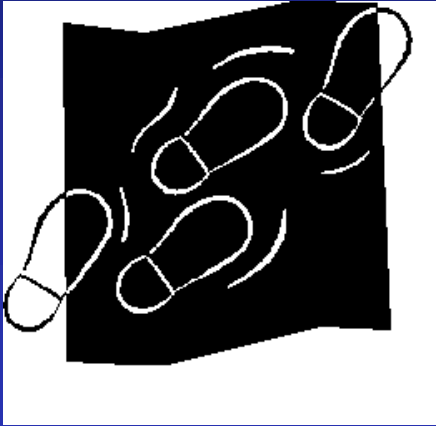


Parkinson's Disease in the Hospital



September 26, 2018
Stephen Grill, MD, PHD



Parkinson's and Movement Disorders
Center of Maryland
and
Johns Hopkins University



- **I have no financial interest with any entity producing marketing, re-selling, or distributing healthcare goods or services consumed by, or used on patients**
- **I will not be discussing the use of off-label products or services or will point out any off-label uses**

Introduction

- Hospitalizations are more common in people with PD
- Many hospitalizations are preventable
- There are specific hospital challenges in PD
- Hospitals and physicians need to improve
- You can take measures to reduce the risk of problems



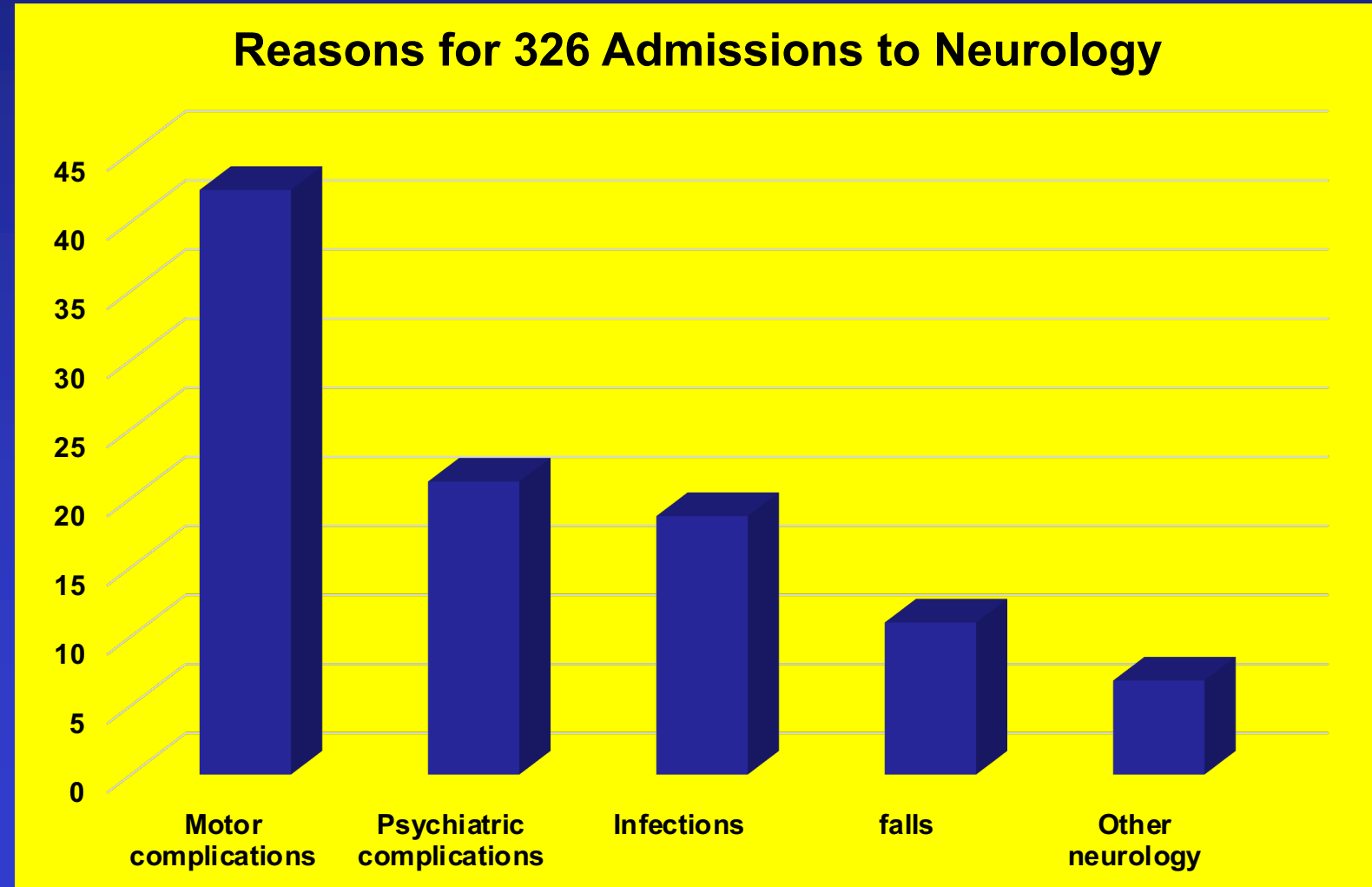
Reasons for Hospital Admissions in PD

- Direct Disease Related
 - Motor complications
 - Psychiatric symptoms
 - Autonomic dysfunction
 - Side effects of anti-PD drugs
- Indirect Disease Related
 - Trauma
 - Pneumonia
- Non-PD Related

