



UNCONTROLLED MOVEMENTS IN A HEMODIALYSIS PATIENT: A CASE REPORT OF MYOCLONIC JERKS AND THEIR CLINICAL IMPLICATIONS

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ABSTRACT

Introduction:

Patients undergoing long-term hemodialysis often face not only physiological but also neurological and psychosocial complications. One such neurological manifestation is myoclonic jerks—sudden, involuntary muscle contractions that may reflect underlying biochemical imbalances and are frequently underrecognized. This phenomenon, particularly in patients with comorbid conditions such as hypertension, warrants closer attention due to its potential impact on patient well-being and healthcare outcomes.

Methods:

This study adopts a qualitative descriptive case study approach with a retrospective review. Clinical data were obtained through medical records, direct observation, and comparative analysis with existing literature. The aim was to explore the interdisciplinary implications of myoclonic movement disorders in the context of chronic kidney disease and long-term hemodialysis.

Results:

The case involves a 54-year-old male with stage V chronic kidney disease on routine hemodialysis who presented with frequent myoclonic jerks, alongside emergency hypertension, type 2 diabetes mellitus, and pulmonary edema. Symptoms were linked to metabolic disturbances and possible neurotoxicity resulting from uremic toxin accumulation. Symptom control was achieved through combined electrolyte correction and pharmacological management using clonazepam.

Discussion:

The findings suggest that neurological manifestations in hemodialysis patients must be understood through a multidisciplinary lens integrating medical, neurological, and psychosocial perspectives. Early diagnosis and comprehensive management, including patient education, are essential in improving quality of life. This case also underscores the need for further interdisciplinary research into movement disorders among chronically ill populations, especially within healthcare systems facing increased burden of non-communicable diseases.

Keywords:

Hemodialysis,
Myoclonic Jerks,
Clinical Implications

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INTRODUCTION

Chronic kidney disease (CKD) requiring hemodialysis is frequently associated with various neurological complications, including myoclonic jerks sudden, involuntary muscle contractions that can significantly impact patient quality of life. While myoclonus is often associated with neurological conditions such as epilepsy or metabolic encephalopathy, it has also been reported in patients with end-stage renal disease (ESRD), both during and outside of hemodialysis sessions (Davis et al., 2020). These symptoms can increase the risk of falls, disability, and overall morbidity.

Several studies have highlighted that myoclonic jerks in hemodialysis patients may be caused by metabolic derangements, uremic toxin accumulation, or electrolyte imbalances. Hypertension—a common comorbidity in CKD patients has also been linked to increased frequency and severity of myoclonic activity (Lee et al., 2019). Management strategies including antihypertensive optimization, anticonvulsant therapy, and dialysis setting modification have shown promising outcomes in reducing symptom severity (Keller & Levin, 2018).

Despite growing recognition of this condition, literature on real-time clinical observation and integrated management of myoclonic jerks during hemodialysis sessions remains scarce. This gap underscores the need for detailed case-based analysis that incorporates comorbid factors, clinical progression, and response to treatment.

This case report presents a patient with stage V CKD undergoing regular hemodialysis who developed recurrent myoclonic jerks, highlighting the potential triggers, clinical course, and implications for interdisciplinary care. The objective is to contribute to a better understanding of this rare but impactful complication and to encourage timely recognition and intervention in similar clinical settings.

CASE

Mr. W, a 54-year-old man came to the Emergency Installation (IGD) of the Wangaya Regional General Hospital with complaints of shortness of breath and weakness felt 12 hours before entering the hospital. The patient also had seizures for about 2 minutes while in the hospital with movements of the whole body, when the seizure the patient was conscious. Other complaints are coughing up phlegm (+), nausea (+), vomiting (-), fever (-). Patients plan hemodialysis today

The patient underwent routine hemodialysis, the last hemodialysis history was on 21/5/25 while undergoing hemodialysis, the patient experienced seizures that lasted for approximately 30 minutes with movement throughout the body. The hemodialysis session was completed at Puri Raharja and feeling better, the patient was sent home.

