A study looking at the effects of blocking stress hormone activation on skin function and wound healing in patients with type 2 diabetes

Submission date 16/10/2017	Recruitment status No longer recruiting	[X] Prospectively registered		
		[X] Protocol		
Registration date	Overall study status	[X] Statistical analysis plan		
18/10/2017	Completed	[X] Results		
Last Edited 18/10/2022	Condition category Nutritional, Metabolic, Endocrine	Individual participant data		

Plain English summary of protocol

Background and study aims

Diabetes is a condition that causes blood sugar to become too high. Diabetes is the fastestgrowing health problem in the UK affecting over three million people in England. Most of these cases are "type 2" diabetes caused by an unhealthy lifestyle and obesity. By 2035, diabetes will affect 1 in 10 people in the UK. The number of diabetes complications of is also increasing. These include foot ulcers which can lead to amputation. Treatments for foot ulcers often fail and diabetes costs the NHS £1 million an hour. During stress, the body produces the hormone cortisol (a glucocorticoid) which causes skin thinning, poor wound healing and infections. Cortisol is activated in skin by the enzyme 11β-HSD1. Studies in patients with diabetes showed that blocking this enzyme improved disease by reducing body weight, blood sugar and cholesterol levels. Blocking this enzyme could also improve skin function and wound healing. The aim of this study is to test healing in patients with type 2 diabetes using 11β-HSD1.

Who can participate? Adults with type 2 diabetes.

What does the study involve?

Participants are asked to attend a short screening visit to check heart function, blood pressure and blood tests. Participants are randomly allocated to one of two groups. Those in the first group receive tablets containing the test drug. Those in the second group receive tablets which do not contain the test drug (dummy). Participants are asked to take the tablet for 35 days twice daily. Participants are asked to provide two 24 hour urine samples, four blood samples and five skin biopsies (two at one visit and three at another visit). Skin biopsies are taken from the arm after numbing the area with an injection. Participants are also measured for skin thickness, water loss, water content and nerve function using pain-free probes. Weight, height, blood pressure, waist and hip circumference are also recorded.

What are the possible benefits and risks of participating?

Patients taking the drug tablets may notice a temporary improvement in their diabetes such as lower blood pressure, lower blood sugar, lower cholesterol and weight loss. Patients will contribute to research which may lead to new treatments which they may benefit from in the future. They will be paid £180 in total for their time and travel. The study has been designed with patient safety and comfort as our top priority and has full ethical approval. Possible but unlikely risks include biopsy infection, discovery of previously unknown health issues or side-effects such as mild to moderate stomach upset or headache. If these occur we will take appropriate medical action.

Where is the study run from? 1. St James's University Hospital (UK) 2. Chapel Allerton Hospital (UK)

When is the study starting and how long is it expected to run for? January 2016 to May 2019 (updated 31/03/2020, previously: April 2019)

Who is funding the study? Medical Research Council (UK)

Who is the main contact? Dr Ana Tiganescu, a.tiganescu@leeds.ac.uk

Contact information

Type(s) Public

Contact name Dr Ana Tiganescu

ORCID ID http://orcid.org/0000-0003-3688-2204

Contact details

Leeds Institute of Rheumatic and Musculoskeletal Medicine Level 8 Wellcome Trust Brenner Building St James' University Hospital Leeds United Kingdom LS9 7TF +44 113 34 38336 a.tiganescu@leeds.ac.uk

Additional identifiers

EudraCT/CTIS number 2017-001351-31

IRAS number

ClinicalTrials.gov number NCT03313297

Study information

Scientific Title

GC-SHealD (Glucocorticoids and Skin Healing in Diabetes) :A double-blind, randomized, placebocontrolled phase II pilot trial investigating efficacy, safety and feasibility of 11β-hydroxysteroid dehydrogenase type 1 inhibition by AZD4017 to improve skin function and wound healing in patients with type 2 diabetes

Acronym

GC-SHealD

Study objectives

The aim of this study is to test healing in patients with T2DM using the selective 11β-HSD1 inhibitor AZD4017 which is approved for use in clinical trials.