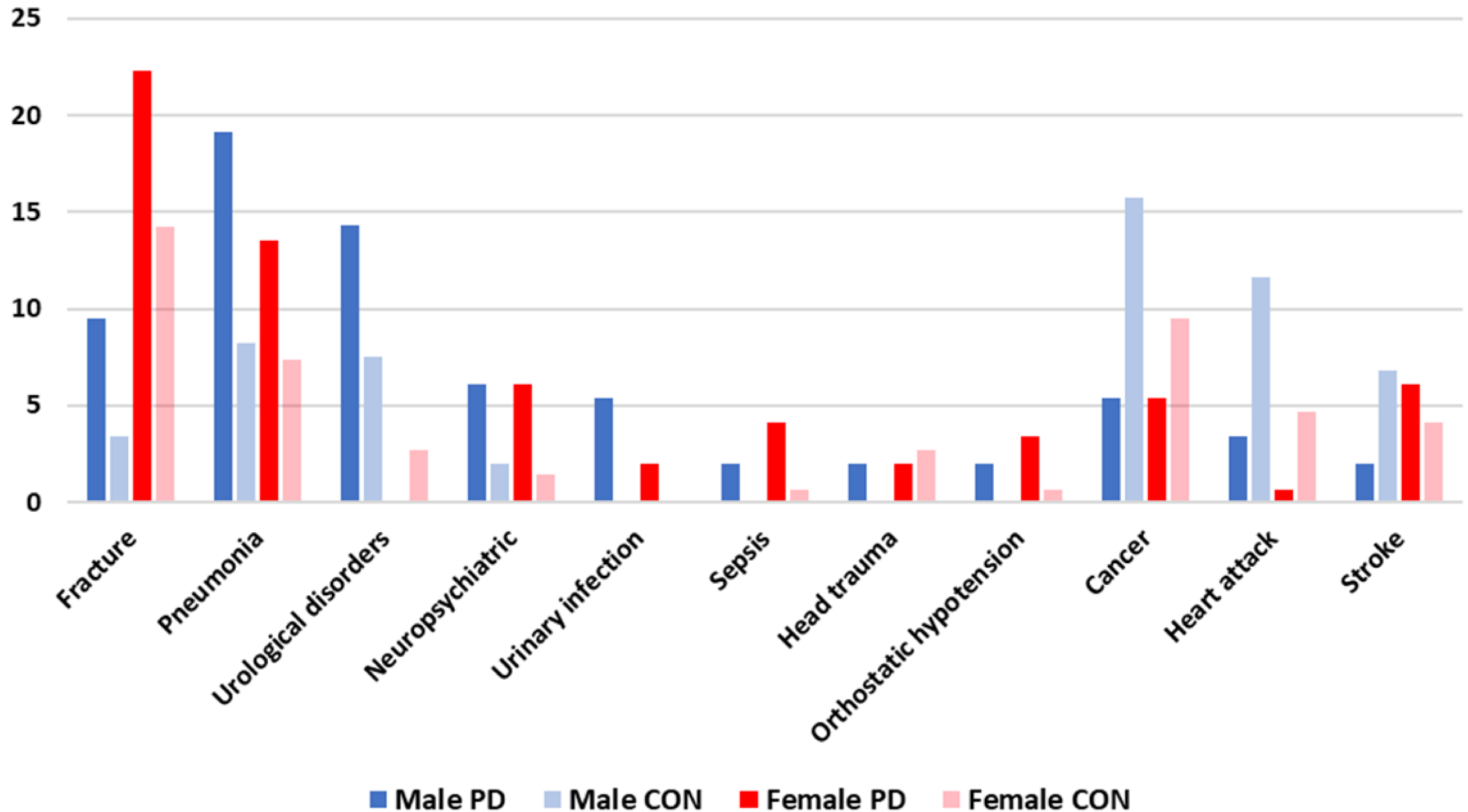


Reasons for Hospital Admissions in PD: General Medical Ward Admissions - 1991 patients

- Literature review; 7 studies from 1997-present
- PD patients 1.4 X more likely to be hospitalized
- Most hospitalizations are for “comorbid” conditions
- In PD, risk for hospitalizations increased for:
 - Aspiration pneumonia (6.3X)
 - Psychosis (2.7X)
 - Femur fracture (2.6X)
 - Urinary infections (2.5X)
 - Sepsis (2.4X)



Reasons for Hospitalizations in PD vs Controls (%)



- PD
- CON
- Male
- Female
- In
- in

High rates and the risk factors for emergency room visits and hospitalization in Parkinson's disease

Anhar Hassan^{a,g,*}, Samuel S. Wu^b, Peter Schmidt^c, Yunfeng Dai^b, Tanya Simuni^d, Nir Giladi^e, Bastiaan R. Bloem^f, Irene A. Malaty^a, Michael S. Okun^a, on behalf of the NPF-QII Investigators

