ABCD
Autumn Meeting
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ABSTRACTS ACCEPTED FOR ORAL PRESENTATION

1. What are the early (6 month) metabolic effects of proximal intestinal exclusion as an adjunct to GLP-1 therapy in suboptimally controlled type 2 diabetes?

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Background: Seventy-five percent of UK patients commencing GLP-1RA therapy fail to achieve NICE's targets for continuation of therapy. New, effective treatments are needed to combat the global diabesity pandemic.

Aim: To investigate early effects of adding proximal intestinal exclusion to GLP-1RA therapy on weight and glycated haemoglobin (HbA1c) compared to either treatment alone.

Methods: Adults with inadequately controlled type 2 diabetes and obesity despite GLP-1RA therapy (liraglutide 1.2mg daily) were randomised to (1) additional proximal intestinal exclusion using a novel endoscopic device, endobarrier); (2) endobarrier without GLP-1RA; (3) escalated dose liraglutide (1.8 mg daily). Descriptive statistics were performed, expressed as %frequency or mean±SD. Changes in weight and HbA1c over 6 months were calculated (paired t-test, ANOVA).

Results: Of 70 patients treated (52.2±10.1 years, 35.7% male, 71.4% Caucasian), baseline weight was 114.1±18.2kg, BMI 40.9±4.7kg/m2and HbA1c 80.7±17.5mmol/mol (9.5±1.6%)), 2 withdrew and 3 did not complete 6-months' treatment. Over 6 months, weight reduction was 11.8±4.7kg (n23, P<0.0001); 10.1±6.7kg (n22, P<0.0001) and 2.9±4.4kg (n20, P=0.007) in groups 1, 2 and 3 respectively. During the corresponding interval, HbA1c fell by 21.6±15.0mmol/mol (2.0±1.4%, P<0.0001), 6.3±14.3mmol/mol (0.6±1.3%, P=0.05) and 12.5±15.3 (1.1±1.4%, P=0.002).

Conclusion: Combined endobarrier-liraglutide has a superior early (6 month) effect in reducing both weight and HbA1c in patients with diabesity apparently failing GLP-1RA therapy. Endobarrier without liraglutide produces comparable weight reduction without corresponding improvement in glycaemic control. These data suggest that adding proximal intestinal exclusion to suboptimally performing GLP1-RA therapy has clinical benefit and advantage over converting to proximal intestinal exclusion or escalating GLP-1RA dose.

2. HbA1c, weight, body mass index (BMI) and systolic blood pressure changes in the ABCD nationwide dapagliflozin audit

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The ABCD nationwide audit of dapagliflozin in real clinical use in the UK, launched in October 2014. One year on, 110 contributors from 48 centres across the UK have submitted data on 849 dapagliflozin-treated patients (55.8% males, mean (±SD) aged 57.2 ±10.46years, weight 103.0± 22.6 kg, BMI 36.6± 13.9kg/m^2 and HbA1c 80.0± 16.1mmol/mol (9.5±1.5%), median (range) duration of diabetes 11.5 (0-44) years. At commencement of dapagliflozin, their diabetes medications included 75.4% metformin, 45.5% insulin (11.4% basal insulin, 13.9% basal bolus, 20.2% insulin mixtures), 34.6% sulphonylurea, 29.7% GLP-1 receptor analogues, 19.2% DPP-4 inhibitors, 7.2% pioglitazone, and 1.5% other agents.
Those with baseline and follow-up HbA1c within a median(range) of 25.0(6.7-97.4) weeks were included in the analysis. Mean(±SE) HbA1c fell by 9.7±0.7 mmol/mol (0.9±0.06%) from 81.9 mmol/ mol(9.6%) to 72.2 mmol/mol (8.7%) (n=465, p<0.001). Weight fell by 2.8±0.02kg from 103.3kg to 100.5kg (n=480, p<0.001). BMI dropped by 1.01 ± 0.08 from mean of 36.32 to 35.30 kg/m^2 (p<0.001) and systolic blood pressure fell by 4.3mmHg ± 0.8 from mean of 137.7 to 133.4 mmHg (n=410, p<0.001).
Dapagliflozin reduced HbA1c, weight, BMI and systolic blood pressure by meaningful amounts in a wide range of real-world UK patients with type 2 diabetes on a variety of diabetes medications