Ethics approval required

Old ethics approval format

Ethics approval(s)

North West - Greater Manchester Central Research Ethics Committee, 10/08/2017, ref: 17/NW /0283

Study design Randomised; Interventional; Design type: Treatment, Process of Care, Drug

Primary study design Interventional

Secondary study design Randomised controlled trial

Study setting(s) Hospital

Study type(s) Treatment

Participant information sheet

Not available in web format, please use the contact details below to request a patient information sheet

Health condition(s) or problem(s) studied

Specialty: Diabetes, Primary sub-specialty: Type 2; UKCRC code/ Disease: Metabolic and Endocrine/ Diabetes mellitus, Skin/ Other disorders of the skin and subcutaneous tissue

Interventions

This study aims to conduct a double-blind, randomised, parallel group, placebo-controlled phase II pilot trial of 35 days' duration with 400mg oral AZD4017 twice daily (n=15) or placebo (n=15) in patients with type 2 diabetes mellitus. Participants are followed up for 7 days after treatment cessation.

Taking part does affect routine diabetes treatment or access to care. The study involves 8 hospital visits. Patients receive either tablets containing the test drug or tablets which do not contain the test drug (dummy). These are given in a random way and neither patients nor the research team will know which tablets were provided until the end of the study. The tablets containing the drug AZD4017 blocks the enzyme to lower cortisol levels. AZD4017 has already been studied in human volunteers and is safe and well tolerated at the dose and duration in this study. Participants are asked to attend a short screening visit to check heart function, blood pressure and blood tests. Participants who pass screening will be enrolled into the trial. They are asked to provide two 24 hour urine samples, four blood samples and five skin biopsies (two at one visit and three at another visit). Skin biopsies are taken from the arm after numbing the area with an injection. They are smaller than a ballpoint pen lid hole, do not require stitches and will not leave a noticeable scar. Participants are also measured for skin thickness, water loss, water content and nerve function using pain-free probes. Weight, height, blood pressure, waist and hip circumference are also recorded.

Intervention Type

Drug

Phase

Phase II

Drug/device/biological/vaccine name(s)

AZD4017

Primary outcome measure

11β-HSD1 activity in skin measured by evaluating conversion of radiolabelled 11β-HSD1 substrate (cortisone) to 11β-HSD1 product (cortisol) at baseline and day 28.

Secondary outcome measures

1. Systemic 11β -HSD1 activity is measured by evaluating tetrahydrocortisol to tetrahydrocortisone urinary metabolites ratios at baseline and day 35

2. AZD4017 in plasma and skin is measured by pharmacokinetic analysis at day 28

3. Adverse Event-related participant withdrawals (safety) will be measured by reviewing patient notes at day 42

4. Clinical evaluation of biopsy site (safety) will be measured by reviewing the patient notes at days 2, 7, 28, 30, 35 and 42

5. Body mass index (safety) will be measured as body weight (in kilograms to the nearest 100 grams) divided by the square of the body height (in metres to the nearest centimetre) at baseline and day 35

6. Waist-hip ratio (safety) will be measured as waist measurement (to the nearest cm) divided by hip measurement (to the nearest cm) at baseline and day 35

7. Blood pressure (safety) will be measured systolic (maximum) pressure over diastolic (minimum) pressure at baseline, day 35 and day 42

8. Blood tests (safety) will be conducted for HbA1c, lipids (total and high density lipoprotein cholesterol and triglycerides), full blood count, liver function (alanine and aspartate aminotransferase, gamma-glutamyl transpeptidase, alkaline phosphatase, albumin and bilirubin),

estimated glomerular filtration rate, kidney function (sodium, potassium, urea and creatinine), adrenal function (testosterone and dehydroepiandrosterone sulphate) and thyroid function (thyroid stimulating hormone and free thyroxine) at baseline and days, 7, 28, 35 and 42 9. Adverse event reporting (safety) will be measured by reviewing the patient notes at baseline and days 2, 7, 28, 30, 35 and 42

10. Sudomotor nerve function (skin function) will be conducted using a Sudoscan device at baseline and day 35

11. Skin hydration (skin function) will be measured using a Corneometer CM 825 device at baseline and day 35

12. Epidermal barrier function (skin function) will be measured by evaluating trans-epidermal water loss (TEWL) using a Tewameter TM 300 device at baseline and day 35

13. Epidermal barrier integrity (skin function) will be measured by evaluating the number of D-Squame tape strips required to induce barrier disruption (TEWL of 40-50 g/h/m2) at baseline and day 28

