

CASE REPORT

Creutzfeldt-Jakob disease with neuroleptic malignant syndrome

Julija Čiauškaitė¹  | Ieva Puleikytė¹ | Simonas Jesmanas² | Giedrė Jurkevičienė¹ | Antanas Vaitkus¹ | Daiva Rastenytė¹

¹Department of Neurology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

²Department of Radiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

Correspondence

Julija Čiauškaitė, Department of Neurology, Medical Academy, Lithuanian University of Health Sciences, Mickevičiaus str. 9, LT-44307 Kaunas, Lithuania
Email: julija0522@gmail.lt

Funding information

None

Abstract

Creutzfeldt-Jakob disease (CJD) is a rare rapidly progressive fatal neurodegenerative disease. Neuroleptic malignant syndrome (NMS) is a complication of antipsychotic medications which may be used to treat neuropsychiatric symptoms of CJD. We present a case of a 51-year-old woman with CJD who developed NMS after being prescribed quetiapine.

KEYWORDS

atypical antipsychotic medications, Creutzfeldt-Jakob disease, electroencephalography, magnetic resonance imaging, neuroleptic malignant syndrome, quetiapine

1 | INTRODUCTION

Prion diseases are a group of rare neurodegenerative diseases that are caused by infectious abnormally structured and shaped proteins—prions—which impose their structure onto nearby normal prion proteins, further propagate and cause progressive cell damage and death.¹ Creutzfeldt-Jakob disease (CJD) is the most common human prion disease with a prevalence of 1 new case per one million individuals each year worldwide, and usually presents in the 7th decade of life.² Sporadic CJD (sCJD) accounts for up to 85%–95% of CJD cases, while other genetic and acquired forms are far less common, accounting for 5%–15% and less than 1% of cases, respectively.³

Creutzfeldt-Jakob disease is a clinically heterogeneous disease but typically presents with rapid cognitive and neuropsychiatric deterioration. Most common clinical

presentation of sCJD is rapid cognitive decline progressing to dementia; other manifestations include behavioral abnormalities, myoclonus, pyramidal/extrapyramidal signs, cerebellar symptoms, and higher cortical dysfunction (ie, aphasia, apraxia, acalculia, agraphia, and neglect), which are seen in about half of all reported cases.^{4–6} Clinical features, in combination with cerebrospinal fluid (CSF) analysis, electroencephalography (EEG), and brain magnetic resonance imaging (MRI) form the basis of in vivo diagnosis of CJD; histopathological confirmation, however, remains the gold standard for diagnosing definite CJD (Table 1). MRI is a valuable tool for detecting signal abnormalities suggestive of CJD in an appropriate clinical context, approaching a sensitivity of 91%–96% and a specificity of 93%–95%.^{7,8} Unfortunately, CJD is incurable and usually progresses rapidly to a fatal outcome within a median of 6 months (range 1–47 months).⁹

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

2 | NEUROLEPTIC MALIGNANT SYNDROME

Neuroleptic malignant syndrome (NMS) is a life-threatening neurologic complication, arising as an idiosyncratic reaction to medications that block D2 receptors.¹¹ Clinically, it is characterized by fever, extrapyramidal symptoms (mainly rigidity), impaired consciousness, and dysautonomia. NMS is not dose-dependent and can occur at any time during treatment with antipsychotic drugs, but usually within the first 2 weeks. The incidence is up to 2.4% among patients receiving these drugs, while mortality (mostly as a result of autonomic complications), is reported in up to 20% of cases.¹² Hypertonia and subsequent rhabdomyolysis lead to leukocytosis and serum creatine kinase (CK) elevation, which are the main laboratory derangements seen in NMS.¹³ It is thought that a variety of factors, including concomitant infections, acute neurologic diseases, or substance abuse, may predispose to NMS.¹⁴

In this case report, we present a rare case of a patient with sCJD who developed NMS.