ABSTRACTS ACCEPTED FOR POSTER PRESENTATION

1 Reduction in diabetic macular oedema on optical coherence tomography after stopping pioglitazone.

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Background: Pioglitazone belongs to class thiazolidinedione, an agonist of peroxisome proliferator-activated receptor-gamma, which is used in the treatment of type 2 diabetes mellitus and has been suggested to worsen diabetic macular oedema (DMO) in patient with established DMO although the exact cause and effect is still unknown. The aim of our study was to demonstrate and evaluate the improvement in central retinal thickness (CRT) in patients with DMO in whom pioglitazone was stopped based on ocular coherence tomography (OCT).

Methods: Patients with type 2 diabetes mellitus under the care of tertiary eye clinic, who had pioglitazone stopped due to worsening DMO, were identified. Patients who were followed up for at least 1 year with OCT done on 4-6 monthly intervals were included for analysis. Patients with greater than 10 mmol/mol variation in HbA1C or 20 or more mmHg variation in systolic blood pressure or those requiring either Laser or specific injectable therapy for DMO or change in smoking status were excluded from the study to minimize confounding factors.

Results: Based on inclusion criteria, 16 patients (11 males; 69%) were initially selected: mean age 63.3 + 9.7(SD; 95%CI) years; mean duration of diabetes 11.6 + 4.9 years; mean duration of pioglitazone treatment 44.6 + 21.9 months. Seven patients were excluded due to lack of follow up data. . The initial mean CRT of 9 patients on stopping pioglitazone was 349 + 70 um(microns) which reduced to 329 + 59 later. 7 out of 9 patients had good improvement in CRT, with the difference being 69.6 + 26.1 um over a period of 12.4 + 6.6 months; two patients did not show sizeable amelioration in their DMO (CRT change 6 + 1 um).

Conclusion: DMO could improve on withdrawal of pioglitazone and measurements based on OCT offer further evidence to this documented phenomenon. Further large scale prospective studies are required to establish the causation and monitoring protocols of this serious complication.

References

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2 Psychosocial screening of 16-19 year olds admitted with diabetic ketoacidosis: inpatient, outpatient and transition perspectives.

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Background: Psychosocial screening is an important skill in adolescent health in inpatient and outpatient settings. It provides an opportunity to explore risk and resilience. Acting on outcomes may influence self-management and future admissions.

Objectives: To explore the extent of psychosocial screening in adolescents with Type 1 diabetes aged 16 to 19 within inpatient and outpatients setting pre and post-transfer from paediatric to adult services.

Methods: All 16-19 year olds admitted with DKA over 12 months at the University Hospitals Leicester were identified. Computerised and paper patient records were reviewed for documented evidence of psychosocial screening during admission, pre- and post-transfer to adult services. Domains identified as important for screening were:- Home circumstance, Education/Employment, Activity/Peers, Drugs, Tobacco, Alcohol, Sexual Activity and Suicide/Depression.

Results: 15 patients (8 female) had 21 DKA admissions. 10 patients were transferred from paediatric services, 14 attended adult services. Percentage of domains screened: during admission 71 /168(42%), paediatric outpatients 22/80(28%) and adult outpatients 51/112(46%). Risks were identified in 44/144(31%) of domains screened, action taken in 26/44(59%). Domain most frequently screened across all settings (>50%) was Education and least frequently screened (<25%) were Drugs, Sexual Activity and Suicide/Depression. Tobacco and Alcohol screening was above >50% during admission and in adult services but <25% in paediatric services

Conclusion: Psychosocial screening opportunities are being missed. Paediatric outpatients had lowest levels of screening. Adapting pro formas may assist screening. Training is required at all levels, with focus on asking about Suicide/Depression, Sexual Activity and Drugs.

