# EUROPEAN STUDY OF THE CEREBELLAR MUTISM SYNDROME (CMS) IN CHILDREN WITH BRAIN TUMOURS OF THE POSTERIOR FOSSA

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The purposes of this study are to uncover1. Which surgical methods are least likely to cause the CMS and if there is a difference in risk between primary surgery andreoperation2. Which patients may be genetically predisposed to developing the CMS 3...

**Ethical review** Approved WMO **Status** Recruiting

Health condition type Nervous system neoplasms malignant and unspecified NEC

**Study type** Observational invasive

## **Summary**

#### ID

NL-OMON53502

#### Source

ToetsingOnline

#### **Brief title**

European CMS Study

#### **Condition**

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

#### **Synonym**

Cerebellar Mutism Syndrome, unable to speak after brain surgery

#### Research involving

Human

### Sponsors and support

**Primary sponsor:** University of Copenhagen - Rigshospitalet - Department of Clinical

Medicine

Source(s) of monetary or material Support: Ministerie van OC&W

#### Intervention

**Keyword:** cerebellum, mutism, neurosurgery, posterior fossa

#### **Outcome measures**

#### **Primary outcome**

To explore the relationship between different surgical methods for the removal of posterior fossa tumours, and relate these to the incidence and clinical course of the CMS (prospective observational study). Hypothesis: Methods that spare the dentate nuclei and their efferents and focus on minimally traumatic techniques lower the risk of developing the CMS by 50%, and lessen its severity and duration by 40% when compared to more invasive tumour removal methods. The risk of getting the CMS is greater after reoperation(s) when compared to primary surgery.

#### **Secondary outcome**

Genetics

To analyze the role of genomic variants on the development, severity and recovery from the CMS by carrying out a broad genetic profiling of the study participants (SNP analysis). Hypothesis: Genetic variants in inflammation, vascularization, neuronal tissues, neurotransmitters, neurotransmitter transporters, blood-brain-barrier tissues and/or lipoproteins explain at least

50% of the variation in incidence of CMS and explain at least 40% of the

2 - EUROPEAN STUDY OF THE CEREBELLAR MUTISM SYNDROME (CMS) IN CHILDREN WITH BRAIN TU ...

variation in severity, duration and level of recovery from the CMS in those instances where tumour type, size, location and the surgical approach are similar.

#### Corticosteroids

To explore the effect that pre, intra and/or postoperative corticosteroids may have on the risk and severity of the CMS (prospective observational study). Hypothesis: Preoperative corticosteroids have a protective effect against the development of the CMS as they reduce vasogenic (tumour induced) cerebral oedema and thereby ICP. Intraoperative corticosteroids increase the risk of getting the CMS as the hyperglycaemia that they induce can cause acute neurological injury. Postoperative corticosteroids have a negative effect on the overall outcome of the CMS as earlier studies have shown a negative effect on the treatment of traumatic head injuries.

#### Other treatments

To investigate the effect of chemo and radiotherapy on recovery from CMS.

Additionally information will be gathered on any medication specifically given to treat the symptoms of the CMS, with the aim of documenting what helps and does not help (prospective observational study). Hypothesis: Chemo and radiotherapy delay recovery from CMS.

#### Tumour type

(prospective observational study). Hypothesis: The risk of CMS depends on tumour type.

#### Handedness

To determine whether the risk of the CMS varies according to handedness (prospective observational study). Hypothesis: The risk of CMS is increased in lefthanded compared to righthanded and even more so in cases of medulloblastomas.

#### Comorbidities

To determine whether the presence of any comorbidities influences the risk of the CMS (prospective observational study). Hypothesis: The risk of CMS is increased in patients suffering from chronic comorbidities such as NF1, diabetes, heart diseases etc.

