ISRCTN36655259 https://doi.org/10.1186/ISRCTN36655259

Epidural spinal cord electrical stimulation frequency study in a group of patients with complex regional pain syndrome

Submission date
04/11/2011

Recruitment status
No longer recruiting

Registration date
01/03/2012

Overall study status
Completed

Last Edited
02/09/2022

Condition category
Musculoskeletal Diseases

[_] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Complex regional pain syndrome (CRPS) is a condition is which a person has a chronic burning pain in one of his/her limbs. It is a disabling condition with a clear psychosocial impact. For some patients, no conventional therapy works and spinal cord stimulation can be an option. Spinal cord stimulation does not always work either for all patients, and when it is successful the positive effect eventually decreases in time. The aim of this study is to compare the effects of four different ESES (Epidural Spinal Cord Electrical Stimulation) stimulation frequencies and placebo (dummy).

Who can participate?
Patients with CRPS who do not react to conventional therapy. Both new ESES implantations and re-implantations can join the study group.

What does the study involve?
Patients will be recruited by the participating anesthesiologists, from their own patient population and from referred patients. Eligible patients will receive the patient information form (with an answering card attached. The patients have two weeks to reconsider. When patients respond with the answering card an appointment will be made to start the study. The ESES implantation is a standard intervention for this indication. What is new in this study is that the patients will receive 4 active frequencies and a placebo (dummy) treatment. This participation in the study will mean that patients will have to travel to the Erasmus Medical Center in Rotterdam for 3 measurement days. Those measurements will take 6 hours every day. Patients will carry the Upper Limb Activity Monitor during 24 hours. There will be 10 visits to the hospital where the ESES was implanted, in order to have the frequency settings changed, most of which will be combined with regular control visits.

What are the possible benefits and risks of participating?
As the ESES implantation is a standard intervention, only the risks and benefits from the different frequencies should be taken into account. There are no risks associated with the testing of these frequencies. Patients may be inconvenienced by the number of hospital visits,

the questionnaires and the measurements. The benefits include the fact that, as several frequencies are tested, the patients have the opportunity to choose the best one. Patients can leave the study at any time for any reason if they wish to do so without any consequences. The investigator can decide to withdraw a subject from the study for urgent medical reasons. Patients who leave the study will be asked to participate in the follow up meetings, but can decline.

Where is the study run from?
This study is currently taking place at the following medical centres and will continue up until 2014:
1. Erasmus Medical Centre Rotterdam (main location)
2. Amphia Ziekenhuis Breda
3. Albert Schweitzer Ziekenhuis Sliedrecht
4. Isala Klinieken Zwolle
5. Gelre Ziekenhuizen Apeldoorn

When is the study starting and how long is it expected to run for?
August 2011 to March 2015

Who is funding the study?
The Erasmus Medical Centre, Rotterdam (Netherlands)

Who is the main contact?
Dr J.G. Groeneweg
j.groeneweg@erasmusmc.nl

Contact information

Type(s)
Scientific

Contact name
Prof Frank Huygen

Contact details
Erasmus Medical Center
University of Rotterdam
Centrumlocatie
T.A.V. Centrum voor Pijngeneeskunde
Gravendijkwal 230
Rotterdam
Netherlands
3015 CE
-
f.huygen@erasmusmc.nl

Additional identifiers

Protocol serial number
NL34915.078.10

Study information

Scientific Title
Epidural spinal cord electrical stimulation frequency study: the effect of high frequency spinal cord stimulation n patients with complex regional pain syndrome using outcome parameters such as pain, global perceived effect, functional status and health-related quality of life

Study objectives
Complex Regional Pain Syndrome (CRPS) has an estimated incidence of 26.2 per 100,000 person years (95% CI: 23.0-29.7). CRPS most often occurs in the upper extremities. A fracture is the most common initial event. Women get CRPS 3.4 times more often than men. The highest incidence occurs in women in the age range 61 to 70 years (de Mos, de Bruijn et al. 2007). Complex Regional Pain Syndrome is a disabling disease with a clear psychosocial impact. There is a significant loss of functionality and quality of life. The natural course of the disease is not always favorable. A part of the patients is not responsive on any conventional therapy at all. In these cases there is an indication for spinal cord stimulation. Also this therapy is not responsive in all the selected patients. Besides, in a part of the successful stimulated patients, the positive effect is diminishing in time.

