11C-erlotinib brain uptake in Diffuse Intrinsic Pontine Glioma imaged by PET

Published: 26-02-2018
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Primary objective:Non-invasively determining the 11C-erlotinib brain uptake in DIPG patients by PET imaging.Secondary objective:Determining the EGFR expression in DIPG

Ethical review	Approved WMO
Status	Pending
Health condition type	Nervous system neoplasms malignant and unspecified NEC
Study type	Observational invasive

Summary

ID

NL-OMON47863

Source
ToetsingOnline

Brief title
11C-erlotinib PET in DIPG

Condition

- Nervous system neoplasms malignant and unspecified NEC
- Nervous system neoplasms malignant and unspecified NEC

Synonym
brainstem glioma, brainstem tumor

Research involving
Human

Sponsors and support

Primary sponsor: Vrije Universiteit Medisch Centrum
Source(s) of monetary or material Support: Stichting Semmy / VONK

Intervention

Keyword: DIPG, Erlotinib, PET

Outcome measures

Primary outcome

Non-invasively determining the 11C-erlotinib brain and tumor uptake in DIPG

patients by PET imaging.

Secondary outcome

Determining the EGFR expression in DIPG.

Study description

Background summary

Diffuse Intrinsic Pontine Glioma (DIPG) has an extremely poor prognoses and is one of the main causes of cancer death in children. Previous studies demonstrated that the Epithelial Growth Factor Receptor (EGFR) is overexpressed in a significant subset of DIPG patients. EGFR promotes tumor growth and invasion. Erlotinib targets this overexpression as a small-molecule EGFR-TKI and has been consistently demonstrated as a safe and well-tolerated therapy in pediatric glioma patients. Without compromising its structural integrity, erlotinib can be radiolabeled with carbon-11 (11C). 11C imaging has been safely and successfully used in previous imaging studies to identify treatment-sensitive cancers. In this study erlotinib is microdosed, resulting in no systemic side effects. The PET imaging coudl demonstrate whether or not some tumors actually show drug uptake. This would allow more individualized efficacy studies, selecting only patients with drug uptake in their tumor, preventing (continuation of) treatment of patients that do not show uptake.

Study objective

Primary objective:
Non-invasively determining the 11C-erlotinib brain uptake in DIPG patients by PET imaging.

Secondary objective:
Determining the EGFR expression in DIPG

Study design

This is a single center, non-randomized, open label drug imaging study. Patients receive 10 ml of 11C-erlotinib; 370 MBq/16,2 µg IV at least 2 weeks after the start of erlotinib therapy. A PET-scan will be performed 40 minutes post-injection (p.i). The PET scan will be preceded by a low-dose CT. Following the CT, a 20 min static PET scan will be performed covering the brain. Directly before and after a PET-CT scan is made, a venous blood sample is taken.

Intervention

IV infusion of 11C-erlotinib, once

Study burden and risks

Risks:
This is an imaging study in patients with a very poor prognosis. Labelled erlotinib, used as a tracer, is administered in a microdose of 16,2 µg (therapeutic dose 85-125 mg/m2). Therefore, no adverse events of erlotinib are expected.
All patients will be or have been irradiated, usually with a total dose of 54 Gy. Patients receive a total dose of 370 MBq/16,2 µg 11C-erlotinib, which results in an expected radiation dose of 2 mSv. An additional 1,5 mSv will be added by the low dose CT scans for the PET/CT examination. The total radiation burden of the brain PET/CT examinations will be 3,5 mSv. The radiation burden added by this study is therefore, negligible.

Burden:
All participants receive two IV cannula and undergo one brain PET scan. Therefore, they have to lay down quietly for 30 minutes. No anesthesia will be used. Our standardized training program enables children from four years and older to undergo MRI without major problems. An advantage of PET is that the quality of the images are less influenced by small movements compared to MRI. We are certainly aware of the burden, but in our opinion, the scientific value of this project outweighs this concern, because response prediction in patients may lead to effective personalized cancer treatment and helps to avoid the administration of inactive drugs and the accompanying side effects in the future. With regard to the latter, we propose that the burden of this study outweighs the unnecessary (and much higher) burden of patients treated with ineffective drugs. PET-erlotinib studies have not been applied in children with DIPG yet: these studies are necessary since biology including receptor kinase expression clearly differs from adult gliomas.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Adolescents (16-17 years)
Adults (18-64 years)
Children (2-11 years)
Elderly (65 years and older)

Inclusion criteria

- Patients with MRI confirmed DIPG
- Erlotinib use for at least 2 week
- Age between 6 years and 19 years
- Able to lay down quietly for 20 minutes

Exclusion criteria

- Known hypersensitivity for erlotinib

- Pregnancy
- Clinically confirmed neurofibromatosis type I

Study design

Design

Study type: Observational invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Diagnostic

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-12-2017
Enrollment:	10
Type:	Anticipated

Medical products/devices used

Product type:	Medicine
Brand name:	[11C]-Erlotinib
Generic name:	[11C]-Erlotinib

Ethics review

Approved WMO Date:	26-02-2018
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO Date:	04-05-2018
Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
EudraCT	EUCTR2017-003860-11-NL
CCMO	NL60690.029.17