Depression in Parkinson's Disease

Parkinson's Society of British Columbia Webinar series
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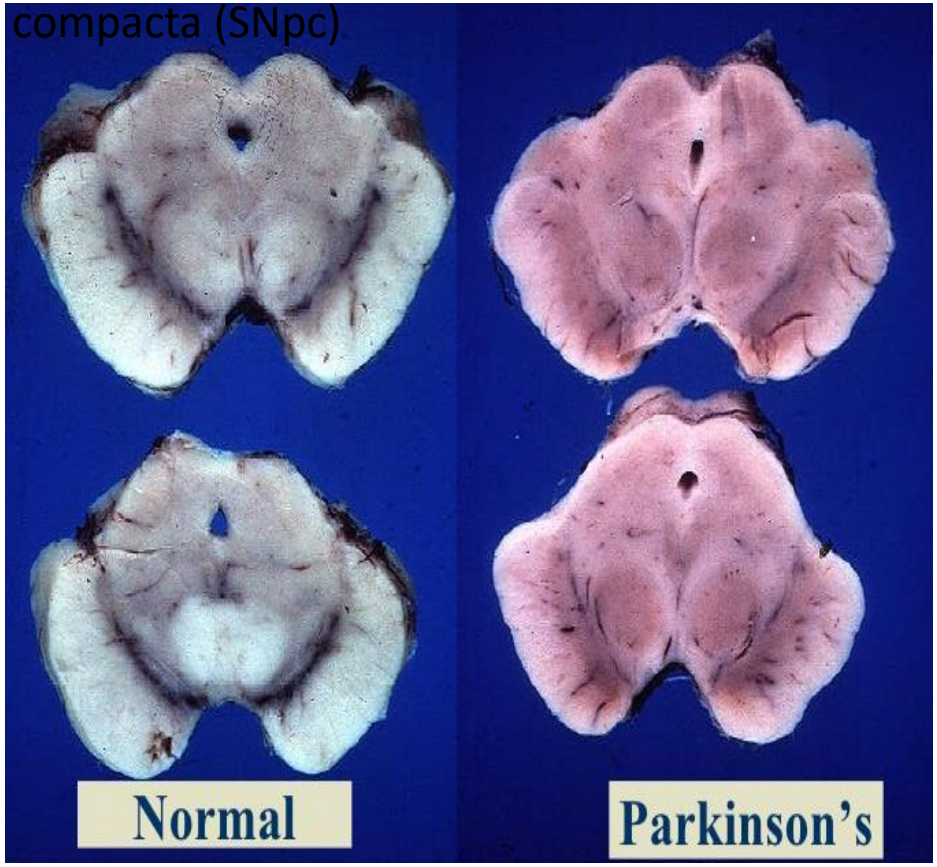
- **<u>Potential for conflict(s) of interest</u>:**
  - I will discuss off-label applications of neurostimulation
  - I will NOT discuss any particular medical device or medical device manufacturer.
  - I have NOT received honoraria, hold any stocks, equities, or financial interest from any neurostimulation device manufacturer.

Parkinson's Disease

- Second most common neuro-degenerative disorder (after ALZ)
- Mean age of onset is 60 years old
- Cardinal symptoms (Motor Syndrome):
  - Tremor
  - Rigidity
  - Bradycardia
  - Postural instability (balance impairment)

Parkinson's Disease: Pathophysiology

Loss of pigmented dopaminergic neurons in the substantia nigra pars compacta (SNpc)



Pathophysiology: loss of dopaminergic neurons in **substantia nigra** -> inhibition of cortical motor areas

PD: Non-Motor Syndrome

Non-motor

- Primary
- Depression, fear, anxiety, psychosis
- Cognitive impairment
- Pain
- Sleep disturbance
- Fatigue, loss of energy
- Sweating
- Constipation, urinary problems
- Hypotension
- Sexual dysfunction

Depression in Parkinson's disease (dPD):

- dPD is frequent; ~40% (Reijnders et al. 2008)
- dPD has a significant impact on quality of life (Schrag 2006)

dPD: Challenging to recognize (I)

- Often go unrecognized due to many overlapping features with motor syndrome
  - Loss of facial expression
  - Hypophonic speech
  - Slowed movement
  - Reduced appetite
  - Sleep disorders
  - Decreased concentration/memory
  - Sexual dysfunction
  - Flat affect

dPD: diagnostic Challenges

- Primary mood disorder vs. secondary?
- Adjustment reaction vs. mood disorder?

- Pharmacotherapy is often used (Skapinakis et al. 2010), but efficacy is modest: ES 0.3 (Bomasang-Layno et al. 2015)

- Is dPD the same type of depression as in primary depression?

Non-Invasive Neurostimulation Therapies

Convulsive

Electro
Convulsive
Therapy

Magnetic
Seizure
Therapy

Electroconvulsive therapy (ECT)

- Non-invasive, convulsive neuromodulation treatment. It works by triggering a seizure **under anesthesia**.
- Indications in psychiatry: Depression and Psychosis
- Most effective treatment for severe depression (~80% response, ~60% remission)
- Particularly effective in older adults

How does ECT work?

- Effects of [controlled] seizure on brain physiology:

- ↑ Glial cells in hippocampus
- ↑ GABA release
- ↑ catecholamines (Noradrenaline, **Dopamine**)
- ↓ neuroendocrinopathy (cortisol, TRH, GH)
- ↑ Neuronal growth factors (BDNF)

– ↓ Electrical activity in the brain
– ↑ seizure threshold

ECT for dPD

- 34 studies in the literature (1990-2018), most case reports and small case series
- ECT is a safe and beneficial treatment option in PD
- PD patients with concomitant depression and psychosis could benefit
- In addition to psychiatric symptoms, some motor symptoms may improve

Kennedy et al (2003) and Calderon-Fajardo et al. (2015)

New treatment modalities: Magnetic Seizure Therapy for dPD

- MST is a convulsive treatment like ECT
- It requires general anesthesia
- But, it seems to have fewer side effects than ECT
- Clinical trial at UBC is coming up

Summary

- Depression is frequent in PD, beyond adjustment to the diagnosis
- It decreases quality of life and is important to treat
- Treatments include lifestyle interventions, antidepressant medications
- New treatments may include non-invasive neurostimulation therapies

Q&A

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