The aim of this study is to compare the effects of four different Epidural Spinal Cord Electrical Stimulation (ESES) stimulation frequencies and placebo, in a group of patients with CRPS on pain, global perceived effect, functional status and health-related quality of life.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Medisch Ethische Toetsings Commissie, ref: NL34915.078.10
2. Erasmus MC Internal Ethics Board, 16/03/2011, ref: MEC-2011-012

Study design
Multicentre double-blinded randomised controlled crossover study

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Complex Regional Pain Syndrome (CRPS) I & II

Interventions
The test stimulation device will be implanted according to the guidelines of the Dutch Neuromodulation Society.

If patients report a 50% reduction of pain during the 1-2 weeks test period, a definitive ESES will be implanted. After the definitive implantation all patients have a 3 month recovery period,

during which the ESES gives optimal comfortable stimulation. The intervention consists of the testing of several ESES stimulation frequencies (1: frequency 40 Hz 2: frequency 500 Hz; 3: frequency 1200 Hz, and 4: Burst frequency) and placebo: no stimulation.

Every test period will last 2 weeks, and except for the first one will be preceded by a 1 week wash-out period, where no stimulation takes place. At the end of each test period a small assessment (k1-5) will be performed, as described under 'assessments'. After the last frequency program there will be a period of 3 months stimulation with one of the five frequencies, as chosen by the patient, which will be followed by a large assessment (G1) to determine the short time follow up results.

Long time follow-up results will be measured in a large assessment (G2) after 9 months stimulation with one of the five frequencies, chosen by the patient. During the whole period of 3 and 9 months follow up, patients are allowed to change there frequency. This will be recorded.

Intervention Type
Device

Primary outcome(s)
1. Patient satisfaction/global perceived effect
2. Pain (VAS score)
3. McGill Pain Questionnaire DLV

Key secondary outcome(s))
1. The medical history will include recording of CRPS specific items:
1.1. Hyperesthesia
1.2. Temperature asymmetry and/or skin colour changes and/or asymmetry
1.3. Oedema and/or sweating changes or sweating asymmetry
1.4. Dysfunction (weakness, tremor, dystonia)
2. Quantitative Sensory Testing will be performed

Completion date
01/03/2015

Eligibility

Key inclusion criteria
1. Age more than or equal to 18
2. Mean pain intensity of a least 5, measured on a Visual Analogue Scale 0-10 (VAS)
3. Duration of CRPS and pain longer than 12 months
4. No lasting success or too much complication with conventional therapy including medication, according to the Dutch CRPS Guideline

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group

Adult

Lower age limit
18 years

Sex
All

Key exclusion criteria
1. Anticoagulant drug therapy or disturbed coagulation
2. Age < 18 years
3. Pregnancy
4. Implantable cardioverter defibrillators (ICD) and pacemaker
5. Life expectancy < 1 year
6. Lack of cooperation of the patient
7. Drugs/medication/alcohol addiction
8. Immune-compromised patients

Date of first enrolment
08/08/2011

Date of final enrolment
01/03/2015

Locations

Countries of recruitment
Netherlands

Study participating centre
Erasmus Medical Center
Netherlands
-

Study participating centre
Amphia Ziekenhuis Breda
Netherlands
-

Study participating centre
Albert Schweitzer Ziekenhuis Sliedrecht
Netherlands
-

Study participating centre
Isala Klinieken Zwolle
Netherlands
-

Study participating centre
Gelre Ziekenhuizen Apeldoorn
Netherlands
-

Sponsor information

Organisation
Erasmus Medical Centre (Netherlands)

ROR
https://ror.org/018906e22

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Erasmus Medisch Centrum

Alternative Name(s)
Erasmus Medical Center, Erasmus MC, Erasmus Universitair Medisch Centrum, Erasmus University Medical Center, Universitair Medisch Centrum Rotterdam, Erasmus Universitair Medisch Centrum Rotterdam, EMC

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
Netherlands

Results and Publications

Individual participant data (IPD) sharing plan
Not provided at time of registration

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/03/2017		Yes	No
Results article		29/08/2022	02/09/2022	Yes	No
Protocol article	protocol	25/08/2015		Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes