



Case Report

Pleural Effusion and Pulmonary Hypertension in a Patient With Parkinson Disease Treated With Cabergoline

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ABSTRACT

Cabergoline is a synthetic dopamine agonist used to treat Parkinson disease. The drug occasionally induces pleuropulmonary adverse effects, which manifest as pleural thickening or effusion, interstitial pneumonitis, pulmonary infiltrates, or fibrosis. We report a rare case of pleural effusion and severe pulmonary hypertension in a 79-year-old man with Parkinson disease who had been treated with cabergoline for 1 year. The symptoms disappeared 10 months after the drug was discontinued.

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Derrame pleural e hipertensión pulmonar en un paciente con enfermedad de Parkinson en tratamiento con cabergolina

RESUMEN

La cabergolina es un fármaco sintético dopaminérgico, que se utiliza en el tratamiento de la enfermedad de Parkinson y que rara vez produce efectos adversos pleuropulmonares, los cuales se manifiestan como engrosamiento o derrame pleurales, neumonitis intersticial, infiltrados pulmonares o fibrosis. Presentamos un caso excepcional en un varón de 79 años con enfermedad de Parkinson, tratado con cabergolina durante un año, que presentó un derrame pleural y grave hipertensión pulmonar, que desaparecieron a los 10 meses de la retirada de este fármaco.

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Introduction

Parkinson disease is an insidious, progressive clinical entity of unknown origin that is characterized by tremor, muscle stiffness, slow movements, and abnormal gait or postural reflexes.¹ It affects 1% to 5% of the population and has an annual incidence of approximately 20 cases per 100 000. The condition is the second most common neurodegenerative disease after Alzheimer disease,^{1,2} and lifelong medical treatment is required. The main

drugs used to manage the condition are anticholinergic agents, amantadine, and levodopa or other dopamine agonists^{1,3} (including bromocriptine, pergolide, and cabergoline) used as first-line alternatives with a similar efficacy. The most common adverse effects are vomiting, nausea, and orthostatic hypotension, as well as dyskinesias, insomnia, hallucinations, confusion, and other neurologic disorders.³ Coronary vasospasm, heart valve involvement, pulmonary fibrosis, and pleural effusion are far more unusual and have never been diagnosed concurrently with

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Figure 1. A, Posteroanterior chest radiograph. Left pleural effusion. B, Chest radiograph at 10 months of follow-up, with disappearance of the pleural effusion.

pulmonary hypertension, as occurred in the case we describe below.³⁻⁵

Case Description

The patient was a 79-year-old man with no history of substance abuse or allergies who had been previously diagnosed with Parkinson disease. He was receiving oral therapy with levodopa (250 mg/d), methylphenidate hydrochloride (20 mg/d), rasagiline (1 mg/d) and, for the past 12 months, cabergoline (2 mg/d). Thirty days before admission, he presented persistent cold symptoms with cough, sputum production, and progressively increasing dyspnea, but no chest pain, constitutional syndrome, or fever. There was no improvement after treatment with oral levofloxacin; radiographs showed a left pleural effusion with no loss of volume or condensation (Figure 1A). Physical examination ruled out symptoms of heart failure, venous thrombosis, or palpable enlarged lymph nodes. Auscultation of the heart detected a systolic murmur with no third heart sound or rhythm abnormalities; auscultation of the chest revealed symptoms of a left pleural effusion with no rales or signs of bronchospasm.

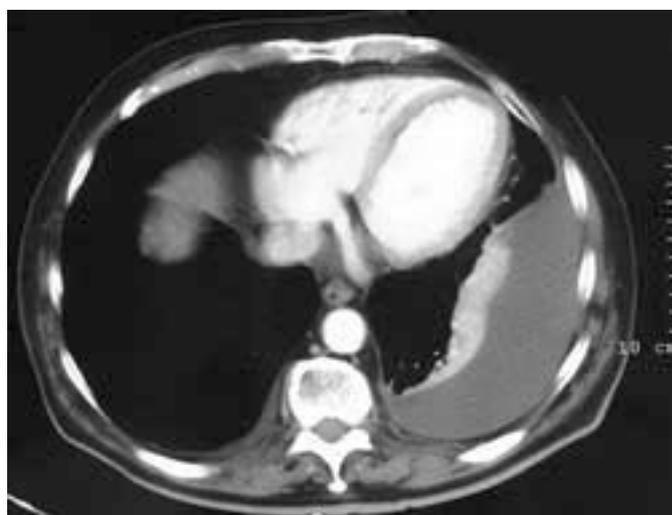


Figure 2. Computed tomography of the thorax. Left pleural effusion with minimal amount of fluid on the right side.