3 An audit of blood glucose or bm monitoring in acute medical admissions at the leicester royal infirmary

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Introduction: With the increasing demand on acute hospitals, basic diagnostic tests such as blood glucose (BG) (or BM) monitoring are at risk of being overlooked or omitted. BG measurement is relevant not only in the diagnosis and management of diabetes, but also in the management of numerous other acute medical presentations. Additionally, although BM monitoring features in the National Early Warning Score chart, it is not a parameter to which a score is assigned and this may also influence the importance given to it by acute admitting teams during periods of intensity working.

Background: Anecdotally we noticed that BG measurement was poorly documents and seldom acted on.

Method: A retrospective audit of 56 new admissions to the three acute medical units at the Leicester Royal Infirmary between October 2014 and January 2015.
Nursing and medical documentation were examined to determine the following:

1) Was the patient's BG recorded on the medical clerking proforma by the admitting Doctor/nurse and has credence been given to it or its relevance been referred to by the medical team?

2) If the BG was not on the clerking proforma then we interrogated the notes for its availability elsewhere.

Findings: 52 of 56 patients presented with a condition for which the authors deemed it good practice to check BG at least once. This is based on widely available standard advice for the management of such acute presentations.

18 of the 52 were known diabetics. 11 of these 18 had their BG documented on their clerking proforma.

Of the remaining 34 (non-diabetic) patients, 15 had their BG documented on the clerking proforma.

In total BG documentation was achieved for only half of the patients for whom the authors believed it should have been.

In only 2 out of 56 cases did the senior doctor (ST or Consultant) reviewing the patient acknowledge the BG.

Conclusion: In our Unit, BG measurement is poorly documented on initial medical clerking and thus it's relevance in acutely presenting patients ignored. It also appears to be ignored by senior doctors during Post-take review.
There may be various reasons for this including those highlighted during the introduction but also, probably, poor documentation of post-take consultations during which BG may have been commented on but not documented.

Within our Trust we propose a poster educational campaign to highlight the importance of giving BG measurements due credence.

4 Management of hypoglycaemia in inpatients at University Hospital Llandough: implementation of "Hypo Sticker".

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Aim And Method: Following an audit showing poor compliance with guidelines developed by the Joint British Diabetes Society on hospital management of hypoglycaemia in adults with diabetes mellitus, medical and nursing staff in University Hospital Llandough were trained in the management of hypoglycaemia with implementation of the "hypoglycaemia sticker". Audit data on documentation and management of all hypoglycaemic events over a two week period was collected on all diabetic medical inpatients prior to and following training and implementation of this sticker on medical wards.

Results: There was a marked improvement in the documentation and medical management of hypoglycaemia after implementation of training and the "hypo sticker" with 49 hypoglycaemic events identified in the original data collection, and 31 on re-audit. Whilst there was only moderate use of the hypoglycaemia sticker (45.2% hypoglycaemic events utilised the sticker), documentation had improved, with 74.2% cases being documented in the medical notes in re-audit, compared with 34.7% previously. 64.5% cases were treated according to guidelines in re-audit, versus 32.7% in previous audit. Following treatment, more patients had their bedside blood glucose reassessed earlier, with 50% patients having it rechecked within 30 minutes, versus 37.5% in earlier audit. Patients were also more likely to have their hypoglycaemic event noted by the medical team at next review with 51.6% cases versus 30.6% in previous audit reviewed appropriately.

Conclusion: This simple yet effective intervention has greatly improved hypoglycaemia management in this setting and is a convenient way of communication adverse events between nursing and medical staff.

5 Evaluating the feasibility of simulation training to teach junior doctors diabetic emergency management.

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Background: Over 20% of inpatients at our busy district general hospital in East London have diabetes. Most of the out-of-hours management of diabetic emergencies is provided by junior doctors. Evaluation of junior doctors' understanding of diabetes management via knowledge questionnaires has shown consistently poor results (Gouveia 2010). Historically, we have provided small group teaching sessions, case-base discussions and grand round lectures to improve the junior doctors' diabetes management training. However, with a growing popularity for simulation training, we wanted to evaluate whether this teaching method would be effective and preferred by junior doctors.

