

Critical Review:

What is the evidence for a relationship between Parkinson's disease and dysfluency?

Olivia Tontini, M.Cl.Sc (SLP) Candidate

University of Western Ontario: School of Communication Sciences and Disorders

This review examined the relationship between Parkinson s disease (PD) and dysfluency by looking at re-emerging stuttering, effects of deep brain stimulation, and the excess theory of dopamine. Studies reviewed include one quasi-experimental between groups study, three case-studies, one survey research design and one single group pre-post test. Overall, there appears to be a relationship between Parkinson s disease and dysfluency, however it is a new area of research, and most studies consist of case study information. Future studies involving experimental group designs are required to strengthen the evidence in this area of research.

Introduction

Individuals with Parkinson s disease (PD) often develop a variety of speech disturbances, that may include dysfluency

Results

In a quasi-experimental between groups study, Benke and colleagues (2000) examined repetitive speech in 53 patients with Parkinson's disease. Patients were separated according to the stability of their response to levodopa. One group consisted of 29 patients that had a stable response to levodopa and the other group consisted of 24 patients who were in a more advanced

information on their history of stuttering and Parkinson's disease. Averages were calculated and compared from the data received.

Out of 12 initial patients, data was only able to be collected from 6 individuals. Various commonalities existed between the patients regarding their history of stuttering. For example, avoidance behaviors were most prevalent in adult stuttering and the most frequent stuttering characteristics were repetitions of sounds, and syllables at the beginning of words, blocks, physical tension, and an increase in severity with stress. There didn't appear to be an association between severity of childhood stuttering and severity of PD symptoms, however those with higher UPDRS scores were shown to have more severe stuttering in adulthood. They didn't find any improvement or worsening of stuttering with Levodopa treatment.

Another case of re-emergent stuttering in Parkinson's disease was reported by Lim and colleagues (2005). The study described the stuttering characteristics of a 61-year old man and used UPDRS scores to report the motor symptoms. After receiving medication to treat his Parkinson's disease, motor symptoms were resolved, but stuttering continued.

The survey study by Shahed and Jankovic (2001) obtained relevant information regarding various case history information and characteristics of individuals who have had a history of developmental stuttering that re-emerged after the onset of Parkinson's disease. Considering this is a fairly new area of research, obtaining norms allows for further studies a means for comparison. They were also able to collect information using well-known standardized testing and scales that allowed for appropriate comparisons. Like any other survey research, there are limitations such as a possible lack of validity and reliability because the responses are subject to the patient's opinions and memory of their childhood. In addition, credibility would increase with more subjects involved.

The case study by Lim et al, 2005, was useful in providing another model to demonstrate the relationship between dysfluency and Parkinson's disease. However, like any other case-study, it describes only one individual's condition; therefore it is difficult to see the representativeness in the hypothesis. Some sort of measure of severity of stuttering would have also been helpful in understanding how severe the dysfluency was and if it differed under various speech tasks and medication states.

Excess dopamine theory

Goberman and Blomgren (2003) investigated the excess dopamine theory of stuttering in 9 individuals with Parkinson's disease (6 males and 3 females). Data was collected in the patient's home during four separate sessions. The first session was used for screening (hearing, cognitive). In the next three sessions, the medication level was modified; either the session was conducted 30 minutes before taking morning medication (OFF state), 1h after the patient took medication (ON1 state), or 2 h after taking medication (ON2 state). During the three data collection sessions, participants read the first paragraph of the rainbow passage, and produced a monologue of 3-5 minutes long. Analysis of dysfluencies was achieved as well as obtaining UPDRS scores during each session. To analyze the results, non-parametric Wilcoxon Signed Ranks Tests were used as well as effect size.

The results revealed that 8 of 9 patients were most impaired during their OFF states. Significant differences in percent dysfluencies existed between individuals in their OFF states compared to controls during the monologue task ($p=0.011$). There was no significant differences in percent dysfluencies that existed between participants in their ON and OFF states.

A major advantage to this study was that it took careful measures to ensure proper validity and reliability (ex. they conducted intra-judge and inter-judge measures and took hearing and cognitive screenings to rule out any other influences on the

In contrast the previous study, the results of this study support the excess theory of dopamine in stuttering. Although the study appears to provide some support for this theory, this study only considered two individuals. Thus, the validity would increase with increasing sample size. In addition, there were no standardized measures or statistical comparisons to allow for appropriate analysis.

Discussion

Although these studies may appear to differ widely in their methodology and outcomes, a series of overall conclusions can be formulated from their findings.

Firstly, the studies that examined dysfluency under varying conditions or tasks had a general consensus that cognitively more demanding tasks elicit a higher percent of dysfluencies (Benke et al, 2000; Goberman & Blomgren, 2003; Louis et al, 2001). More dysfluencies in a “cognitively more demanding task” support the notion that there is a cognitive component to dysfluency in that more neural resources are required to formulate the higher linguistically demanding task (Goberman & Bomgren, 2003). In addition, the study by Benke and colleagues found that the individuals with more advanced stage Parkinson s disease showed a significantly higher amount of dysfluencies, and dementia was ruled out due to the cognitive testing that was preformed.

When examining the types of dysfluencies present, the results of the papers demonstrate that a variety exists. As mentioned in the study by Benke and others, “a continuum of speech symptoms rather than a uniform profile of speech” may subsist (Benke et al, 2000, pg. 323). With this being said, there still appears to be a prominent prevalence of “speech freezing” which can be compared to “blocks” of speech that is evident in individuals who stutter. The “speech freezing” has been

Clinical Implications

There appears to be an association between dysfluency and Parkinson's disease. This link is of clinical relevance for various reasons. From a diagnostic perspective, it may be relevant to examine individuals with either adult onset or re-emergent stuttering for basal ganglia disorders (Lim et al, 2005). This importance was emphasized in a case that mistook a 29-year old male that had adult-onset stuttering to have a conversion when in fact he was later diagnosed with a Parkinsonian-like syndrome (Leder, 1996).

C

- P.D., Benazzouz, A., LeBas, J.F., Benabid, A.L., & Pollak, P. (2003). Five-year follow-up of bilateral stimulation of the subthalamic nucleus in advanced Parkinson's disease. *N Engl J Med*, 329, 1925-1934.
- Leder, S.B. (1996). Adult onset of stuttering as a presenting sign in Parkinsonian-like syndrome: a case report.