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- **3415 PD patients; 61% male; mean age: 67.1; mean disease duration: 8.9 yrs**
- **31% had an “encounter”**
- **Risks**
 - Longer “timed up-an-go”
 - More co-morbidities
 - Motor fluctuations
 - Deep brain stimulation



A systematic review of interventions to reduce hospitalisation in Parkinson's disease

S. Muzerengi ^{a, b, *}, C. Herd ^c, C. Rick ^c, C.E. Clarke ^{a, c, d}

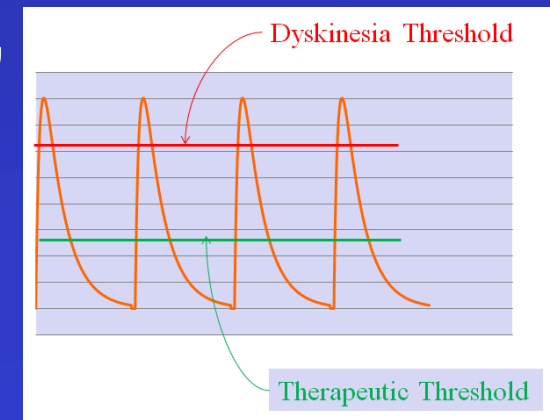
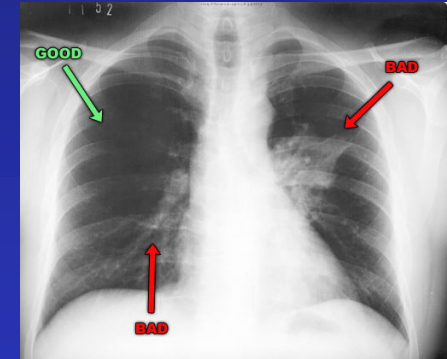
CTRS01 NEW2/6/02

- Frequent neurologist involvement
- Open Access Clinic: 50% reduction in hospitalizations and shorter lengths of stay (11 vs 4.5 days)
- PD medication Adherence – 80% compliance resulted in 49% fewer ER visits and 39% less hospitalizations



PD-Specific Hospitalization Prevention

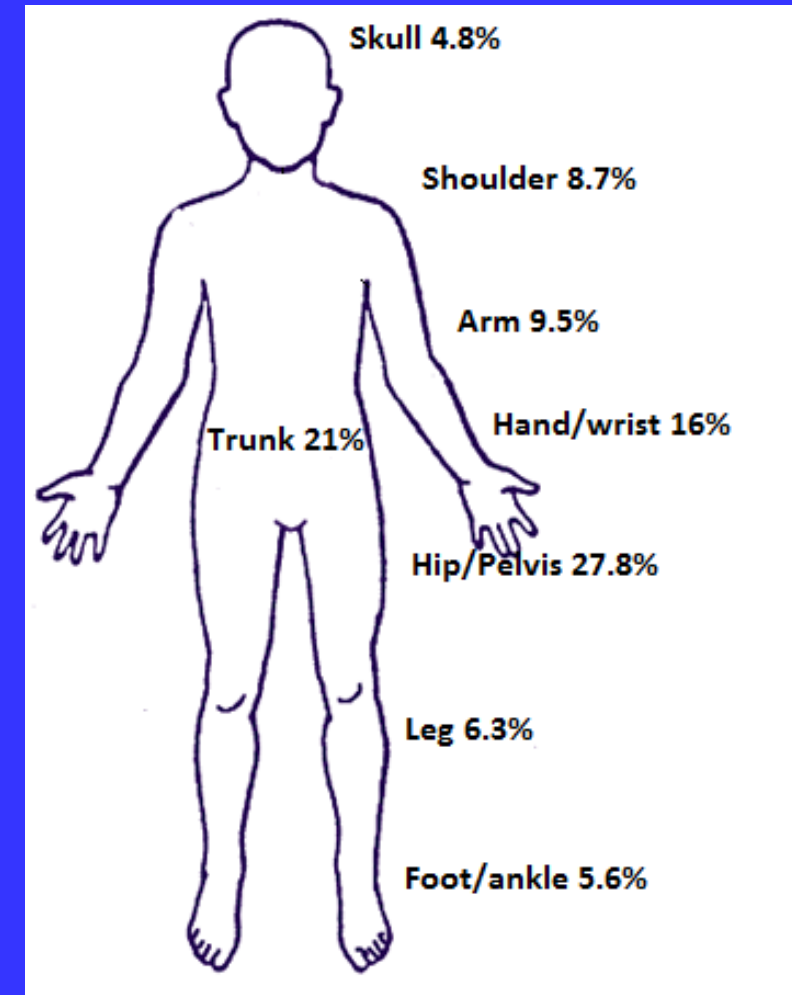
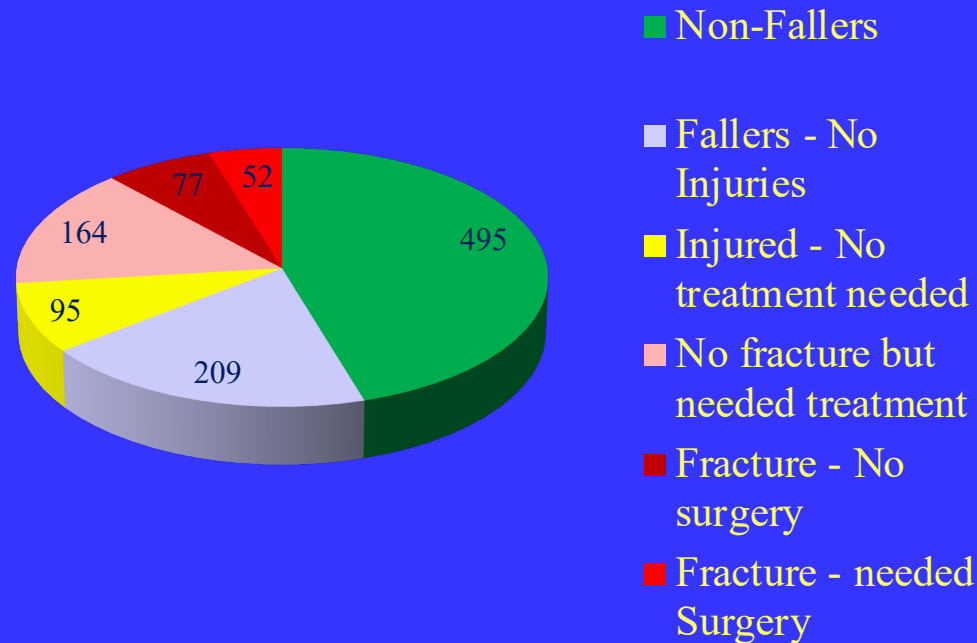
- Fall prevention
 - Physical therapy & assistive devices
- Infection prevention
 - Pneumonia - swallowing studies evaluate dysphagia; manage saliva
 - Urinary – manage bladder dysfunction
- PD medication issues (motor fluctuations, dyskinesias, adverse effects)
 - Frequent medication assessment



