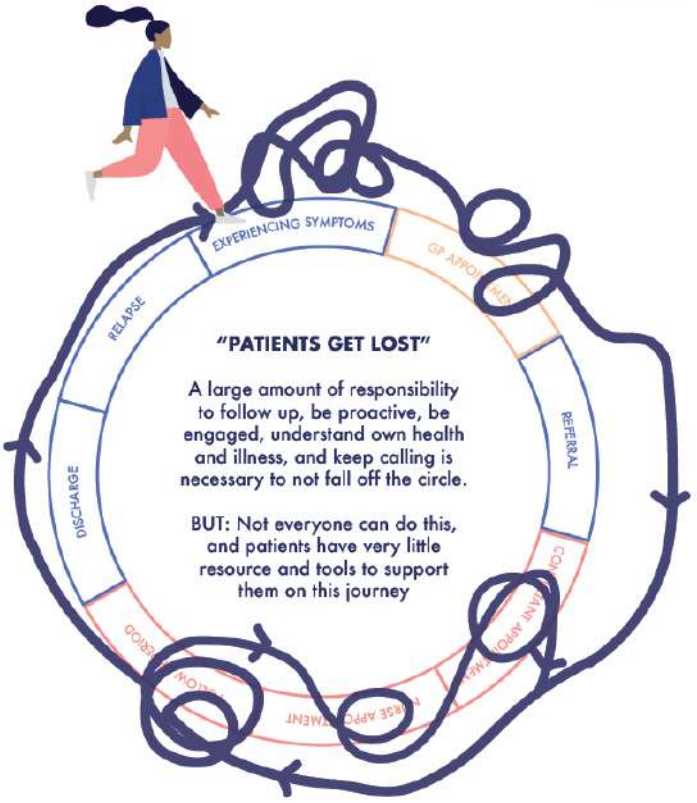
Currently Endocrinology Nurses are working mostly within GGC, Grampian, and Highlands. This is due to funding and personal preference of consultants.

KEY POINTS:

Clear, written patient information

Access to Phlebotomy

Current role of phone consultations



INTERVIEW - ENDOCRINOLOGY NURSE, GGC

November 2019

REFERRAL

Non-specific symptoms, stigma of laziness
Not taken seriously

Some GPs start treatment, others are less confident and wait

Straightforward to diagnose, blood test with binary result

Potentially worsening symptoms

Anxiety, worry about cancer

No information on what is happening or when to expect an appointment

NURSE APPOINTMENT

Access to results during clinic greatly improves appointment quality, nurse can assess symptoms and blood test together and prepare in advance

Can call nurse with questions or to be seen if feeling worse

Nurse-led service is relying on trust from consultants

Patient arranges next follow up when leaving clinic in person, can then be seen by other service elsewhere if more convenient

Patients often feel more comfortable and have more time to ask questions, but do want to see the doctor sometimes

Clear who to contact, and they are easy to get hold off. This provides huge reassurance to patients.

Currently often need to call patients after appointment for additional phone consultation after blood test results are checked

FOLLOW UP SECONDARY CARE

Letters can have a two week dictating backlog

Travelling to clinic and getting time off work can be difficult for patients

Not much support available, information leaflets from Thyroid Foundation important

Maintain close relationship with consultants for advice or to refer back if there is an issue

FOLLOW UP PRIMARY CARE

Ad-hoc arrangements with GPs to do bloods and pass on results

Service relies on patient to watch symptoms, call in at appropriate times, and follow up monitoring

NES Digital Service x Endocrinology

INTERVIEWS - ENDOCRINOLOGY CONSULTANTS AND SERVICE MANAGERS

November 2019

Endocrinology Consultants often work with long waiting times, and manage patients remotely collaborating with GPs and nurses.

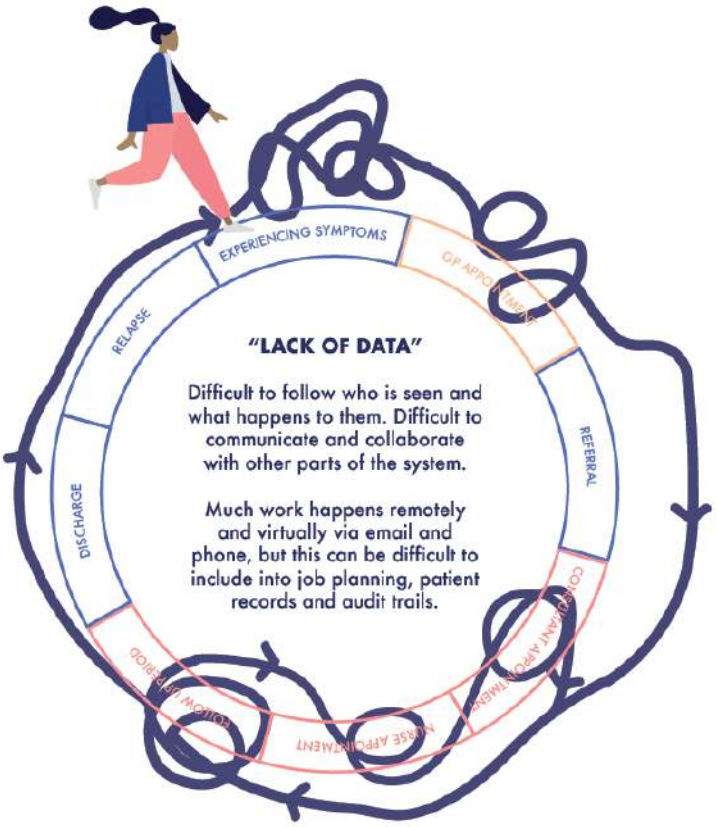
Phlebotomy is becoming an issue with less GPs able and willing to take on regular blood tests for Endocrinology patients.

KEY POINTS:

Lack of data around who is seen and what happens to them.

Collaboration with GPs

Waiting times



INTERVIEWS - ENDOCRINOLOGY CONSULTANTS AND SERVICE MANAGERS

November 2019

REFERRAL

Generally good quality of referrals.

Thyroid is part of standard tests, thyroid conditions are generally easy to diagnose.

Where waiting times are long, a letter with advice on how to start treatment is sent to GP (and sometimes CCed to patient). Many areas have put lots of work into 'standard' letters containing lots of detail and medical advice.

Some areas have the 'advice-only' option on SCI gateway, others improvise something similar with admin support. This:
- improves referral quality
- means record is added to patient record
- ensures an audit trail
- needs to be included in job planning

VETTING

Needs to be part of job planning, ideally consultant vetting.

The 'straight to test' should be available.

GP access to tests could be improved.

Grampian enter patients into database. This is entered and updated manually and via a spreadsheet. It can help to manage flow of patient journey, red flags show problems and potential actions. All Endocrinology staff have access (nurse / medical / admin)

CONSULTANT APPOINTMENT

Long waiting times.

This is when medication is typically started by consultant.

Timing:
- If waiting times are long, patient might arrive very confused
- If GP started treatment and patient arrives soon after, they might still be very confused, and it is difficult to assess if medication is working

NURSE APPOINTMENT

Nurses have more time, so generally patients are more than happy to be seen by a nurse.

Some areas struggled to get admin support for nurses as admins traditionally support consultants only.

Some areas do not have a specialist nurse service, or are in the process of introducing / funding one, especially to better coordinate follow-up testing.

Some nurses run "drop-in" phone clinic slots for when patients are experiencing issues.

FOLLOW UP SECONDARY CARE

Most areas have a form of 'open access':
- Patients can call the nurse directly
- Patients can call an admin who will notify the consultant
- This is allowed within a certain timeframe or parameters

Some areas have implemented a safety net, e.g. an admin looks for unchecked blood results on the system and emails consultants to check those.

FOLLOW UP PRIMARY CARE

GPs in GGC are not happy to do blood tests on behalf of secondary care. Elsewhere this has been okay as long as GPs do not need to analyse or notify anyone, the results are consultant responsibility.

Marie Freel / Carol Watson

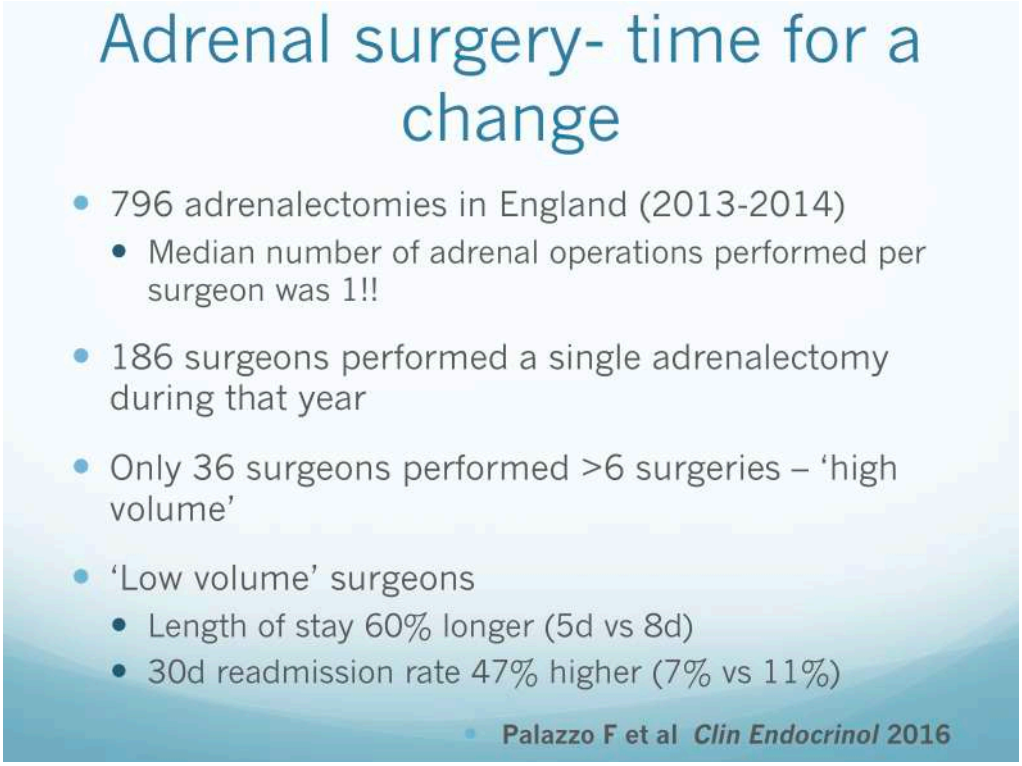
Biography

Marie Freel is a Consultant Endocrinologist and Honorary Associate Clinical Professor at the Queen Elizabeth University Hospital, Glasgow. Her major clinical and research interests are in adrenal pathology and endocrine hypertension. Along with Carol Watson, she leads the adrenal surgical service and MDT incorporating complex adrenal pathology from the entire West of Scotland. She is a member of the Society of Endocrinology Council as well as the exam board of the SCE in Endocrinology and Diabetes. She is also Director of CPD for the Royal College of Physicians and Surgeons of Glasgow and Training Programme Director (TPD) for Core/Internal Medical Training and Lead TPD for Higher Medical Training in the West of Scotland.

Carol Watson is a consultant in Endocrine and General Surgery at the Queen Elizabeth University Hospital in Glasgow. She was appointed as the first and only Endocrine surgeon in the West of Scotland. She has a specialist interest in Thyroid, Parathyroid and Adrenal surgery. Since her appointment she has established a tertiary practice in Endocrine surgery in the West of Scotland. She has consolidated a sole adrenal practice performing approx 40 adrenalectomies per year. She has also established a joint adrenal clinic in combination with the endocrinologists and nurse specialists. Outside of clinical practice, she has a strong interest in post graduate education. She has completed a post graduate diploma in clinical education and has recently been appointed as a Foundation Programme Director. She is an honorary clinical senior lecturer at Glasgow university and examines for the MRCS. She also currently teaches on the Endocrine module of a Surgical Masters degree at Edinburgh University.

Adrenal surgery in Glasgow and the West of Scotland.

Marie and Carol's presentation will outline the case for a robust, multi-disciplinary approach incorporating a range of appropriate expertise to optimise management of adrenal disease. Their approach to the adrenal MDT will be described in more detail as well as presentation and discussion of complex/interesting cases that have been discussed at the MDT over the years.



