Multimodal image-guided resection of IDH-wildtype glioblastoma and grade IV IDH-mutant astrocytoma

Published: 22-12-2023
Last updated: 02-12-2024

In this project we aim to develop a safe and effective technique for ADC/FET-guided resection of IDH-wildtype glioblastoma and grade IV IDH-mutant astrocytoma. The safety concerns neurological deficits and time to start of adjuvant therapy, while...

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Nervous system neoplasms malignant and unspecified NEC
Study type	Interventional

Summary

ID

NL-OMON56595

Source
ToetsingOnline

Brief title
Next FRONTIER

Condition

- Nervous system neoplasms malignant and unspecified NEC
- Nervous system neoplasms malignant and unspecified NEC
- Nervous system, skull and spine therapeutic procedures

Synonym
brain tumor, glioblastoma

Research involving
Human

Sponsors and support

Primary sponsor: Amsterdam UMC

Source(s) of monetary or material Support: CCA grant

Intervention

Keyword: ADC, FET PET, glioblastoma, Supramarginal resection

Outcome measures

Primary outcome

The main study endpoint is the optimization of ADC/FET-guided resection.

Volumetric and percentual extent of resection, as measured with MRI and PET imaging, combined with surgery-induced morbidity will be used as outcome parameters.

Secondary outcome

The secondary study parameters will be the histopathology-based diagnostic accuracy of APT-CEST MRI in comparison with FET PET, cognitive performance over time and progression free survival.

Study description

Background summary

Patients with IDH-wildtype glioblastoma or gade IV IDH-mutant astrocytoma have a very poor prognosis despite standard treatment consisting of surgery, radiotherapy, and chemotherapy. Diffuse infiltration of the brain by the tumor is thought to be one of the main causes of this therapy-resistance. In order to improve the surgical treatment, tumor regions with lower infiltration percentages need to be identified and resected during surgery, a so-called supramarginal resection. Currently, pre-operative T1 contrast enhanced weighted (T1c) MRI is used to identify the tumor for resection. We recently found the combination of apparent diffusion coefficient MRI and O-(2-[18F]fluoroethyl-)-L-tyrosine positron emission tomography (ADC/FET) to be significantly more accurate than T1c MRI alone in the detection of tumor infiltration. This makes ADC/FET a suitable candidate to guide supramarginal resection.
Since FET PET is not as accessible and widely available as MRI, identification

of an MRI-based alternative could result in a more widespread implementation. Amide proton transfer-chemical exchange saturation transfer (APT-CEST) MRI is a novel potential alternative for FET PET, since both measures are related to protein content.

Study objective

In this project we aim to develop a safe and effective technique for ADC/FET-guided resection of IDH-wildtype glioblastoma and grade IV IDH-mutant astrocytoma. The safety concerns neurological deficits and time to start of adjuvant therapy, while the effectiveness is aimed at the extent of resection. Our secondary aim is to evaluate the diagnostic accuracy of APT-CEST MRI and to assess whether APT-CEST MRI can serve as an alternative for FET PET for the detection of tumor infiltration.

Study design

Prospective observational intervention study

Intervention

Supramarginal resection will be guided by ADC/FET. To make sure that the standard treatment is always guaranteed, T1c MRI abnormalities will be included in the surgical target.

Study burden and risks

Participants will undergo a pre- and postoperative MRI. This is also part of regular clinical care, except there are additional MRI sequences in the preoperative MRI including APT-CEST. There are no risks associated with MRI acquisition after MRI safety screening. Participants will furthermore undergo a pre- and postoperative FET PET. The risks associated with PET scanning are limited, and the radiation burden will remain below 10 mSv (ICRP62 category intermediate risk (level IIb)). During surgery, biopsies are performed from areas that will be resected, so these biopsies will not introduce any extra risk. A potential benefit is the possibility of the removal of more tumor tissue. A potential risk is the additional removal of healthy brain tissue with the risk of neurological damage, which is controlled by pre- and intraoperative techniques such as visualization of white matter tracts and mapping (both asleep and awake) of critical functions such as language and control of strength.

Contacts

Public
Amsterdam UMC

Boelelaan 1118
Amsterdam 1081 HV
NL
Scientific
Amsterdam UMC

Boelelaan 1118
Amsterdam 1081 HV
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Age >= 18 years
- New clinical and radiological suspected diagnosis of IDH-wildtype glioblastoma or grade IV IDH-mutant astrocytoma
- Indication for a surgical resection and adjuvant treatment according to the neuro oncology multidisciplinary meeting
- Eligible for a supramarginal resection according to two neurosurgeons in consensus
- Karnofsky Performance Score (KPS) >= 70

Exclusion criteria

- Previous brain surgery or cranial radiotherapy
- Significant other brain pathology, in the opinion of the PI or designee, such as multiple sclerosis, neurodegenerative disease, stroke
- Tumor located infratentorially or in the spinal cord
- Lack of adequate social or family support needed for adherence to the further postoperative therapeutic regimen
- Pregnancy

Study design

Design

Study type: Interventional

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

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	21-05-2024
Enrollment:	30
Type:	Actual

Ethics review

Approved WMO

Date:	22-12-2023
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
CCMO	NL82806.018.22