Targeting these problems avoids hospitalizations and improves quality of life

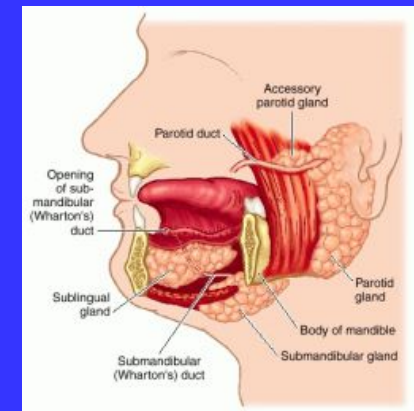
Falls and Injuries Resulting from Falls Among Patients with Parkinson's Disease and Other Parkinsonian Syndromes

- Survey mailed to 1,417 PD clinic patients; 1092 patients included



Reduce Your Risk for Pneumonia

- If you are choking, tell your physicians
- Be evaluated by Speech/Language/Swallowing therapist
- Modified Barium Swallow
- Swallowing therapy
- Manage excess saliva
 - Atropine drops sublingually
 - Botulinum toxin injections to salivary glands



Action Points: Avoid Hospitalization



- **Avoid Falls**
 - Be compliant with Physical Therapy and use of canes/walkers
- **Reduce risk of infections**
 - If choking on food or saliva, get evaluation and treatment (swallow evaluation, Modified Barium Swallow, swallow therapy, control of excess saliva)
 - Manage bladder symptoms
- **Good regulation of PD meds**
 - Be compliant; take meds on time
 - Regular visits with PD neurologist



Plan Ahead For Hospitalizations

- Ready Bag
- Facilitate communication
- Family/friend support
- Stop MAOb inhibitors (rasagiline, selegiline, safinamide) 2 weeks before elective surgery



Action Point: Pack a Ready Bag

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- Medication list*
 - Include timing of carbidopa/levodopa
- Physician list*
- Living Will/Advanced Directives*
- Power of attorney or Guardian documents*
- Branded medications
 - Rytary®, Gocovri® (amantadine ER), Xadago® (safinamide)
- Eyeglasses; hearing aids
- Patient control device for DBS



PART I
**DURABLE POWER OF ATTORNEY
FOR
HEALTH CARE DECISIONS**

(1) DESIGNATION OF AGENT.

I designate the following individual as my agent to make health care decisions for me:

Name _____
Address _____
City _____ State _____ Zip _____
Home Phone _____ Work _____

OPTIONAL: If I revoke my agent's authority or if my agent is not willing, able, or reasonably available to make a health care decision for me, I designate as my first alternate agent:

Name _____
Address _____
City _____ State _____ Zip _____
Home Phone _____ Work _____

OPTIONAL: If I revoke the authority of my agent and first alternate agent or if neither is willing, able, or reasonably available to make a health care decision for me, I designate as my second alternate agent:

Name _____
Address _____
City _____ State _____ Zip _____
Home Phone _____ Work _____

(2) AGENT'S AUTHORITY.

My agent is authorized and directed to follow my individual instructions and my other wishes to the extent known to the agent in making all health care decisions for me. If these are not known, my agent is authorized to make these decisions in accordance with my best interest, including decisions to provide, withhold, or withdraw artificial hydration and nutrition and other forms of health care to keep me alive, except as I state here:

(Add additional sheets if needed.)

4



*Pack these now!

**PARKINSON'S AND MOVEMENT DISORDERS CENTER OF MARYLAND
INSTRUCTIONS WHEN HOSPITALIZED**

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Phone: 443-755-0030
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Test, Mary 04/10/1958
Phone: 410-555-5555
Columbia, MD 21044

Internal Medicine Physician: Dr. Good Doc

I have Parkinson's Disease. Please read these instructions if you are evaluating me in an emergency situation.

General information about Parkinson's Disease

Parkinson's Disease (PD) is a slowly progressive neurodegenerative disease. There are no sudden worsenings or exacerbations of the disease. If the symptoms appear to worsen rapidly, other explanations should be considered. Typical reasons why people with PD present for emergency evaluation include:

- 1. Confusion/Hallucinations/Delusions.** With advancing PD, there can be dementia and hallucinations/delusions. A rapid change does not happen as part of the disease so a search for a cause should be done. The most likely causes are dehydration, medications (sedative/hypnotics/analgesics), metabolic derangements, infections and a change in social situation (moving to a new place). History and evaluation should be directed towards those. If there is a history of falls, a CT of the brain can evaluate for subdural hematomas. Stroke should easily distinguished by the neurological examination.
- 2. Falling or cannot walk.** Falls do happen in advancing Parkinson's Disease, can lead to traumatic injuries and should be taken seriously. If there is an increased rate of falls, a search for a cause should be sought. Frequent causes include orthostatic hypotension, leg/back pain, behavioral (encephalopathy, psychosis), stroke. It is important that the gait be evaluated in a person complaining of increased falls. If the patient uses a cane or walker, then their gait should be evaluated with it.
- 3. Worsened symptoms or motor fluctuations.** Again, PD does not change rapidly so a rapid change in PD symptoms is almost always due to other causes. Consider recent changes in medications including addition of dopamine-blocking agents such as neuroleptics and anti-emetics.

Information about Deep Brain Stimulators: I have a deep brain stimulator implanted to help control the symptoms of my disease including tremors and motor fluctuations (dyskinesias, off time). If symptoms suddenly worsen, it is possible that the battery has expired or malfunctioned. This should be evaluated by Dr. Grill. I may not have a MRI (brain MRI's may be done under special circumstances with the battery off but this should not be done without contacting Dr. Grill or Medtronic, the manufacturer). The stimulator must be turned off during a CT scan. Diathermy is contraindicated. There are also restrictions in the use of cautery devices during surgery and the surgeon should contact Medtronic about that. The manufacturer, Medtronic, may be contacted at 800-328-0810. There are technicians available 24/7.

I was last seen by my Movement Disorders Neurologist on 09/22/2018. If you are considering a change in my medications used to treat my PD, please contact Dr. Grill. It is extremely important that the medications to control my PD are given on time, especially if I am taking them more than 3 times in a day.

Current Medications

- 1 Atorvastatin 10 Mg Tablet** SIG: Take 1 daily
- 2 Carbidopa-levodopa 25-100 Tab Mg** SIG: Take 1 at 7AM, 11AM, 3PM, 7PM
- 3 Rasagiline Mesylate 1 Mg Tab** SIG: Take 1 every morning
- 4 Rivastigmine 3 Mg Capsule** SIG: Take 1 twice daily

Challenges in PD When Hospitalized

- **Medication Issues**
 - Timing or lack of administration of dopaminergic medications
 - Administration of contra-indicated drugs
 - Non-formulary medications
- **Staff unfamiliar with disease and medications**
- **Hospital Environment Issues**
 - Complications due to immobilization
 - Psychiatric disorders triggered/exacerbated by admission
- **“Competing interests”**
- **Special considerations**
 - Deep brain stimulators
 - Duopa pump



Clinical Problems in the Hospitalized Parkinson's Disease Patient: Systematic Review

RGPCTRS01 NEW2/6/02

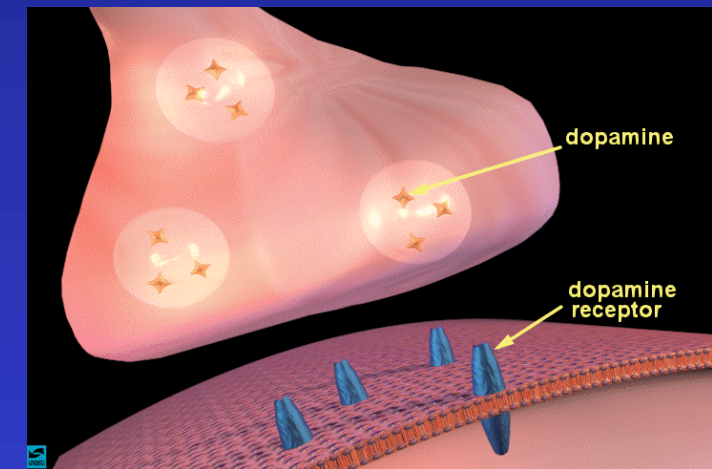
Oliver H.H. Gerlach, MD,* Ania Winogrodzka, MD, PhD, and Wim E.J. Weber, MD, PhD
Section of Movement Disorders, Department of Neurology, Maastricht University Medical Centre, Maastricht, The Netherlands