The patient previously had a history of myoclonic seizures since 1 year ago and at the time of seizure the patient was said to be conscious. The patient also has a history of chronic kidney failure and routinely undergoes hemodialysis on Wednesdays and Saturdays at Puri Raharja Hospital. History of Hypertension and Type 2 Diabetes with Regular Treatment. Previous treatment history with Adalat oros 1x30mg, Bisoprolol 1x5mg, Candesartan 1x16mg, Riklona 2x1, Valisanbe 3x2mg, Alprazolam 2x0.5mg, Fenobarbital 3x30mg, Phenytoin 3x100mg, and Sodium valproate 2x250mg. No family has had similar complaints.

On physical examination, the general condition of the patient appeared to be seriously ill, the patient's consciousness compos mentis, blood pressure 211/111 mmHg, pulse rate 132 times/minute, respiratory rate 30 times/minute, and body temperature 36°C. The results of the neurological examination were obtained from the examination of the Cranialis Nerve within normal limits, examination of motor and sensory function within normal limits, examination of autonomic nerve function within normal limits. Complete Blood Supporting Examination obtained White Blood Cells 17.74 (H), Hemoglobin 11.9 (L), Hematocrit 35.4 (L). Examination of kidney function showed an increase in Ureum 149 (HH), Creatinine 13.1 (HH). Examination of liver function, electrolytes and blood sugar results were obtained within normal limits. Thorax X-ray examination shows pulmonary edema dd pneumonia. The Head CT Scan examination is not performed.

Clinical diagnosis in the form of movement disorder (myoclonic jerk) with CKD st V on HD, Emergency hypertension, type 2 diabetes militancy, Oedema pulmo dd pneumonia. The therapy given to patients is in the form of medicated therapy and non-medicated therapy. Mediamentose therapy with the administration of Nasal Cannula O2 2-4 lpm, IVFD NaCl 0.9% 8 tpm, phenobarbital 3x30mg, klonazepam 1mg-0-2mg, sodium valproate 2x250mg, Inj omeprazole 2x1 vial, Inj ondansetron 2x1 ampoule, Adalat oros 1x30mg, Bisoprolol 1x5mg, Candesartan 1x16mg, Folic acid 2x1, moxifloxacin 1x400mg, nebul combivent every 8 hours, N-Acetylcysteine 3x200mg, nitrokaf 2x, simvastatin 1x20mg night. Nonmedical therapy of the patient is recommended for total bedrest.

METHOD

This study employed a clinical case study method using a qualitative descriptive approach with a retrospective review to analyze a reported case of *Uncontrolled Movements in a Hemodialysis Patient: A Case Report of Myoclonic Jerks and Their Clinical Implications*. The study was conducted using a qualitative descriptive design, with a retrospective approach focusing on a single patient who was admitted to Wangaya General Hospital, Denpasar, Bali.

Study Design

This research is a descriptive case study, aiming to explore the etiology, pathophysiology, and clinical implications of uncontrolled movements in a hemodialysis patient who experienced myoclonic seizures. Data were collected from the patient's medical records and direct clinical observations by the attending medical team.

Study Subject

The subject of this study was a 54-year-old male patient diagnosed with a movement disorder (myoclonic jerk) associated with Chronic Kidney Disease (CKD) stage V on hemodialysis, emergency hypertension, type 2 diabetes mellitus, and pulmonary edema with differential diagnosis of pneumonia.

Data Collection Procedure

Data were obtained from the following sources:

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1. **Patient's Medical Records:** Including history of present illness, results of physical and laboratory examinations, and administered treatments.
2. **Clinical Observation:** Direct monitoring of the patient's condition during hospitalization.
3. **Literature Review:** Comparison of the case findings with current literature on movement disorders (specifically myoclonic jerks) in patients with CKD.

Data Analysis

Data were analyzed using a descriptive analytical method, in which the patient's clinical findings were compared with established medical guidelines and relevant literature. Particular attention was given to the identification of complications and the patient's response to therapeutic interventions, which constituted the primary focus of this study.

RESULTS AND DISCUSSION

Uncontrolled movements, such as myoclonic jerks in hemodialysis patients, can be caused by a variety of mechanisms related to complex medical conditions. Myoclonic jerks are involuntary movements that last suddenly, are short-lived, and appear like a jolt or shock, caused by abnormal releases in cortical or subcortical neurons. In patients with chronic kidney failure, this movement is rare, but it can occur due to various pathophysiological mechanisms, especially in those undergoing long-term hemodialysis.

