Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v30i12.7166

COGNITIVE-COMMUNICATIVE PROFILE IN A CASE OF DRUG-INDUCED PARKINSONISM

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Abstract
The purpose of this case study was to evaluate the cognitive-communicative profile of a 44-year-old female patient diagnosed with drug-induced parkinsonism, which developed over a five-year period due to antipsychotic polypharmacy management for bipolar affective disorder and recurrent depression. To accomplish this, an evaluation plan was devised and implemented based on medical care guidelines and speech therapy in PD, including the administration of WAIS-IV, MocA, and NEUROBEL. The results indicated a cognitive-communicative disorder characterized by moderate global cognitive impairment, language alterations in the expressive and pragmatic aspects, and motor speech difficulties, which necessitate multidisciplinary intervention by neurorehabilitation. Furthermore, it is recommended that pharmacological therapy be reviewed by neurology and psychiatry services to improve the patients' quality of life and that of their family members.

Keywords: cognitive-communicative profile, parkinsonism, drug and induced

1. Introduction

Drug-induced parkinsonism (DIP) is characterized by symptoms such as bradykinesia, postural instability, rigidity, and high-frequency tremors, which are caused by alterations in the ganglion-basal dopaminergic circuit, specifically at the nigrostriatal level, in individuals without a history or diagnosis of Parkinson's disease. These symptoms can occur after the use of antidepressant drugs, D2, or calcium receptor blockers, with a variable temporal relationship of days to months between the use of the medication and the onset of clinical manifestations (Savica et al., 2017, as cited in Vasquez et al., 2021).

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) defines FIP as a category of major or mild neurocognitive disorders involving significant cognitive decline in higher brain functions that interfere with an individual's ability to perform daily activities. The duration and magnitude of medication use are necessary to maintain or improve symptoms after the discontinuation of drug treatment (DSM-5, 2013).

According to various reports, extrapyramidal syndrome (EPS) is the most common side effect of antipsychotic drugs and calcium antagonists worldwide, affecting between 10% and 54% of patients,

with a higher prevalence among females (Fernandez et al., 2020). Studies in Latin American countries have found a crude prevalence of 12.3% among 1,300 cases per 100,000 people and between 6.8% and 56% of patients seeking neurology services, making EPS one of the most common diagnoses because of factors such as advanced age, polypharmacy, treatment duration and dose, and type of agent (Lopez et al., 2012; Vale et al., 2018; Lopez, 2019).

The signs and symptoms of FIP, including acquired immunodeficiency syndrome, tardive dyskinesia, pre-existing movement disorders, cognitive impairment, and communication difficulties, can be reversed by discontinuing medication or may persist, causing cognitive and/or physical disabilities (Alvarez and Evidente, 2008, as cited in Lopez, 2019). A comprehensive examination of the literature on cognitive-communicative impairments in FIP indicates that certain medications used to treat emotional, behavioral, anxiety, and psychotic disorders have an impact on the central nervous system and may directly or indirectly influence motor processes involved in speech, leading to symptoms such as dry mouth or decreased salivation, muscle stiffness, slowness of movement, and limited movement of articulatory organs, which can hinder cognitive processes including attention and memory (Miarons & Rofes, 2017, referred to in Jordi, 2021).

Furthermore, case studies of patients with FIP have shown that 60% of them have been attributed to psychopharmacological treatment for psychotic disorders (Yomtoob, 2018). Follow-up neurology with significant pharmacological management in patients with FIP revealed clinical manifestations, including alterations in short-term memory, temporo-spatial disorientation, difficulties in visuospatial skills, executive dysfunction, attention deficits, and visual-auditory perceptual processes (Ramirez et al., 2017). Additionally, linguistic-communicative disorders are characterized by facial inexpressiveness, monotonous speech, dysphonia, articulatory inaccuracies, verbal dysfluency, trembling voice, and hypernasality, which can aggravate the efficiency and safety of oropharyngeal function (Batum et al., 2021).

Therefore, the study of cognitive-communicative disorders in FIP requires a thorough evaluation process that follows a care pathway, beginning with the signing of an informed consent form for the completion of an anamnesis, review of the clinical history, neurological and psychiatric assessment, paraclinical tests, imaging assessments, neuropsychological testing, and interdisciplinary assessments by the neurorehabilitation group to establish a differential diagnosis (Contreras et al., 2017; Arés et al., 2018; Agudo et al., 2021). Therefore, it is crucial to present an evaluative experience from the care practice of neuropsychology and speech therapy services in a patient with FIP that considers cognitive-communicative components to determine a diagnostic characterization that can adjust and/or modify pharmacological treatment and establish specific objectives in the neurorehabilitation area.

