

Axonal misrouting in obstetric brachial plexus lesions

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The objective of this research is to find out to what extent a correlation exists between axonal misrouting, the extent of the injury and the associated functional recovery.

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Congenital and peripartum neurological conditions
Study type	Observational non invasive

Summary

ID

NL-OMON33209

Source

ToetsingOnline

Brief title

Axonal misrouting OBPL

Condition

- Congenital and peripartum neurological conditions

Synonym

Erb's palsy, OBPL

Research involving

Human

Sponsors and support

Primary sponsor: Leids Universitair Medisch Centrum

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

Intervention

Keyword: axonal misrouting, EMG, OBPL

Outcome measures

Primary outcome

In Experiment 1:

CMAP (compound muscle action potential) amplitudes

arm function and more specifically muscle strength (MRC (Medical Research Council) scale).

In Experiment 2:

presence or absence of CMAP or SNAP (sensory nerve action potential)

Secondary outcome

not applicable

Study description

Background summary

Obstetric Brachial Plexus Lesion (OBPL) is injury of the nervous network in the shoulder acquired during labour. This network connects the brain with the arm and the degree of damage to sensation and muscle strength varies. The current practice dictates the neurosurgeon to decide whether surgery is necessary based on the extent of the injury. The necessity for operation and the exact moment are yet to be elucidated. This is based on the complexity of this type of nervous injury. Each projection of a neural cell in the arm has different layers that can be damaged. In the case where all the layers are damaged, a neurosurgical intervention can contribute to the recovery of as many connections as possible. In the case that some layers are spared, the injury can recover spontaneously in general and operation is not needed. Unfortunately these different degrees of damage are difficult to distinguish initially because in all cases the neural signal is not passed on. The operation includes the removal of the damaged part of nervous tissue and reconnection by placing a healthy piece of nerve extracted from the lower leg in its place. This makes it quite important to know who can benefit from the operation and who can suffer damage by it.

The occurring misrouting of the neural projections can be observed as so called 'co-contractions', which means that the function of different muscles is irreversibly linked. For example the flexion of the elbow can be linked to the

extension, which can be inconvenient for daily activities. We would like to have a better understanding of this phenomenon. Also in the future this research can lead to the earlier assessment of the extent of the injury. We believe that the more erroneous projections are present, the more extensive the injury must have been.

Study objective

The objective of this research is to find out to what extent a correlation exists between axonal misrouting, the extent of the injury and the associated functional recovery.

Study design

First the current state is determined for the 30 unoperated adults with Erb's palsy. For this purpose the freedom of movement is measured in the shoulder and elbow and with a few simple tests the strength of a number of muscles is determined.

The rest of the research consists of two parts. In the first part during stimulation of the biceps the maximum co-contraction of two other muscles will be measured. The best place for stimulation will be determined first. Axonal misrouting is the very reason why this is not easy to find. The places to measure are the triceps, the extensor of the elbow and deltoid muscle, which elevates the arm above shoulder level.

In the second part measurements are made in ten muscles simultaneously using adhesive electrodes to find out if neural projections have branched in those muscles. This is achieved applying successively a single stimulus to each of the ten muscles and ten (sensory) nerves. This is followed by measuring the activity in ten (sensory) nerves during successive stimulation of three sensory nerves.

The same is also done with 30 controls.

Study burden and risks

Stimuli can cause an inconvenient feeling but are very safe considering the many years of experience with EMG. We do not expect any intense stimuli.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

Patients:

Obstetric brachial plexus lesion

Exclusion criteria

Patients and controls:

No other disorder affecting the EMG signal recordings at the following levels:

- muscles (example: polymyositis)
- neuro-muscular (example: myasthenia gravis)
- peripheral nerves (example: advanced DM)
- CNS (example: CVA)

Patients:

Neurosurgical reconstruction

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	18-03-2009
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO	
Date:	25-02-2009
Application type:	First submission
Review commission:	METC Leids Universitair Medisch Centrum (Leiden)

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

CCMO

ID

NL26621.058.09