Methods: A previous knowledge questionnaire covering the management of diabetic emergencies was distributed and completed by junior doctors. 30 junior doctors consisting of Foundation Year doctors, SHOs and SpRs completed the questionnaire in 2014.
After reviewing the results of the knowledge questionnaire, we decided to design a three hour simulation session covering the diabetic emergency scenarios. The simulation scenarios included management of diabetic ketoacidosis (DKA), hyperosmolar hyperglycaemia syndrome (HHS) and hypoglycaemia. Nine junior doctors agreed to participate in the Diabetic Emergency simulation sessions and they were divided into groups of 2-3, with each group tackling one simulation scenario.
We evaluated their experience of the Simulation training session using anonymous feedback forms utilising Likert scales and free-text response boxes.

Results: The results of our knowledge questionnaire revealed that only 14/30 junior doctors correctly identified the main biochemical features of DKA, 8/30 junior doctors stated administering IV 50% dextrose to an unconscious patient with a capillary blood glucose =3mmol/l and only 8/30 junior doctors were able to correctly calculate the serum osmolality. These results were similar to previous junior doctor knowledge evaluation carried out in 2010, confirming a strong need to provide more post-graduate training in diabetes emergency management.
After completion of the Diabetic Emergency Simulation sessions, we retrieved anonymous feedback from all nine participants. All participants "strongly agreed" that the simulation sessions were relevant to their training, were interesting and informative. Participants were asked whether simulation training was a better teaching method than lectures, for diabetic emergency management training. 8/9 junior doctors felt that simulation was better than traditional lectures. Comments included; "better to learn by example", "discussions were useful", "I'll remember this session more than any lecture", "simulation allows the trainee to become more immersed in practical problems" and "More fun and sticks in mind better".

Conclusion: Simulation training was shown to be a feasible and a popular teaching method amongst junior doctors for teaching the management of diabetic emergencies. Future challenges are to increase the junior doctor participation in simulation training and perhaps adapt the session to coincide with trainees' mandatory teaching.

6 Confidence levels of junior doctors in managing hospital in-patients with diabetes

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Introduction: There has been a significant increase in the prevalence of diabetes, and this is represented in the in-patient population. Our aim was to evaluate self reported confidence levels of trainee doctors in managing patients with diabetes and to identify training needs.

Methods: An online pre-validated questionnaire was administered to trainee doctors working in the West of Scotland training deanery. The study was hosted on a dedicated web portal, www.topdocdiabetes.org previously used for a national survey and all results were anonymous.

Results: There were 33 completed questionnaires. The percentage of all respondents that were 'fully confident' in managing diabetes were; diagnosing diabetes (6%, n=2); diagnosing impaired glucose tolerance (9%, n=3); managing hypoglycaemia (21%, n=7); managing diabetic ketoacidosis (18%, n=6);

managing hyperosmolar hyperglycaemic state (3%, n=1); commencing, titrating and discontinuing IV insulin (6%, n=2); and altering diabetes therapy prior to surgery or other procedure (3%, n=1).
Four participants (12%) said they would 'always' or 'almost always' take initiative to improve diabetes control, with the majority (72%) reporting that they would 'often' or 'not very often' do this. With regard to changing the dose or timing of oral therapy, no participants would 'always', 15% would 'almost always' and 27% never. There were more participants who would change the dose, timing or type of insulin therapy; 12% and 24% would 'always' and 'almost always' respectively. The majority of respondents would 'always' and 'almost always' (54%) involve the diabetes specialist teams.
Half of participants felt that their postgraduate training had not adequately prepared them to manage in-patients with diabetes. The majority (79%) of participants felt that they required further training in the diagnosis of diabetes.

