OVERVIEW OF DEEP BRAIN STIMULATION (DBS), CURRENT INDICATIONS, PATIENT SELECTION, BASICS OF SURGERY

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Overview of DBS- historical background

- Early and more recent history

Current FDA approved Movement Disorder Indications

- Essential Tremor:
  - 1997: Tremor in the upper extremity in patients diagnosed with essential tremor or parkinsonian tremor not adequately controlled by medications and where tremor constitutes a significant functional disability
    - Unilateral VIM DBS

- Parkinson’s disease:
  - 2002: As an adjunctive therapy in reducing some of the symptoms of advanced, levodopa-responsive Parkinson’s disease that are not adequately controlled with medication
  - 2016: PD of at least 4 years duration and with recent onset of motor complications or motor complications of longer-standing duration that are not adequately controlled with medications
    - Bilateral STN DBS
    - Bilateral GPI DBS

- Primary Dystonia (HDE)
  - 2003: Aid in the management of chronic, intractable (drug refractory) primary dystonia, including generalized and segmental dystonia, hemidystonia, and cervical dystonia (torticollis) in patients seven years of age or older.
    - Unilateral or Bilateral GPI DBS
    - Unilateral or Bilateral STN DBS

Evidence for efficacy of bilateral DBS: RCTs

- Parkinson’s disease

- **Essential tremor**

- **Dystonia**

### Patient Selection

- **General considerations**

- **Parkinson’s disease specific considerations**
  - Levodopa OFF/ON evaluation
  - Predictors of good response to DBS
  - When becomes DBS an option? Therapeutic window.
  - Patient expectations.

- **Essential tremor and Dystonia**
  - Selection criteria
  - Predictors of good response to DBS

DBS procedure

- Stereotactic frame, trajectory/navigation, electrophysiology

- Components of the DBS system
  - Internal
    - Intracerebral DBS lead; Lead extensions; Pulse generators
  - External
    - Clinician programmer; Patient programmer

- New ways to perform DBS
  - Intra-operative MRI
  - Intra-operative CT

- Novel DBS systems
  - Current shaping
  - Current steering