14. Epidermal barrier recovery (skin function) will be measured by evaluating TEWL after barrier disruption at baseline and days 2, 7, 28, 30 and 35

15. Skin thickness (skin function) will be measured by Optical Coherence Tomography imaging at baseline and day 35

16. Wound healing (skin function) will be measured by Optical Coherence Tomography imaging of biopsy wounds at days 2, 7, 30 and 35

17. Skin RNA-seq gene expression profiling (skin function) will be measured by RNA extraction and Next Generation Sequencing of mRNA at baseline and day 28

18. Feasibility will be measured by evaluating eligibility, recruitment, consent, randomization, adherence, retention and data completeness captured using Logs, Informed Consent Forms, Pharmacy Records and Diary Cards at the end of the study

Overall study start date

01/09/2016

Completion date

21/05/2019

Eligibility

Key inclusion criteria

Able and willing to consent
T2DM with HbA1c ≤11% (≤97 mmol/mol) at screening while taking standard therapy at a stable dose for ≥10 weeks
Aged 18 and older

Participant type(s) Patient

Age group Adult

Lower age limit 18 Years

Sex Both

Target number of participants

Planned Sample Size: 30; UK Sample Size: 30

Total final enrolment

28

Key exclusion criteria

- 1. Women of child-bearing potential
- 2. Active leg/foot ulceration
- 3. Clinically relevant acute ECG anomalies
- 4. Uncontrolled hypertension
- 5. Endocrine disorder (other than T2DM), including type 1 or secondary diabetes (except treated hypothyroidism)
- 6.Gilbert's disease
- 7. Alanine aminotransferase and/or aspartate aminotransferase and/or alkaline phosphatase >1. 5x ULN
- 8. Bilirubin >1.5x ULN
- 9. eGFR <45 ml/min/m2
- 10. CK >2x ULN
- 11. Drug abuse within the last year
- 12. Any GC treatment within 3 months of screening
- 13. Anti-coagulant medication
- 14. Probenecid therapy
- 15. Medical/surgical procedure or trauma during IMP administration or one week after IMP
- cessation (excluding skin biopsies)
- 16. Involvement in trial planning and/or conduct
- 17. Participation in other clinical study within 1 month
- 18. Deemed inappropriate to participate by the trial team

Date of first enrolment

06/04/2018

Date of final enrolment 25/01/2019

Locations

Countries of recruitment England

United Kingdom

Study participating centre St James's University Hospital Beckett Street Leeds United Kingdom LS9 7TF **Study participating centre Chapel Allerton Hospital** Chapeltown Road Leeds United Kingdom LS7 4SA

Sponsor information

Organisation University of Leeds

Sponsor details

Worsley Building (9.29) Faculty of Medicine and Health Leeds England United Kingdom LS2 9JT +44 113 343 4897 business@leeds.ac.uk

Sponsor type University/education

Website https://www.leeds.ac.uk/info/2000/research_and_innovation

ROR https://ror.org/024mrxd33

Funder(s)

Funder type Government

Funder Name Medical Research Council

Alternative Name(s) Medical Research Council (United Kingdom), UK Medical Research Council, MRC

Funding Body Type

Government organisation

Funding Body Subtype

National government

Location United Kingdom

Results and Publications

Publication and dissemination plan

The trial protocol will be published in a medical journal in 2018. Results will be presented at scientific conferences and published in medical journals in 2019. They may also be published through third parties such as Diabetes UK. Publication of the trial protocol will be available in a peer-reviewed journal (such as Trials) by the end of 2018

Intention to publish date

21/06/2021

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a nonpublically available repository: Unblinded anonymised full Case Report Form data will be stored as an electronic spreadsheet file in the Research Data Leeds Repository Research Data Leeds repository http://archive.researchdata.leeds.ac.uk

IPD sharing plan summary

Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient- facing?
<u>Protocol (preprint)</u>	non-peer-reviewed protocol in preprint	26/03/2021	15/06 /2021	No	No
<u>Results article</u>		01/02/2022	04/02 /2022	Yes	No
<u>Protocol file</u>	version 2	24/10/2018	18/10 /2022	No	No
<u>Statistical Analysis</u> <u>Plan</u>			18/10 /2022	No	No
HRA research summary	1		28/06 /2023	No	No