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# Electroconvulsive therapy and anticoagulation after pulmonary embolism: a case report

*Eletroconvulsoterapia e anticoagulação após tromboembolismo pulmonar: relato de caso*

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## ABSTRACT

**Introduction:** Electroconvulsive therapy (ECT) is considered the most effective treatment for catatonia regardless its underlying condition. The rigid fixed posture and immobility observed in catatonia may lead to several clinical complications, of which, pulmonary embolism (PE) is one of the most severe. The rapid improvement of the psychiatric condition in catatonia-related PE is essential, since immobility favors the occurrence of new thromboembolic events and further complications. In that scenario, ECT should be considered, based on a risk-benefit analysis, aiming at the faster resolution of the catatonia. **Methods:** Case report and literature review. **Results:** A 66-years-old woman admitted to the psychiatric ward with catatonia due to a depressive episode presented bilateral PE. Clinically stable, but still severely depressed after a trial of antidepressants, she was treated with ECT in the course of full anticoagulation with enoxaparin. After five ECT sessions, her mood was significantly better and she was walking and eating spontaneously. She did not present complications related either to PE or to anticoagulation. After the eighth ECT session, she evolved with hypomania, which was managed with oral medication adjustments. The patient was completely euthymic at discharge. **Conclusion:** The case we presented provides further evidence to the anecdotal case reports on the safety of ECT in the course of concomitant full anticoagulant therapy after PE, and illustrates how, with the proper precautions, the benefits of ECT in such condition might outweigh its risks.

## Keywords

Electroconvulsive therapy, pulmonary embolism, catatonia, enoxaparin.

## RESUMO

**Introdução:** A eletroconvulsoterapia (ECT) é considerada o tratamento mais eficaz para catatonia independente da causa base. Rigidez e imobilidade são comumente observadas e podem levar a diversas complicações clínicas, das quais o tromboembolismo pulmonar (TEP) é a mais grave. A melhora rápida da condição psiquiátrica de base no TEP associado à catatonia é fundamental, uma vez que a imobilidade favorece a ocorrência de novos eventos tromboembólicos e suas complicações. Nesse cenário, a indicação de ECT deve ser considerada, pesando-se riscos e benefícios, visando-se à rápida resolução do quadro catatônico. **Métodos:** Relato de caso e revisão da literatura. **Resultados:** Paciente de 66 anos estava internada em enfermaria de psiquiatria com quadro catatônico devido a episódio depressivo

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**Palavras-chave**

Eletroconvulsoterapia,  
embolia pulmonar,  
catatonia, enoxaparina.

quando apresentou TEP bilateral, necessitando de medidas de suporte ventilatório e, posteriormente, de anticoagulação plena com enoxaparina. Embora clinicamente estável, apresentava-se ainda gravemente deprimida após ensaio com antidepressivos. Foi indicada ECT apesar de manter-se terapia de anticoagulação concomitante. Após cinco sessões de ECT, o humor da paciente apresentou significativa melhora e ela já andava e comia espontaneamente. Não houve complicações relacionadas ao TEP ou à anticoagulação com enoxaparina. Após a oitava sessão, evoluiu com hipomania, manejada com ajustes da medicação oral. A paciente recebeu alta hospitalar completamente eutímica. **Conclusão:** O caso apresentado oferece evidência adicional em favor da segurança da ECT concomitante à anticoagulação plena após TEP, mostrando que, com precauções adequadas, os benefícios na ECT em tais situações podem superar seus riscos.

**INTRODUCTION**

Catatonia is a neuropsychiatric syndrome associated to conditions such as mood disorders and schizophrenia, as well as to general medical conditions, such as multiple sclerosis. It is characterized by the presence of marked psychomotor disturbances, negativism, mutism, echolalia and echopraxia<sup>1,2</sup>. The rigid fixed posture and prolonged immobility commonly observed in catatonia may lead to several clinical complications, of which, PE is one of the most severe<sup>2-4</sup>.

PE is a clinical emergency, requiring immediate hemodynamic and ventilatory support in order to prevent a fatal outcome and anticoagulation therapy for circulatory restoration. The rapid improvement of the psychiatric condition in catatonia-related PE is also essential, since motor immobility favors the occurrence of new thromboembolic events and further complications such as bedsores, rhabdomyolysis and infections<sup>5</sup>. In that scenario, ECT should be considered, based on a risk-benefit analysis, since it is still considered the most effective treatment for catatonia regardless its underlying condition<sup>2,3,5,6</sup>.

Data on the safety of ECT in patients who recently suffered PE are scarce. Aiming at providing further support to the feasibility of this treatment option, we report a case of catatonia successfully treated with ECT shortly after PE, while the patient was still under full anticoagulation with enoxaparin.