2. Method

2.1 Population

This is LMBB, a 44-year-old female patient, separated from the mother of two children, a housewife with a 5-year clinical picture of antipsychotic PIF due to pharmacological management of bipolar affective disorder, episodes of depression, and mental and behavioral disorders. Due to the use of opioids, the patient presented cognitive, speech, and language impairments with follow-up by neurology and psychiatry with significant pharmacological management. The patient was administered three doses of 3 mg/day of biperiden, 1 quetiapine 25 mg tablet at night; 0.5 mg/day of alprazolam; 900 mg/day of lithium carbonate; 10 mg/day of escitopran; 50 mg of sertraline in the morning, and 250 mg/day of valproic acid. No neurorehabilitation was performed.

2.2 Evaluation techniques and instruments

According to the legal principles for developing the research process and ensuring the participation of individuals with FIP, an interview was conducted with the patient and the adult son to gather information about the case study through informed consent, adhering to the ethical guidelines for human research in Colombia, based on Resolution 008430 of MinSalud (1993), and at the international level, the Helsinki Declaration (2013). The evaluation process was based on the Clinical

Practice Guide (Arés et al., 2018) and speech therapy protocol for managing patients with PD (Agudo et al., 2021), which outlines a comprehensive assessment route to determine the cognitive-communicative profile. A tailored assessment plan was devised and implemented utilizing both standardized and qualitative assessment methods. Initially, the anamnesis process was conducted using the neurorehabilitation clinical history format for adults (Contreras et al., 2017), which covered personal, family, psychiatric, psychosocial, neurological, economic, clinical history, current health situation, activities of daily living, communicative history and skills, pharmacological treatments, and interdisciplinary neurorehabilitation. The Adult Intelligence Scale-WAIS-IV was used to gauge cognitive profile (Wechsler, 2012), while the Montreal Cognitive Assessment (MoCA) test was administered to assess global cognitive function (Nasreddine et al. 2005).

González and Toledo's protocol (2000) was used to evaluate the motor aspects of speech, assessing breathing, phonation, resonance, oral motor control in articulation, and prosody. Additionally, the language-NEUROBEL battery, adapted by Adrián et al. (2015), was administered to assess the basic production and comprehension processes. The rapid pragmatic evaluation protocol, revised PREP-R (Fernández et al., 2015), was also applied to evaluate the pragmatic aspect and determine the status of specific and general communicative skills. The results were interpreted based on correction rules to determine the degree of performance for each test, with the synthesis of scores establishing a global cognitive profile. For the qualitative evaluation of language and speech, schemes were designed to describe the communicative characteristics of the patient.

3. Results

The following passage provides an overview of the patient's cognitive–communicative profile based on the administration of standardized and qualitative evaluation methods. As shown in Table 1, the patient demonstrated a low level of cognitive ability to perform tasks that required both verbal and nonverbal support. Specifically, patients experience difficulties in verbal comprehension, including defining and expressing similarities between words and answering questions related to general principles and social situations. The patient also exhibited challenges in fluid reasoning, spatial processing, and visuomotor integration. Furthermore, patients' short-term memory skills are compromised, as evidenced by struggles with tasks such as repeating a list of numbers in order, recalling a series of numbers and letters, and performing simple visual information tasks such as scanning, sorting, and discriminating. Overall, the patient's working memory skills, including attention, concentration, mental control, and reasoning, were also affected.

Table 1. Description of the results of the Wechsler Adult Intelligence Scale - WAIS-IV

SUB-PRUEBAS	**SCALAR SCORING**	**AVERAGE**		**D.E**	**INTERPRETATION QUALITATIVE**	
Cube designs	1	10		3	**Low**	
Similarities	2	10		3	**Low**	
Digit retention	2	10		3	**Low**	
Matrices	2	10		3	**Low**	
Vocabulary	4	10		3	**Low**	
Arithmetic	1	10		3	**Low**	
Symbol search	2	10		3	**Low**	
Visual puzzles	1	10		3	**Low**	
Information	3	10		3	**Low**	
Keys	4	10		3	**Low**	
Scale	**Scalar scoring**	**Composite score**		**Percentile rank**	**95% confidence interval**	**Qualitative classification**
Verbal comprehension	9	ICV	62	1	58-70	**Very low**
Perceptual reasoning	4	IRP	48	≤ 0.1	44-57	**Very low**
Working memory	3	IMT	49	≤ 0.1	45-59	**Very low**
Processing speed	6	IVP	63	1	58-75	**Very low**
Total IQ	**22**	CIT	**50**	≤ 0.1	57-56	**Very low**

Table 2 demonstrates that the patient had compromised cognitive functioning, as evidenced by deficits in visuoconstructive skills, difficulties in retaining, storing, and recalling information, and challenges with attention and mental calculation. Additionally, phonological fluency is hindered by inhibitory processes and linguistic errors, leading to low performance indicators of pathological risk and a moderate level of cognitive impairment. Please note that no changes have been made to citations, references, or in-line citations and the numbers remain unchanged. The sentence has been rephrased to improve clarity and language quality, while adhering strictly to American English spelling, specific terms, and phrases.