3 | CASE PRESENTATION

A 51-year-old woman was transferred from the regional hospital to the Neurology department of the University hospital due to a 2-week history of progressive speech

abnormalities characterized by difficulty in retrieving words, producing structured sentences, and involuntary repetition of the same words or phrases. CT scan of the brain was normal which ruled out several possible common pathologies (ie, intracranial hemorrhage, significant ischemic stroke, or gross mass lesions). Ongoing COVID-19 pandemic and strict quarantine rules did not allow family members to visit the patient in the hospital, which made it difficult to acquire a comprehensive history. Repeated urgent phone conversations with the patient's family members revealed that first symptoms were noticed about 3 months prior to hospitalization. She had trouble concentrating, had impaired short-term memory which resulted in her doing the same actions repeatedly (eg, bringing multiple cups of coffee or meals to her husband), did not answer questions sensibly, and looked mildly confused.

Past medical history was significant for hypertension. Otherwise, the patient was physically active and worked as an accountant.

During the initial evaluation, the patient was disoriented in space and time, seemed noncritical of her condition, had inadequate emotions (eg, kept smiling or laughing at questions about her health), and was unable to follow commands on neurological examination. She had severe sensorimotor aphasia and could not tell her name or formulate her complaints. Palilalia, echolalia, apraxia, acalculia, and agraphia were present. The rest of the examination was unremarkable: cranial nerves, motor, and sensory systems were intact, there were no pathologic or primitive reflexes, myoclonus, or signs of either extrapyramidal or cerebellar dysfunction.

The patient used valsartan/hydrochlorothiazide and metoprolol for her hypertension. There was no reported alcohol, illicit drug use, or possible contact with chemicals or heavy metals.

On the day of the admission, brain magnetic resonance imaging (MRI) did not show any signs of ischemia, focal pathology, or other possible structural causes of the patient's symptoms.

The patient underwent a broad investigation for differential diagnosis: tests were performed to rule out encephalopathy of various origin, that is, hepatic, renal, thyroid, vitamin deficiencies, and any possible vascular, infectious, paraneoplastic, and autoimmune etiology of her symptoms. Laboratory tests, which were unremarkable, included a complete blood count, a comprehensive metabolic panel, vitamin B12, folates, thyroid-stimulating hormone, tests for sexually transmitted diseases (ie, syphilis and HIV), borreliosis, tick-borne encephalitis, onconeural, and antineuronal antibodies. Lumbar puncture was performed to eliminate an infectious process, and CSF analysis did not

TABLE 1 Criteria for probable sporadic Creutzfeldt-Jakob disease¹⁰

Neuropsychiatric disorder + positive RT-QuIC in CSF or other tissues
OR
Rapidly progressive dementia; and at least 2 out of 4 following clinical features:
1. Myoclonus
2. Visual or cerebellar signs
3. Pyramidal/extrapyramidal signs
4. Akinetic mutism
AND at least one positive result on one of the following laboratory tests:
• a typical EEG (periodic sharp wave complexes) during an illness of any duration
• a positive 14–3–3 protein CSF assay in patients with a disease duration of less than 2 years
• hyperintensity in caudate nucleus/putamen on brain MRI or at least two cortical regions (temporal, parietal, and occipital) either on diffusion-weighted imaging (DWI) or fluid-attenuated inversion recovery (FLAIR) Routine investigations should not suggest an alternative diagnosis.

Abbreviations: CJD, Creutzfeldt-Jakob disease; CSF, cerebrospinal fluid; EEG, electroencephalography; MRI, magnetic resonance imaging; RT-QuIC, real-time quaking-induced conversion.

show any pleocytosis or derangement of glucose and protein levels.

Neuropsychological testing with the Mini-Mental State Examination (MMSE) and a clock drawing test returned scores of 0, representing significant impairment of cognitive function, including short-term memory, attention, concentration, writing, reading, calculation, and constructional praxis.

Over the next 2 weeks, she suffered severe cognitive decline, could no longer eat, or go to the bathroom on her own, and replied with one-word nonsensical answers.

On day 15 in the Neurology department, a second brain MRI was performed. It revealed subtle cortical T2W/FLAIR hyperintensities most conspicuous in the right parietal region, multifocal cortical diffusion restriction best appreciated in the right parietal and the left parieto-occipital regions, and diffusion restriction in the caudate nuclei and anterior putamina (Figure 1). MRI findings were suggestive of typical sCJD, with possible (but less likely) differential diagnoses including autoimmune encephalitis and other systemic encephalopathies of various etiologies.

