ramr
American Review of Respiratory Medicine
Revista Americana de Medicina Respiratoria

CASE REPORT

ISSN 1852-236X

# Bilateral Vocal Cord Paralysis in a Patient with Parkinson's Disease. Interdisciplinary Management and Outcome in a Public Hospital in the Province of Buenos Aires. Case report

*Parálisis bilateral de cuerdas vocales en sujeto con Enfermedad de Parkinson. Manejo interdisciplinario y evolución en un hospital público de la provincia de Buenos Aires. Reporte de caso*

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*Received:* 10/25/2024
*Accepted:* 11/02/2024

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## ABSTRACT

This article shows a case report of bilateral vocal cord paralysis (BVCP) in a 64-year-old patient with Parkinson's disease (PD), a neurodegenerative disorder that affects motor coordination and causes alterations in speech, swallowing and breathing. The patient was admitted to the hospital with respiratory distress, initially diagnosed as bronchoaspiration pneumonia. After some tests, BVCP in the paramedian position was diagnosed, thus an emergency tracheostomy was performed. The patient showed respiratory improvement and subsequent tolerance to oral feeding.

During her hospitalization, different strategies for tracheostomy management were implemented and swallowing evaluations were performed, facilitating the return to oral feeding of semisolid and liquid consistencies. The patient also received assistance with motor rehabilitation and had tracheostomy management education both for her and her family. Despite the lack of access to neurology specialists, comprehensive treatment and family training enabled an adequate recovery and a successful transition to home care, improving the patient's quality of life.

The study highlights the rarity of BVCP in PD patients, the fact that it is frequently misdiagnosed, and the importance of an interdisciplinary approach to its management.

**Key words:** Parkinson's disease; Vocal cords; Differential diagnosis; Interdisciplinary care team

Rev Am Med Resp 2024;24:234-239
https://doi.org/10.56538/ramr.HDUW1663

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## RESUMEN

Este artículo presenta un caso clínico de parálisis bilateral de cuerdas vocales (PBCV) en una paciente de 64 años con Enfermedad de Parkinson (EP), un trastorno neurodegenerativo que afecta la coordinación motora y provoca alteraciones en el habla, la deglución y la respiración. La paciente ingresó al hospital con dificultad respiratoria, inicialmente diagnosticada como neumonía broncoaspirativa. Tras evaluaciones, se diagnosticó PBCV en posición paramediana, por lo que se optó por realizar una traqueostomía de urgencia. La paciente mostró mejoría respiratoria y posterior tolerancia a la alimentación por vía oral.

Durante su internación, se implementaron distintas estrategias de manejo de la traqueostomía y se realizaron evaluaciones deglutorias, facilitando el regreso a la alimentación oral de consistencias semisólidas y líquidas. La paciente también fue asistida en su rehabilitación motora y recibió educación para el manejo de la traqueostomía por parte de su familia.

A pesar de la falta de acceso a especialistas en neurología, el tratamiento integral y la capacitación de la familia permitieron una adecuada recuperación y una transición exitosa al cuidado domiciliario, mejorando la calidad de vida de la paciente.

El estudio destaca la rareza de la PBCV en pacientes con EP, su diagnóstico a menudo erróneo y la importancia de un enfoque interdisciplinario para su manejo.


**Palabras clave:** Enfermedad de Parkinson; Cuerdas vocales; Diagnóstico diferencial; Grupo de salud interdisciplinario

## INTRODUCTION

The larynx is a functionally complex organ that is part of the aerodigestive crossroads; it enables voice production, and plays a fundamental role in the ventilation and protection of the airways. Any structural alteration and/or laryngeal dysfunction can have significant consequences on an individual's health and quality of life.[1] Specifically, neurological conditions represent a risk factor, as they can interfere with the neuromuscular coordination required for these vital functions. This is evident in the physiopathology of multiple neurological disorders that impact speech, swallowing, and/or breathing in affected individuals.[1,2]

Parkinson's Disease (PD) is the second most prevalent neuromuscular disease worldwide, affecting over 7 million people globally. It is a neurodegenerative disorder characterized by a progressive loss of motor coordination control, primarily attributed to a decrease in dopamine secretion by neurons in the basal ganglia. Its symptoms are classified as motor, neuropsychiatric, and autonomic, with tremors, hypokinesia, and rigidity being the most prevalent, in addition to speech and swallowing disorders.[3] Laryngeal alterations manifest as dysphagia, respiratory obstruction, vocal cord problems, including vocal cord fatigue, voice tremor, dyspnea, rigidity in the voice, and inability to project the voice, primarily due to vocal cord movement disorders.[3,4] Additionally, the central control of respiratory muscles can also be affected, which, along with all other symptoms, can significantly impact the quality of life of patients with PD.[5]

Vocal cord paralysis is a rare diagnosis and is associated with increased morbidity and mortality.[4] To our knowledge, there have been reports of 19 cases worldwide in patients with PD.[3,6]

The aim of this study is to report a case of bilateral vocal cord paralysis (BVCP) in a patient with Parkinson's disease, which represented a challenge for its diagnosis and therapeutic definition in the context of hospitalization at a public hospital in the province of Buenos Aires.

