

UNIT 5

MOVEMENT DISORDERS

Unit #5 – Movement Disorders

Movement disorders comprise a spectrum of *hypokinetic* (sometimes called *bradykinetic* or *akinetic /rigid*) and *hyperkinetic* syndromes, many of which are seen quite commonly in a general neurology practice. Anatomically, the area of greatest interest is the **basal ganglia**, which is generally accepted to include the deep nuclei of the **caudate, putamen, globus pallidus, subthalamus and substantia nigra (the latter a midbrain structure)**. Other terminology: **putamen+globus pallidus=lentiform nuclei; lentiform nuclei+caudate=corpus striatum**.

A. Suggested review

Your **Neurosciences** syllabus contains several sections on the basal ganglia, including anatomy and physiology. See especially lectures **28 and 30**.

In the "picture is worth a thousand words" category, the LRC has patient tapes on Parkinson's disease, cerebellar movement disorders, etc. which we encourage you to review.

After this review, you can move on to Chapter 7 (p. 233) of your text.

Sections for concentrated reading include: pp. 233-238 on **general concepts**, pp. 241-249 on **Parkinsonism**, pp. 249-251 on **Huntington's disease**, **drug-induced** movement disorders on pp. 256-258, and pp. 258-260 on **Tourette's disease** and **restless legs syndrome**. Focal dystonias are discussed on pp. 253-254. Syndromes which are rare, but of interest include Wilson's disease and hemiballismus.

***NOTE:** In your neurology rotation, make sure that you have seen at least one patient with Parkinson's disease.

B. Objectives

At the end of this unit on Movement Disorders, you should be able to discuss the following:

1. What is meant by postural and intention (action) tremors? How do they differ from rest tremor? How is benign essential tremor treated?
2. What is chorea? Name four causes of chorea, including a hereditary cause, a drug-induced type, a vascular cause and a perinatal etiology. What is dyskinesia? In what clinical situation is it frequently encountered?
3. Name two focal dystonias. Be aware of modern treatment modalities.
4. In evaluating patients with movement disorders, discuss why the following are relevant: age and mode of onset, drug and general medical history, family history. Be able to give a specific disease example which illustrates each of these points.
5. What is felt to be the pathogenesis of idiopathic Parkinson's disease? Know at least five common clinical features of PD. How is the diagnosis established? Name at least two Parkinson's plus syndromes and know how they differ from idiopathic PD.
6. What are the mainstays of treatment, both medical and surgical, of Parkinson's disease?

7. What are tardive dyskinesia and neuroleptic malignant syndrome?

C. Getting Started

As mentioned above, a good way to start is to review the lectures in your neurosciences syllabus on the basal ganglia. These include lecture 30 as well as Dr. Nolte's lecture on **Wiring Principles** of the nervous system (Chapter 3). Then, turn to Chapter 7 in your text and review the sections outlined above as well as the section on **essential tremor** on page 234. On myoclonus, note its common clinical settings. Briefly review tics and some of the other **hyperkinetic syndromes** such as chorea and hemiballismus. You need to have some basic grounding in the common types of tremor--seeing them is best. The section on history and physical of patients emphasizes obtaining a relevant history (including family history in many cases, age of onset, drug or medication use) and describing the abnormal movement observed. **Note: With the exception of Wilson's disease and a few very rare entities (e.g., chorea-acanthocytosis, lupus-associated chorea, thyrotoxicosis-associated tremor),** most movement disorders are diagnosed clinically, and not by neuro-imaging or lab tests (a few of which may be supportive of clinically suspected diagnoses). History may include family history in several disorders with genetic transmission (the most obvious being Huntington's disease), history of medication use in others (e.g., tardive dyskinesia) and history of mode of onset and progression of the disorder. Physical examination should focus on extra movement vs. lack of movement, exclusion of weakness and UMN involvement in most disorders, with focal neurologic signs rarely seen (e.g., sometimes in hemiballismus); cognitive involvement or lack of it should be noted. About 20% of patients with Parkinson's disease develop cognitive impairment, part of so-called **subcortical dementias**; these are generally distinguishable from **cortical dementias** (with Alzheimer's disease--AD--being the prototype), though some patients have both.

D. Self-Assessment Quiz

Directions: Give the one best answer to the questions below.