The patient then developed psychomotor agitation, sleep disturbance, severe confusion, and was caught trying to jump out of the window. She was started on quetiapine 50 mg once daily and lorazepam 1 mg before sleep to alleviate neuropsychiatric symptoms. Subsequently, over the next week, she developed fever of over 40°C, muscular rigidity of all extremities, muscles of mastication and jaw, as well as autonomic instability (ie, high blood pressure, tachycardia, profuse diaphoresis, and sialorrhea). Blood and urine laboratory tests, chest and abdominal imaging revealed no signs of possible infectious processes. Serum creatine kinase (CK) level was elevated 1225 IU/L (normal 0–145 IU/L). With most infections being ruled out, the likely diagnosis was NMS. Antipsychotic drugs (quetiapine) were immediately discontinued and a specific treatment for muscular rigidity with dopamine agonist bromocriptine was initiated. Further supportive care was started: intravenous fluids to maintain volemia, antipyretics and cooling blankets to reduce hyperthermia, trihexyphenidyl to manage extrapyramidal symptoms, and doses of antihypertensive drugs were increased.

Efficacy of NMS treatment was only partial, as the patient still had a subfebrile fever and showed signs of dysautonomia and muscle hypertonia, although CK levels normalized.

Over the next 2 weeks, the patient's neurological condition worsened. She showed exaggerated, startled responses to louder noises or sudden touch (hyperekplexia), developed akinetic mutism, and lost all voluntary motor function; a nasogastric tube had to be placed due to dysphagia.

On the 30th day of hospitalization, a follow-up MRI was performed. It showed slightly more pronounced diffusion restriction in bilateral multiple cortical regions and the striatum, with corresponding similar subtle cortical T2W/FLAIR hyperintensities (images not shown). MRI findings continued to be suggestive of typical sCJD with slight progression of signal abnormalities even on short-term follow-up.

Follow-up awake EEG revealed pathologic diffuse slowing of background activity and bilateral periodic polyphasic sharp wave complexes, dominating in the right frontal-temporal area (Figure 2).

The patient was diagnosed with probable sporadic CJD as she met the Centers for Disease Control and Prevention Diagnostic Criteria for probable sporadic Creutzfeldt-Jakob disease based on 1) rapidly progressive dementia followed by development of myoclonus (hyperekplexia), extrapyramidal signs, and akinetic mutism; 2) typical EEG findings of periodic sharp wave complexes; 3) brain MRI findings of diffusion restriction in the striatum and bilateral multiple cortical areas (the latter most prominent in the right parietal and left parieto-occipital cortices); 4) alternative diagnoses were excluded.

The patient was transferred to the palliative care unit 35 days following admission. Three months later, she died of a pulmonary embolism. An autopsy was carried out, and immunohistochemical examination demonstrated abnormal prion protein deposition in the acquired gray matter specimens (brainstem). The abnormal prion protein deposition was in the form of synaptic diffuse labeling without any micro-plaques or larger plaque-like deposits, or filamentous labeling in the white matter. Histopathological changes were compatible with prion disease, confirming the diagnosis of definite CJD. For exclusion of a genetic form, genetic testing for mutations in the PRNP gene was warranted, but unfortunately could not be performed.

4 | DISCUSSION

In this case report, we showed that NMS can develop following the administration of quetiapine in a patient with sCJD, resulting in a rare combination of symptoms.

Rapidly progressive cognitive decline is a particularly typical finding in sCJD. Thus, the differential diagnosis should always include conditions that manifest with a syndrome of rapidly progressive dementia (RPD). Primarily, certain treatable and/or reversible diseases, such as paraneoplastic and autoimmune encephalitis, viral encephalitis, metabolic encephalopathy, HIV, and Lyme disease, should be considered.^{15,16} Primary CNS lymphoma, vasculitis, and intravascular lymphoma can also lead to RPD, and MRI is usually helpful in confirming or excluding

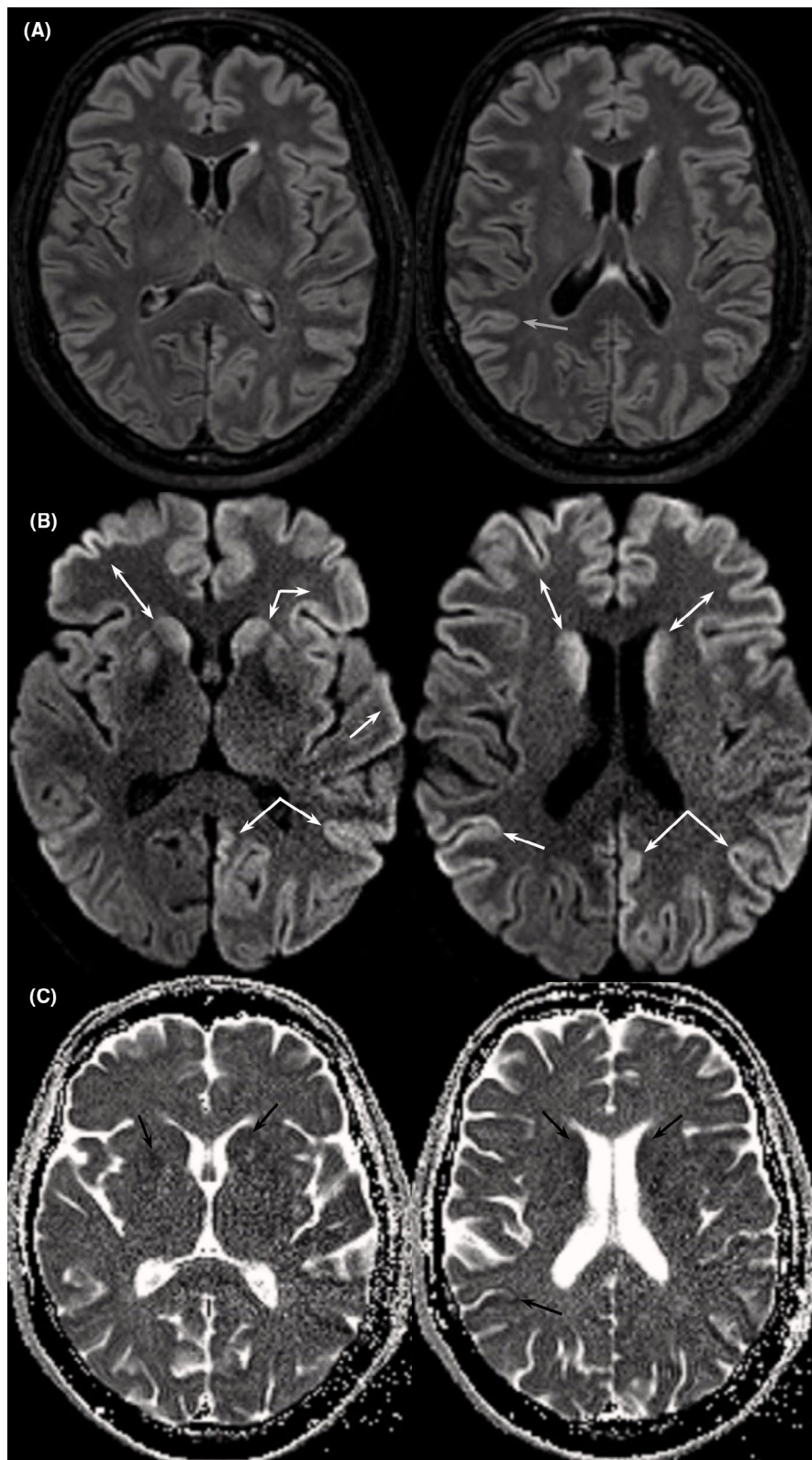


FIGURE 1 MRI features suggestive of sCJD. Axial T2-weighted FLAIR images (A) show very subtle cortical hyperintensities, best appreciated in the right parietal cortex (gray arrow). Axial diffusion-weighted images (B) show more extensive hyperintensities in bilateral multiple cortical regions (best appreciated in the right parietal and left parieto-occipital cortices), caudate nuclei, and anterior putamina (white arrows), with corresponding slight hypointensities on apparent diffusion coefficient maps (C), representing true diffusion restriction (black arrows)

these diagnoses.¹⁵ Other more common neurodegenerative diseases such as Alzheimer's disease, dementia with Lewy bodies, frontotemporal dementia, corticobasal degeneration, and progressive supranuclear palsy usually progress less quickly and are characterized on imaging as atrophy in a non-specific generalized or specific distribution, without

the extensive and predominant diffusion restriction typically found in sCJD.^{16,17} Indeed, diffusion restriction (which correlates with spongiform changes detected on autopsy) in the basal ganglia (particularly caudate nuclei and putamina) and in multiple cortical regions is found in a great proportion of sCJD cases and is the most significant