The laboratory workup (coagulation, D-dimer, troponins, thyroid hormones, carcinoembryonic antigen, collagen disease markers, human immunodeficiency and hepatitis C virus serology, and urinary sediment) was normal. Baseline arterial blood gas results were pH of 7.43, PaO₂ of 75 mm Hg, and PaCO₂ of 39 mm Hg. A Doppler study of the lower limbs and ventilation-perfusion lung scintigraphy ruled out thromboembolic disease. The tuberculin test and 3 sputum smears were negative. Computed tomography confirmed the left effusion, with no pleural thickening and with a minimal amount of fluid on the right side (Figure 2), and also revealed enlargement of the pulmonary artery, and bilateral enlarged mediastinal lymph nodes less than 1 cm, but with no signs of parenchymal involvement. Thoracentesis obtained a clear fluid indicative of transudate (pH, 7.46; glucose, 113 mg/dL; lactate dehydrogenase, 98 U/L; pleural-fluid to blood ratio of lactate dehydrogenase, 0.4, and of proteins, 0.3; cholesterol, 19 mg/dL; adenosine deaminase, 12 U/L; and white blood cell count, 120/μL, with 65% lymphocytes). The cytology, smear tests, cultures of 3 fluid samples, and Abrams percutaneous pleural biopsy found no granulomas or atypical cells. The bronchoscopy revealed no significant endobronchial abnormalities, and cytology, culture, and bronchial aspirate tests were negative. The electrocardiogram showed sinus rhythm with complete right bundle-branch block and S1Q3T3 complex. A subsequent echocardiogram confirmed severe tricuspid regurgitation, right ventricular dilation, and pulmonary hypertension (estimated pulmonary arterial pressure, 80 mm Hg), with mild-to-moderate mitral regurgitation, a normal left ventricle, and an ejection fraction of 51%, with no pericardial effusion.

In view of these findings, cabergoline was withdrawn, respiratory physiotherapy was started, and diuretic therapy was initiated to obtain negative fluid balance. At 2 months, follow-up radiographs confirmed a noticeable decrease in the pleural effusion, and the diuretics were withdrawn. At 10 months, the patient was asymptomatic and no pleural effusion was observed on the radiograph (Figure 1B). The follow-up echocardiogram showed no dilation of the right chambers, minimal tricuspid regurgitation, a pulmonary pressure of 32 mm Hg, and mild mitral regurgitation.

Discussion

Some of the drugs prescribed most often by neurologists, such as carbamazepine, hydantoin, and antidepressants, can cause

pulmonary toxicity, particularly in the form of pneumonitis (with or without eosinophilia), noncardiogenic pulmonary edema, or hypersensitivity reactions.^{5,6} This possibility is less common in the ergoline group, which includes bromocriptine and cabergoline.⁷ Cabergoline is a long-acting synthetic dopamine agonist used to treat Parkinson disease, hyperprolactinemia, and acromegalia; it rarely causes adverse pleuropulmonary effects.^{4,7,8} The pathogenesis of these adverse effects is unclear; they are known to be potentially reversible and to include pleural thickening and effusion, as well as possible interstitial pneumonitis and pulmonary infiltrates and fibrosis.⁹⁻¹¹ Pleural involvement is more common than parenchymal involvement, and a literature search (MEDLINE, 1966-2007) did not reveal any cases with severe pulmonary hypertension attributable to cabergoline or other dopamine agonists in the same family used to treat Parkinson disease.