Marie Freel / Carol Watson

QEUH Adrenal service

- Monthly joint clinic
  - Endocrinologist/Surgeon
  - Nurse specialist to co-ordinate functional testing
  - Review all patients in whom surgery being considered (either directly or via MDT)
  - Post-operative reviews and decisions about follow up
  - Referrals from NHS GGC, Lanarkshire (sort of), Ayrshire and Dumfries
  - Approximately 6-8 patients per clinic
- Bimonthly MDT
- Peri-operative management supported by nurse specialist/registrars

Adrenal MDT

- All core members present:
  - ✓ Adrenal surgeon (> 6 adrenalectomies per year)- Carol
  - ✓ Endocrinologist with relevant expertise- me/Colin Perry
  - ✓ Radiologist with relevant expertise- Wilma Kincaid
  - ✓ Pathologist with relevant expertise- Lorna Cooper
  - ✓ Endocrine nurse specialist- Karen Campbell and team
- Meets bi-monthly
- Outcomes recorded on electronic case record (GGC) or by direct letter to referrer
- Discussed >450 patients since 2016
  - Auditing outcomes currently

Aled Rees

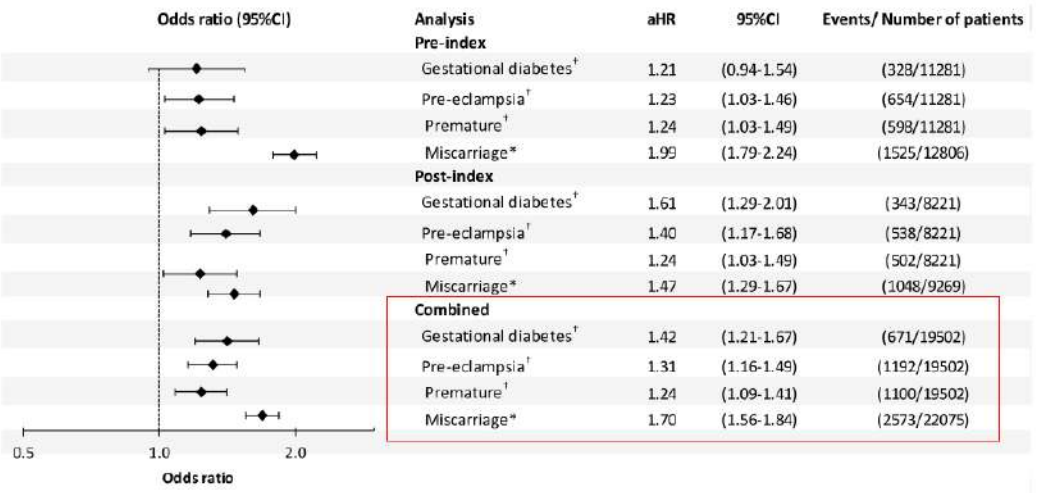
Biography

Aled Rees is Professor of Endocrinology at the School of Medicine, Cardiff University. His clinical practice embraces all aspects of endocrinology with a particular focus on neuroendocrinology. Professor Rees graduated from the University of Wales College of Medicine. He was awarded a Wellcome Trust Clinical Training Fellowship and a Society for Endocrinology Clinical Endocrinology Trust Fellowship for his PhD examining growth regulation in pituitary tumours. His current research seeks to understand the impact of the hormonal environment in early life on cognition on neurodevelopment, with a particular focus on Polycystic Ovary Syndrome and thyroid disease.

Polycystic Ovary Syndrome: Long-term outcomes

Polycystic Ovary Syndrome (PCOS) is the commonest endocrine disorder in young women, affecting up to 10% of the premenopausal population. In addition to its reproductive sequelae, PCOS is now established as a metabolic disorder, characterised by defects in insulin secretion and action. These disturbances, along with comorbidities such as obesity and dyslipidaemia, may predispose to an increased risk of cardiometabolic disease in later life. Our studies confirm a higher prevalence of surrogate risk measures for cardiovascular disease, including antioxidant capacity, complement activation and sympathoexcitation, in women with PCOS compared to matched controls. Nevertheless, differences between groups in arterial stiffness, myocardial function and carotid intima media thickness are not apparent after adjustment for obesity. Large-scale epidemiological data confirm an increased long-term risk of type 2 diabetes and fatty liver disease but not of all-cause mortality, cancer and cardiovascular events, albeit that studies were conducted in a young population (with a low event-rate) hence longer-term data are required. These risks extend into pregnancy and include an increased risk of gestational diabetes, pre-eclampsia, prematurity and miscarriage. However, age-standardised fertility ratios are not different compared to unaffected controls, providing some reassurance to patients that fertility may be restored with appropriate treatment. More recently, data show an increased incidence of depression, anxiety, bipolar disorder and eating disorder in women with PCOS, accompanied by alterations in white matter microstructure. Furthermore, linkage analysis also found an increased risk of a recorded diagnosis of autism spectrum disorder and attention-deficit hyperactivity disorder in children born to mothers with PCOS, raising the possibility that increased exposure to androgens in utero might affect neonatal brain development. Treatments to reduce these long-term risks are thus needed urgently. In this regard, data from randomised, placebo-controlled trials of metformin on vascular function show promise, whereas lifestyle trials comparing different exercise modalities are ongoing.

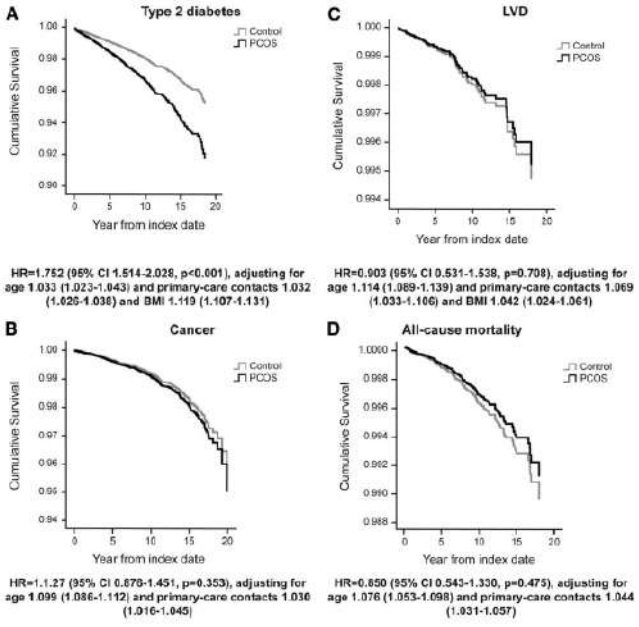
Pregnancy outcomes



Analysis	aHR	95%CI	Events/ Number of patients
Pre-index			
Gestational diabetes†	1.21	(0.94-1.54)	(328/11281)
Pre-eclampsia†	1.23	(1.03-1.46)	(654/11281)
Premature†	1.24	(1.03-1.49)	(598/11281)
Miscarriage*	1.99	(1.79-2.24)	(1525/12806)
Post-index			
Gestational diabetes†	1.61	(1.29-2.01)	(343/8221)
Pre-eclampsia†	1.40	(1.17-1.68)	(538/8221)
Premature†	1.24	(1.03-1.49)	(502/8221)
Miscarriage*	1.47	(1.29-1.67)	(1048/9269)
Combined			
Gestational diabetes†	1.42	(1.21-1.67)	(671/19502)
Pre-eclampsia†	1.31	(1.16-1.49)	(1192/19502)
Premature†	1.24	(1.09-1.41)	(1100/19502)
Miscarriage*	1.70	(1.56-1.84)	(2573/22075)

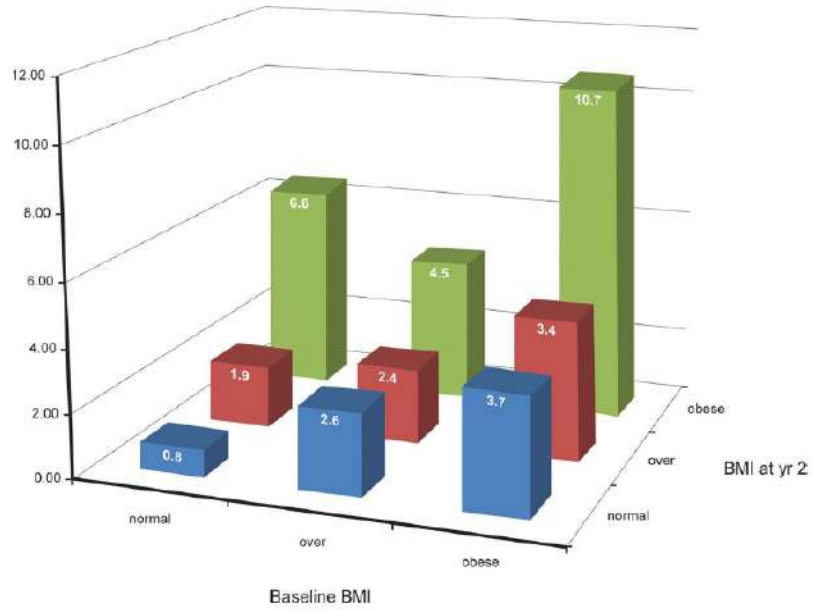
Odds ratio calculated using multivariable logistic regression, adjusting for age, BMI, number of previous births and history of GDM or pre-eclampsia

HR for type 2 diabetes, LVD, cancer, and all-cause mortality for BMI-matched patients with PCOS vs. controls.



Aled Rees

Rate of type 2 diabetes per kpy by BMI at baseline and BMI at baseline plus 2 yr for patients diagnosed with PCOS. Patients diagnosed with diabetes within 2 yr of baseline were excluded.



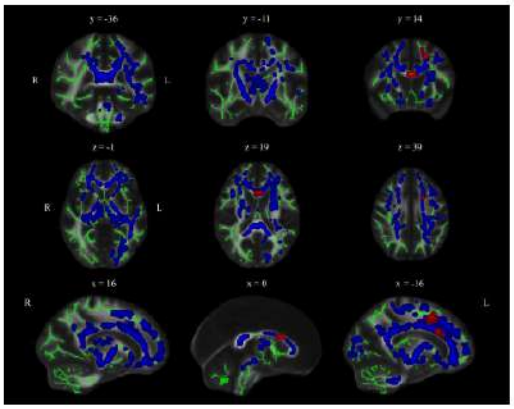
Incidence of mental health disorders

	Cases		Controls		Hazard Ratio (CI)	p-value
	Number	(Rate pky)	Number	(Rate pky)		
Control set 1	16,938		16,938			
Depression	3,545	42.62	2,327	34.46	1.26 (1.19 – 1.32)	<0.00001
Anxiety	1,829	21.99	1,189	17.61	1.20 (1.11 – 1.29)	<0.00001
Bipolar Disorder	402	4.83	246	3.64	1.21 (1.03 – 1.42)	0.02126
Autism	14	0.83	16	0.94		
ADHD	13	0.77	11	0.65		
Schizophrenia	22	1.30	9	0.53		
Eating Disorder	125	7.57	72	4.36	1.37 (1.05 – 1.81)	0.02283
Control set 2	16,355		16,355			
Depression	3,353	41.66	2,146	26.66	1.38 (1.30 – 1.45)	<0.00001
Anxiety	1,717	21.33	1,017	12.64	1.39 (1.29 – 1.51)	<0.00001
Bipolar Disorder	356	4.42	200	2.48		
Autism	9	0.55	3	0.18		
ADHD	8	0.49	6	0.37		
Schizophrenia	10	0.61	6	0.37		
Eating Disorder	118	7.40	63	3.95	1.54 (1.16 - 2.05)	0.00256

Number, crude rates and hazard ratios for mental health disorders in women with PCOS and matched controls

PCOS: altered white matter microstructure

- 19 women with PCOS and 19 age/BMI-matched controls
- Diffusion tensor MRI and detailed cognitive assessment
- Despite similar educational achievement (NART IQ 122, p=0.35), subjects with PCOS performed less well on a wide range of cognitive domains
- Tract based spatial statistics showed areas of decreased axial diffusivity in PCOS throughout the white matter skeleton
- Increased tissue volume fraction in anterior corpus callosum. Similar findings reported in studies of sexual dimorphism



Group differences based on tract-based spatial statistics. Mean FA skeleton voxels showing significantly lower value of axial diffusivity (blue) and higher value of tissue volume fraction in PCOS (red) The mean white matter skeleton is shown in green.

