

18-Fluorothymidine positron emission tomography (18-FLT PET/CT) to assess tumour proliferation during radical radiotherapy

Submission date 27/07/2010	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
Registration date 27/07/2010	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
Last Edited 22/09/2017	Condition category Cancer	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

<http://cancerhelp.cancerresearchuk.org/trials/a-study-using-PET-CT-scan-look-at-changes-in-cancer-cells-during-radiotherapy>

Contact information

Type(s)

Scientific

Contact name

Dr Anastasia Chalkidou

Contact details

The Rayne Institute
4th Floor Lambeth Wing
St Thomas Hospital
London
United Kingdom
SE1 7EH

-
Anastasia.Chalkidou@kcl.ac.uk

Additional identifiers

Protocol serial number

8495

Study information

Scientific Title

Research study of 18-FLT (18F-3'-fluoro-3-deoxy-L-thymidine) positron emission tomography (PET/CT) sequential imaging to quantify tumour proliferation during radical radiotherapy in patients with non-small cell lung cancers and head and neck cancers

Study objectives

Despite impressive advances in radiotherapy over recent years many tumours are still not cured by radical doses of radiation, partly because tumours respond to radiotherapy by growing more rapidly ('accelerated repopulation'). This makes treatment rather like running down an upward escalator. In this study an imaging technique is investigated that might help us identify whether accelerated repopulation is taking place in individual patients, when it begins, how fast it is progressing, and where in the tumour it is occurring. This could help to individualise patient treatments, both by modifying treatment schedules to minimise repopulation and by selectively raising doses delivered to rapidly repopulating tumour regions - with the aim of curing more patients using radiotherapy.

Twenty patients with either lung cancer or head and neck cancer who are being treated using radiotherapy will undergo a series of 6 positron emission tomography (PET) scans, imaging a novel thymidine-based tracer called fluoro-L-thymidine (FLT). FLT uptake measured in PET images has been found to correlate with levels of a biomarker of proliferation measured in surgical specimens, and is increasingly being investigated as a measure of tumour proliferation in cancer patients. To make the best use of the PET imaging data a set of technical processes will be established so that FLT tracer uptake per voxel can be measured accurately. These complex data will relate to the same parts of the tumour and therefore can be compared consistently across a series of scans. The sequences of PET images collected in the study will be comprehensively analysed exploring the time-course and spatial maps of tumour proliferation.

These data will enable the comparison of the effect of radiotherapy on DNA damage and provide proof of principle data on whether FLT relates to this. These data may then show how radiotherapy can be modified to minimise the scope for accelerated proliferation and target rapidly proliferating tumour regions.

Ethics approval required

Old ethics approval format

Ethics approval(s)

St Thomas REC, 12/04/2010, (ref: 10/H0802/2)

Study design

Single-centre non-randomised interventional trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Topic: National Cancer Research Network; Subtopic: Head and Neck Cancer, Lung Cancer;
Disease: non small cell lung cancer

Interventions

1. Arterial line: Arterial line placed in the radial artery by experienced Intensive Care Unit physicians. Blood tests taken from this arterial line.
2. Biopsy material: Ultrasound guided fine needle aspiration for head and neck cancer patients once during radiotherapy.
3. PET/CT scan with new tracer: PET/CT scan with FLT. From injection to end of scanning is about 75 minutes. Undertaken by fully trained PET centre staff.
4. Radiotherapy mask: Radiotherapy mask will be used in head and neck patients to position the patient for the scanning.
5. Venepuncture: Blood test during each PET scan.

Follow-up length: 3 months

Study entry: registration only

Intervention Type

Other

Phase

Not Applicable

Primary outcome(s)

Stability of tumour FLT spatial uptake pattern throughout treatment, measured during treatment and 3 months afterwards.

Key secondary outcome(s)

1. Average time-course of overall tumour FLT uptake
2. Patient-to-patient differences in FLT uptake time-course
3. Characterisation of typical spatial pattern of tumour FLT uptake
4. Patient-to-patient variability in tumour FLT spatial uptake patterns
5. Relationships between CK-18Asp396 levels in blood and changes in tumour FLT uptake between scans
6. Comparison of FLT kinetics with SUV values

All the secondary outcomes will be measured at baseline, during radiotherapy and at 3 months follow up.

Completion date

31/01/2012

Eligibility

Key inclusion criteria

1. About to undergo radical radiotherapy for one of the following:
 - 1.1. Non-small cell lung cancer with staging between I - III and either the primary tumour or an involved lymph node being greater than 3 cm in maximum dimension
 - 1.2. Squamous cell carcinoma of the head and neck region with staging between II - IVA and either the primary tumour or an involved lymph node being greater than 3 cm in maximum dimension
2. Over 18 years of age, either sex

3. Able to understand consent form
4. Fit for extra inconvenience of longer stays in hospital on days of scans
5. Receiving chemotherapy concurrently with radiotherapy

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 years

Sex

All

Key exclusion criteria

1. Patient unfit to attend extra scanning visits
2. Tumour criteria not met
3. Clotting disorder for head and neck group
4. Severe claustrophobia or inability to tolerate PET/CT
5. Unable to provide written consent
6. Pregnant or breastfeeding women
7. Subjects taking nucleoside analog medications such as those used as antiretroviral agents

Date of first enrolment

17/06/2010

Date of final enrolment

31/01/2012

Locations**Countries of recruitment**

United Kingdom

England

Study participating centre

The Rayne Institute

London

United Kingdom

SE1 7EH

Sponsor information

Organisation

Guy's and St. Thomas' NHS Foundation Trust (UK)

ROR

<https://ror.org/00j161312>

Funder(s)

Funder type

Charity

Funder Name

Cancer Research UK (CRUK) (UK)

Alternative Name(s)

CR_UK, Cancer Research UK - London, Cancer Research UK (CRUK), CRUK

Funding Body Type

Private sector organisation

Funding Body Subtype

Other non-profit organizations

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/04/2014		Yes	No