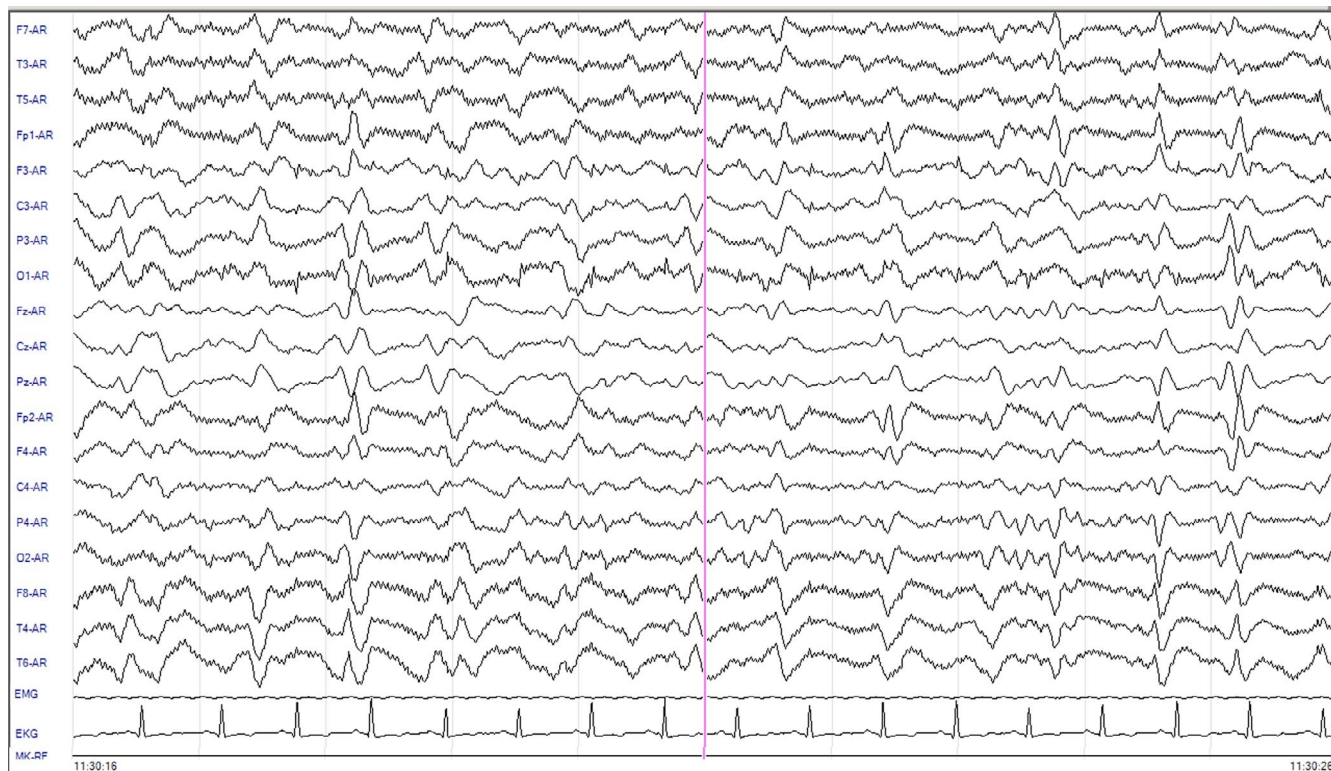


FIGURE 2 Diffuse slowing of background activity. Bilateral periodic polyphasic sharp wave complexes, dominating in right frontal-temporal area

and specific finding differentiating sCJD from other causes of RPD.^{7,18,19} Our patient developed NMS symptoms before the final follow-up MRI scan which showed slightly progressing signal abnormalities consistent with typical sCJD, in agreement with the pattern of signal abnormality progression described in the literature, and without any additional imaging features that may be attributed to NMS itself.²⁰ Beyond imaging, a quantitative deep learning-based EEG technique also appears to be sensitive and specific for differentiating patients with early-stage CJD from patients with other etiologies of rapid progressive dementia and Alzheimer's disease, but such techniques in our experience are not employed in daily clinical practice.²¹