- In 74% of admissions PD medication stopped, omitted or wrongly prescribed; 61% of these patients suffered sequelae
- Non-adherence to medication schedules
- Anti-dopaminergic medications prescribed in 11%
- Post-operative problems more common in PD
 - Aspiration pneumonia
 - Urinary infections
 - Confusion/delirium – up to 60%; may be delayed by 36 hours
 - Hypotension
 - Falls
 - 71% miss doses of meds
 - Anti-dopaminergic medications prescribed in 41%
 - 31 % of PD patients dissatisfied in how PD was managed



Medication Interactions

- Dopamine blocking agents induce PD symptoms
 - Antipsychotic medications (except quetiapine (Seroquel®), pimavanserin (Nuplazid®), clozapine*)
 - Anti-emetic medications: metoclopramide (Reglan®), Prochlorperazine (Compazine®)
- MAO inhibitors – Potentially Serious Interactions
 - MAOb inhibitors – adjunct to levodopa in PD
 - Selegiline, rasagiline, safinamide
 - MAOa inhibitors – rarely used
 - Contra-indicated with MAOb inhibitors and also should not be used with carbidopa/levodopa as there is risk of hypertensive episode

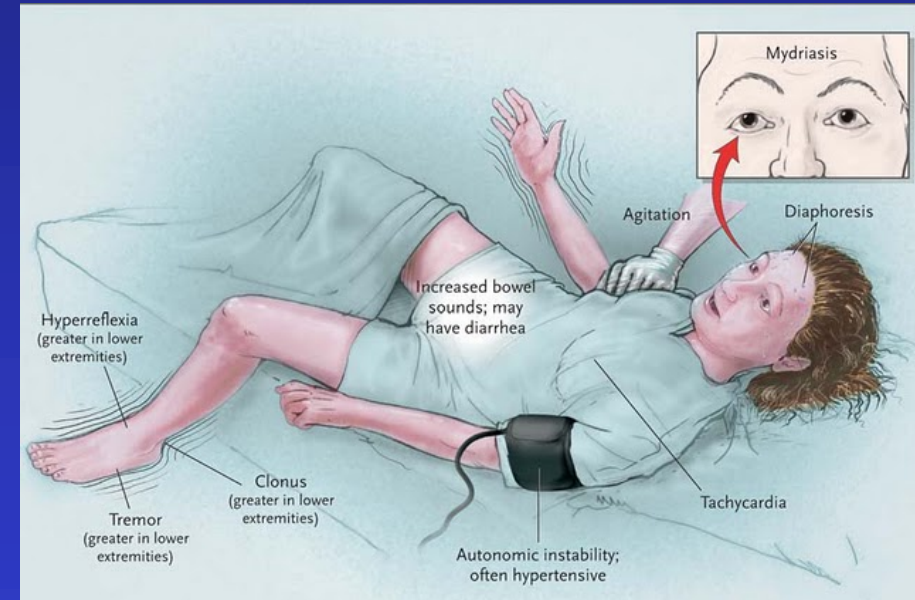


*Not the same medication as clonazepam (Klonopin®)

MAOb Inhibitors: Medication Interactions

ROPCTRS01 NEW2/6/02

- **Serotonin Syndrome**: neuromuscular hyper-excitability, confusion, fever; life-threatening. Due to excess serotonin in the brain.
- Use of MAO inhibitors and antidepressant medications can cause “Serotonin Syndrome” but risk with MAOb is very low
- May occur as an interaction of MAOb inhibitors with **opioid analgesics** such as **meperidine**, **tramadol**, **methadone** and **dextropropoxyphene**. (also rare but since life-threatening – good to avoid)
- Recommend to stop MAO inhibitors 2 weeks before elective surgery in case opiates are to be used in pain management
- Avoid muscle relaxant cyclobenzaprine (Flexeril)
- Don't use other MAO inhibitors (including St. John's wort)



Action Point



- Stop MAOb inhibitors (selegiline, rasagaline (Azilect) two weeks before elective surgery admission due to possible interaction with opiate analgesics
- Ensure medical team knows us of MAOb inhibitor prior to urgent surgeries or pain management



**Comorbid disorders and hospitalisation in Parkinson's disease:
a prospective study**

Acute Problems During Hospitalizations

- 83 patients admitted to Neurology
 - Pneumonia
 - Diarrhea
 - Atrial Fibrillation
 - Urinary infections
 - Transient Ischemic Attack (TIA)
- 20 patients admitted to Non-Neurology
 - Urinary infections
 - Agitation
 - Bowel occlusion
 - Hypotension
 - Pressure ulcers/leg edema
 - Dysphagia