## CASE REPORT

The case involves a 64-year-old female patient with a history of type 2 diabetes treated with oral hypoglycemics and PD diagnosed in 2021, treated with Levodopa (follow-up treatment with a private neurologist). Figure 1 shows the timeline with the relevant events from hospitalization to discharge.

On July 9, 2023, the patient was admitted to the emergency room of the Hospital Interzonal General de Agudos

"Petrona Villegas de Cordero" located in the northern area of Greater Buenos Aires. She was admitted due to respiratory difficulty that had begun 48 hours prior and was progressively worsening. She was alert, responded to simple and complex commands, had regular ventilatory mechanics, oxygen saturation of 90% by pulse oximetry ($SpO_2$) while breathing ambient air, a respiratory rate of 25 breaths per minute, and a heart rate of 110 beats per minute. The first diagnostic suspicion in the emergency room was bronchoaspiration pneumonia due to swallowing disorder associated with PD, thus a swallowing evaluation by the kinesiology team was initially requested.

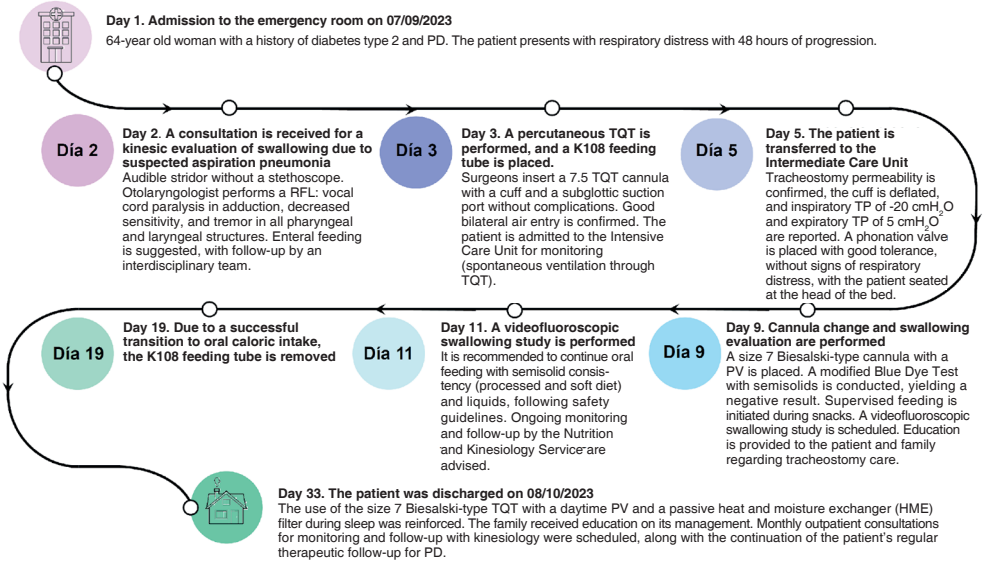
During the bedside swallowing evaluation, inspiratory laryngeal stridor was detected without a stethoscope. Also, weak voice, ineffective cough, use of accessory muscles for ventilation, and asymmetry of the soft palate (right-side drooping), with no swallowing or gag reflex present upon stimulation. Voluntary and spontaneous swallows were observed.

Given the patient's clinical condition, a consultation with the Otorhinolaryngology Department was requested, which performed a rhinofibrolaryngoscopy (RFL), revealing vocal cord paralysis in the midline, causing closure of the glottic space (Figure 2), decreased sensitivity, and tremor in the pharyngeal and laryngeal structures. After discussing with the treatment team and the patient, it was agreed to perform an urgent tracheostomy (TQT) to prevent the progression of respiratory failure (RF). The procedure was carried out on July 11 by the General Surgery Department using a percutaneous technique, placing a 7.5 cannula with an endotracheal cuff and a subglottic suction port. Following the procedure, the patient was transferred to the Intensive Care Unit for monitoring. She was spontaneously ventilating and hemodynamically stable. Additionally, an enteral feeding tube (type K108) was placed to ensure proper nutritional intake in a safe manner. In the following days, the patient responded favorably with improved ventilatory mechanics and 100% $SpO_2$ on ambient air.

Various surgical options were presented to the patient, such as cordopexy, cordotomy, or unilateral partial arytenoidectomy (procedures that would have required her transfer to another institution with the capability to handle such complexity) as alternatives to permanent use of the TQT. But the patient declined any intervention with potential risks that could prolong her hospital stay. Given this resolution, the necessary procedures were initiated to manage the required resources for home hospitalization for patients with TQT.

Starting on July 13, her hospitalization continued in the Intermediate Care Unit, where the relevant evaluations were conducted according to the protocol for managing tracheostomized patients by the kinesiology team, as well as swallowing assessments in collaboration with otorhinolaryngology.

48 hours after the tracheostomy was performed, tracheal pressures were measured, showing an inspiratory pressure of -20 $cmH_2O$ and an expiratory pressure of 5 $cmH_2O$. With these values, the use of a phonation valve (PV) was tested, showing a good clinical response, and daytime use was initiated. A few days later, the cannula was changed to a Biesalski type with an endocannula, and a modified Blue Dye Test was performed with semisolid foods, which resulted negative, allowing the start of supervised meals. Due to episodes of mucous blockage in the endocannula, the use of a passive thermohumidifier filter during the night was decided, a strategy that proved effective in improving TQT maintenance and the quality of inspired air.




PD: Parkinson's disease; RFL: rhinofibrolaryngoscopy; TQT: tracheostomy; TP: tracheal pressure; PV: phonation valve.

**Figure 1.** Timeline of relevant aspects of the subject's evolution

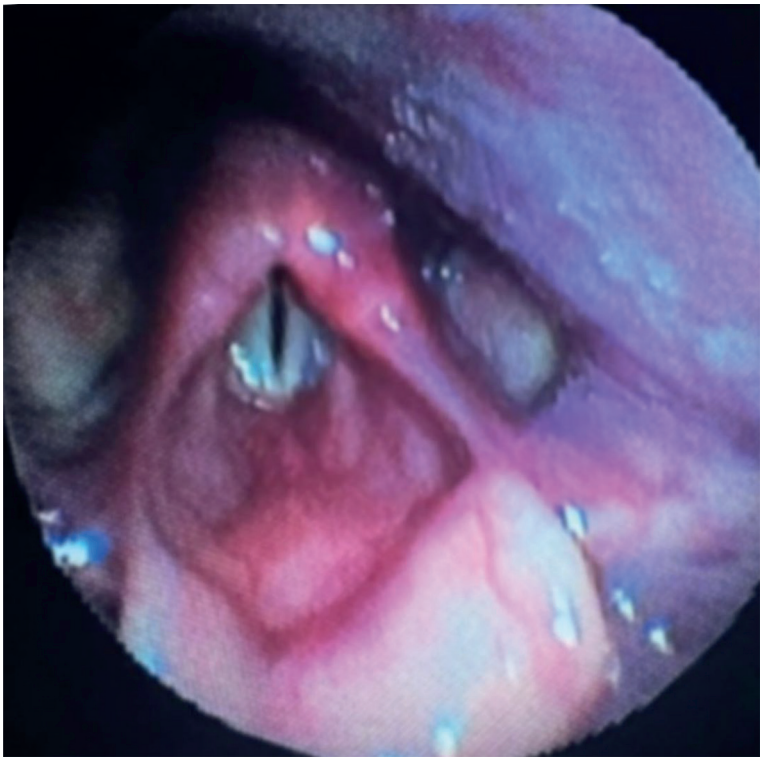


**Figure 2.** Rhinofibrolaryngoscopy showing bilateral vocal cord paralysis in a paramedian position

On the 11th day of hospitalization, a videofluoroscopy with barium sulfate staining of semisolid foods, liquids, and solids was performed. During the swallowing of a semisolid consistency (firm yogurt), the patient demonstrated adequate lip sealing and proper intraoral handling of the bolus, triggered the swallowing reflex at the base of the tongue and valleculae, and showed preserved laryngeal mobility and epiglottic closure, with no residue accumulating in anatomical recesses. No penetration or aspiration of food was observed, and esophageal transit showed no particularities. In the evaluation with liquids administered in 5 mL boluses via syringe, the same results were observed. During the swallowing of solid food (bread), regular intraoral handling of the bolus was observed, with slowing down of the preparatory and oral phases, requiring a double swallow, but no other particularities were noted in the remaining stages of swallowing. No coughing reflex was triggered during the study. Based on these results, it was agreed to continue with oral feeding of semisolid, processed, and liquid consistencies, and gradually progress to solid foods depending on the patient's clinical evolution and tolerance. After 8 days of this approach, the patient progressed to the point where total caloric intake was achieved orally, in collaboration with the Nutrition Service, allowing for the removal of the K108 tube.