Quetiapine is described as a relatively lower risk antipsychotic regarding the possibility of developing NMS, because it acts as a stronger antagonist for serotonin receptors rather than dopamine receptors.²² Various predisposing factors, including organic brain diseases, are postulated to exert influence on the development of NMS.²³ The risk of NMS may increase with extrapyramidal disorders such as Parkinson's disease (PD).²⁴ Neuroleptic sensitivity is broadly described in patients with dementia with Lewy bodies (DLB), as was shown in a case series by Lemstra et al²⁵ in which they described 12 patients with autopsy-confirmed DLB who had been clinically suspected to suffer from CJD. Thus, given the knowledge that neuroleptic sensitivity is common in other types of dementias, we

had some initial diagnostic doubts whether our patient truly had sCJD, as neuroleptic sensitivity in this disease is not as widely described. However, our case shows that a manifestation of neuroleptic sensitivity can also occur in CJD. We might hypothesize that structural changes in the brain (particularly in the caudate nuclei and putamina) caused by CJD could have contributed to a disruption of nigrostriatal pathways and a decrease in dopaminergic activity, which could have resulted in a hypersensitivity to antipsychotic drugs and, therefore, a predisposition to develop NMS. However, more data are needed to differentiate a true association from a simple coincidence.

Furthermore, we were presented with a dilemma whether the persisting extrapyramidal hypertonia, reduced consciousness, and dysautonomia after treatment of NMS were residual symptoms of incompletely resolved NMS, or a consequence of the inevitable progression of CJD. According to Yang et al²⁶ study of 173 sCJD cases, extrapyramidal symptoms were noticed in over 77% of patients and were the second most frequent symptom after progressive dementia. Hence, either of the two possibilities remain feasible.

Finally, we found several reports in the literature describing a similar, but not identical, combination of pathologies.

Some of them showed features (clinical or EEG) suggestive of CJD but were diagnosed with NMS. One such

report described a 57-year-old man with bipolar disorder treated with thioridazine, a typical antipsychotic, who presented with a 2-week history of several clinical features suggestive of NMS, with the addition of confusion and EEG findings suspicious for CJD (polymorphic delta and periodic bursts of synchronous serial irregular triphasic delta waves).²⁷ The patient's drugs were discontinued (except for supportive care), and the abnormalities resolved. The patient subsequently died of a myocardial infarction and the neuropathological examination excluded CJD. This report underscored that NMS could manifest as CJD-like activity on EEG.²⁷ Another report described an 84-year-old man with probable DLB (mild cognitive impairment) whose initial treatment with olanzapine was substituted for quetiapine, with subsequent development of NMS features.²⁸ Quetiapine was discontinued, but 24 h later EEG was performed due to persistent altered consciousness and showed abundant triphasic waves with generalized spike discharges.²⁸ Based on EEG findings, the differential diagnosis included CJD; however, MRI was not performed. Over the next 4 days impairment of consciousness and other NMS features started to resolve, the patient's condition improved, and he was stable 3 months later.²⁸ The clinical improvement excluded CJD and emphasized the possibility of neuroleptic sensitivity in DLB, which was described in the previously mentioned literature.^{25,28} Another case described a 61-year-old man with rapidly progressive cognitive decline, visual hallucinations, rigidity, and startle myoclonus who was suspected to have CJD, but was shown to have a combination of NMS (associated with olanzapine) and duloxetine withdrawal, as his condition improved upon treatment of these conditions.²⁹

There were also opposite cases where NMS was suspected initially but, in the end, CJD was diagnosed. One such report described an 81-year-old female with new-onset severe depression who was recently treated with quetiapine and presented with rapidly progressive cognitive decline, muscle rigidity, and startle reflexes; the patient was initially suspected to have serotonin syndrome or NMS; however, unrelenting deterioration raised the possibility of an alternative diagnosis.³⁰ CSF analysis suggested CJD, and the patient died 5 days later, with the neuropathological examination confirming sCJD.³⁰ Interestingly, MRI was performed but the typical features of CJD were not described.³⁰ Also, a study in Taiwan described a cohort of CJD patients, two of whom were initially suspected to have NMS.³¹

These published reports demonstrate that NMS can develop due to either typical or atypical antipsychotics (including quetiapine), and that NMS and CJD may mimic one another; however, in these cases, either NMS or CJD was confirmed to be the final diagnosis. Our case shows that both conditions can occur simultaneously.

