

Aspiration Pneumonia in Parkinson’s Disease

Brittny Mills, RN, BSN



ABSTRACT

BACKGROUND AND SIGNIFICANCE: People diagnosed with Parkinson’s Disease have higher rates of dysphagia and aspiration pneumonia, increasing morbidity and mortality amongst this population. **PURPOSE:** The aim of this literature review is to show that with early detection and intervention, healthcare providers can improve quality of life with fewer cases of aspiration pneumonia in patients with Parkinson’s Disease. **RESEARCH QUESTION:** *In adult patients with Parkinson's Disease (P), do swallowing dysfunction tests and treatments (I) as opposed to no swallowing dysfunction interventions (C) help reduce rates of aspiration pneumonia (O)?* **METHODS:** Searches for applicable articles were conducted using the online research databases MEDLINE, PubMed Central, and CINAHL through the University of Arkansas for Medical Sciences library website. Search terms used included: Parkinson’s Disease, aspiration pneumonia, swallow dysfunction, intervention, swallow dysfunction test, swallow dysfunction treatments, and adult. Filters were applied to limit articles to full text, only in English language, and date published between 2011 to 2017. Thirteen studies were found that met criteria and, five articles were retained for this review. The five studies were qualitatively analyzed using critical appraisal items. **RESULTS:** Five of five studies showed a positive correlation between swallowing dysfunction tests and interventions and reduced rates of aspiration pneumonia and/or dysphagia in patients with Parkinson’s Disease. **CONCLUSIONS AND IMPLICATIONS:** The evidence from the five studies support the hypothesis that swallowing dysfunction tests and interventions do reduce the rates of aspiration pneumonia in patients with Parkinson’s Disease. Study limitations included the size of the population and stages of disease severity decreasing generalizability of study results. Another study limitation was the use of different interventions and measurement tools in each study, decreasing the applicability of the interventions. Based on these findings, it is recommend a large randomized controlled study to be conducted on the general adult male and female population with Parkinson’s Disease at various stages of disease severity, that aims to determine the effectiveness of different swallowing study interventions on reducing the rates of aspiration pneumonia at different disease stages in this population.

BACKGROUND

- Parkinson’s Disease is a common neurodegenerative brain disorder with dysphagia as a common symptom.²
- It has been estimated that Parkinson’s Disease patients have a 3.8 times increased risk of developing aspiration pneumonia.⁵
- Aspiration pneumonia has been reported as the most frequent cause of death in Parkinson’s Disease patients, and it has been estimated to account for 70 percent of the mortality.⁵
- Early recognition and intervention of dysphagia and other swallowing related impairments can prevent aspiration pneumonia and reduce morbidity and mortality in this population.

METHODS

The databases PubMed, Cumulated Index to Nursing and Allied Health Literature [CINAHL], and MEDLINE were utilized to search for relevant articles related to key concepts in the research question. The following limits were applied: Parkinson’s Disease, aspiration pneumonia, swallow dysfunction, intervention, swallow dysfunction test, swallow dysfunction treatments, and adult. The Boolean operator words “AND” and “OR” were applied to combine or exclude key concepts expanding the search and making it more focused. The collected article results were further examined for relevance by limiting the articles patient population to adults with Parkinson’s Disease, published between years 2011 to 2017, and full text, English language only. Thirteen articles were found that met criteria; the five articles were included and qualitatively analyzed using critical appraisal items.