Rees, DA *et al* JCEM 2016;101:314-323.

Fahmy Hanna

Biography

Professor Fahmy Hanna:

- Had his MD from collaborative work between the Hammersmith and the Welcome laboratories at Queen's University of Belfast.
- In 1998, was appointed as Consultant Physician and Endocrinologist at Prince Charles Hospital, South Wales then, in 2004, moved to the University Hospital of North Midlands
- In June 2016, I was appointed as "Honorary Chair in Endocrinology and Metabolism" by Staffordshire University
- Academic interests include the management of Adrenal Incidentalomas. Also interested in glyco-metabolic status in high risk populations e.g. gestational diabetes

Adrenal Incidentaloma: the journey so far

NHS University Hospitals of North Midlands NHS Trust

Clinical Practice Guideline | M Fassnacht and others | ESE and ENSAT guideline on adrenal incidentaloma | 175:2 | G1–G34

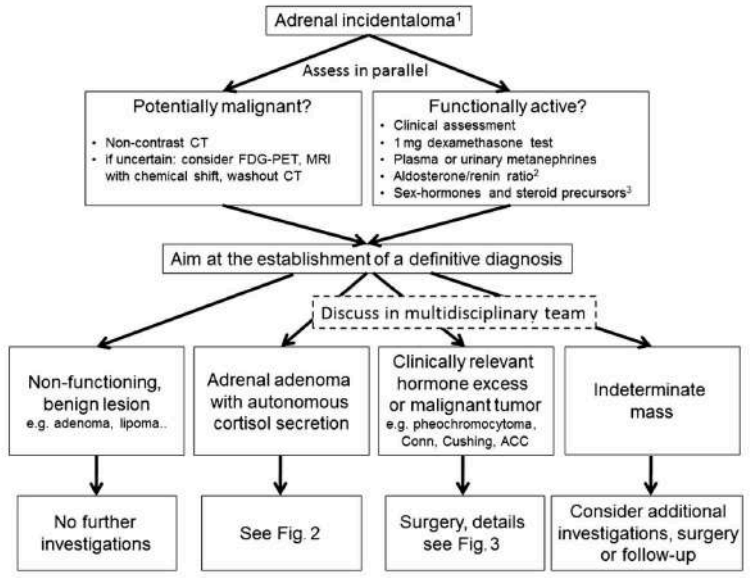
Management of adrenal incidentalomas: European Society of Endocrinology Clinical Practice Guideline in collaboration with the European Network for the Study of Adrenal Tumors

Martin Fassnacht[1,2], Wiebke Arlt[3,4], Irina Bancos[3,4,5], Henning Dralle[6], John Newell-Price[7,8], Anju Sahdev[9], Antoine Tabarin[10], Massimo Terzolo[11], Stylianos Tsagarakis[12] and Olaf M Dekkers[13,14]

PROUD TO CARE

Fassnacht et al. Eur J Endocrinol 2016;175:G1-G34 AI Management Overview;

NHS University Hospitals of North Midlands NHS Trust



[1]For patients with history of extra-adrenal malignancy, see special section 5.6.4.
[2]Only in patients with concomitant hypertension and/or hypokalemia.
[3]Only in patients with clinical or imaging features suggestive of adrenocortical carcinoma.

published by bioscientifica

PROUD TO CARE

Fahmy Hanna

AI; Overview

NHS University Hospitals of North Midlands NHS Trust

- **Definition:**
  - An adrenal mass, >10mm, detected on imaging which was not performed for suspected adrenal disease
- **Mostly, benign and non functioning:**

Classification (Series including all patients with Ad mass)	Median (%)	Range
Adenoma	80	30-96
Non-functioning	75	
Cortisol-secreting	12	
Aldosterone-secreting	2.5	
Phaeochromocytoma	7.0	
Adrenocortical Cancer	8.0	1.2-11
Metastasis	5.0	

PROUD TO CARE

AI; Real World Challenges

NHS University Hospitals of North Midlands NHS Trust

1. Uncertainties

2. Workload

3. Process

PROUD TO CARE

Kristien Boelaert

Biography

Kristien Boelaert is a Reader in Endocrinology at the University of Birmingham and a Consultant Endocrinologist at University Hospitals Birmingham. Her clinical research interests include the management of thyroid dysfunction, nodules and endocrine disorders in pregnancy. Her laboratory research programme focuses on the pathogenesis of thyroid cancer and she is involved in a number of clinical trials in the field of thyroid disease. She is the Clinical Lead for the NICE Guidelines on Thyroid Diseases, the National Consensus Statements on Management of Thyroid Cancer and the RCOG Green Top Guidelines for Management of Thyroid Diseases in Pregnancy. Kristien's research continues to attract funding from major grant awarding bodies and is evidenced by a rapidly growing list of publication and numerous invitations to speak at international conferences. She is Senior Editor for Endocrine Connections and BMC Endocrine Disorders and serves on the Editorial Boards of several endocrine journals including Lancet Diabetes & Endocrinology. She is a member of the Society for Endocrinology Council and Clinical Committee, The ATA Research Committee and the RCP Specialist Certificate Examination Board.

Management of thyroid disease before and during pregnancy

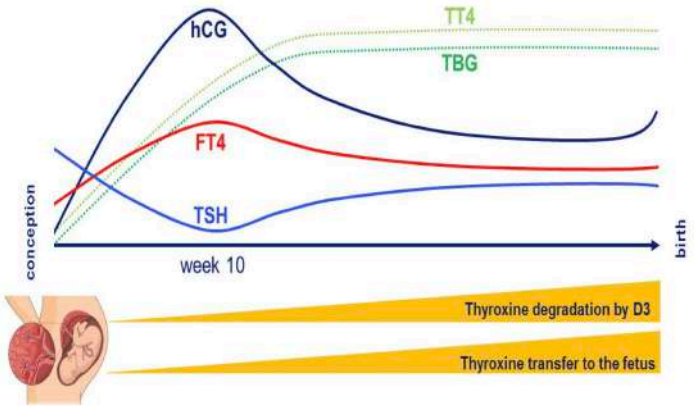
Significant controversy continues to surround the management of thyroid dysfunction before and during pregnancy and indications for treatment are not adopted in a universally uniform manner. The physiological changes to thyroid function associated with pregnancy make the interpretation of thyroid function tests difficult and ideally population and pregnancy-specific reference ranges should be used. The previous upper limit for TSH concentrations of 2.5 mIU/L has been revised in view of accumulating evidence that levothyroxine replacement for women with serum TSH below 4 mIU/L does not necessarily result in improved obstetric nor neurocognitive outcomes and may in fact be associated with a degree of harm. Careful and pragmatic preconception planning and management of thyroid function is key to ensure optimal outcomes, aiming to mirror normal physiological adaptive changes during pregnancy as well as minimizing potential unwanted effects of the treatment administered.

Whilst there are clear links between thyroid autoimmunity and increased risks of miscarriage and pre-term delivery, a number of well-conducted clinical trials have failed to demonstrate beneficial effects of levothyroxine replacement in euthyroid women who have raised concentrations of autoimmune antibodies on obstetric outcomes. Uncontrolled hyperthyroidism during pregnancy is associated with significant risks of adverse outcomes and should be distinguished from transient rises in circulating thyroid hormones. Specific consideration is required as to the choice of antithyroid drugs to be used especially before and during early pregnancy, aiming to use the lowest possible doses with regular monitoring of thyroid function.

The current state of knowledge leaves physicians managing women before and during pregnancy uncertain regarding the indications for treatment of thyroid dysfunction and autoimmunity as well as the choice of treatment to be administered in order to optimize fetal and maternal outcomes. This symposium will review the current evidence and identify areas for further research and clinical trials.

Kristien Boelaert

Physiological changes to TFT



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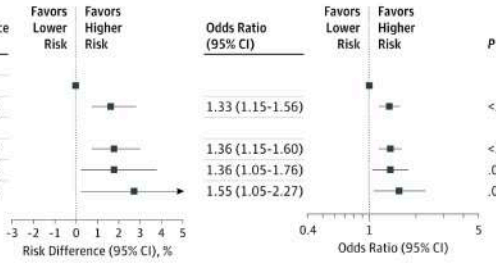
Thyroid disease and preterm birth

	No. of Events/ Total No. (%)	Risk Difference (95% CI), %	Odds Ratio (95% CI)	P Value
Preterm birth (gestational age <37 wk)				
TPO antibody negative (reference group)	1847/37 516 (4.9)			
TPO antibody positive	202/3043 (6.6)	1.6 (0.7-2.8)	1.33 (1.15-1.56)	<.001
TPO antibody positive and				
Thyrotropin within normal range	174/2566 (6.8)	1.8 (0.7-2.9)	1.36 (1.15-1.60)	<.001
Thyrotropin >2.5 mIU/L	64/989 (6.5)	1.8 (0.2-3.7)	1.36 (1.05-1.76)	.01
Thyrotropin >4 mIU/L	29/406 (7.1)	2.7 (0.2-6.3)	1.55 (1.05-2.27)	.02



- N = 47,045 — N = 19 cohorts
- N = 1,234 (3.1%) Shypo — N = 904 (2.2%) Isolated hypothyroxinemia
- N = 3,043 (7.5%) TPO pos — N = 1,080 (5.8%) Tg pos

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Korevaar et al. JAMA 2019; 322: 632-641

Obstetric outcomes in Shypo Treatment

Adverse outcomes	No (%) events: Thyroid hormone treatment (n=843)	No (%) events: No thyroid hormone treatment (n=4562)	Odds ratio (95% CI): Unadjusted	Odds ratio (95% CI): Adjusted	P value†
Pregnancy loss‡	89 (10.6)	614 (13.5)	0.76 (0.60 to 0.96)	0.62 (0.48 to 0.82)	<0.01
Preterm delivery	60 (7.1)	236 (5.2)	1.41 (1.05 to 1.88)	1.60 (1.14 to 2.24)	0.01
Preterm labor	111 (13.2)	569 (12.5)	1.08 (0.87 to 1.34)	1.14 (0.89 to 1.46)	0.29
Premature rupture of membranes	42 (5.0)	220 (4.8)	1.04 (0.74 to 1.45)	0.97 (0.66 to 1.42)	0.87
Placental abruption	7 (0.8)	36 (0.8)	1.05 (0.47 to 2.37)	1.60 (0.65 to 3.93)	0.30
Gestational diabetes	101 (12.0)	401 (8.8)	1.41 (1.12 to 1.78)	1.37 (1.05 to 1.79)	0.02
Gestational hypertension§	49 (5.8)	221 (4.8)	1.24 (0.90 to 1.70)	1.27 (0.88 to 1.82)	0.21
Pre-eclampsia§	46 (5.5)	177 (3.9)	1.43 (1.03 to 2.00)	1.61 (1.10 to 2.37)	0.01
Poor fetal growth	78 (9.3)	397 (8.7)	1.07 (0.83 to 1.38)	1.12 (0.84 to 1.50)	0.45
Tachycardia	18 (2.1)	90 (2.0)	1.08 (0.65 to 1.81)	1.77 (1.00 to 3.11)	0.05

Maraka et al. BMJ 2017 356: i6865

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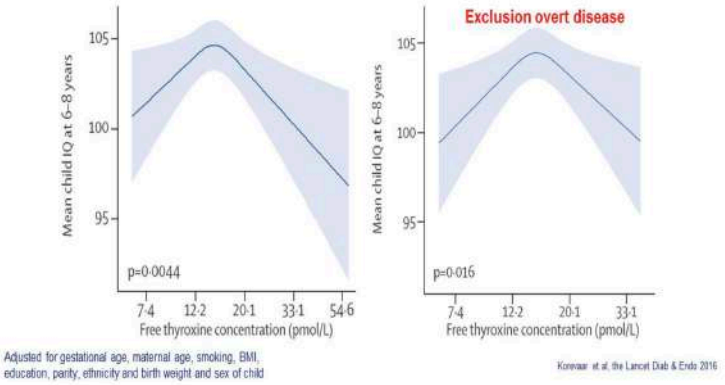
Effects of TFT on Offspring IQ