5 | CONCLUSIONS

In conclusion, our case shows that NMS can develop in patients with CJD who receive atypical antipsychotic medications.

ACKNOWLEDGEMENTS

We thank fellow physicians for taking part in care of this patient and a consulting pathologist of University College London Hospital for supplying detailed post-mortem analysis. We are also grateful to the family of our patient for their consent to publish this case.

Publication of this case report did not receive any funding.

AUTHOR CONTRIBUTIONS

Julija Čiauškaitė, Ieva Puleikytė, and Simonas Jesmanas collected the data from the medical record and drafted the manuscript. Giedrė Jurkevičienė and Daiva Rastenytė supervised the drafting of the manuscript. Antanas Vaitkus was the patient's treating physician. All authors reviewed, edited, and agreed on the final version of the manuscript.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

ORCID

Julija Čiauškaitė  <https://orcid.org/0000-0002-7361-7920>

REFERENCES

- Groveman BR, Foliaki ST, Orru CD, et al. Sporadic Creutzfeldt-Jakob disease prion infection of human cerebral organoids. *Acta Neuropathol Commun*. 2019;7(1):1-12.
- Ladogana A, Puopolo M, Croes EA, et al. Mortality from Creutzfeldt-Jakob disease and related disorders in Europe, Australia, and Canada. *Neurology*. 2005;64(9):1586-1591.
- Collins SJ, Sanchez-Juan P, Masters CL, et al. Determinants of diagnostic investigation sensitivities across the clinical spectrum of sporadic Creutzfeldt-Jakob disease. *Brain*. 2006;129(9):2278-2287. <https://doi.org/10.1093/brain/awl159>
- Krasnianski A, Bohling GT, Heinemann U, et al. Neuropsychological symptoms in sporadic Creutzfeldt-Jakob disease patients in Germany. *J Alzheimer's Dis*. 2017;59(1):329-337.
- Brown P, Cathala F, Castaigne P, Gajdusek DC. Creutzfeldt-Jakob disease: clinical analysis of a consecutive series of 230 neuropathologically verified cases. *Ann Neurol*. 1986;20(5):597-602.
- Rabinovici GD, Wang PN, Levin J, et al. First symptom in sporadic Creutzfeldt-Jakob disease. *Neurology*. 2006;66(2):286-287.
- Vitali P, Maccagnano E, Caverzasi E, et al. Diffusion-weighted MRI hyperintensity patterns differentiate CJD from other rapid dementias. *Neurology*. 2011;76(20):1711-1719. <https://doi.org/10.1212/WNL.0b013e31821a4439>