RESULTS

- 3/5 studies used the Swallowing Quality of Life Questionnaire (SWALQOL) for outcome measurements.^{3,1,2}
- 1/5 studies used before and after intervention Swallowing Scores as the main outcome measurement.¹
- 1/5 studies used the Functional Dysphagia Scale (FDS) and the Penetration-Aspiration Scale (PAS) as an outcome measurement.⁴
- 1/5 studies used the MD Anderson Dysphagia Inventory (MDADI) and a Single-Item Dysphagia Severity Scale as outcome measurements.³
- 1/5 studies used Speech-Language Pathologist (SLP) based intervention for dysphagia to delay symptom onset as their primary intervention.²
 - SWAL-QOL domains total score improved after the SLP intervention period (p=0.033); significant symptom frequency improvement (p=0.025 and r=-2.24).²
- 1/5 studies used was a systematic review that aimed to evaluate the effectiveness of treatment for dysphagia in Parkinson’s Disease patients.⁶ The literature review explored Expiratory Muscle Strength Training (EMST) and Video-Assisted Swallowing Therapy (VAST) as an intervention.⁶
 - EMST and VAST are effective treatments for dysphagia in Parkinson’s Disease patients.⁶
- 1/5 studies used motor swallowing exercises designed to increase the strength and range of motion of the mouth, larynx and pharyngeal structures, coordination between breathing and swallowing, and airway protection as their primary intervention.¹
 - Motor swallowing exercises improved bolus control (P< 0.03), piecemeal swallow (P= 0.05) and residue on the tongue (P< 0.01), valleculae (P= 0.01) and pyriform sinuses (P= 0.05).¹
 - And quality of life domains: fear (P= 0.02) and symptom frequency (P= 0.05).¹ Improvement in the ability to move food around in the mouth when chewing was also a reported improvement (P= 0.02).¹
- 1/5 studies used a Videofluoroscopic Swallowing Study (VFSS) evaluated by three rehabilitation physicians and rehabilitation that determined the Penetration-Aspiration Score (PAS) and the Functional Dysphagia Scale (FDS) score.⁴
 - The FDS (odds ratio, 1.10; p=0.043) score was the most effective at independently predicting aspiration pneumonia in patients with Parkinson’s Disease.⁴
 - FDS based on VFSS findings has a significance of P=0.009.⁴
- 1/5 studies used traditional logopedic dysphagia treatment and traditional logopedic dysphagia treatment combined with Neuromuscular Electrical Stimulation (NMES) at sensor or motor level stimulation as primary interventions.³
 - All three randomized treatment groups showed significant improvement on the Dysphagia Severity Scale, SWAL-QOL, and the MDADI.³
 - The total as a group showed significant effect on the Burden scale (p=0.009), global assessment (p=0.000), and physical (p=0.000) and emotional subscales (0.002), supporting the hypothesis that swallowing dysfunction interventions help reduce rates of aspiration pneumonia in adult Parkinson’s Disease patients.³

CONCLUSIONS

The studies chosen for this systematic review show significant evidence that supports the clinical question: *In adult patients with Parkinson's Disease (P), do swallowing dysfunction tests and treatments (I) as opposed to no swallowing dysfunction interventions (C) help reduce rates of aspiration pneumonia (O)?* Five of five studies showed improved swallowing in patients with Parkinson’s Disease after receiving a swallow dysfunction study and/or intervention. This systematic review had several study limitations including small sample size, and variation in the populations’ disease severity. The difference in the interventions and forms of measurement used in each study is also a limitation. Based on these findings, it is recommended a large, randomized, controlled study to be conducted on the general adult male and female population with Parkinson’s Disease at various stages of disease severity, that aims to determine the effectiveness of different swallowing study interventions on reducing the rates of aspiration pneumonia at different disease stages in this population.

1.Argolo, N., Sampaio, M., Pinho, P., Melo, A., & Nóbrega, A. C. (2013). Do swallowing exercises improve swallowing dynamic and quality of life in Parkinson’s disease? *NeuroRehabilitation*, 32, 949-955. DOI: 10.3233/NRE-130918
2. Ayres, A., Jotz, G.P., Rieder, C.R. M., Schuh, A.F.S., & Olchik, M.R. (2016). The impact of dysphagia therapy on quality of life in patients with Parkinson’s disease as measured by the swallowing quality of life questionnaire (SWALQOL). *International Archives of Otorhinolaryngology*, 20(3), 202-206. DOI.org/10.1055/s-0036-1582450
3. Heijen, B. J., Speyer, R., Baijens, W. J., & Bogaardt, H. C. A. (2012). Neuromuscular electrical stimulation versus traditional therapy in patients with Parkinson’s disease and oropharyngeal dysphagia: Effects on quality of life. *Dysphagia*, 27, 336-345. DOI 10.1007/s00455-011-9371-z
4. Lee, J. H., Lee, K. W., Kim, S. B., Lee, S. J., Chun, S. M., and Jung, S. M. (2016). The functional dysphagia scale is a useful tool for predicting aspiration pneumonia in patients with Parkinson disease. *Annals of Rehabilitation Medicine*, 40(3), 440-446.
5. Martinez-Ramirez, D., Almeida, L., Giugni, J. C., Ahmed, B., Higuchi, M., Little, C. S., Chapman, J. P., Mignacca, C., Wagle Shukla, A., Hess, C. W., Wheeler Hegland, K., and Okun, M. S. (2015). Rate of aspiration pneumonia in hospitalized Parkinson’s disease patients: A cross-sectional study. *BMC Neurology*, 15(104), 1-6. DOI 10.1186/s12883-015-0362-9
6. Van Hooren, M.R.A., Baijens, L.W.J., Voskuilen, S., Oosterloo, M., & Kremer, B. (2014). Treatment effects for dysphagia in Parkinson’s disease: A systematic review. *Parkinsonism and Related Disorders*, 20, 800-807. DOI.org/10.1016/j.parkreldis.2014.03.026