- **Cohort, N=3839 (IQ), thyroid function <18wks, median age child 6yrs**



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Korevaar et al. Lancet D&E 2016, 4: 35-43

RCT in TPO positive women undergoing IVF-ET

- **Primary outcome: miscarriage rate < 28 weeks**

Table 3. Pregnancy Outcomes of the Participants (Intention-to-Treat analysis)

IVF-ET outcomes	No. /Total No. (%) Intervention	Control	Absolute Rate Difference, % (95% CI)[e]	Relative Risk (95% CI)	P Value
Primary outcome					
Miscarriages[a,b]	11/107 (10.3)	12/113 (10.6)	−0.34 (−8.65 to 8.12)	0.97 (0.45 to 2.10)	.94
Early	10/107 (9.3)	10/113 (8.8)	0.50 (−7.39 to 8.55)	1.06 (0.46 to 2.44)	.90
Late	1/107 (0.9)	2/113 (1.8)	−0.84 (−5.36 to 3.53)	0.53 (0.05 to 5.74)	>.99[f]
Secondary outcomes					
Clinical intrauterine pregnancies[a]	107/300 (35.7)	113/300 (37.7)	−2.00 (−9.65 to 5.69)	0.95 (0.77 to 1.17)	.61
Twin pregnancies[c]	39/107 (36.4)	32/113 (28.3)	8.13 (−4.19 to 20.18)	1.29 (0.88 to 1.89)	.20
Live births[a]	95/300 (31.7)	97/300 (32.3)	−0.67 (−8.09 to 6.77)	0.98 (0.78 to 1.24)	.86
Preterm deliveries[a,d]	21/95 (22.1)	19/97 (19.6)	2.52 (−8.98 to 13.99)	1.13 (0.65 to 1.96)	.67

Wang et al. JAMA 2017; 318: 2190-2198

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TABLET: Obstetric outcomes

Outcome	Levothyroxine	Placebo	Comparison (RR or mean difference), 95%CI
Primary outcome			
Live birth>=34 weeks	176/470 (37.4%)	178/470 (37.9%)	0.97 (0.83, 1.14) p=0.74
Secondary pregnancy outcomes			
As a proportion of women who achieved pregnancy within 12 months:	N=266	N=274	0.97 (0.88-1.07)
Clinical pregnancy at 7 weeks	237/266 (89.1%)	248/274 (90.5%)	0.98 (0.93, 1.04)
On-going pregnancy at 12 weeks	194/266 (72.9%)	200/274 (73.0%)	1.00 (0.90, 1.11)
Miscarriage <24 weeks	75/266 (28.2%)	81/274 (29.6%)	0.95 (0.73, 1.23)
Stillbirth (intra-uterine death ≥24 weeks)	1/266 (0.4%)	0/274 (-)	-
Ectopic pregnancy	3/266 (1.1%)	6/274 (2.2%)	0.50 (0.13, 1.99)
Termination	1/266 (0.4%)	0/274 (-)	-
Live birth<34 weeks	10/266 (3.8%)	10/274 (3.6%)	1.02 (0.43, 2.42)
Live birth>=34 weeks	176/266 (66.2%)	178/274 (65.0%)	1.02 (0.90, 1.15)

TABLET

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Dhillon-Smith et al. N Engl J Med 2019; 380: 1316-1325

Kristien Boelaert

Thyrotoxicosis in pregnancy

Graves' disease (10%)	Gestational Transient Thyrotoxicosis (90%)
Requires ATD	Self-limiting with normalisation of thyroid function
Risk of complications	No adverse outcomes
Symptoms predate pregnancy	Hyperemesis gravidarum (60%)
Positive family history	No family history of thyroid disease
Goitre, ophthalmopathy	No goitre / eye signs
Raised Free T3	Normal Free T3 in 85%
TSH receptor +/- TPO antibodies	Thyroid antibodies negative

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ATD and congenital malformations

- 2 886 970 pregnancies; live births 2 210 253 (2008-2014)
- 12 891 pregnancies exposed to ATD
- Births defects: 7.27% vs 5.94% (p<0.001) OR 1.19 [1.12 - 1.28].
- PTU: OR 8.81 [3.92 -13.70]
- MMI: OR 17.05 [1.94 -32.15]
- MMI+PTU: OR 16.53 [4.73 -28.32]
- High cumulative dose (>495 mg vs 1-126mg): AOR: 1.87 [1.06 - 3.30].

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Seo et al. Ann Int Med 2018 168: 405-413

Graham Leese

Biography

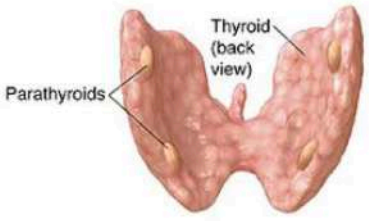
Professor Graham Leese is an NHS consultant at Ninewells Hospital Dundee and former lecturer at the University of Liverpool. He has paralleled research interests and clinical developments especially in diabetic eye disease with screening, and diabetic foot disease with risk stratification. He has interests in the epidemiology of these areas in addition to thyroid and parathyroid disease. He has published over 250 papers in these areas. Over the years he has been part of the Scottish Diabetes Group (in a number or roles, including chairman of the Foot subgroup), Scottish Diabetes Research Network (as chairman), Clinical Team Leader and MCN chairman locally. He is NRS clinical lead for metabolic and endocrine research and is previous advisor to the CMO in general medicine and diabetes and endocrinology. He has developed and established local clinical services in diabetes, endocrinology and osteoporosis. He is also Associate Postgraduate Dean for medical specialties and Broad Based Training, and is past-chair of the SCE exam board, and current chair of the standard setting committee.

Hypoparathyroidism: An overview

Hypoparathyroidism is generally diagnosed with a low serum calcium and a low or inappropriately normal plasma PTH concentration, and often with a mildly raised serum phosphate. Low magnesium can be a cause or an effect of hypoparathyroidism. The majority of chronic cases occur post thyroid or parathyroid surgery, but there are string of other rarer presentations of genetic and autoimmune aetiology. Population based studies suggest the latter may be more common than realised and may have worse outcomes than post-surgical cases. The overall rate is probably around 25-40 per 100,000. Treatment usually involves oral calcium and activated Vitamin D (alphacalcidol or calcitriol), and thiazides may help reduce excessive calciuria and reduce the risk of nephrocalcinosis. Treatment should aim keep serum calcium at the lower end or just below the reference range, ad maintain urine calcium excretion within the reference range. Recombinant PTH is being trialled as a therapy in Europe but has a licence in the US. CASR antagonists are also being explored.

Causes of Hypoparathyroidism

1. Post surgical



Overall Rate: 7 – 60 %[1-3]
Transient[3,4] - recovered in 2 months: 70%
- recovered in 6 months: 90%
- recovered in 12 months: 95%
Permanent: Rate of 0.1-5.8% (quoted rate 2-3%)
15% for second neck surgery

1. Bollerslev et al 2015 EJE, 2. Page et al 2007 J Laryngol Otol, 3. Powers et al 2013 JBMR, 4. Ritter et al 2015 J Sur Res

Causes of Hypoparathyroidism
2. Non-surgical

Genetic	
Autosomal Dom	PTH mutation
	CASR activating mutation (ADH 1) - Bartter Syndrome Type V
	GCM 2
	GNA11 activating (ADH 2)
Autosomal Rec	PTH mutation
	GCM 2
X- linked	

How common is Hypoparathyroidism?

Overall rate /100,000	Post- Surgery rate	Non- surgery rate	Country	Ref
24	22	2.3	Denmark	Underbjerg et al 2013,2015
10.2	6.4	3.0	Norway	Astor et al 2016
37	29	8	US	Clarke et al 2011,16
25			US	Powers 2013
5.9			Italy	Cipriani et al 2017 (hospital admissions)
		0.7	Japan	Nakamura et al 2000
		0.9	Israel	Zlotgora et al 1981
40	23	17	Scotland	Vadiveloo et al 2018

What is the incidence of Hypoparathyroidism?

Overall rate /100,000	Post- Surgery rate	Non- surgery rate	Country	Ref
0.8			Denmark	Underbjerg et al 2013
		0.1	Italy	Betterle et al 2014
1.2	0.7	0.5	Scotland	Vadiveloo et al 2018

Treatment – long term

- Calcium (carbonate) 1-8g per day
- Activated Vitamin D
  Calcitriol: 0.25-1 microgram per day
  1-α calcidol: 0.5-2 microgram per day
- rhPTH (1-84) in US
- Thiazide diuretic (↓ hypercalciuria)

FUTURE

- Long acting (wkly)/Oral PTH
- Calcilytics: CASR antagonists – inhibit Ca sensing

Tom Chambers

Biography

Tom Chambers graduated from the University of Manchester in 2008. He developed an interest in endocrinology whilst intercalating with Prof Julian Davis, during which time he examined the role of Wnt signalling in oestrogen induced lactotroph proliferation. After completing early training in the NW deanery, he moved to do his PhD in Edinburgh in 2012. He worked with Profs Richard Sharpe and Mandy Drake to show that high fat diet exposure can induce a metabolic phenotype in offspring and grand-offspring and the role of the germ cell epigenome. He is a SCREDS clinical lecturer and is just starting ST7 training in diabetes and endocrinology in SE Scotland Deanery. He is currently out of program with an ISSF3 award. His current work examines recovery of the HPA axis following exposure to chronic courses of glucocorticoids, focussing on transcriptional regulation of pomc, the gene coding ACTH. He also holds an MRC Confidence in concept award to investigate biomarkers of adrenal activity and glucocorticoid sensitivity.

Abstract

Modelling glucocorticoid-induced HPA axis suppression in mice

Nicola Romanò, Peter Duncan, Oscar Nolan, Paul Le Tissier, Mike Shipston, **Thomas Chambers**

Centre for Discovery Brain Sciences, University of Edinburgh, Hugh Robson Building, George Square, EDINBURGH, EH8 9XD

Glucocorticoids are prescribed for >3 months to 1% of the UK population. 10-50% of glucocorticoid treated patients develop persistent HPA axis suppression associated with mortality and morbidity. Understanding mechanisms which result in persistent HPA axis suppression may inform treatment strategies and identification of patients at risk. Thus, we developed a mouse model of glucocorticoid-induced HPA axis dysfunction.

Experiment 1: 36 C57BL/6 adult male mice received Dexamethasone (DEX,~10µg/day) or vehicle (CTL) via drinking water for 28 days, following which treatment was stopped and tissues were harvested at 0, 7 and 28 days. DEX suppressed waking serum corticosterone at week 0 and 7, recovering by day 28. Adrenal size remained lower 28 days following DEX withdrawal. DEX had no effect on whole pituitary pomc, nr3c1 or crhr1, although increased avpr1b at day 0. In the adrenal, hsd3b2 and cyp11a1 expression were reduced at time 0; normalising by 28 days.

Experiment 2: 24 POMC-GFP male mice were treated as above. Tissues were collected at day 0 (n=6), 7 (n=3) and 10 (n=3) following withdrawal. Pooled corticotrophs (groups of 3) were sorted by FACS and RNA extracted for qPCR. DEX reduced corticotroph pomc expression at time 0 (x20), with x5 suppression at day 7 and which recovered with evidence of compensation by day 10. DEX increased expression of avpr1b but not crhr1.

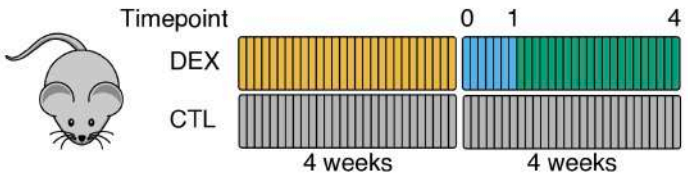
CONCLUSION: 28 days dexamethasone treatment in mice suppresses the HPA axis. HPA suppression is evident 7 days following withdrawal of dexamethasone, in the adrenal, corticotroph population and corticosterone production. This model may be helpful to determine mechanisms for delays in HPA axis recovery.

