

Ketogenic diets as an adjuvant therapy in glioblastoma (the KEATING trial)

Submission date 13/03/2017	Recruitment status No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
Registration date 13/03/2017	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 14/04/2021	Condition category Cancer	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

<https://www.cancerresearchuk.org/about-cancer/find-a-clinical-trial/a-study-comparing-types-of-ketogenic-diet-in-people-with-glioblastoma-keating>

Contact information

Type(s)

Public

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Scientific

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number
NCT03075514

Secondary identifying numbers
33354

Study information

Scientific Title

Ketogenic diets as an adjuvant therapy In glioblastoma: a randomised pilot study

Acronym

KEATING

Study objectives

The aim of this study is to investigate protocol feasibility and patient impact by comparing two ketogenic diets in an NHS setting, with a view to informing future phase III clinical trials.

Ethics approval required

Old ethics approval format

Ethics approval(s)

North West, Greater Manchester West Research Ethics Committee, 13/01/2017, ref: 17/NW/0013

Study design

Randomised; Interventional; Design type: Treatment, Dietary

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 to request a patient information sheet

Health condition(s) or problem(s) studied

Glioblastoma

Interventions

Added 04/01/2018:

An information study is embedded into KEATING, with the aim of identifying recruitment challenges and aid understanding of the patients' recruitment experience, by interviewing a sub-sample of patients and their relatives/ carers. This will enable the design of bespoke strategies to optimise recruitment to future trials related to ketogenic diets and gliomas.

From 31/08/2017:

Two types of ketogenic diets will be compared: the Modified Ketogenic Diet (MKD) and the Medium Chain Triglyceride (MCT) Ketogenic Diet. Patients will be randomly assigned to a diet via a permuted block randomisation method.

Both diets are high in fat and low in carbohydrates, but contain different types and amounts of fat. The MKD is 80% fat (predominantly long chain fatty acids) and 5% carbohydrate, whilst the MCT diet is 75% fat (30% of which is from medium chain fatty acids) and 10% carbohydrate. The MCT fats in this case are to be consumed through the inclusion of a nutritional supplement/drink (Betaquik, Vitaflo International Ltd). Both diets will be calculated and supervised by a dietitian.

Patients will commence the diet up to four months post surgical resection or biopsy, prior to receiving/ whilst receiving/ after receiving oncological treatments (radiotherapy, chemotherapy or chemoradiotherapy) and follow the diet for 3 months initially (primary completion). After this period if they wish to continue with the diet follow up will be offered for 12 months (secondary completion).

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Patients will commence the diet post surgery, prior to commencing chemo/radiotherapy and follow the diet for 3 months initially (primary completion). After this period if they wish to continue with the diet follow up will be offered for 12 months (secondary completion).

Intervention Type

Other

Primary outcome measure

Retention rate is measured by recording:

1. The number of patients who start randomized treatment as a proportion of the number

randomized a 12 weeks

2. The number of patients who complete 12 months as a proportion of the number randomized
3. The time to dietary discontinuation
4. A description of barriers and facilitators to data collection and participant retention

Secondary outcome measures

From 31/08/2017:

1. Recruitment rate is assessed by actual recruitment compared to proposed recruitment at 12 months
- 2.1 Enrolment of patients (consent, randomisation, baseline screening) prior to receiving oncological treatment(s) is assessed by number of patients initiated on diet prior to starting oncological treatment at 12 months
- 2.2 Enrolment of patients (consent, randomisation, baseline screening) whilst receiving oncological treatment(s) is assessed by number of patients initiated on diet whilst receiving oncological treatment at 12 months
- Enrolment of patients (consent, randomisation, baseline screening) after receiving oncological treatment(s) is assessed by number of patients initiated on diet after completing oncological treatment at 12 months
3. Long term retention is assessed by time to dietary discontinuation after week 12
4. Dietary adjustments required to achieve ketosis is assessed by number of dietary adjustments to macronutrient composition of MCT and MKD diets required to achieve ketosis at 12 months
5. Dietary compliance is assessed by a self reported by compliance rate at 2 years and Analysed by comparing macronutrient content assessed via 3 day food diaries to advised macronutrient content at 12 months
6. MCT supplement compliance is assessed by dose of MCT taken compared to dose advised at 12 months
7. Ketosis levels are assessed by self reported urinary ketone levels twice daily for first 6 weeks then once per week thereafter and blood ketone and glucose levels weekly at 12 months
8. Dietetic time required for each intervention is assessed by dietetic time spent on clinical and non clinical activities relating to the trial at 12 months
9. Protocol refinements required are assessed by number of deviations from the protocol including reasons for deviations at 12 months
10. Data to inform sample size calculations of future trials is assessed by retention rates at 12 months
11. Completeness of data for all trial outcomes is assessed by number of complete data sets for all trial outcomes at 12 months

