

Relationship of respiratory infection with aspiration and other characteristics in Parkinsonism

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Introduction

Parkinson's disease and Parkinson plus syndrome are progressive neurodegenerative disorders. Most patients with Parkinsonism eventually develop dysphagia, and aspiration pneumonia is an important cause of morbidity and mortality in these patients. Although videofluoroscopic swallowing study (VFSS) is considered as 'gold standard' technique to assess dysphagia, the association between videofluoroscopic findings and respiratory infection in patients with Parkinsonism is not well studied. This study aimed to investigate the relationship of respiratory infection with aspiration and other findings in VFSS as well as clinical characteristics in patients with Parkinsonism.

Methods

Total 113 VFSS cases in 208 patients of Parkinsonism who were referred due to dysphagia symptoms were reviewed retrospectively from Dec. 2015 to Jan. 2018. Demographic characteristics and VFSS findings were collected by reviewing the electronic medical record for each patient. The videofluoroscopic dysphagia scale (VDS), which consisted of 14 items, were used to evaluate the functional components of swallowing. The swallowing disturbance questionnaire (SDQ), which consisted of 15 items, were used to evaluate history of the respiratory infection over last one year and dysphagia symptoms. The relationship of clinical characteristics and VFSS findings, including aspiration, with respiratory infection were analyzed by Mann–Whitney U Tests for continuous and ordinal variables, and Fisher exact tests for categorical variables.

Results

The patients with history of the respiratory infection were more older ($P = 0.019$) and had a higher score on the Hoehn and Yahr stage (Table 1). Videofluoroscopic evidence of aspiration and lip closure, bolus formation, apraxia, premature bolus loss, oral transit time, vallecular residue, pyriform sinus residue, coating of pharyngeal wall and penetration/aspiration of VDS were significantly associated with history of the respiratory infection (Table 2). However, type of aspirated diet and presence of reflex cough were not significantly related with history of respiratory infection in patients who showed aspiration in VFSS (Table 3).

Conclusion

This study suggested that age, Hoehn and Yahr stage, videofluoroscopic evidence of aspiration were associated with history of the respiratory infection in patients with

Parkinsonism. In addition, oral phase dysfunction, vallecular residue and pyriform sinus residues were more frequent and severe in patients with history of the respiratory infection. These characteristics and findings may be considered to prevent respiratory infection in dysphagic patients with Parkinsonism.

Table 1. Demographic and clinical characteristics of patients

Variable	All patients (N=123)	No history of respiratory infection (N=103)	History of respiratory infection (N=20)	P
Age, y (SD)	72.29 (9.31)	70.35 (8.77)	76.15 (10.69)	<i>0.019</i>
Sex, n (%)				0.079
Male	73 (59.3)	58 (56.3)	16 (80.0)	
Female	50 (40.7)	45 (43.7)	4 (20.0)	
Diagnosis, n (%)				0.220
IPD	56 (45.5)	44 (42.7)	12 (60.0)	
Parkinson plus syndrome				
MSA	28 (22.8)	26 (25.2)	2 (10.0)	
PSP	22 (17.9)	11 (10.7)	3 (15.0)	
CBD	2 (1.6)	2 (1.9)	0 (0.0)	
DLB	1 (0.8)	1 (1.0)	0 (0.0)	
Not diagnosed	14 (11.4)	11 (10.7)	3 (15.0)	
Duration, disease, y (SD)	6.44 (4.50)	6.46 (4.60)	6.35 (4.02)	0.989
Duration, dysphagia, y (SD)	1.85 (2.04)	1.85 (2.102)	1.85 (1.69)	0.673
Hoehn and Yahr stage, n. (%)				<i>0.011</i>
Hoehn and Yahr stage I-III	53 (43.1)	50 (48.5)	3 (15.0)	
Hoehn and Yahr stage IV-V	68 (55.3)	52 (50.5)	16 (80.0)	
Can not evaluate	2 (1.6)	1 (1.0)	1 (5.0)	
LED, n. (SD)	764.48 (544.59)	783.05 (561.92)	662.36 (436.36)	0.550

IPD : idiopathic parkinson's disease; MSA : multiple system atrophy; PSP : progressive supranuclear palsy; CBD : corticobasal degeneration; DLB : Dementia with Lewy bodies; LED : Levodopa equivalent dose.
p values <0.05 appear in italics.

Table 2. Relationship of aspiration and other findings in VFSS with history of respiratory infection

	No history of respiratory infection (N=103)	History of respiratory infection (N=20)	P
Aspiration on VFSS, n. (%)	43 (41.7)	15 (75.0)	<i>0.007</i>
No evidence of aspiration on VFSS, n. (%)	60 (58.3)	5 (25.0)	
VDS subdomains, n. (%)			
Lip closure (intact/inadequate + none)	93/10 (9.7)	14/6 (30.0)	<i>0.024</i>
Bolus formation (intact/inadequate + none)	39/64 (62.1)	2/18 (90.0)	<i>0.018</i>
Mastication (intact/inadequate + none)	40/63 (61.2)	5/15 (75.0)	0.314
Apraxia (none/mild + moderate + severe)	93/10 (9.7)	14/6 (30.0)	<i>0.024</i>
Tongue to palate contact (intact/inadequate + none)	70/33 (32.0)	11/9 (45.0)	0.306
Premature bolus loss (none/<10%/10–50%/>50%)	40/33/24/5 (61.2)	6/2/9/3 (70.0)	<i>0.046</i>
Oral transit time (≤1.5 s/>1.5 s)	91/12 (11.7)	13/7 (35.0)	<i>0.015</i>
Triggering of pharyngeal swallow (normal/delayed)	55/48 (46.6)	6/14 (70.0)	0.086
Vallecular residue (none/<10%/10–50%/>50%)	45/21/28/9 (56.3)	6/2/6/6 (70.0)	<i>0.037</i>
Laryngeal elevation (normal/impaired)	14/89 (86.4)	1/19 (95.0)	0.461
Pyriform sinus residue (none/<10%/10–50%/>50%)	62/26/12/3 (39.8)	7/6/2/5 (65.0)	<i>0.011</i>
Coating of pharyngeal wall (no/yes)	52/51 (49.5)	5/15 (75.0)	<i>0.049</i>
Pharyngeal transit time (≤1.0 s/>1.0 s)	89/14 (13.6)	15/5 (25.0)	0.193
Aspiration (none/supraglottic penetration/subglottic aspiration)	12/48/43 (88.3)	0/5/15 (100)	<i>0.005</i>

VFSS, videofluoroscopic swallowing study; VDS, videofluoroscopic dysphagia scale
p values <0.05 appear in italics.

Table 3. Relationship of type of aspirated diet and presence of reflex cough with history of respiratory infection in patients who showed aspiration in VFSS

	Aspiration without history of respiratory infection (N=43)	Aspiration with history of respiratory infection (N=15)	P
Diet type, n. (%)			0.484
Aspiration of thickened liquids or solid food	9 (20.9)	5 (33.3)	
Aspiration of thin liquids only	34 (79.1)	10 (66.7)	
Presence of reflex cough, n. (%)			1.000
Silent aspiration	35 (81.4)	12 (80.0)	
Aspiration with reflex cough	8 (18.6)	3 (20.0)	