

Correlation between voice intensity and swallowing function in subjects with Parkinson disease

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Introduction: People with Parkinson's disease (PwPD) may experience a variety of motor and non-motor impairments, including decreased voice loudness and dysphagia [1]. Dysphagia involves oral, pharyngeal, or esophageal phases of swallowing [2], leading to malnutrition and dehydration, pneumonia, and even death [3]. Instrumented vocal parameters seem useful for identifying PwPD with dysphagia since recent evidence has shown organs related to swallowing and speech are structurally and neurologically intertwined [4-5-6].

Objective: The aim of this study was to investigate: the relationship between voice intensity and swallowing function and determine if disease severity could affect this correlation.

Methods: 30 PwPD according to the MDS Clinical Diagnostic Criteria were recruited at IRCCS Don Gnocchi Foundation (Milan, Italy). The MDS-UPDRS Part III [7] was used to evaluate motor disability; sustained /a/ intensity and the intensity of 1 minute of spontaneous speech were analyzed with PRAAT software. The Penetration Aspiration Scale [8], the Dysphagia Severity [9] and Videofluoroscopic Dysphagia Scales [10] were used for swallowing evaluation during videofluoroscopy. Spearman correlation coefficient and logistic and linear model were used to analyze data.

Results: Speech intensity correlated with swallowing impairment (between -.42 and -.72 across scales), even when controlling for UPDRS motor scores (mean score= 47.2±13.8). Swallowing impairment is 56 times more likely (p<0.01) when the speech intensity is below the normal voice intensity cut-off score (> 60 dB). Furthermore, the positive predictive value indicates that among those who have a negative voice test (<60 dB), the probability of swallowing disorders is 93%.

Conclusions: The results of the present study confirm the correlation between voice and swallowing. Voice recording is a non-invasive, low-cost, easy-to-use assessment, potentially useful for clinicians to identify PwPD who need an instrumental examination investigating dysphagia, allowing timely management and reduction of complications, and improving life's quality.

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