Hospital-Induced Delirium

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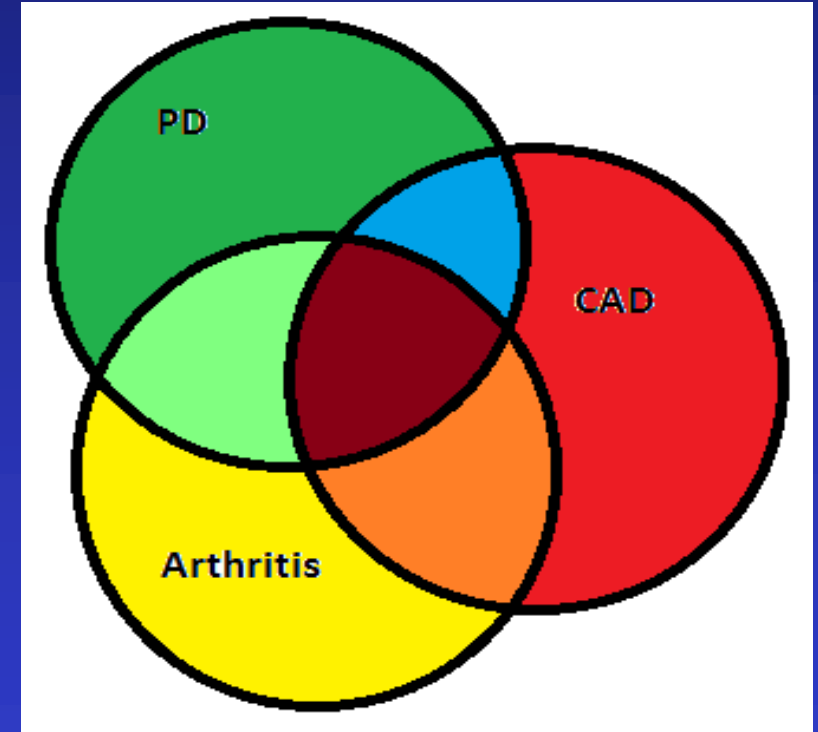
- People with cognitive impairment/dementia at risk for worsening while hospitalized
- Greatest risk in ICU: “ICU psychosis”
- “Benign hallucinations” WILL get worse
- Reasons
 - Unfamiliar environment
 - Unfamiliar people
 - Immobilization
 - Day/Night cycle
 - Sedatives, pain medications, anesthetics
 - Poor sleep
 - Electrolyte disturbances
 - Infections, fever



Competing Interests: Almost No-one Has Just PD

01 NEW2/6/02

- Importance of communication amongst specialists
- Competing interests: management of one disease may exacerbate symptoms of another



Hypertension: Competing Interests

- People with PD often develop low blood pressure and “orthostatic hypotension”
- Orthostatic hypotension: a drop in blood pressure when standing; may cause fainting
- As PD advances, people with hypertension usually need less or no medications for blood pressure
- Beta-blockers (e.g., propranolol) often used in coronary artery disease
- Important to monitor BP
- Facilitate communication with internists and cardiologists



Improving Care for Hospitalized PD Patient

- No studies evaluating effects of recommendations for improvement
- Multidisciplinary approach
- Maintain exact medication regimen
- Education of nurses/physicians
- Be attentive to early signs of complications
- Fall prevention
- Emotional support
- Attention to sleep hygiene
- Ensure hydration/nutrition
- Environment: limit # caregivers, light, noise
- Avoid harmful medications



Improvement of Peri-Operative Care

- During pre-operative screening, pay attention to cognitive function, respiratory status, urological function, fluid status, GI system
- Continue anti-PD meds as close to regular schedule as possible
- If not able to take meds by mouth (NPO) for prolonged periods, may consider rotigotine patch, carbidopa/levodopa enteral suspension (duopa pump)
- Consider local anesthesia if possible



Action Points During Hospitalization

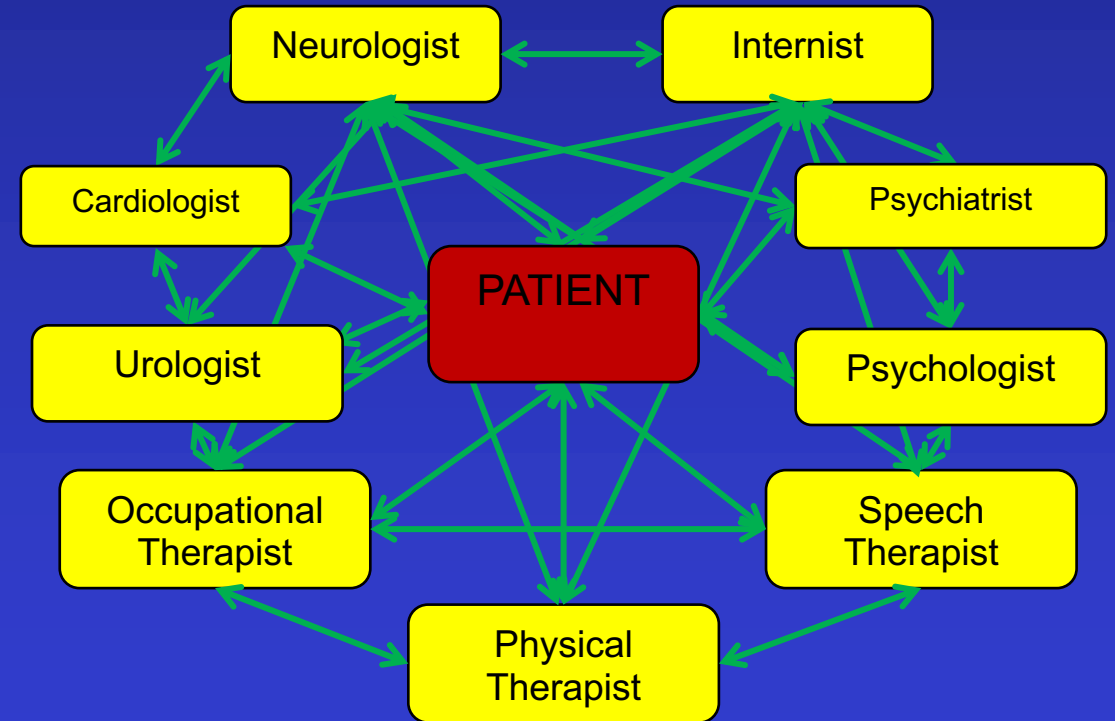
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- Give hospital staff branded medications
- Give ER doc/staff medication list
 - Make sure meds ordered correctly from the start
- Help mobilize early
 - Get out of bed (when allowed)
 - Physical therapy – ask for it!
- Support system – especially important in people with cognitive decline/dementia
 - Keep room well-lit during the day; close blinds at night
 - Family/friends presence (better than using sedatives)
 - Consider over-night sitter if agitation develops
- Facilitate communication with your internist, neurologist & other physicians
- Discharge planning (Rehab, home therapy, aides)
 - Ask case manager/social worker to be involved