Conclusion: We have demonstrated a significant lack of confidence in trainee doctors in managing in-patients with diabetes highlighting the need to improve both undergraduate and postgraduate teaching

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7 The effect of the sodium-glucose co transporter Dapagliflozin upon cardiovascular risk factors and risk scores in a Scottish Teaching Hospital.

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Sodium-glucose co-transporter (SGLT-2) therapies are not simply glucocentric but also confer the advantage of weight loss and blood pressure reduction. Therefore there is potential cardiovascular benefit, recently demonstrated with Empagliflozin in a randomized controlled trial (the EMPA-REG OUTCOME trial) which demonstrated a 14% reduction in the primary outcome (1).

We sought to ascertain the relative benefits of one of these agents, Dapagliflozin, on cardiovascular risk profile, in a planned, observational analysis of routine care in a university hospital.

This study analysed the effect of Dapagliflozin upon weight, BP and HbA1c over an 18 month period in patients with T2DM. We also measured lipid profiles and using the UKPDS risk calculator were able to assess cardiovascular risk scores for coronary heart disease (CHD) before and after treatment. A *t* test was used to determine statistical significance and a model was utilised correcting for sex, age, duration of diabetes, heart rhythm and smoking status to assess the effect on cardiovascular risk scores.

Dapagliflozin (n=94) was assessed within a population in our clinic where the mean age was 56.89 ± 8.81 years (40 males and 54 females). 39 were on Insulin and 55 not on Insulin. 44 had been smokers, 40 were ex smokers and 10 were current smokers. Mean BMI was 36.09 ± 7.39 and duration of diabetes 11.82 ± 5.05 years. Treatment with Dapagliflozin lowered mean Hba1c from 83.15 mmol/mol to 69.23 mmol/mol (p=0.0001), weight (101.00kg to 96.56kg (p=0.003)) as well as systolic BP 135.84mmHg to 121.54mmHg (p=0.004). UKPDS risk estimate for CHD decreased from 20.28% to 17.39%

We have demonstrated, similar to previous trial data (2) that Dapagliflozin treatment is associated with reduced HbA1c, weight loss and reduced blood pressure. Additionally this was associated with a reduction in CV risk score, an effect that requires validated within randomised controlled trials with Dapagliflozin This will assist in determining whether an improvement in cardiovascular outcome is a class effect for this group of medication rather than specific to an individual drug.

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8 Incidence of Gestational Diabetes Mellitus in University Hospital Llandough - a comparison of old versus new guidelines.

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Introduction: In February 2015, the diagnostic criteria for gestational diabetes mellitus (GDM) were amended, lowering the fasting threshold for diagnosis based on a 75g, 2 hour oral glucose tolerance test (OGTT) from 6.1mmol/l to 5.6mmol/l.

Aim: This study aimed to identify the impact of this on the incidence of gestational diabetes diagnosed in University Hospital Llandough period from March 2014 to March 2015 inclusive (13 months).

Results: 481 OGTTs were conducted on pregnant women during the specified period. Of these, 202 OGTT tests were performed between 24 to 28 weeks, 196 after 28 weeks and 81 before 24 weeks gestation. Between 24-28 weeks gestation using new criteria there were 6 additional cases (25 versus 19 cases), a 31.58 % increased relative risk of GDM. As a significant proportion of patients had this diagnostic test performed outside the recommended gestational age we examined these data separately. Of the 196 OGTTs performed after 28 weeks gestation, there were 3 additional cases using new criteria (17 versus 14 cases) an increased relative risk of 21.43%. Of the 81 OGTTs performed on women of less than 24 weeks gestation, there was 1 additional case (7 versus 6 cases) an increased relative risk of 16.67%. Overall, looking at all tests performed at any gestation, there was a 23% increase in the incidence of gestational diabetes with 10 new cases based on new diagnostic criteria (49 cases versus 39 cases). These additional cases will have major implications for resources in our local diabetes and obstetric departments.

9 What happened to patients diagnosed with gestational diabetes mellitus in Hastings antenatal clinic? 5 year review.

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Background: Incidence of Type 2 diabetes mellitus in women diagnosed with Gestational diabetes varies from 2.6% to 70% over periods of 6 weeks to 28yrs with the highest incidence in the first 5 years after pregnancy.