During hospitalization, motor kinesiology assistance was also provided according to the patient's abilities and previous levels of functional independence, achieving slow walking with the help of family members and encouraging as much self-management as possible in daily living activities. Additionally, the medical team was advised to begin the process of requesting supplies for home care through the patient's health coverage provider. Family education was provided on the management of the tracheostomy and its care. This included teaching alarm signs for obstruction or accidental decannulation, as well as suction techniques for secretions.

The total hospital stay was 33 days until discharge to home care.

Currently, both the patient and her family continue to attend the hospital monthly for regular follow-up of the tracheostomy, ensuring the proper maintenance of the artificial airway and prevention of complications. Moreover, potential changes in the symptoms associated with BVCP are being evaluated, which might allow for modifications in the tracheostomy management. Additionally, nutritional follow-up is ongoing (with scheduled controls through the Nutrition Service). On the other hand, there are still barriers to accessing follow-up care with a specialized neurologist, not only to evaluate potential advances in the functional neuromuscular deterioration due to PD, but also to explore various pharmacological therapeutic approaches that could improve BVCP. These limitations stem from the lack of available professionals in the area accessible to the patient and her family, their economic resources, and the personal decision to prioritize the clinical stability achieved so far.

## DISCUSSION

Bilateral vocal cord paralysis is rarely observed in patients with PD, being more common with conditions such as multiple system atrophy. Although

cases of this alteration have been reported in the literature, its incidence in this population is low, suggesting a pathogenesis that remains poorly understood.[6] In the specific case of our patient, the clinical symptoms presented in the emergency room along with her medical history initially led to a misdiagnosis. This highlights the importance of an interdisciplinary approach for a comprehensive evaluation and appropriate management during hospitalization.

The patient's initial respiratory management required an emergency tracheostomy, a strategy similar to what has been reported in other cases in which maintaining upper airway (UAW) permeability is prioritized.[3,6]

A significant limitation in our case was the inability to use a collaborative medical approach to optimize neurological medication that could alleviate symptoms associated with BVCP, due to the lack of specialized professionals at our institution. However, cases in which BVCP-related stridor has resolved solely with pharmacological treatment—without the need for surgical intervention—are rare.[6-8] In this regard, laryngeal stridor in patients with PD can have various etiologies beyond BVCP, such as laryngospasm or dystonia,[9] requiring a thorough evaluation by neurologists, dosage adjustments of different medications, and individualized follow-up. But this type of specialized care wasn't easily accessible for our patient.

In contrast to other reported cases, our patient did not present with severe dysphagia, which allowed for oral feeding despite upper airway involvement and typical clinical symptoms such as dysphonia, vocal tremor, and increased respiratory effort. These symptoms have also been described in other case reports,[3,10] but most of them involve patients with a longer disease duration since diagnosis.

In the 2018 review by Hamdan et al, a total of 18 patients with PD were analyzed, reporting a male-to-female ratio of 2.6:1 for (BVCP), with the most common onset age being 63.94 years and an average duration of 9.58 years from diagnosis to symptom onset. In our case, the patient had a similar age to those in the review but had only a two-year disease progression since diagnosis. This could suggest a possible late diagnosis in relation to the onset of symptoms.[3]

The hospital stay was long despite the resolution of respiratory failure due to limited access to adequate home care resources for a patient with a tracheostomy. However, during this time, efforts were made to facilitate the transition home by providing extensive education and training to the family, who served as the patient's primary caregivers.

There are reports of other laryngeal surgical options performed in patients with PD and BVCP. However, in our case, these options were offered as a long-term therapeutic strategy after the tracheostomy (which was the best option in the emergency situation at our institution). The patient declined these procedures after receiving appropriate advice in that regard.

Despite the challenges presented within the context of emergency care of a public hospital, we were able to assess the case, consider differential diagnoses, and promptly resolve the emergency situation of a patient with PD presenting with an atypical case of acute RF due to BVCP. Our institution lacks specialized neurology professionals to optimally adjust pharmacological treatments and does not have the resources to offer all surgical alternatives from the onset of symptoms. However, the interdisciplinary management of the acute episode and subsequent tracheostomy care allowed the patient to make an informed and timely decision regarding her therapeutic course. This approach helped prevent severe complications and ensured a quality of life aligned with her condition and possibilities.

**Conflict of interest**
The authors have no conflicts of interest to declare.

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