**CASE REPORT**

A 66-years-old Caucasian woman with a 20-years history of bipolar disorder type II and several hospitalizations due to depression was admitted to the psychiatric ward of a university general hospital presenting catatonia. Her symptoms had started two months earlier with sadness, anhedonia, anxiety, loss of appetite and reduction of oral intake. She presented progressive psychomotor retardation until she was lying completely bedridden 10 days before her hospitalization, with mutism and negativism. For the previous 8 years,

she had been taking sertraline 50 mg/day and lithium 600 mg/day. She was non-smoker and hypertensive (taking propranolol 40 mg twice a day). At admission, her BMI was 36, and her serum lithium level was 0.8 mg/dL.

On the second day of hospitalization, the patient presented sudden onset of shortness of breath, oxygen saturation of 85%, and tachycardia. The characteristic S1Q3T3 pattern at the ECG and an abnormal ventilation perfusion scan confirmed bilateral PE. She was transferred to the internal medicine ward, receiving ventilatory support and anticoagulation with enoxaparin 80 mg 12/12 hours SC. After 48 hours there was no more tachycardia or low oxygen saturation and patient remains stable. Lithium was withdrawn and sertraline was switched to venlafaxine augmented with mirtazapine. After a one-month trial of venlafaxine 300 mg/day, mirtazapine 45 mg/day and clonazepam 2 mg/day, the patient was still severely depressed and bedridden, despite haemodynamic stability. Taking into account the unsatisfactorily response to oral antidepressants and the risk of severe complications – such as bedsores, aspiration pneumonia and other infections – associated to the prolonged immobility due to the patient's depression, we indicated ECT. The patient's family provided written informed consent after receiving detailed information about the risks related both to the procedure itself and to the patient's clinical condition. After cardiological assessment and 2 months after PE, with the patient still under full anticoagulation with enoxaparin, ECT was started. The sessions occurred two or three times a week, with bilateral bitemporal placement of electrodes and clinical control of convulsion, which was considered effective after 20 seconds. Treatment with venlafaxine 300 mg/day and mirtazapine 30 mg/day was maintained in the course of ECT sessions.

The patient presented hypertensive peaks during the ECT sessions, but with no clinical consequences whatsoever. After two weeks and five ECT sessions she was walking and eating spontaneously and her mood had improved significantly. By the eighth session the patient began to show signs of hypomania presenting sexual disinhibition, loquacity and psychomotor agitation. We started valproate 1,000 mg/d, wi-

threw mirtazapine and decreased venlafaxine to 225 mg/day and suspended ECT. She was discharged completely euthymic after two weeks. No major complications related either the PE, ECT applications or her psychiatric condition, were observed during a follow-up of six months.

## DISCUSSION

In an ECT session, the administration of electrical current to a sharp parasympathetic outflow that causes intense bradycardia and decrease in blood pressure, which corresponds to the tonic phase of the seizure; the clonic phase that follows corresponds to a sympathetic surge, causing pulse rate and blood pressure to substantially raise, cerebral blood flow to double and intracerebral pressure to increase<sup>2,4</sup>. These changes usually resolve within 10 to 20 minutes after the seizure, but may be occasionally prolonged. Patients with history of recent PE might be at increased risk for cardiac complications and hypoxia resulting from those abrupt changes<sup>2,4</sup>. In addition, the concomitant administration of anticoagulant therapy after PE is likely to increase the risk of bleeding in CNS and of thrombi mobilization during the procedure. ECT itself has been sometimes associated with the occurrence of PE<sup>7,8</sup>; nevertheless, there have been a few case reports on its application shortly after PE, with favorable results and no major adverse effects<sup>5,8-10</sup>.

No particular technical adaptation in ECT was required in the case reported. Careful evaluation of cardiac function and assessment of residual deep vein thrombosis before the start of ECT course are recommended<sup>4,8-12</sup>. In our particular case, the ultrasound of lower extremities was not requested, since two months had elapsed since the PE, and the patient had been under anticoagulation since then.

Regarding concomitant anticoagulation, in a case series involving 35 patients receiving long-term warfarin therapy and 300 ECT sessions, no ECT-related complications due to anticoagulation occurred despite increases in blood pressure and pulse rate<sup>13</sup>. However, the international normalized ratio (INR) during ECT was subtherapeutic (< 2.0) in approximately one third of patients in that study. Our patient was fully anticoagulated, but the early morning dose of enoxaparin was suspended before each ECT session in an attempt to make the procedure safer.

## CONCLUSION

Timely prescription of ECT is essential to the good outcome, preventing potentially life-threatening complications

of prolonged catatonic immobility. This report adds to the anecdotal literature on the safety of ECT in the course of concomitant anticoagulant therapy after PE and illustrates how, with proper precautions, the benefits of ECT in such condition might outweigh its risks. Nonetheless, controlled studies are needed in order to better establishing the safety of ECT in patients under anticoagulation therapy with enoxaparin.

## INDIVIDUAL CONTRIBUTIONS

**Julio Cesar Lazaro** and **Clarissa de R. Dantas** – Were part of the team responsible for the patient's care. Both authors carried out the literature review and the writing of the manuscript.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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