Neurocognitive functioning and brain plasticity in high-grade glioma patients: a magnetoencephalography pilot

No registrations found.

Ethical review	Positive opinion
Status	Pending
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON23187

Source
NTR

Brief title
Cognition & brain plasticity in HGG patients

Health condition

glioblastoma multiforme (high-grade glioma)

Sponsors and support

Primary sponsor: VU University Medical Center
Source(s) of monetary or material Support: VU University Medical Center

Intervention

Outcome measures

Primary outcome

Main study parameters are neurocognitive functioning and MEG-measures (synchronization likelihood and small-world features).

Secondary outcome

Not applicable.

Study description

Background summary

Patients with localized brain tumors, such as glioblastoma multiforme, often suffer from diffuse cognitive deficits. It is difficult to understand how such a local brain lesion gives rise to non-specific, diffuse cognitive deficits. Evidence has accumulated that higher cognitive functions require functional interactions, or connectivity, between multiple distinct neural networks. An optimal neuronal network architecture is probably characterized by so-called 'small-world' characteristics, combining high local connectivity with efficient overall integration.
By using magnetoencephalography (MEG), which has proven to be an excellent way to capture the dynamics of the electromagnetic fields of the brain, we recently found that brain tumor patients not only have altered levels of synchronization throughout the brain, but also that these alterations correlate with neurocognitive functioning. It is unknown, however, to what extent remodeling of the neurosynaptic networks (i.e: cerebral plasticity), varies as a function of treatment (i.e., surgery, radiotherapy, chemotherapy) and tumor recurrence.
Using prospective cognitive data and MEG recordings of ten newly diagnosed glioblastoma multiforme patients and ten glioblastoma multiforme patients with tumor recurrence we will investigate 1) the impact of tumor- and treatment-related factors on functional connectivity and neural network features, and 2) the correlation between changes in these measures and cognitive function.
If such treatment- and/or tumor-related cerebral plasticity and its correlation with cognition can be established in this pilot, future prospective studies will focus in more detail on 1) the effects of different treatment modalities (e.g. less or more extensive surgery, radiotherapy) and 2) the contribution of tumor-related symptoms (e.g. epilepsy) and their treatment (e.g. anti-epileptic drugs) on neural network function and cognition. This knowledge will eventually assist in the guidance of clinical decision-making in these patients.

Study objective

We hypothesize that a relationship is present between functional connectivity, network features and neurocognitive performance in GBM patients. We also expect treatment and recurrence of the tumor to lead to remodeling of the neuronosynaptic maps and network

features (i.e. plasticity), and hypothesize that these dynamic changes correlate with improvements of cognition.

Intervention

Not applicable.

Contacts

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Eligibility criteria

Inclusion criteria

For newly diagnosed patients:
1. Adult (> 18 years),
2. Radiologically suspected GBM prior to surgery,
3. histologically confirmed GBM after surgery,
4. treatment consisting of surgery followed by combined radiotherapy and chemotherapy,
5. written informed consent.
For patients with GBM recurrence:
1. adult (> 18 years),
2. histologically confirmed GBM,
3. treatment consisting of surgery followed by chemotherapy,
4. written informed consent.

For matched healthy controls:
1. adult (> 18 years),
2. written informed consent.

Exclusion criteria

For patient groups:
1.use of centrally acting drugs, including corticosteroids, other than antiepileptic drugs,
2. psychiatric disease or symptoms,
3. insufficient mastery of the Dutch language,
4. inability to communicate adequately.
For controls:
1. use of centrally acting drugs (including analgetics),
2. psychiatric disease or symptoms,
3. disorders of the central nervous system, 4. insufficient mastery of the Dutch language.

Study design

Design

Study type:	Interventional
Intervention model:	Other

Control: Active

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-09-2007
Enrollment:	40
Type:	Anticipated

Ethics review

Positive opinion

Date:	05-07-2007

Application type: First submission

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
NTR-new	NL988
NTR-old	NTR1016
Other	: NWOpilot01
ISRCTN	ISRCTN73594603

Study results