1. A thirty-five year old man with a history of anxiety comes for evaluation of tremor. The tremor is described as occurring with the hands outstretched and is worse when something upsets him. When his hands are at repose, they do not shake. Neurologic examination shows only an 8- to 12-Hz tremor bilaterally with the hands outstretched. Which history below may be helpful in making a diagnosis?
 - a. The patient is on lithium chloride
 - b. The patient's sister has a history of psychiatric disease
 - c. The patient has hypothyroidism
 - d. The patient's tremor does not occur in sleep.
2. The most common cause of chorea seen in a general adult neurology practice is:
 - a. Huntington's disease
 - b. Sydenham's chorea
 - c. Levodopa- induced chorea
 - d. Metabolic in origin
3. The most common cause of generalized myoclonus seen in the hospital setting is:

- a. Epilepsy
 - b. Alzheimer's disease
 - c. Stroke
 - d. Post-anoxic encephalopathy
4. A twenty three year old man was noted by others to have become short-tempered and poor in his work performance. He is seen by you at age 28; at that time, he has some facial grimacing and some writhing movements of the trunk. His gait is abnormal, as though he is dancing. The most important piece of history you can obtain from this patient is:
- a. A history of depression
 - b. A history of a psychiatric disorder
 - c. A history of the same problem in a parent or sibling
 - d. A history of drug abuse
5. A fifty five year old woman comes to you for evaluation of tremor. She states that she has noted tremor in her right hand for about a year, particularly when she writes or lifts a coffee cup. On examination, she has a normal facial expression, a mild head tremor and a severe, rapid tremor when she tries to write. An indicated treatment for this condition is:
- a. Propranolol, in divided doses or long-acting form
 - b. Levodopa/carbidopa, taken several times a day
 - c. Alcohol, as needed
 - d. It is unwise to treat this condition

Answers: 1) a 2) c 3) d 4) c 5) a

E. Parkinson's Disease

Parkinson's disease, the "shaking palsy" first described by James Parkinson in 1817, is the most prevalent and important of the hypokinetic movement disorders. It occurs world-wide, in the U.S. there are approximately one half million people with Parkinson's. The peak age of onset is probably in the 60's, although patients in their 40's are commonly seen, and patients can be diagnosed into very old age. The original **triad** of signs and symptoms described by Parkinson included **tremor, rigidity, and bradykinesia**. It is known now that a certain percentage of patients (some say as high as 30%) do not have tremor, but still appear to have idiopathic Parkinson's, and not a Parkinson's variant. Historically, it was discovered in the 1950's that **dopamine** was the principal neurotransmitter lacking in idiopathic Parkinson's (PD); attempts were made to administer dopamine orally, but it was found that dopamine does not cross the blood-brain barrier and its precursor, levodopa (l-dopa) had to be used. This, too, was problematic at first, as very large amounts of l-dopa had to be given to produce clinical benefit, and this routinely resulted in vomiting and patient intolerance to side effects. The addition of carbidopa, which blocked peripheral conversion of l-dopa to dopamine, represented a tremendous improvement in therapy and is still a mainstay of PD therapy (Sinemet). For a more detailed historical review, see Neuroscience lecture **67**, Dr. Montgomery's lecture, inserted at the end of this unit.

Now review the **clinical features** of Parkinsonism in your text, pp. 243-244.

Treatment of Parkinson's disease is a complicated and important area in general neurologic practice, but it is also key to learn the cardinal clinical features of the disease as a primary care physician. Pharmacologic treatment is still, in one way or another, primarily aimed at replacing dopamine (DA). Most existing drugs are either L-dopa preparations, dopamine agonists, or, as in the most recent (1998) addition to the pharmacopoeia for PD, enzyme inhibitors (COMT inhibitor—Entacapone)

Some anticholinergic drugs are still used, and selegiline is also still used by some practitioners. (see the **MPTP section in lecture 76, Neurosciences**).

Surgery

This is still an evolving area in PD treatment (as well as treatment of severe essential tremor). Surgery is not a new idea, but has been greatly refined with the use of modern technology, such as MRI. Surgery is generally performed under local anesthesia. The surgeries which are practiced commonly today are:

Thalamotomy or implantation of thalamic stimulator--done contralaterally for refractory tremor

Pallidotomy or deep brain stimulator-- also done contralaterally and felt to help for rigidity, and even more for medication-induced dyskinesia

Subthalamic DBS - help for rigidity and possibly gait, often done bilaterally.

Fetal cell transplants—thus far disappointing.

Clinical point: Many patients ask: Is there a test I can take for PD? How do you know I have it? This is, in fact, a good question. Most available neurologic tests—neuro-imaging studies, EEG, laboratory work--is unrevealing in PD. PD remains a **clinical diagnosis**. What, then, is the differential diagnosis?