Tom Chambers

Background

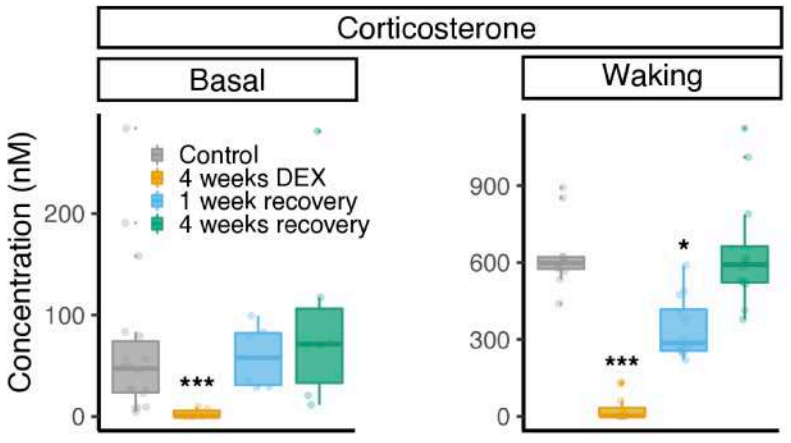
- Glucocorticoid Rx is common
  - 1% population on >3 month course
- 10-20% people will have HPA axis suppression
  - At 6 months following treatment withdrawal
- All levels axis affected.
  - CRH testing demonstrates importance of the pituitary

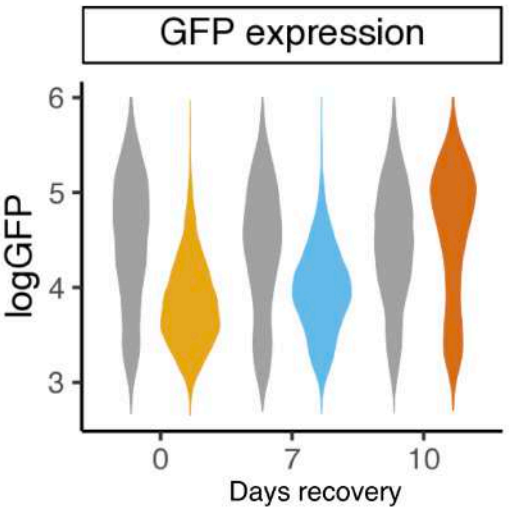
Mouse model



- POMC eGFP male adult mice
- Dosing ~10microg/mouse/day
  - Relative to ~2.5mg dexamethasone/day for a 70kg human (allosteric)
- Trunk blood, adrenal, pituitary hypothalamus dissected

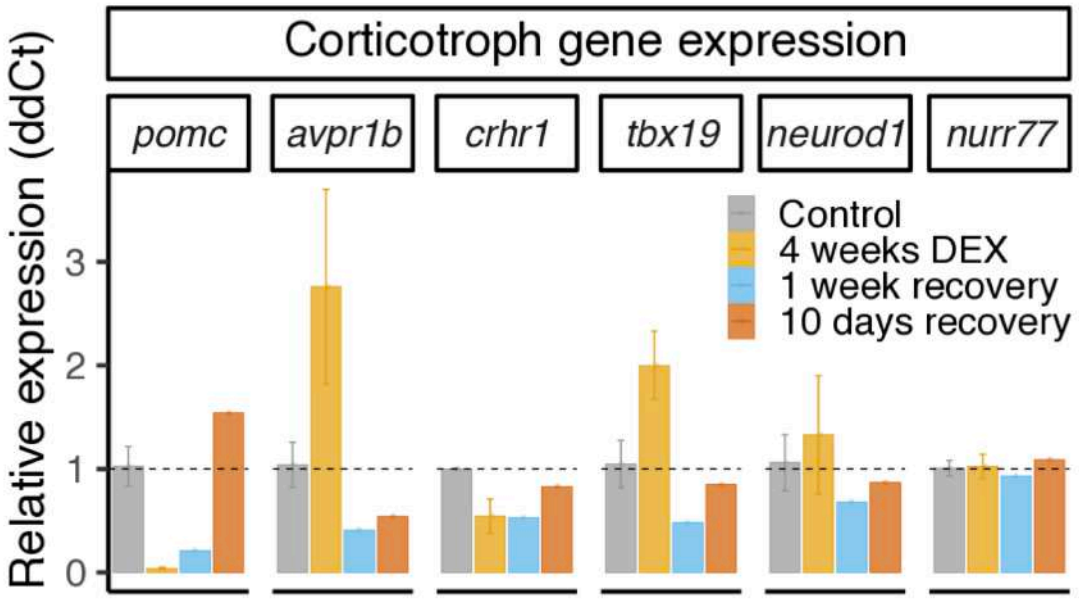
Suppressed corticosterone and GFP expression 1 week after DEX withdrawal





Tom Chambers

Corticotroph gene expression



Summary

- Waking corticosterone remains suppressed 1 week after Dex stopped with persistent reduction in adrenal size
- This associates with reduced *pomc* transcription
- Model will allow investigation of molecular mechanisms regulating sustained suppression of *pomc* and its recovery
- Model shows sustained effect of chronic hormone treatment

Rob Gifford

Biography

Rob Gifford qualified from Glasgow in 2008, having had the help of a military cadetship during university. Following core training in Glasgow he started training as a RAF physician in Edinburgh and is currently in ST5 endocrinology and diabetes at the Royal Infirmary. He completed a PhD in August 2019 entitled 'female endocrine adaptations to arduous military training', which aimed to explore the effects of exercise, stress and energy deficit from field studies of military women. He also helps provide aeromedical evacuation for military personnel around the world (transfers in the last year have included from USA, Kuwait and Sierra Leone), and deployed to Afghanistan in 2014. His other interests include type 2 diabetes treatment and aviation, gender associations of heat illness and diabetogenic effects of nerve agent poisoning.

Abstract

Preserved reproductive, adrenal and bone function in the first all-female Antarctic traverse: implications for mitigating the impact of military training on women.

Gifford RM,1,2 Reynolds RM,2 Woods DR1,3,4
1 Research and Clinical Innovation, Royal Centre for Defence Medicine, UK
2 Centre for Cardiovascular Science, University of Edinburgh, UK
3 Carnegie Institute for Sports and Exercise Science, Leeds Beckett University, UK
4 Newcastle University, UK

Background. High rates of reproductive dysfunction, stress fracture and adverse psychological outcomes have been reported among military women. Such conditions are closely linked with hormonal changes during stress and exercise.

Hypothesis. In women, an Antarctic traverse is associated with suppression of reproductive, adrenal and bone function.

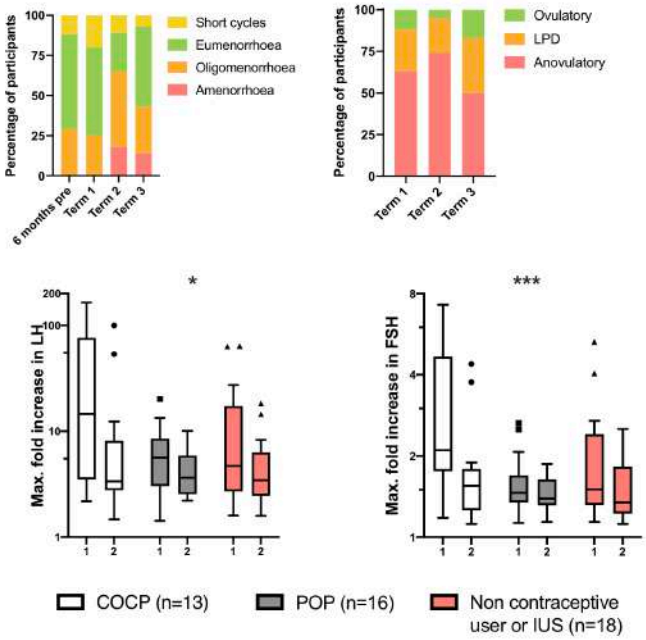
Methods. Six women (aged 28-36, BMI 24.2 ±0.97 kgm-2) hauled 80kg sledges 1700km in 61 days. The following were assessed before and after: body composition (by DXA, skinfold and bioimpedance), bone health by high resolution quantitative CT (HRpQCT) and serum bone turnover markers (BTMs), and heartrate variability (HRV). Basal metabolic and endocrine blood markers and dynamic tests of pituitary-adrenal-gonadal function by combined low-dose dexamethasone suppression/ low-dose Gonadorelin and Synacthen tests were also performed before and after the expedition. Cortisol was assayed in hair (average monthly concentration) and saliva (diurnal variability).

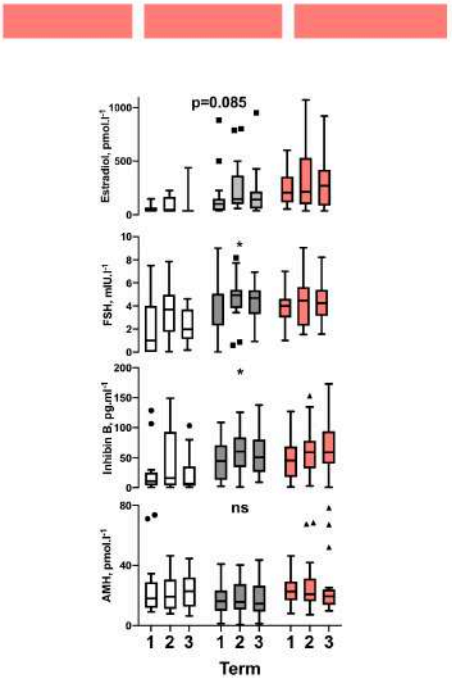
Results. Participants lost 9.37 ±2.31 kg ($p<0.0001$), comprising fat mass only; lean mass was maintained. Basal sex steroids, corticosteroids, metabolic markers and BTMs were largely unaffected except leptin, which decreased during the expedition and recovered after 15 days. HRV parasympathetic activity and IGF-1 increased after 15 days. HRpQCT was unaffected. Luteinising hormone responsiveness was suppressed before and during the expedition, but recovered after 15 days. Follicle-stimulating hormone and cortisol responsiveness did not change during or after the expedition. Hair cortisol was elevated during the expedition.

DISCUSSION: Endocrine function, bone and lean mass were preserved, with evidence of latent physiological benefit, not harm. Possible mitigating factors which may be relevant to military training include comprehensive nutrition planning, psychological preparation, self-directed selection and expedition strategy.