#### Language and speech

To analyze the speech and language deficits associated with CMS on shortas well as longterm basis, and to explore how preoperative language status affects the risk of developing CMS. Both have been done before, although in significantly smaller cohorts (prospective observational study). Hypothesis: Poor preoperative speech and language status increases the risk of postoperative speech and language deficits. The degree and type of impairment also depends on other patient and tumour variables.

#### Neuroradiology

To replicate and further extend the association between certain neuroradiographic features and development of the CMS established by previous studies (prospective observational study). Hypothesis: Different neuroradiographic features carry different risks for the development and progress of CMS.

# **Study description**

#### **Background summary**

Central nervous system (CNS) tumours constitute 25% of all childhood cancers, and more than half of these are located in

the cerebellum. One of the most troublesome late effects after operation for such a tumour is the cerebellar mutism syndrome

(CMS) which is seen in up to 25% of children after surgery. It is characterized by mutism, hypotonia, ataxia and irritability, and

the exact causes have yet to be identified.

Although a cure may have been achieved with respect to their brain tumour, the CMS and its consequences can still

represent a lifelong challenge for these children. Since roughly half of all paediatric brain tumours reside in the posterior

fossa and require operative removal, the CMS constitutes both a common and severe problem in paediatric neurooncology.

## **Study objective**

The purposes of this study are to uncover

- 1. Which surgical methods are least likely to cause the CMS and if there is a difference in risk between primary surgery and reoperation
- 2. Which patients may be genetically predisposed to developing the CMS 3. The effect that corticosteroids may

have on the development and clinical course of the syndrome 4. Differences in incidence and clinical course of the CMS

according to tumour type, comorbidities, handedness, the effect of attempted symptomatic medication and chemoand radiotherapy

We hope that the results will contribute to an overall reduction in incidence

5 - EUROPEAN STUDY OF THE CEREBELLAR MUTISM SYNDROME (CMS) IN CHILDREN WITH BRAIN TU ...

and severity of the CMS as well as increasing understanding and awareness of the syndrome. Furthermore, this study can lead to harmonization of the treatment of these patients.

#### Study design

Multicenter prospective observational cohort study

#### Study burden and risks

Patients participating in the study will be treated according to the local standards. Additionally, we will take preand postoperative speech samples that take about 10 minutes each. We will also ask for one extra blood sample of 2 cc for genetic analysis, that can be taken at any time point during the study (for example, along with other routine blood samples). Participating in the study will not impact or interfere with the child\*s treatment plan and the child will not be exposed to any additional risks or disadvantages by participating in this study except for the blood sample which carries minimal risks and discomfort.

CMS is almost exclusively seen in children. Very few cases of CMS in adults can be found in the literature, and thus it would not be possible to perform this study in an adult population.

Besides contributing to an increased understanding and awareness of the CMS this study has the direct prospect of reducing both the incidence and the severity of the syndrome, which would be a great advantage for other children with CMS.

## **Contacts**

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## **Trial sites**

#### **Listed location countries**

**Netherlands** 

# **Eligibility criteria**

#### Age

Adolescents (12-15 years)
Adolescents (16-17 years)
Children (2-11 years)
Babies and toddlers (28 days-23 months)
Newborns

#### Inclusion criteria

- Age <18 years at the date of first imaging showing this tumour
- Tumour in the cerebellum/4th ventricle/brainstem with intention to treat with surgical resection or open biopsy. Second and further surgeries are also included.
- Signed Informed consent from custodial parent(s) and/or patient

#### **Exclusion criteria**

No informed consent

# Study design

## **Design**

Study type: Observational invasive

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Diagnostic

#### Recruitment

NL

Recruitment status: Recruiting
Start date (anticipated): 14-08-2023

Enrollment: 140

Type: Actual

## Medical products/devices used

Registration: No

## **Ethics review**

Approved WMO

Date: 24-03-2023

Application type: First submission

Review commission: METC NedMec

Approved WMO

Date: 07-03-2024

Application type: Amendment

Review commission: METC NedMec

# **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

ClinicalTrials.gov CCMO ID

NCT02300766 NL81967.041.22