Table 2. Description of the results of the Montreal Cognitive Assessment- MoCA

Domains	**Tests**	**PD**	**QUALITATIVE DESCRIPTION**
Executive function	T.M.T B	0/1	**I.C**
Visuoconstructive skills	Cubes	0/1	**I.C**
	Clock	1/3	**Low**
Memory	Word list		
	Delayed recall	0/5	**I.C**
Attention	Digits in progression	0/1	**I.C**
	Digits in regression	0/1	**I.C**
	Auditory detection	0/1	**I.C**
	Subtraction	1/3	**Low**
Language	Naming	3/3	**Average**
	Sentence repetition	1/2	**Low average**
	Verbal fluency	0/1	**I.C**
	Similarities	2/2	**Average**
Orientation	Temporal	3/4	**Low average**
	Spatial	1/2	**Low average**
TOTAL		12/30	**Moderate cognitive impairment**

Table 3 suggests that the patient exhibits impairments in oral language, which are evident in their difficulty in the comprehension process when distinguishing between similar and/or different words, recognizing genuine or fabricated words, and understanding intricate instructions. Furthermore, their production process is constrained by specific linguistic mistakes such as anomias, phonetic errors, and semantic paraphrases that occur during the retrieval of words.

Table 3. Description of the results of the NEUROBEL battery

BASIC LANGUAGE PROCESSES COMPREHENSION	**TASKS**	**PD**	**QUALITATIVE DESCRIPTION**
COMPRENSION	Phoneme discrimination	10/24	Low average
	Auditory lexical decision	14/24	Average
	Spoken word-drawing matching	12/16	Average
	Sentence comprehension	5/12	Low average
PRODUCTION	Repetition	10/24	Low
	Picture naming	9/24	Low
	Action naming	5/12	Low
	Sentence Completion	5/12	Low
TOTAL		**70/148**	Low

Table 4 reveals the limitations demonstrated by the patients in their conversational and discursive abilities when acting as the sender and attempting to convey a message. These limitations stem from

difficulties in producing speech acts with a clear enunciation, a limited capacity to produce illocutions, and syntactic paragrammatism in the organization and structuring of oral discourse. Additionally, there are multiple linguistic errors of the anomic type, including circumlocutions and literal and semantic paraphasias, which disrupt the flow of conversation and cause delays in turn taking. Despite these challenges, when acting as a receiver, patients utilize non-verbal cues, such as gestures, facial expressions, and eye contact, to confirm their understanding of information. However, the reliability of this understanding is sometimes compromised by the presence of bradykinesia.

Table 4. PREP-R Results Description

LEVELS OF PRAGMATIC ANALYSIS	COMMUNICATIVE BEHAVIORS		PD	QUALITATIVE DESCRIPTION
Enunciative Pragmatics	Speech acts	Production	**2/3**	Low average
		Intentionality	**1/2**	Low average
	Editing tasks	Compensatory behaviors	**3/3**	Average
		Rectifications and metapragmatics	**1/1**	Average
	Interference	Principles of cooperation	**3/5**	Low average
		Conventional implicit	**1/1**	Average
Textual Pragmatics	Coherency	Textual superstructures	**0/2**	Low
		Thematic management	**1/2**	Low average
	Cohesion	Lexical efficiency	**0/1**	Low
		Morphology	**0/1**	Low
		Syntax	**0/1**	Low
Interactive Pragmatics	Conversational turn	Agility	**0/1**	Low
		Fluency	**0/1**	Low
		Participation rate	**0/1**	Low
		Predictability	**0/1**	Low
		Priority	**0/1**	Low
		Natural gestures	**1/1**	Average
		Communicative use of gaze	**1/1**	Average

Table 5 demonstrates the consequences of linguistic limitations on communicative abilities, particularly in areas such as grammar and pragmatics, which can impact both specialized and general language skills. These limitations can affect cognitive functions involving attention and the capacity to process and retrieve information, ultimately affecting the ability to communicate effectively and efficiently.