Rob Gifford

the FEAT study — Results: Reproductive function

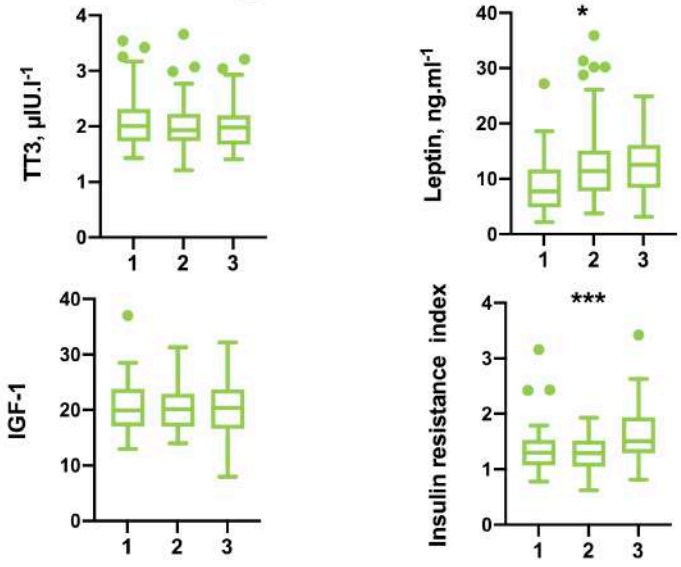


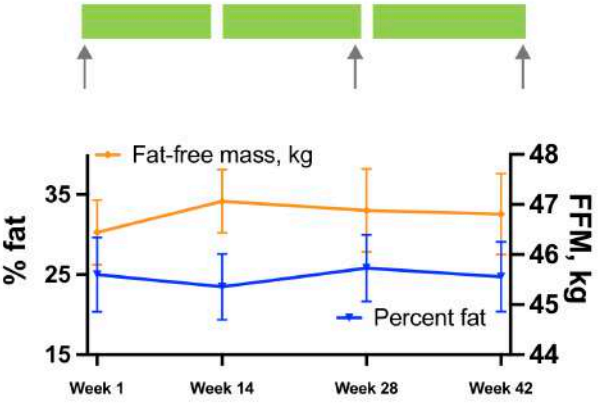


the FEAT study — Results: Nutrition

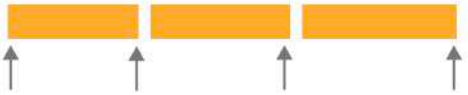
Markers of low energy status *unchanged*

Adiposity *increased*

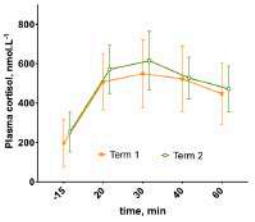


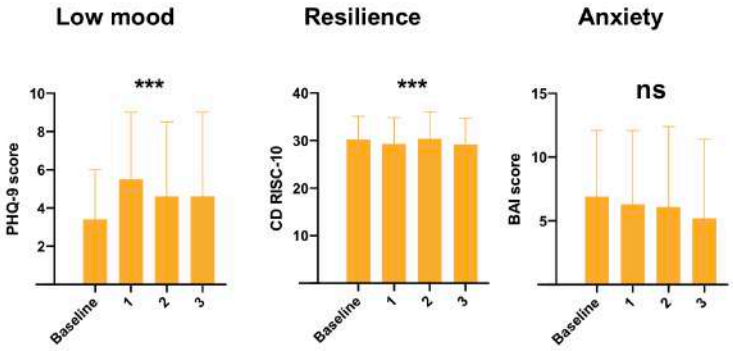


Results: stress and adrenal function

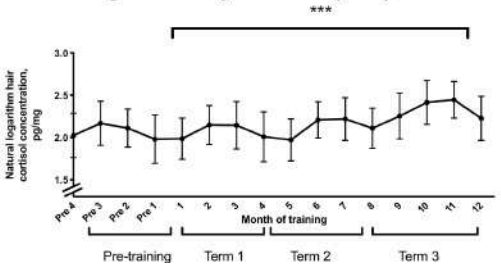


Dynamic response of cortisol to ACTH





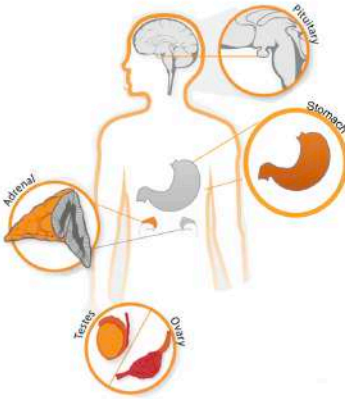
Average monthly cortisol (hair)



Gifford et al., Psychoneuroendocrinology 2019

Conclusion

- Reproductive dysfunction despite energy sufficiency
- A novel paradigm of (mal)adaptative response to multi-stressor training
  - Anovulation, ovarian dysregulation
  - Increased adiposity and insulin resistance



- What next?
  - Military policy: Less focus on female athlete triad/ RED-S
  - Consider sleep insufficiency, locus of control
  - Sex differences in HPG and HPA axis adaptation

Gifford, Reynolds et al., Psychoneuroendocrinology 2019
Gifford, Reynolds et al., J Roy Army Med Corps, 2017

Charlotte Dewdney

Biography

Charlotte Dewdney graduated from the University of Edinburgh in 2016 with an additional intercalated Neuroscience degree. She undertook Foundation Training in Edinburgh followed by a Clinical Development Fellowship in medical education in Shetland. She is currently completing Internal Medicine Training in Inverness and the Western Isles, whilst holding a position as an Honorary Research Fellow with the University of Aberdeen.

Abstract

Adoption of an age adjusted testosterone reference range reduces referrals to endocrine clinic and new prescriptions of testosterone

Dr Charlotte Dewdney, Dr David Macfarlane

Introduction

Testosterone levels decline with age, but until recently well defined harmonised age and/or obesity (BMI <30kg/m2) adjusted reference ranges did not exist.1 There is also a lack of international consensus on whether an age adjusted reference range (RR) should be used to define the syndrome of hypogonadism in men. Our local referral guideline suggests referral to endocrinology is appropriate if morning testosterone is <9.4nmol/L similar to the Endocrine Society Clinical Practice Guideline.2 In mid 2018 our laboratory adopted the published all men age adjusted RR.1

Aims

We sought to; i) investigate clinic referrals before and after adoption of the all men age adjusted RR and, ii) to model the impact on referrals and prescription of testosterone replacement therapy (TRT) had we adopted either the lower limit of either all men or non-obese age adjusted RR as our referral criteria.

Methods

Datasets of all testosterone samples analysed were obtained from clinical biochemistry and all referrals to the endocrinology clinic were obtained from service planning between 01/06/2017 and 31/05/2019. Clinic referrals for hypogonadism were identified (excluding those with a history of anabolic steroid use or Klinefelter's syndrome) . Testosterone prescription data was obtained from pharmacy.

Results

Despite similar numbers of testosterone levels being measured in the laboratory, referrals to endocrine clinic for investigation of male hypogonadism fell by 52% (n=101 vs 48) in the one year following the introduction of the new age adjusted RR, with a corresponding reduction in prescriptions for testosterone. Mean testosterone concentration (6.7±2.5 vs 6.4±3.9nmol/L [mean±SD], NS), and age (51±13.9 vs 50±17.9 years, NS) of individuals referred were similar before and after the change of RR. Of the 101 patients referred for investigation of hypogonadism prior to the new RR mean testosterone concentrations were 8.5±4.5, 7.3±4.1, 6.8±3.6, 6.7±2.1 & 6.6±1.6nmol/L, with 39, 71, 39, 40 & 17% of the 87 patients seen in clinic being prescribed TRT in age groups 19-39 (n=28), 40-49 (n=7), 50-59 (n=33), 60-69 (n=20) &70-79 (n=6) respectively. Mean BMI was 30.9±4.4kg/m2, which was similar between age groups.

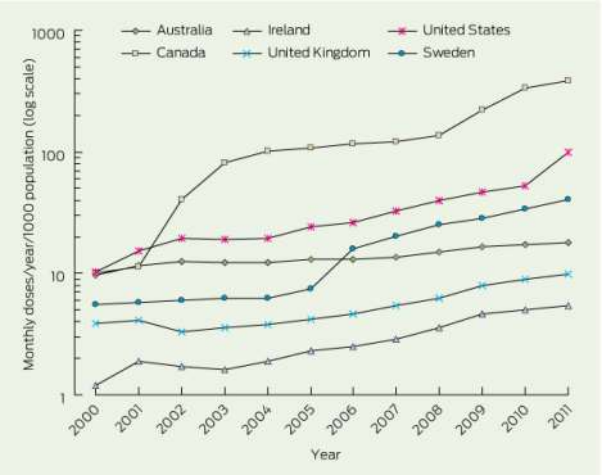
Had the lower limit of normal of the all men testosterone RR been employed as our referral criteria in the preceding year, 23.8% (24/101) of referrals would not have met referral criteria, and 26.2% (n=11/42) of those receiving a prescription would potentially not have received a trial of TRT. In contrast, had the non-obese age adjusted RR had been adopted for all men 13.9% (14/101) of referrals would not have met referral criteria and, of those prescribed testosterone, 2.4% (n= 1/42) would not have received a trial of TRT.

Conclusions

In conclusion, adoption of the all men age adjusted RR for testosterone has been associated with a significant fall in referrals for investigation of male hypogonadism. However, modelling of historical clinic data would suggest that some individuals will miss out on a therapeutic trial of TRT, especially if the all men, rather than non-obese, age adjusted RR is adopted.

References: (1) Travison et al, J Clin Endocrinol Metab, 2017,102(4):1161–1173, (2) Bhasin S et al,. J Clin Endocrinol Metab . March 2018;103(5):1715–1744.

Testosterone prescribing trends



Handlesman Med J Aust 2013; 199 (8): 548-551.

CLINICAL RESEARCH ARTICLE

Harmonized Reference Ranges for Circulating Testosterone Levels in Men of Four Cohort Studies in the United States and Europe

Age	*All men RR*	*Non-obese RR (nmol/l)*
19-39	7.9- 31.3	9.2-32.2
40-49	7.2-31.3	8.2-32.2
50-59	6.7-31.3	7.6-32.2
60-69	6.6-31.3	7.6-32.2
70-79	6.6-31.3	7.6-32.1
80-99	4.1-31.3	5.4-31.7

Adopted in NHS Highland mid 2018 (without change in GP guidance)

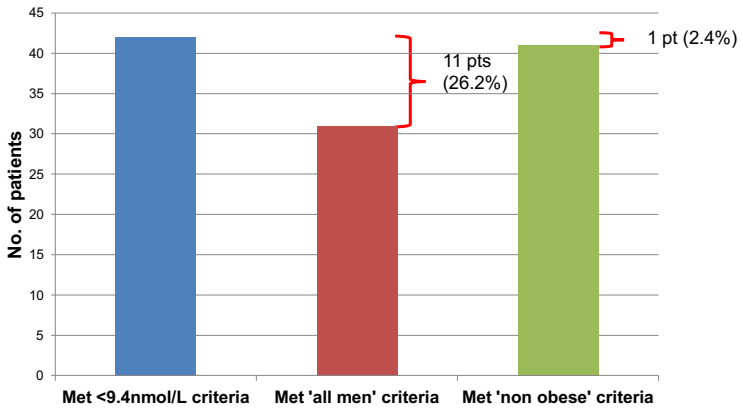
Travison et al *J Clin Endocrinol Metab*. 2017;102 (4):1161 –1173 .

Charlotte Dewdney

Hypotheses

- Adoption of the *all men* RR will lead to a significant reduction in referrals for assessment of hypogonadism
- New prescriptions for testosterone replacement therapy (TRT) will be reduced
- Non-obese individuals will miss out on a trial of TRT

Modelled impact of RRs on TRT prescriptions



Roby Rajan

Biography

Dr. Roby Rajan
ST5 in endocrinology and diabetes at Aberdeen Royal Infirmary .
Dr. Milena Tomova
Specialty Doctor at Aberdeen Royal Infirmary

Abstract

Aberdeen Adrenal Incidentaloma Pathway

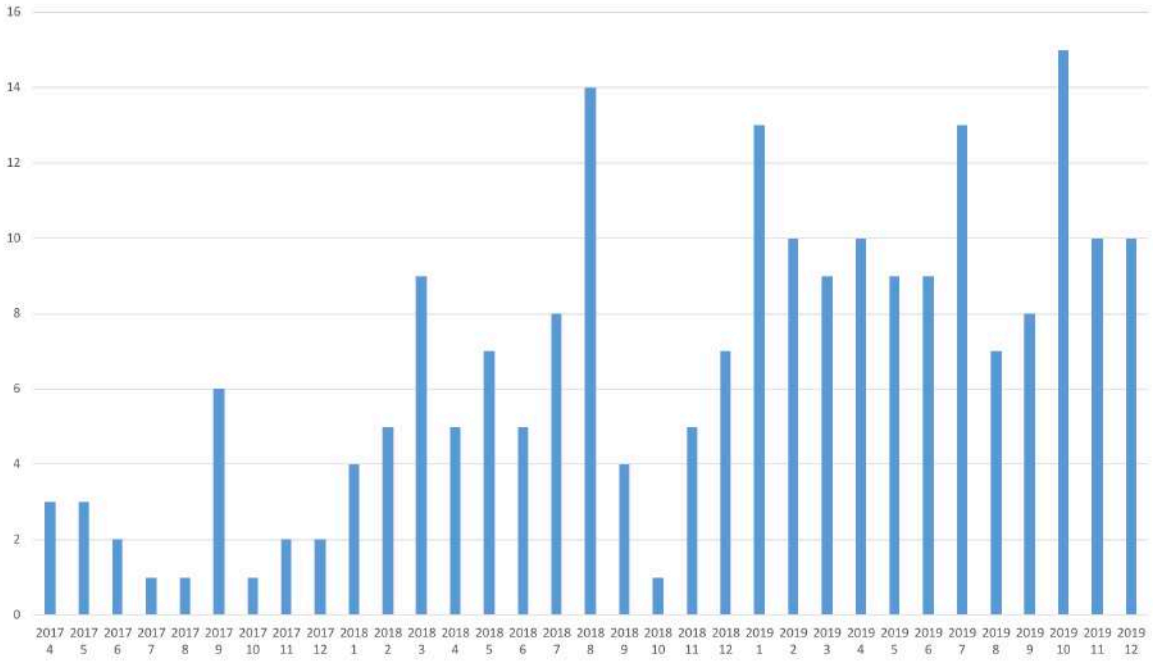
Aims and Background
Adrenal incidentalomas are a major part of the endocrine workload due to increasing cross sectional imaging .We describe our local endocrine nurse led pathway in the assessment and management of adrenal incidentalomas.

