Functional lesional neurosurgery for tremor—a protocol for a systematic review and meta-analysis

Sebastian R Schreglmann, Joachim K Krauss, Jin Woo Chang, Kailash P Bhatia & Georg Kägi

INTRODUCTION
The recent introduction of incision-less lesional neurosurgery using Gamma Knife and MRI-guided focused ultrasound has revived interest in lesional treatment options for tremor disorders. Preliminary literature researches reveal that the consistency of treatment effects after lesional neurosurgery for tremor has not formally been assessed yet. Similarly, the efficacy of different targets for lesional treatment and incidence of persistent side effects of lesional neurosurgical interventions has not been comprehensively assessed. This work therefore aims to describe a suitable process how to review the existing literature on efficacy and persistent side effects of lesional neurosurgical treatment for tremor due to Parkinson's disease, essential tremor, multiple sclerosis and midbrain/rubral tremor.

METHODS AND ANALYSIS
We will search electronic databases (Medline, Cochrane) and reference lists of included articles for studies reporting lesional interventions for tremor in cohorts homogeneous for tremor aetiology and intervention (technique and target). We will include cohorts with a minimum number of five subjects and follow-up of 2 months. One investigator will perform the initial literature search and two investigators then independently decide which references to include for final efficacy and safety analysis. After settling of disagreement, data will be extracted from articles using a standardised template. We will perform a random-effect meta-analysis calculating standardised mean differences (Hedge's g) for comparison in Forest plots and subgroup analysis after assessment of heterogeneity using I(2) statistics.

ETHICS AND DISSEMINATION
This study will summarise the available evidence on the efficacy of lesional interventions for the most frequent tremor disorders, as well as for the incidence rate of persisting side effects after unilateral lesional treatment. This data will be useful to guide future work on incision-less lesional interventions for tremor.
SYSTEMATIC REVIEW REGISTRATION
This study has been registered with the PROSPERO database (no. CRD42016048049).

**type**
journal paper/review (English)

**date of publishing**
09-05-2017

**journal title**
BMJ Open (7/5)

**ISSN electronic**
2044-6055

**pages**
e015409