Most pleural effusions associated with dopamine antagonists are lymphocytic, and occasionally eosinophilic, exudates.^{12,13} In these patients, the agonist effect on serotonin receptors stimulates fibroblast activity and the subsequent fibrosis of affected organs or tissues, which reverts with discontinuation of the drug.^{12,14} In our patient, the echocardiography results, bilateral pleural involvement, and confirmation of transudate without pleural thickening did not suggest direct pleural involvement or valvular or ischemic heart disease, as reported in other patients.^{9,15} The mechanism by which cabergoline causes pulmonary hypertension is not clear; however, in some patients it is probably a similar mechanism to that of anorexigenic agents, such as fenfluramine, with complex cell biology effects that alter the production, release, and metabolism of serotonin or its metabolites.¹⁶ The progressive rise in pulmonary pressure increases hydrostatic pressures and reduces the reabsorption of pleural fluid, facilitating its accumulation in the form of transudate, with no direct pleural lesion.^{13,17}

Most of the adverse pleuropulmonary effects of cabergoline have a good prognosis and are reversible once the drug is discontinued, as occurred in our patient, although persistence or progression have been reported in cases with fibrosis.^{7,9,10} This possibility, along with increasing reports of pleuropulmonary

adverse effects, makes it necessary to recommend follow-up of these patients, as well as to consider possible alternatives to cabergoline in those at higher risk of developing heart or lung disease.

References

1. Nutt JG, Wooten GF. Diagnosis and initial management of Parkinson's disease. *N Engl J Med.* 2005;353:1021-7.
2. Lang AE, Lozano AM. Parkinson's disease. Second of two parts. *N Engl J Med.* 1998;339:1130-43.
3. Korczyn AD, Nussbaum M. Emerging therapies in the pharmacological treatment of Parkinson's disease. *Drugs.* 2002;62:775-86.
4. Villavicencio C, Ramírez A, Gayete A, Grau S, Orozco M. Toxicidad pleuropulmonar precoz asociada al tratamiento con cabergolina, un fármaco antiparkinsoniano. *Arch Bronconeumol.* 2007;43:519-22.
5. Cooper JA, White DA, Matthay RA. Drug-induced pulmonary disease (part 2). Noncytotoxic drugs. *Am Rev Respir Dis.* 1986;133:488-505.
6. Haro M, Rubio M, Puig J. Enfermedad pulmonar asociada a la administración de fluoxetina. *Arch Bronconeumol.* 2002;38:153.
7. Pfitzenmeyer P, Foucher P, Dennewald G, Chevalon B, Debieuvre D, Bensa P, et al. Pleuropulmonary changes induced by ergoline drugs. *Eur Respir J.* 1996;9:1013-9.
8. Curran MP, Perry CM. Cabergoline. A review of its use in the treatment of Parkinson's disease. *Drugs.* 2004;64:2125-41.
9. Frans E, Dom R, Demedts M. Pulmonary changes during treatment of Parkinson's disease with long-acting ergot derivative, cabergoline. *Eur Respir J.* 1992;5:263-5.
10. Frank W, Moritz R, Becke B, Pauli R. Low dose cabergoline induced interstitial pneumonitis. *Eur Respir J.* 1999;14:968-70.
11. Townsend M, MacIver DH. Constrictive pericarditis and pleuropulmonary fibrosis secondary to cabergoline treatment in Parkinson's disease. *Heart.* 2004;90:47-8.
12. Morelock SY, Sahn SA. Drugs and the pleura. *Chest.* 1999;116:212-21.
13. Villena V, Ferrer J, Hernández L, de Pablo A, Pérez E, Rodríguez F, et al. Normativa SEPAR: diagnóstico y tratamiento del derrame pleural. *Arch Bronconeumol.* 2006;42:349-72.
14. Newman-Tancredi A, Cussac D, Quentric Y, Touzard M, Verrière L, Carpentier N, et al. Differential actions of antiparkinson agents at multiple classes of monoaminergic receptor. III. Agonist and antagonist properties at serotonin, 5-HT(1) and 5-HT(2), receptor subtypes. *J Pharmacol Exp Ther.* 2002;303:815-22.
15. Schade R, Andersohn F, Suissa S, Haverkamp W, Garbe E. Dopamine agonists and the risk of cardiac-valve regurgitation. *N Engl J Med.* 2007;356:29-38.
16. Higenbottam T, Laude L, Emery C, Essener M. Pulmonary hypertension as a result of drug therapy. *Clin Chest Med.* 2004;25:123-31.
17. Villena V. ¿De qué nos informa el líquido pleural? *Arch Bronconeumol.* 2003;39:193-4.