8. Young GS, Geschwind MD, Fischbein NJ, et al. Diffusion-weighted and fluid-attenuated inversion recovery imaging in Creutzfeldt-Jakob disease: high sensitivity and specificity for diagnosis. *Am J Neuroradiol.* 2005;26(6):1551-1562.
9. Llorens F, RübSamen N, Hermann P, et al. A prognostic model for overall survival in sporadic Creutzfeldt-Jakob disease. *Alzheimer's Dement.* 2020;16(10):1438-1447.
10. Centers for disease control and prevention. "Diagnostic Criteria. Creutzfeldt-Jakob disease, classic (CJD). Prion Disease. CDC," 2018. <https://www.cdc.gov/prions/cjd/diagnostic-criteria.html>. Accessed April 19, 2021.
11. Trollor JN, Chen X, Sachdev PS. Neuroleptic malignant syndrome associated with atypical antipsychotic drugs. *CNS Drugs.* 2009;23(6):477-492.
12. Bertorini TE. Myoglobinuria, malignant hyperthermia, neuroleptic malignant syndrome and serotonin syndrome. *Neurol Clin.* 1997;15(3):649-671.
13. Latham J, Campbell D, Nichols W. How much can exercise raise creatine kinase level—and does it matter? *J Fam Pract.* 2008;57(8):545-547.
14. Gurrera RJ. Sympathoadrenal hyperactivity and the etiology of neuroleptic malignant syndrome. *Am J Psychiatry.* 1999;156(2):169-180.
15. Geschwind MD. Rapidly progressive dementia. *Continuum.* 2016;22(2, Dementia):510-537.
16. Fragoso DC, Gonçalves Filho ALdM, Pacheco FT, et al. Imaging of Creutzfeldt-Jakob disease: imaging patterns and their differential diagnosis. *Radiographics.* 2017;37(1):234-257.
17. Osborn AG, Hedlund GL, Salzman KL. *Osborn's Brain: Imaging, Pathology, and Anatomy* (2nd edn.). Salt Lake City: Elsevier Health Sciences. 2017.
18. Manners DN, Parchi P, Tonon C, et al. Pathologic correlates of diffusion MRI changes in Creutzfeldt-Jakob disease. *Neurology.* 2009;72(16):1425-1431.
19. Carswell C, Thompson A, Lukic A, et al. MRI findings are often missed in the diagnosis of Creutzfeldt-Jakob disease. *BMC Neurol.* 2012;12(1):1-5.
20. Eisenmenger L, Porter M-C, Carswell CJ, et al. Evolution of diffusion-weighted magnetic resonance imaging signal abnormality in sporadic creutzfeldt-jakob disease, with histopathological correlation. *JAMA Neurol.* 2016;73(1):76-84. <https://doi.org/10.1001/jamaneurol.2015.3159>
21. Morabito FC, Campolo M, Mammone N, et al. "Deep learning representation from electroencephalography of early-stage Creutzfeldt-Jakob disease and features for differentiation from rapidly progressive dementia". *Int J Neural Syst.* 2017;27(02):1650039. <https://doi.org/10.1142/S0129065716500398>
22. Muench J, Hamer AM. Adverse effects of antipsychotic medications. *Am Fam Physician.* 2010;81(5):617-622.
23. Seitz DP, Gill SS. Neuroleptic malignant syndrome complicating antipsychotic treatment of delirium or agitation in medical and surgical patients: case reports and a review of the literature. *Psychosomatics.* 2009;50(1):8-15.
24. Mesquita J, Siva L. Fatal neuroleptic malignant syndrome induced by clozapine in Parkinson's psychosis. *J Neuropsychiatry Clin Neurosci.* 2014;26(1):E34.
25. Lemstra AW, Schoenmaker N, Rozemuller-Kwakkkel AJM, Van Gool WA. "The association of neuroleptic sensitivity in Lewy body disease with a false positive clinical diagnosis of Creutzfeldt-Jakob disease". *Int J Geriatr Psychiatry.* 2006;21(11):1031-1035.
26. Yang J, Kuang H, Wang Q, Liu J, Chen X, Shang H. Analysis of Chinese patients with sporadic Creutzfeldt-Jakob disease. *Prion.* 2020;14(1):137-142.
27. Kramer LD, Louke GE. A case of neuroleptic malignant syndrome with myoclonus and triphasic EEG waves. *J Clin Psychopharmacol.* 1987;7(5):354-356.
28. López Pardo P, Jiménez Rojas C, Ortiz Pascual A, Socorro García A. Neuroleptic malignant syndrome associated with quetiapine after withdrawal of olanzapine and donepezil, with EEG differential diagnosis of Creutzfeldt-Jakob disease. *Rev Esp Geriatr Gerontol.* 2016;51(5):301-302. <https://doi.org/10.1016/j.regg.2016.01.005>
29. Zucker E, Miller RP, Rubin D, Wright P, Schloss ER. Concurrent duloxetine withdrawal and neuroleptic malignant syndrome mimicking Creutzfeldt-Jakob disease: a case report. *Neurology.* 2017;88:16 Supplement.
30. Cumbler E, Furfari K, Guerrasio J. Creutzfeldt-Jacob disease presenting as severe depression: a case report. *Cases J.* 2009;2(1):122. <https://doi.org/10.1186/1757-1626-2-122>
31. Yen CF, Lin RT, Liu CK, Lee PW, Chen CC, Chang YP. The psychiatric manifestation of Creutzfeldt-Jakob disease. *Kaohsiung J Med Sci.* 1997;13(4):263-267.

How to cite this article: Čiauškaitė J, Puleikytė I, Jesmanas S, Jurkevičienė G, Vaitkus A, Rastenytė D. Creutzfeldt-Jakob disease with neuroleptic malignant syndrome. *Clin Case Rep.* 2021;9:e04699. <https://doi.org/10.1002/ccr3.4699>