Facilitate Communication

- Your “team” should know of your admission and be contacted if necessary
- Have hospital records faxed to your team



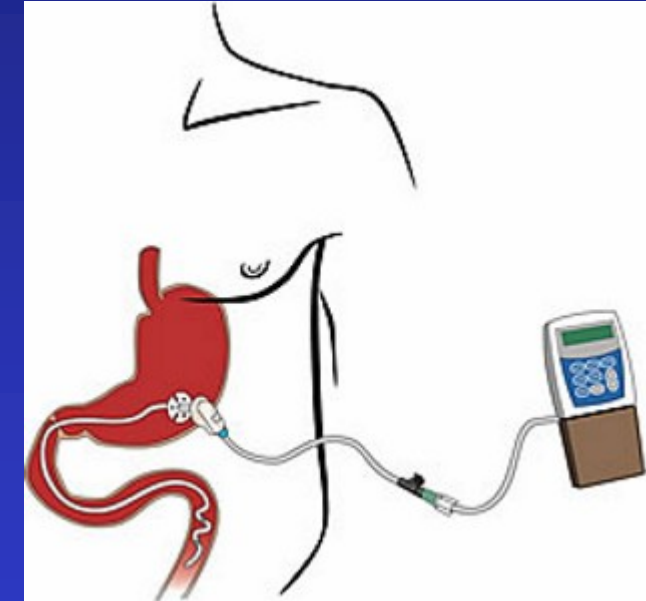
Deep Brain Stimulators

- Bring control device
- Ensure medical team knows of DBS
- Diagnostic ultrasounds are OK
- DBS system off during surgeries
- MRI compatibility improving
 - Currently Medtronic and Abbott systems OK but with precautions
- Recharging while hospitalized



Carbidopa/levodopa Intestinal Gel (Duopa®)

- Nursing staff may be unfamiliar technology
- Bring equipment including cartridges
- Contact nurse manager at “DuoConnect” – available 24/7
- They will educate hospital staff on care of pump



Summary of Action Points

RGPCTRS01 NEW2/6/02



- Avoid hospitalization
- Pack a “Ready bag”
 - Medication list
 - Physician list
 - Branded medications –
 - DBS control devices
- Tell ER doc/staff about
 - Make sure meds ordered
- Mobilize early
 - Get out of bed (when allowed)
 - Physical therapy
- Support system in home
 - Family/friends calming
- Facilitate communication
 - They should know of admission
 - Arrange for hospital records

Parkinson's Disease Hospitalization Action points

- Avoid Hospitalization
 - Fall prevention: be compliant with Physical Therapy and use of canes/walkers
 - Reduce risk of infections
 - If choking, be evaluated and treated
 - Manage urinary symptoms
- Stop MAOB inhibitors 2 weeks before elective surgery
- Pack a Ready Bag
 - Medication list – include timing of Parkinson's medications
 - Physician list
 - Living will
 - Power of Attorney/Guardian papers
 - Bring branded medications
 - Bring control device for DBS
 - Bring eyeglasses and hearing aids
- Support System in Hospital
 - Family/friends presence helpful to avoid confusion/agitation
 - Consider overnight sitter if agitated
 - If possible, keep room well-lit during day, and close blinds at night
- Facilitate Communication with your team
 - Inform your team of physicians of admission
 - Ask that hospital physician contact your neurologist as needed
 - Arrange to have hospital records faxed to your physicians
- Discharge Planning
 - Case manager involvement
 - Consider help or therapy in home following hospitalization
- Special factors
 - Deep brain stimulation
 - Inform medical team about DBS
 - Bring control device
 - Duopa Pump
 - Need to arrange for maintenance of system
 - Bring equipment



Neurologist

Freedom! Go Home!

