



Early Recognition of Parkinson's Disease in Emergency Medicine: Commentary on an Unrealized Opportunity for Improved Care and Research in Movement Disorders

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Abstract

Despite Parkinson's Disease (PD) typically being diagnosed after 80% of dopaminergic neurons are lost, evidence suggests that many patients exhibit early symptoms and frequently utilize emergency department (ED) services years before formal diagnosis. Here we examine the untapped potential of EDs in early PD recognition and intervention. Analysis of nearly 14,000 PD patients from two major healthcare systems revealed that 74% visited the ED or urgent care in the two years preceding diagnosis, yet of over 147,000 PD-related articles published since 1950, only 203 address PD in the ED setting, with just 22 authored by emergency medicine personnel. Early manifestations bringing patients to the ED include falls, syncope, autonomic dysfunction, and neuropsychiatric symptoms, often preceding classic motor symptoms by years or decades. We propose that EDs, serving as healthcare safety nets with over 131 million annual visits in the United States, are uniquely positioned to improve early detection of movement disorders through: (1) utilization of simple targeted screening protocols integrated with ED workflows, (2) creating clear pathways for fall patient evaluation that include direct referrals for mobility assessments, and (3) building research bridges between emergency medicine and movement disorder specialists. Earlier recognition could significantly impact patient out-

comes through timely intervention and increased clinical trial participation, while advancing research in movement disorders.

Subject Areas

Neurology, Emergency Medicine, Nursing

Keywords

Parkinson's Disease, Emergency Medicine, Early Detection, Movement Disorders, Healthcare Safety Net, Falls, TUG Test

1. Introduction

1.1. Introduction and Case Example

Parkinson's Disease (PD) represents a significant healthcare challenge, as by the time of diagnosis, patients have typically lost 80% of their dopaminergic neurons, representing an irreversible loss of function which if discovered earlier, could be delayed or reversed as researchers advance new therapeutics and interventions [1]-[3]. Meanwhile, it has been estimated that the cost of PD in the United States is upwards of \$53 billion dollars each year with approximately half resulting from direct medical costs, and this is considered a low estimate given that upwards of 40% of the US population with PD (approximately 1.5 million) are undiagnosed and were not included in the study's estimates [1] [2]. The prevalence of PD approximately among those 65 - 69 years of age is 0.5% - 1% and rises to 1% - 3% among persons 80 years of age and older. Significantly, the distribution of Parkinson's disease varies in time, geography, ethnicity, age, sex and may appear at significantly young ages sporadically or as the result of PD-associated mutations, and male patients with tremors are more likely to be diagnosed than those with gait disturbances [1] [2].



Figure 1. Pinna avulsion injury following stumble into chain-link fence. The patient had a Timed Up and Go ("TUG" test) recently introduced to the ED and was referred to PT for a formal mobility test. A formal diagnosis of PD was made within 2 weeks. The method for the Timed Up and Go test is illustrated in **Figure 5**, below.

The early, if not prodromal phases of PD present unique opportunities for early intervention, with numerous non-motor symptoms often preceding the classic motor manifestations by years or even decades [1]-[3]. For example, a 73-year-old man presented to the emergency department (ED) after falling into a chain-link fence while carrying groceries (Figure 1). This was his fifth ED visit in a pattern spanning 726 days that included falls, syncope, and constipation. Essentially, all signs are potentially attributable to PD. His pinna avulsion is approximated, and he's referred to plastics and physical therapy (PT) for a mobility assessment through which he is quickly referred to neurology with confirmation of a PD diagnosis within 2 weeks.

Notably, the stereotypical tremor of Parkinson's is a late presenting sign in many patients, but many patients with "akinetic" or "freezing of gait" types of PD do not have tremor but may be prone to falling—starting with smaller but then progressively worse mishaps. These early manifestations include autonomic dysfunction (e.g., orthostatic hypotension), neuropsychiatric symptoms, and constipation [1]-[4]. Falls, syncope, abdominal pain, and psychiatric emergencies bring patients to the ED, but awareness of these as early signs of a movement disorder such as PD can improve chances of diagnosis (Figure 2).

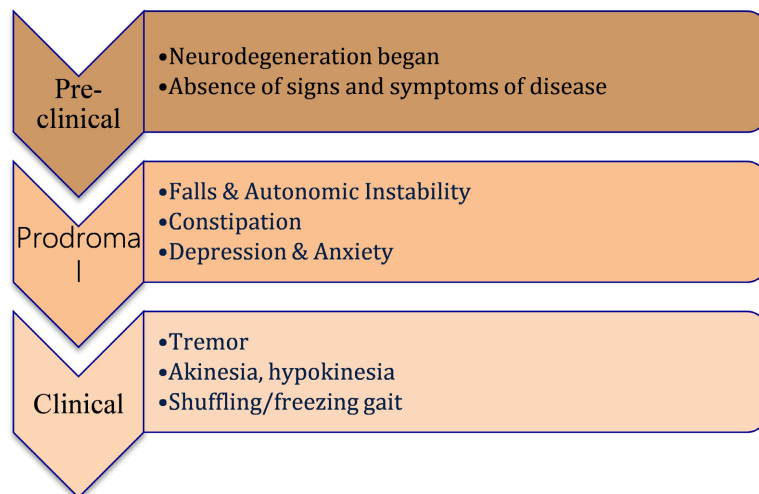


Figure 2. Summary of the stages of Parkinson's Disease (PD) with examples of common signs and symptoms characteristic of each stage.