In patients with chronic kidney failure, impaired kidney function affects the body's ability to excrete waste products, including urea and creatinine. The accumulation of these toxins can lead to the formation of uremic encephalopathy, which is characterized by a variety of neurological symptoms, including myoclonus (Kim et al., 2016). Kim et al. report that effective hemodialysis management is able to lower serum creatinine levels and help reduce related neurological disorders (Kim et al., 2016).

Another cause of myoclonic jerks in hemodialysis patients is the presence of electrolyte imbalances, especially calcium and magnesium, which often occur due to the accumulation of uremic toxins (Ibrahim et al., 2017). This imbalance can increase neuromuscular irritability which contributes to the occurrence of uncontrolled movements. In addition, hypertension is a common problem in hemodialysis patients and its suboptimal treatment can result in further damage to the nervous system. Antihypertensive medications used often affect the body's ability to maintain adequate blood pressure, which can impact neuromuscular interactions and worsen symptoms (Inrig, J., 2010).

The pathophysiological mechanism of myoclonic jerks in hemodialysis patients involves damage to the central and peripheral nervous systems due to the accumulation of metabolic waste products that would otherwise be excreted through normal kidney function. This process can cause changes in neurotransmitters that play a role in regulating movement. For example, dopamine and serotonin deficits occur in chronic kidney disease, which can result in neurological symptoms such as myoclonic jerks (Maita et al., 2021).

The clinical implications of these myoclonic jerks are also significant. Patients who experience uncontrolled movement may face a higher risk of falls, as well as a decrease in quality of life due to neurological dysfunction¹¹. Therefore, a comprehensive and integrative management approach is urgently needed, which includes blood pressure control and adjustment of treatment policies. Based on research, optimization of glycemic control and hypertension can reduce the prevalence of neurological complications in hemodialysis patients (Hameed et al., 2023).

Myoclonic jerks in hemodialysis patients are rare, but they have an important clinical impact. In these cases, movement appears during and after dialysis, leading to metabolic disorders or the accumulation of toxins as the cause. Uremic encephalopathy and rapid electrolyte changes are most likely to be triggering factors. The absence of brain structural abnormalities and a good response to clonazepam corroborates the hypothesis of reversible functional causes. Early detection can prevent over-examination and improve patient comfort.

Treatment with Klonazepam has been reported to be an effective therapy in controlling myoclonus. In a study by Machado et al., clonazepam was shown to be effective in small doses (0.5–2 mg) for myoclonic jerks in JME patients, although it may not be fully effective in controlling generalized tonic-clonic seizures (GTCS) (Machado et al., 2013). These results demonstrate the potential of clonazepam as a therapeutic option for isolated myoclonus symptom control. The use of combination therapy according to the study by Reyes et al. showed that the combination of clonazepam with valproic acid provided a positive response to myoclonus, but also showed that various other therapies such as carbamazepine and levetiracetam were also effective in the management of the same condition. This suggests that combination therapy can improve the effectiveness

of treatment, but there are also other alternatives to consider (Reyes et al., 2019). Overall, it is important to recognize the multifactorial etiology of myoclonic jerks in hemodialysis patients in order to formulate effective management strategies.

CONCLUSION

Myoclonic jerks in hemodialysis patients can be caused by a variety of causes such as electrolyte disruption, accumulation of uremic toxin and comorbid risk factors such as hypertension. Electrolyte imbalance management, medication therapy with clonazepam, and patient education regarding risks and warning signs are important to implement. Combination therapy is used to maintain better control of symptoms. Further research is needed to explore the underlying mechanisms of myoclonic jerks in hemodialysis patients, as well as to evaluate the effectiveness of different intervention protocols in the management of this condition and hopefully provide optimal management for patients with similar symptoms. Further research is recommended to investigate the underlying pathophysiological mechanisms of myoclonic jerks in patients undergoing hemodialysis. It is also important to evaluate the effectiveness and safety of various therapeutic protocols, in order to develop more standardized and optimal management strategies for similar cases.

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