Methods:
Patients referred to the service are vetted by an endocrine consultant and placed on the adrenal pathway. The endocrine nurse specialist follow a standard protocol for excluding endocrine functionality. Patients are reviewed at Medical PAR clinic (parathyroid and adrenal) clinic with the results and appropriate plans for further management are outlined .Indeterminate radiology are discussed at the Adrenal MDT.

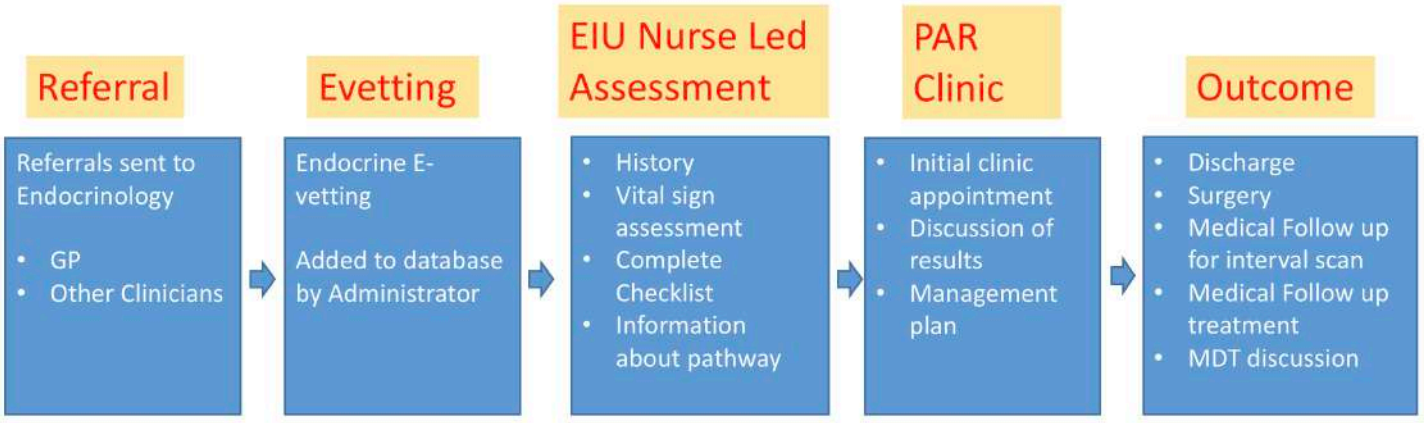
Results:
We analysed the data for 131 patients (85 females and 46 males, mean age 65 years) referred to endocrine service between February 2017 to February 2019 .A further 96 referrals have been dealt with in the last 11 months .
CT scans was the initial imaging modalities in 95% of the patients . 45 patients (35%) had conclusions made based on the primary scan. 86 patients (65 %) proceeded to a dedicated CT adrenal to characterise the incidentaloma .
The radiology report classified 102 (78%) as benign; 28 (21%) as indeterminate and 1 (1%) was a metastases.
Following endocrine assessment, 116 (88%) patients had a benign non-functioning adenoma ,6 had confirmed endocrine activity 4(autonomous) and 2 (phaeochromocytoma) . Rarer findings included 1 adrenal cancer , 1 metastasis and 1 macronodular hyperplasia .
18 patients had bilateral adenomas (14%) out of which 17 were benign and one was a metastasis104 (76 %) patients were discharged , 8 were referred to the surgeons and 16(12 %) continue on interval follow up in the medical pathway . 5 patients declined assessment or were unsuitable for further investigations .

Conclusion:
The endocrine nurse led pathway has been useful in streamlining the pathway of investigation for this group of patients. This has reduced the number of medical appointments and help cope with increasing burden of incidentaloma referrals.

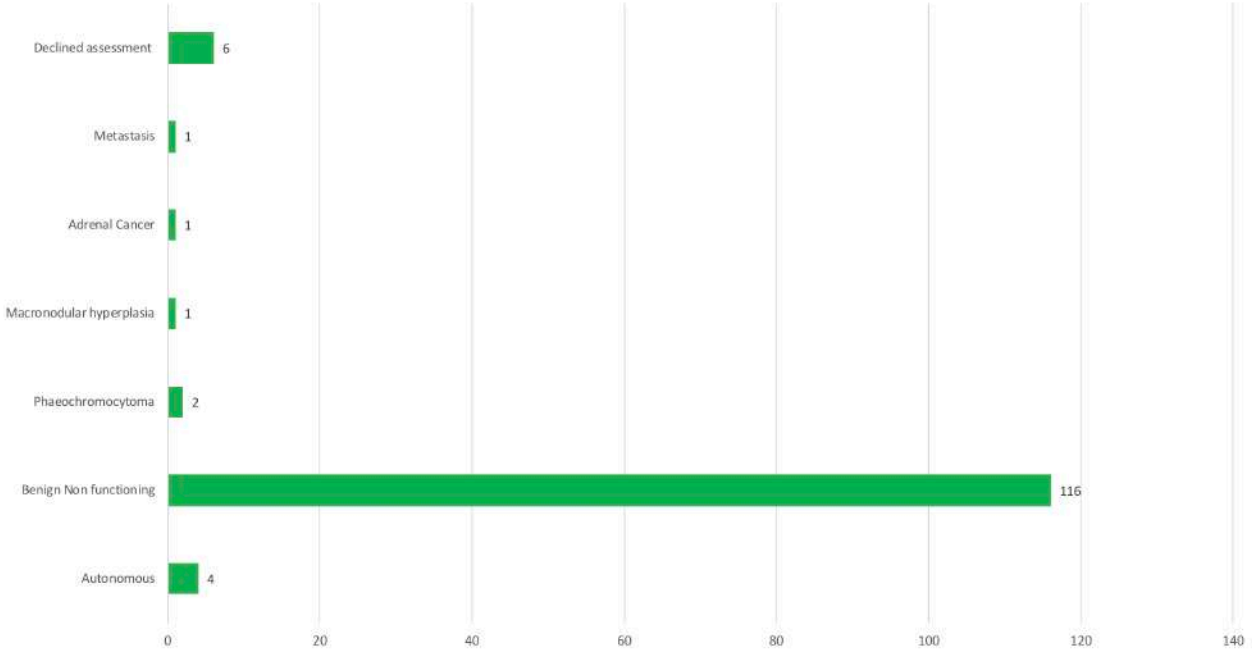
Roby Rajan



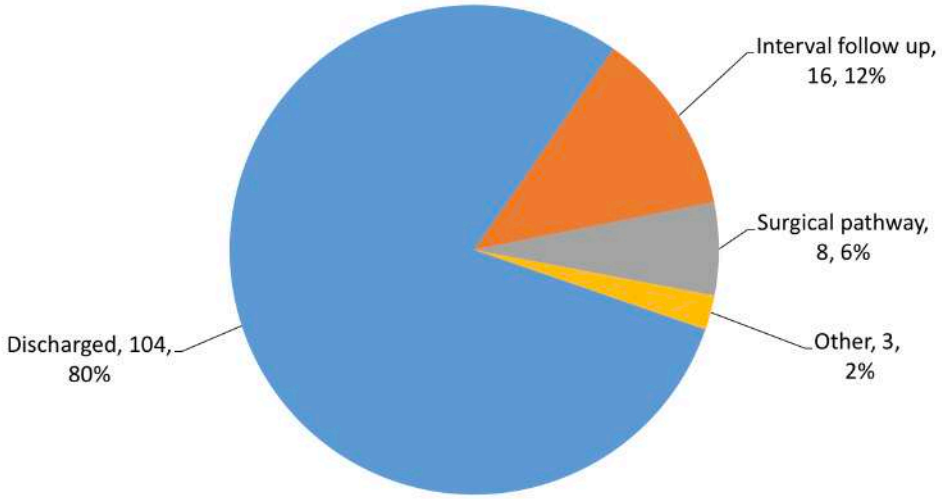
Patients assessed in EIU since the start of the service in April 2017



Aberdeen Adrenal Incidentaloma Pathway



Final Diagnosis



Management outcomes : Aberdeen Adrenal Incidentaloma Pathway

Rebecca Haggarty / Nathan Smith

Rebecca Haggarty graduated from the University of Glasgow in 2013 and completed foundation training in NHS Lanarkshire. She then worked in Emergency Medicine in the Gold Coast, Australia for two years. She returned to Glasgow in 2017 to complete core medical training. She is currently working as a clinical teaching fellow in NHS Lanarkshire with her clinical time spent in Endocrinology clinics. She is also completing a post graduate certificate in medical education at the University of Glasgow. She is applying for an Endocrinology and Diabetes training post this year.

Nathan Smith graduated from the University of Aberdeen in 2016, before moving to Glasgow for foundation training. Last year he completed a post as a clinical development fellow in diabetes and endocrinology. He is currently working as a clinical teaching fellow in NHS Lanarkshire. As part of this role he is studying for a postgraduate certificate in medical education from the University of Dundee. He hopes to begin internal medicine training later this year.

Abstract

Reducing insulin errors: Improving senior medical students' insulin prescribing practice

Introduction

Diabetes is an increasingly prevalent disease in the UK with over 15% of patients in hospital having an established diagnosis. Almost two fifths of inpatients on insulin treatment will experience an insulin error during their admission. A UK study found that 32% of junior doctors would not feel comfortable taking the initiative to manage a patient's diabetic care based on their blood glucose level. There have been patient safety issues highlighted in NHS Lanarkshire due to errors in insulin prescribing and management of patients with diabetes in hospital based on local incident reporting. This was therefore identified as an area for educational intervention with the potential to improve patient outcomes. The aim of the session was to improve medical students' knowledge and confidence in prescribing insulin.

Methods

Medical students' knowledge on insulin types and insulin regimes, as well as their ability to prescribe insulin appropriately will be assessed. The study has been designed using level one and two of the Kirkpatrick's evaluation model (reaction and learning respectively). A questionnaire has been created, taking the form of a confidence scale and short answer questions, allowing both objective and subjective assessment.