Method: We looked at the hospital records of patients with GDM who delivered between 2008 and 2009 and followed their records to see if they developed diabetes over the subsequent years based on the standard criteria for diagnosing diabetes. We used our hospital biochemistry system to search for Fasting glucose, OGTT or HbA1C test.

Results: 38 patients were diagnosed to have Gestational diabetes mellitus during one year period between 2008 to 2009.

31 patients (79%) were Caucasians 6 (18%) were Asians, and one patient was of African in ethnicity. 17 patients were in the age group of 20-30 years whereas 18 patients were between 30-40 years and 3 patients above 40 years.

Only 18 patients (47%) had glucose assessments over this 5 year period. Out of this 7 (18%) patients developed diabetes and 1 developed impaired fasting glucose. Other 10 (26%) patients' tests were normal. Only 5 out of this 10 patients had regular monitoring during this periods, other 5 patients had only tests up to 1-3 yrs. 20 patients did not have any glucose assessment after their diagnosis of GDM.

Conclusion: Only 47% of our GDM patients had regular follow up tests. 18% of our patients with GDM developed diabetes within 5 years. We have presented this data to our CCG and planning to adapt yearly HbA1C testing.

10 Does dapagliflozin affect the metabolic response in patients with elevated alanine aminotransferase and Type 2 diabetes?: the Association of British Clinical Diabetologists (ABCD) nationwide dapagliflozin audit

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Aims: To evaluate the effect of (1)dapagliflozin on metabolic response to patients with elevated alanine aminotransferase(ALT) and (2)baseline ALT on metabolic response to dapagliflozin.

Methods: Data was obtained from ABCD nationwide audit of dapagliflozin in real-clinical use from 2014 to 2015(n=853).Inclusion criteria: audit patients with baseline and follow-up ALT (≥8weeks). Exclusion criteria: dapagliflozin cessation. Descriptive analysis was performed and expressed as per cent frequency, mean ± SD or median(interquartile range). Patients were categorised into three groups (ALT<30; ALT30-50; ALT>50U/l). Changes in ALT, weight and HbA1c overtime were calculated within and between ALT groups with Wilcoxon's signed rank test. Spearman's correlation was used to assess the relationship between baseline variables including ALT and metabolic response.

Results: Of 241 patients(age 57.33 ± 10 years,55.84% males, type 2 diabetes duration 11.4 years(7-17),baseline ALT 27U/l(20-41),weight 100.7kg(87-115),body mass index 35.12 kg/m2(31.0-39.0) and HbA1c 79mmol(68-89) or 9.4%(8.4-10.3), over 5 months(4-7) median reduction in ALT was 2.0U/l(-2.0 to 7.0),p<0.001; weight 2.3kg(-0.1 to 5.9),p<0.001; and HbA1c 9mmol(0 to 19.0),p<0.001. Comparing groups[baseline ALT<30U/l, n=134 (55.6%); ALT 30-50U/l,n=68(28.21%); ALT>50U/l,n=39(16.18%), ALT changed from 20.0U/l(16.0-24.0) to 20.0U/l(16.0-24.0U/l)(p=0.564), 38.0(33.0-41.0) to 31.0 U/l(25.75-38.0)(p<0.001) and 63.0U/l(56.5-72.0) to 45.0U/l(34.0-55.0)(p<0.001), respectively. Baseline ALT correlated with baseline weight (correlation coefficient(R)= 0.2001,p=0.0017), ALT(R=0.7069,p<0.001 and weight response(R=0.2045,p=0.0014) but did not correlate with baseline HbA1c or HbA1c response.

Conclusion: Apart from positive impact on glycaemic control and weight, dapagliflozin has a statistically significant response on ALT reduction in Type 2 diabetes patients with high baseline ALT>30U/l. This result may have may have implications regarding non-alcoholic fatty liver disease, which is associated with Type 2 diabetes.