Table 5. Description of the results of the patient's communicative competence index

MEASURES OF COMMUNICATIVE COMPETENCE	PD	RESULTING NUMERICAL INDEX
General pragmatic index	**14/29**	**48.2%**
Specific pragmatic ability	**11/21**	**52.3%**
Grammatically based pragmatic ability	**3/8**	**37.5%**

The patient exhibited dysfunctions in speech motor processes, as shown in Table 6, which highlights the characteristics of these dysfunctions. Specifically, the patient's poor phonorespiratory efficiency was due to an oral mode with costal-superior support that limited airflow for phonation, resulting in aggravated timbre characteristics, low tone, and weak intensity. Additionally, audible nasal emissions were present due to the limited opening of the oral cavity, deficient agility, and lingual mobility. Furthermore, diadochokinesia was observed in the patient's articulatory production of syllables and complex series, which restricted the continuity and fluency of repetition and altered the suprasegmental aspects of the intonation, rhythm, and musicality of oral production.

Table 6. Description of results of the speech protocol

BASIC MOTOR PROCESSES OF SPEECH	PD	PERFORMANCE APPRAISAL
Breathing	3/5	Moderate impairment
Phonation	4/5	Moderate to severe impairment
Resonance	3/5	Moderate impairment
Oral motor control and articulation	4/5	Moderate to severe impairment
Prosody	4/5	Moderate to severe impairment
Intelligibility	3/5	Moderate to severe deficiency

4. Discussion

The process of evaluating a patient with FIP to establish a cognitive-communicative profile necessitates the creation and implementation of an evaluation plan based on medical clinical guidelines and speech therapy protocols. This plan should include standardized and qualitative methods to assess the patient's global cognitive compromise, which is moderate in degree because of short-term memory failures, attention deficits, executive and visuoconstructive dysfunction, and expressive alterations. These alterations are characterized by the presence of multiple linguistic errors, such as paragrammatism, anomias, circumlocutions, and literal and semantic paraphasias, causing poor conversational and discursive skills. Additionally, the patient experienced difficulties in motor speech acts, including imprecise articulation, nasal emissions, dysfluency, dysphonia, and dysprosody. These findings are consistent with the diagnosis of FIP, as revealed by a review of the patient's clinical history and antipsychotic pharmacological records over the past five years. A systematic review of the literature shows that the dose and individual susceptibility to therapeutic agents in categories such as opioids, antipsychotics, antidepressants, psychoactives, sedatives, and hypnotics can affect the function of the central nervous system (Ropper et al., 2016).

When examining the limitations that can lead to the misuse of medications, such as quetiapine, alprazolam, lithium carbonate, escitalopram, sertraline, and valproic acid, which are used to treat bipolar affective disorder and depression, it is inferred that the patient had been prescribed an important pharmacological regimen that justifies the appearance of parkinsonian symptoms. Studies by Rojas et al. (2010) and Salguero (2016) have found that patients taking an average of 2.84 medications per day exhibit an unreasonable use of atypical antipsychotics, with 9.26% showing features of parkinsonism due to dopaminergic blockade that negatively affects the cognitive and communication functions of the brain.

This study reveals that the results align with the observations made by Picó and Yévenes (2019) and Aguado et al. (2021), where individuals with Parkinson's disease exhibit significant communication traits influenced by disorders in the control of orofacial, phonatory, and respiratory muscles. These disorders can lead to hypotonia, hyponasality, dysphonia, hypokinetic dysarthria, dysfluency, and dysprosody. Additionally, the rigidity, slowness, and low motor amplitude of the phonoarticulatory organs contribute to these issues. At the language level, individuals with Parkinson's disease face challenges in the morphosyntactic aspect of oral discourse, which negatively affects facial expression control for effective communication (Paredes and Espinosa, 2020). Cognitive deficits are also evident, particularly when monitoring task changes, verbal working memory, and cognitive flexibility (Vázquez, 2021).

To create a comprehensive cognitive-communicative profile for patients with FIP, it is crucial to conduct evaluations following the care guidelines for AD management. The neuropsychologist-audiologist dyad should collaborate to characterize the patient's behavior holistically. This approach allows for the identification of restrictions in cognitive-communicative processes that hinder an individual's family and social relationships. By establishing objectives for cognitive-communicative processes, the neurorehabilitation process can be adjusted to address a patient's specific needs. This is essential for justifying the review and adjustment of pharmacology by neurology and psychiatry services, ultimately improving the patient's quality of life and that of their families.

5. Conclusions

Reiterating the significance of conducting neuropsychological and speech therapy evaluations for patients with FIP is crucial to create a more precise profile of the cognitive-communicative impairments they experience. By establishing this profile, medical professionals can effectively guide pharmacological and interdisciplinary neurorehabilitation treatments, ultimately improving patients' quality of life. Research on this topic not only benefits the academic and scientific community by publishing case study results but also presents a multitude of research opportunities using diverse study variables and specific populations.

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