A two hour workshop was designed for between 10 and 15 fourth and fifth year medical students with a detailed lesson plan, based on Gagne's framework . This session starts with a short presentation outlining the pharmacology of insulin, different types of insulin and practical tips on adjusting insulin doses based on capillary blood glucose (CBG). The students are then divided into small groups and rotate around six low-fidelity simulation stations, where the student acts as a junior doctor and the facilitator acts as a member of the nursing staff requesting an insulin prescription for their patient. The following scenarios were designed:

Insulin dose adjustment for a patient with early morning hypoglycaemia on a biphasic insulin regime

Insulin dose adjustment for a patient on a basal bolus regime with hyperglycaemia secondary to steroids

Insulin dose adjustment for a patient on a biphasic insulin regime with hyperglycaemia

Management of a patient with type 1 diabetes and hyperglycaemia and positive ketones, but no acidosis

Review of a patient with hyperglycaemia secondary to lipodystrophy

Switching to subcutaneous insulin for a post-operative patient on a variable rate insulin infusion

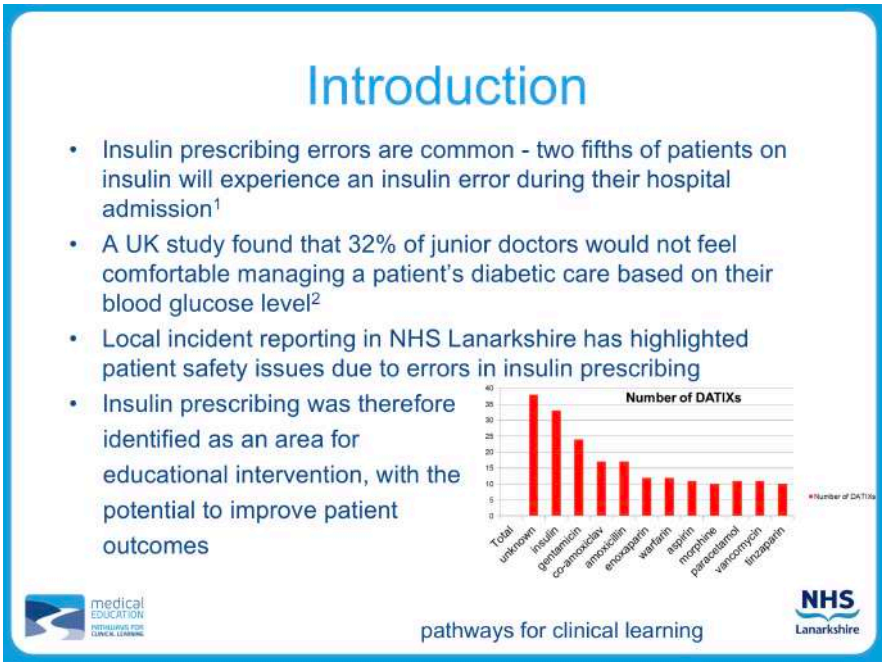
At each station the students are given an insulin prescription chart to review the patient's recent CBG results and prescribe their insulin. They are also provided with local guidelines if requested. The students are closely supervised by a tutor at each station and have the opportunity to gain immediate feedback on their performance. Peer learning will also be incorporated by allowing students to give feedback to each other and discuss their prescriptions. The workshop content has been reviewed by a consultant endocrinologist and diabetes specialist nurse to ensure its accuracy and quality.

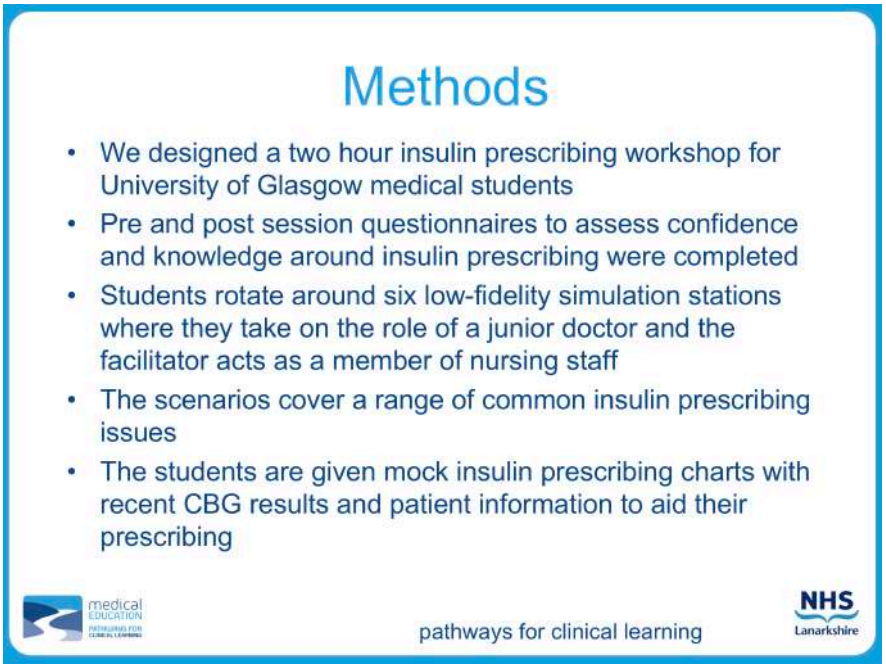
Following the workshop, the medical students' knowledge and confidence will be reassessed using the same questionnaire. Students will be invited to participate in the study by the Medical Education administrators based in NHS Lanarkshire. The

questionnaires will be anonymous and completed questionnaires will be collated by the administrative team and stored as confidential information.

Discussion

The implementation of this simulated teaching session for medical students aims to target a practice that has been shown to be performed poorly, with the potential to reduce prescribing errors. This may have significant patient safety implications. Future plans include incorporating this session into the regular curriculum for senior medical students in NHS Lanarkshire and possibly the University of Glasgow. The session will also be delivered to local FY1s and focus groups will be conducted in order to establish the impact of this on their prescribing practice.





Rebecca Haggarty / Nathan Smith

Results

	Pre-teaching (n=13)		Post teaching (n=13)		
Area of confidence	Mean	SD	Mean	SD	p-value
Recognising duration of action of insulin from it's brand name	2.31	0.56	3.69	0.23	<0.001
Identifying precipitants for hyperglycaemia in patients with diabetes	3.08	1.24	3.69	0.23	0.088
Adjusting insulin dosing for patients with raised CBG	2.23	1.03	4.46	0.27	<0.001
Adjusting insulin dosing for patients with low CBG	2.08	0.58	4.31	0.23	<0.001

Significant improvement in knowledge when re-assessed 3 weeks later (P= <0.001)

100% found the session useful to their training

100% felt the session had a positive impact on their clinical experience for the rest of the placement

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pathways for clinical learning

NHS Lanarkshire

Future plans

- Plan to continue delivering the workshop to medical students on placement in NHSL every 5-10 weeks
- Our aim is to eventually implement the workshop into the University of Glasgow curriculum
- Currently awaiting ethical approval to pilot this workshop with FY1 doctors in NHSL, with the aim to improve their prescribing practice and as a result reduce prescribing errors

medical EDUCATION PATHWAYS FOR CLINICAL LEARNING

pathways for clinical learning

NHS Lanarkshire

Pui San Yap

Dr Pui San Yap graduated from University of Aberdeen in 2011. She is currently ST7 in Endocrinology& Diabetes based in Aberdeen Royal Infirmary

Abstract

A 60 year old woman presented with symptoms of thyrotoxicosis at the end of 2009. She has family history of thyroid disease with her sister having had hyperthyroidism. On examination, heart rate was 62 beats per minute, regular. There is no evidence of tremor, goitre or visual field defects on confrontation.

Thyroid function test shows elevated T4 28pmol/l (10-25) and T3 9.6pmol/l (3-7) and inappropriate TSH 1.47 mu/l (0.35-4.5). Thyroid antibodies were negative. The samples were sent for measurement in a different assay and the results were similar. Heterophyllic antibodies testing was negative. TRH testing showed a small TSH rise with basal levels of around 1.5mu/l rising to 3.5mu/l after 30 minutes and falling back to 2.7mu/l after 60 minutes. Prolactin was mildly raised at just over 600mu/l and showed a flat response to TRH. Alpha subunit and thyroid hormone receptor gene analysis were negative. She had MRI pituitary which was entirely normal.

She was commenced on Carbimazole which was switched to Propylthiouracil until April 2012. We suspect she has TSH secreting microadenoma which was too small to be visualised on MRI. She had some symptomatic response but remained biochemically thyrotoxic. She was commenced on Lanreotide titrating up to 120mg 8 weekly.

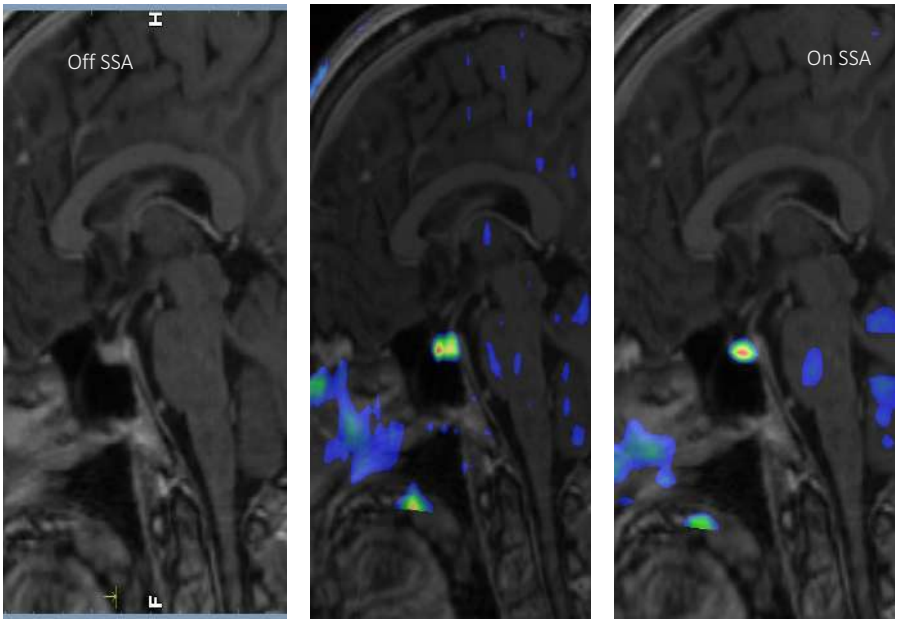
We withheld Lanreotide and proceeded with C-11 methionine PET scan which is aim to localise or find a functioning tumour which could then be surgically targeted. This shows two midline anterior pituitary hot spots. Given the lack of structural abnormality on MRI, PET scan was repeated after being on Lanreotide for 3-4 months after discussion with colleagues from Cambridge. She remains euthyroid with Lanreotide and a repeat C-11 methionine PET scan helped localise pituitary adenoma. Following that, she had transphenoidal surgery which lead to a cure.

Pui San Yap

TEST	TSHoma	RESISTANCE TO THYROID HORMONE
Clinical thyrotoxicosis	Present	Present
Family History	Absent	Present
TRH test	No change	Normal/Increase
SHBG	Elevated	Normal
α subunit	Elevated	Normal
Pituitary MRI	Tumour	Normal
THRB gene analysis	Normal	Mutation ~ 90%
Depot SSA response	Yes	No

^{11}C-methionine

- Taken up at sites with active peptide synthesis
- Favourable target: background ratios
- Normal pituitary: brain uptake ratio ~ 2:1
- Higher uptake in many pituitary adenomas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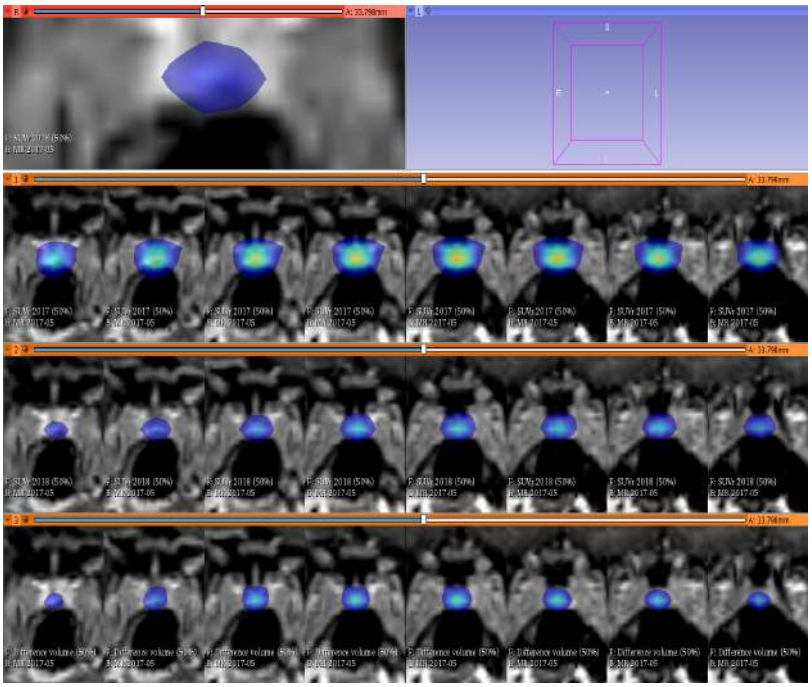

Notes

Notes

caledonian society for endocrinology and diabetes

CalSoc 2020 registration, meals and accommodation were covered by our sponsors:

MSD

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