Differential diagnosis of PD

1. Drug-induced PD-- can actually be indistinguishable on physical exam, so you will need a good history. Most commonly implicated: anti-psychotic medicines such as phenothiazines or butyrophenones.
2. Essential, or familial tremor--usually, these are fairly easy to distinguish both because of the nature of the tremor itself in PD (**rest tremor**) vs. tremor exacerbated by use of the limb (essential tremor) and because of the absence of other clinical findings in essential tremor--masked facies, gait changes, micrographia, etc. Every once in a while, a particular patient may appear to have features of both.
3. Parkinson's plus syndromes--(**see p. 244, text**) These diagnoses may not be easy to make and are uncommon diseases. It is worth noting that diseases such as PSP may only "declare themselves" over a year or more. However, there may be some early clues that what is going on is not going to turn out to be idiopathic PD: 1) Early severe falling or balance problems, often with a severely flexed gait 2) Lack of tremor, along with very poor balance 3) Early personality changes – irritability, aggressive behavior 4) Early apraxia 5) Apparent involvement of other brain systems – cerebellar, peripheral nerve, etc., suggesting a multisystem atrophy 6) **poor response to dopaminergic medications**.

A useful clinical rule of thumb is that a trial of dopaminergic medication is warranted if you have a suspicion of Parkinsonism; medication can always be discontinued.

Before finishing this chapter and moving on to the self-assessment quiz, be sure to review the previously mentioned section on focal dystonias (p. 253). These include blepharospasm, hemifacial spasm (which may have an anatomic cause and not be idiopathic in some patients – not reviewed in your text)), torticollis and writer's cramp.

F. Movement Disorders Self-Assessment Exam

1. A 70 year old man comes to your office with a complaint of slowing down in his movements over the past year. He does not note any tremor or abnormal movement. He has difficulty getting out of a chair and difficulty signing a check because it's "hard to use a pen". On exam, you note a decreased blink rate, small handwriting and decreased arm swing on the right.

The next step in this patient's work-up and treatment should be:

- a. A CT scan of the brain
 - b. Advising the patient that the problem is not serious
 - c. A trial of dopaminergic medication
 - d. A trial of Propranolol
2. After you have known the patient in question #1 for a year, he starts to have increasing problems. His wife notes frequent falls, irritability and poor response to medication. On physical exam, the patient has impaired voluntary eye movement downward, although the oculocephalic maneuver is normal. He walks with small steps and appears extended backward. He may be doing poorly on medication because:
 - a. He has progressive supranuclear palsy (PSP)
 - b. He is clearly underdosed
 - c. He is depressed
 - d. He has Alzheimer's disease
 3. Huntington's disease (HD) is known to have a genetic basis. The child of an affected parent has what chance of inheriting the disease?
 - a. One in four
 - a. Fifty-fifty
 - b. Only males inherit the disorder
 - c. Very little chance
 4. A 45 year old woman comes to your office because of neck discomfort which has been going on for a "few years." More recently, she has a feeling that her neck pulls to the right, although she can straighten it by touching her cheek on that side. On physical exam, she appears well, if somewhat anxious. You note hypertrophy of the left sternocleidomastoid muscle and some of the left paracervical muscles. The patient's neck clearly pulls to the right.

Appropriate treatment for this problem includes:

- a. A psychiatric evaluation
 - b. A cervical MRI scan
 - c. A trial of diazepam (Valium)
 - d. Discussion of possible Botox treatment
5. You are asked to evaluate a 75 year old inpatient who was resuscitated from a code arrest three days previously, but is still in coma. The primary team was concerned about seizures. On exam, you note irregular, random jerking movements of all limbs at different times. You suspect that the patient has:
- a. Ongoing seizures
 - b. Post-anoxic symptomatic myoclonus
 - c. A spinal cord problem
 - d. A large stroke
6. A 10 year old child is noted to sniff periodically, particularly when the teacher calls on him at school. He otherwise has normal development and is an average student. On exam, he is anxious and sniffs about every minute in the same way. He has no unusual vocalizations. There is no neurologic family history. Parents should be told:
- a. This will likely not require treatment
 - b. The child may develop socialization problems
 - c. The child has a high probability of developing Tourette's
 - d. The child should have a brain scan
7. An 80 year old man is brought in for evaluation by a nursing home technician because of abnormal movements. You cannot obtain a past medical history, except that he is in the nursing home for "dementia." On examination, you note continuous tongue thrusting and chewing movements along with some facial grimacing. Probably the most important history that you can obtain at this point is:
- a. The patient's family history
 - b. The patient's metabolic status
 - c. The MRI report on the patient
 - d. The patient's past and present medication list

Answers: 1) c 2) a 3) b 4) d 5) b 6) a 7) d