Patient impact objectives

1. Quality of life is assessed by change in quality of life assessed through EORTC QLQ C30 and BN 20 questionnaires at baseline and 12 months
2. Food acceptability is assessed by change in food acceptability assessed through food acceptability questionnaire at baseline and 12 months
3. Gastrointestinal side effects are assessed by number of reported gastrointestinal side effects assessed through EORTC QLQ C30 questionnaire and Common Terminology Criteria for Adverse Events at baseline and 12 months
4. Changes in biochemical markers are assessed by changes to biochemical markers (renal, bone, LFT, lipid profiles) during the duration of the diet at baseline and 12 months
5. Anthropometric changes are assessed by changes to anthropometry (weight, body mass index, fat mass, muscle circumference, hand grip strength) at baseline and 12 months

Before 31/08/2017:

1. Recruitment rate is assessed by actual recruitment compared to proposed recruitment at 12 months
2. Enrolment of patients (consent, randomisation, baseline screening) pre-chemoradiation is assessed by number of patients initiated on diet prior to starting chemoradiation treatment at 12 months
3. Long term retention is assessed by time to dietary discontinuation after week 12
4. Dietary adjustments required to achieve ketosis is assessed by number of dietary adjustments to macronutrient composition of MCT and MKD diets required to achieve ketosis at 12 months
5. Dietary compliance is assessed by a self reported by compliance rate at 2 years and Analysed by comparing macronutrient content assessed via 3 day food diaries to advised macronutrient content at 12 months
6. MCT supplement compliance is assessed by dose of MCT taken compared to dose advised at 12 months
7. Ketosis levels are assessed by self reported urinary ketone levels twice daily for first 6 weeks then once per week thereafter and blood ketone and glucose levels weekly at 12 months
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Patient impact objectives

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Overall study start date

01/07/2016

Completion date

05/03/2019

Eligibility

Key inclusion criteria

From 31/08/2017:

1. Age 16 years and over
2. Patient at The Walton Centre NHS Foundation Trust
3. Performance status ≤ 2 (Sørensen et al., 1993)

4. Confirmed histological diagnosis of GB (WHO grade IV)
5. Undergone surgical resection or biopsy within the last 4 months and will go onto receive/ is currently receiving/ has received oncological treatment

Before 31/08/2017:

1. Age 16 years and over
2. Patient at The Walton Centre NHS Foundation Trust
3. Performance status ≤ 2 (Sørensen et al., 1993)
4. Confirmed histological diagnosis of GB (WHO grade IV)
5. Undergone surgical resection and will go onto receive chemoradiotherapy

Participant type(s)

Patient

Age group

Adult

Lower age limit

16 Years

Sex

Both

Target number of participants

Planned Sample Size: 12; UK Sample Size: 12

Total final enrolment

12

Key exclusion criteria

From 31/08/2017:

1. Having prior use of a ketogenic diet
2. Kidney dysfunction
3. Liver dysfunction
4. Gall bladder dysfunction
5. Metabolic disorder
6. Eating disorder
7. Diabetes (requiring medication)
8. Body mass index (BMI) $\leq 18.5 \text{ kg/m}^2$
9. Weight loss medications
10. Currently pregnant or breastfeeding
11. Performance status ≥ 3

Before 31/08/2017:

1. Having prior use of a ketogenic diet
2. Kidney dysfunction
3. Liver dysfunction
4. Gall bladder dysfunction
5. Metabolic disorder
6. Eating disorder
7. Diabetes (requiring medication)

- 8. Body mass index (BMI) $\leq 18.5 \text{ kg/m}^2$
- 9. Weight loss medications
- 10. Pregnancy
- 11. Performance status ≥ 3

Date of first enrolment

01/04/2017

Date of final enrolment

09/02/2018

Locations

Countries of recruitment

England

United Kingdom

Study participating centre

The Walton Centre NHS Foundation Trust

Lower Lane

Liverpool

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Sponsor information

Organisation

University of Liverpool

Sponsor details

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Sponsor type

University/education

ROR

Funder(s)

Funder type

Industry

Funder Name

Vitaflo

Alternative Name(s)

Funding Body Type

Private sector organisation

Funding Body Subtype

For-profit companies (industry)

Location

United Kingdom

Results and Publications

Publication and dissemination plan

The trial will be undertaken as part of a PhD programme at the University of Liverpool. Completion of a thesis is proposed for July 2019. Results of the trial will be published as soon as possible, in an appropriate peer reviewed journal and presented at appropriate conferences. The financial sponsor Vitaflo International Ltd will be acknowledged, however they will have no part in conducting or analysing the trial. A newsletter detailing the findings of the trial will be circulated to patients.

Intention to publish date

05/03/2020

Individual participant data (IPD) sharing plan

The current data sharing plans for the current study are unknown and will be made available at a later date.

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article	protocol	28/11/2017		Yes	No
	results				

Results article	01/03/2020	18/03/2020	Yes	No
Plain English results		14/04/2021	No	Yes
HRA research summary		28/06/2023	No	No