1.2. A Lack of Research and Collaboration between Emergency Medicine and Neurology Services

A literature analysis suggests a lack of awareness or apparent interest among ED physicians and their institutions in PD associated cases. Of over 147,000 PD-related articles published since 1950, only 203 address PD in the ED setting, with just 22 authored by emergency medicine personnel (Figure 3). While it is well known that patients with PD have high levels of ED utilization following diagnosis [5]-[8], virtually nothing is known about ED utilization prior to diagnosis. Only one recent article addresses this subject tangentially [9]. Further, an exploratory

analysis of nearly 14,000 PD patients from two major healthcare systems (KP Nor-Cal n = 7976; UNC Carolina Data Warehouse for Health n = 5689) reinforces this missed opportunity. In that analysis, 71% percent had ED visits within 5 years of diagnosis while 74% visited the ED or urgent care in the two years preceding diagnosis [10]. In a sample of ten consecutive patients from the Carolina Data Warehouse for Health data, the time between initial ED visit and a diagnosis of PD varied from 2 - 176 weeks. While pilot in nature, both literature searches and ED utilization data suggest a compelling need and opportunities for impactful research generated from, or in collaboration with, EDs. At least some EDs in the Kaiser system have recently begun to prompt the use of the TUG to document mobility sufficient for discharge and/or referral, but even for falls there is likely not be a trigger or flag to consider if referral to PT for mobility testing is warranted. While current Emergency Medicine guidelines note that existing PD should be considered in the setting of falls, there are no admonition to consider undiagnosed PD in the ED.

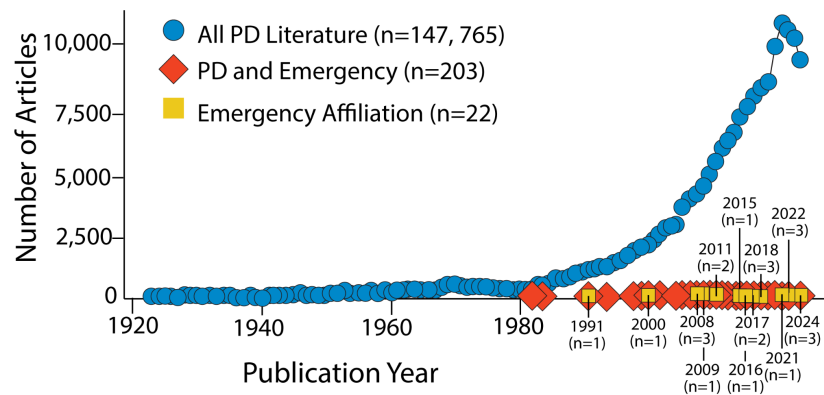


Figure 3. A paucity of PD literature originating from ED where many, if not most patients might be presenting with diagnosable disease for significant periods prior to diagnosis.

1.3. The Benefits of Considering a Movement Disorder in the Emergency Department

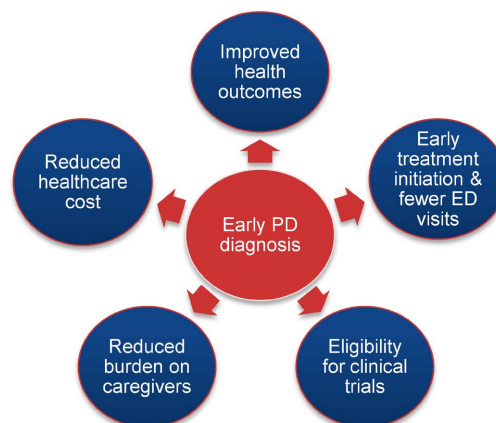


Figure 4. Benefits of early recognition of a potential movement disorder.

Early recognition should offer substantial benefits for both individual patients and research advancement (Figure 4). Clinical and research collaboration between experts in emergency care and movement disorders could substantially improve early diagnosis rates, benefiting individual patients through earlier treatment and expanding the population available for testing early detection methods (e.g., biomarkers, wearables). Current treatments can slow symptom progression, and numerous clinical trials target dopamine neuron preservation so early diagnosis is critical to preserve salvageable neuronal tissues [11]-[13].

2. Conclusions

The ED's unique role in the evaluation of undifferentiated illness and injury—including mental health perturbations—encompasses many of the conditions, signs and symptoms seen in early PD. As a field, this uniquely positions prepared emergency physicians, nurses and receiving departments to help identify patients with movement disorders early. This, however, requires awareness and interest by individual champions as well as in and between fields of medicine such as emergency medicine, emergency nursing and neurology. We suggest the following for consideration in research and potential practice:

- (1) Develop targeted or automated screening protocols that integrate with ED workflows.
- (2) Create clear pathways for further evaluation for fall patients, such as formal mobility assessments in physical therapy referrals following a TUG test in the Emergency Department (Figure 5).
- (3) Build research bridges between emergency medicine physicians, its nursing or patient coordinator departments, and movement disorder specialists.

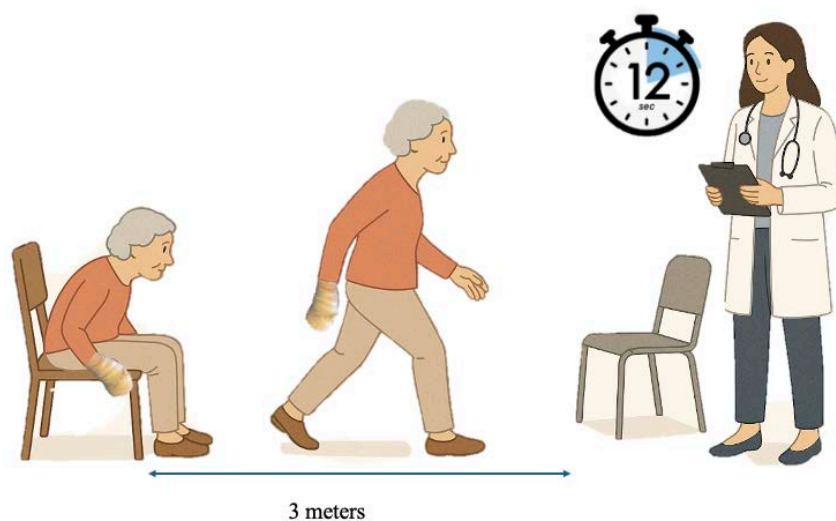


Figure 5. The Timed Up and Go (TUG) test assesses mobility and balance in older adults. The patient begins seated in a chair, stands up on command, walks 3 meters (~10 feet), turns around, walks back to the chair, and sits down. The total time taken is measured by a healthcare professional using a stopwatch to evaluate fall risk and functional mobility referencing age appropriate normal values (see Appendix 1 for detailed method) [17]-[20].

More than \$250 million is spent each year on PD research in the US—the ED is an ideal environment to advance the field [1]. With over 131 million annual ED visits in the United States, nearly half involving patients over age 50 [14]-[16], we stand at a critical intersection. By developing systematic approaches to identify potential PD cases in emergency settings, we could significantly impact patient outcomes through earlier intervention and increased clinical trial participation. The convergence of frequent pre-diagnosis ED utilization and minimal research engagement suggests an urgent need for change. The time has come to recognize and act upon this opportunity. For a busy emergency department, this could be based on a TUG test and clinical prompt recommending a formal mobility assessment during physical therapy after a fall or potentially for the general population of geriatric patients as part of the discharge routine [17]. More research is needed, but herein we seek to begin the conversation.

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Authors’ Contributions

Original Concept: MRL, JS, SJ; Data acquisition and/or analyses: DB, JS, TPM, VB; Manuscript: JS, MRL, SA, SB; Funding acquisition: MRL. [Supplemental Data](#).

Conflicts of Interest

The authors declare no conflicts of interest.

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Appendix

Timed Up and Go Test (TUG Test) [17]-[20]

(1) Setup

- A chair with a flat back and solid seat is needed.
- A line or cone should be placed 3 meters (10 feet) away from the chair.
- A stopwatch is required to measure the time.

(2) Instructions

- The person sits back in the chair.
- On the word “go,” they rise from the chair and walk to the line/cone at a normal pace.
- They turn, walk back to the chair, and sit down again.

(3) Timing

- The stopwatch is started when the person begins to stand up and stopped when their buttocks make contact with the chair after sitting down.
- The test is typically performed with or without any assistive devices the person uses.

Age-Related Normals: TUG times generally increase with age, indicating a decline in functional mobility.

- **Normal Values:**

Research suggests the following, although individual variability exists:

- **Younger Adults:** Times are generally in the range of 8 - 10 seconds.
- **Older Adults:** Times tend to be longer, with some studies reporting averages of 11 - 13 seconds or more in the 60 - 80 age range.
- **Cutoff Points:**

A time of 12 seconds or more on the TUG has been suggested as a potential indicator of increased fall risk in some studies. However, other studies have suggested different cut-off points depending on the population being assessed.

- **Factors Influencing TUG Time and Other Considerations:**

Age, sex, health status, and cognitive impairment can all influence TUG times.

- The TUG test is a valuable tool for assessing functional mobility and can be used to monitor changes over time.
- It's important to consider the individual's overall health and functional abilities when interpreting TUG results.
- The TUG test might have utility in the Emergency Department to help determine the type of referral that is appropriate such as formal mobility testing in a Physical Medicine Department or a referral to Neurology.

The appropriate use of the TUG test in Emergency Medicine settings has not been adequately studied.