QMJ
A peer reviewed journal
QATAR MEDICAL JOURNAL

CASE REPORT

Gabapentin-induced myositis in a patient with spinal cord injury – a case report

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http://dx.doi.org/10.5339/qmj.2020.30
Submitted: 16 March 2020
Accepted: 11 June 2020

Cite this article as: Ghosh S, Villan S, Yazeedi WA. Gabapentin-induced myositis in a patient with spinal cord injury – a case report, Qatar Medical Journal 2020:30 http://dx.doi.org/10.5339/qmj.2020.30

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HAMAD BIN KHALIFA UNIVERSITY PRESS

ABSTRACT

Myositis and rhabdomyolysis are the same forms of myopathy, with rhabdomyolysis being a more severe form of myopathy. Gabapentin is frequently used in patients with spinal cord injury for neuropathic pain. We report a case of probable gabapentin-induced myositis in a patient with spinal cord injury who was on an increasing dose of gabapentin.

This paraplegic patient was receiving an increasing dose of gabapentin for neuropathic pain in the lower limbs. Gabapentin-induced myositis was diagnosed by a combination of new-onset generalized body pain with tenderness, an increase in creatine kinase, elevated myoglobin levels, and a score of 6 on the Naranjo adverse drug reaction probability scale. Withdrawal of the gabapentin resolved the symptoms completely. Blood parameters became normal within two weeks.

We suggest that myopathy, in the form of myositis, should be recognized as a potential side effect of gabapentin in the literature.

Keywords: neuropathic pain, gabapentin, myositis, spinal cord injury

INTRODUCTION

We report a case of probable gabapentin-induced myositis in a patient with spinal cord injury. Gabapentin is frequently used to treat neuropathic pain in patients with spinal cord injury.[1] The patient was on an increasing dose of gabapentin because of neuropathic pain in his lower limbs. Gabapentin-induced myositis seems rare with few case reports.[2,3] Rhabdomyolysis was reported in the FDA Neurontin (gabapentin) literature as postmarketing experience. Rhabdomyolysis is still not an adverse event because of insufficient data to support its estimated incidence or establish causation.

The objective of this case report is to confirm the suspicion of myositis in a patient with gabapentin who developed new-onset generalized muscle pain.

CASE PRESENTATION

Our patient was a 29-year-old Srilankan male, with no known previous comorbidities. On October 31, 2018, he presented to the emergency department of Hamad General Hospital. He had a history of a heavy object falling on his back. He complained of severe back pain and the inability to move his lower limbs. He was able to move both of his upper limbs; however, the power of his lower limbs was 0/5. His sensations were intact, the anal tone was weak, the perianal sensation was intact, and bulbocavernosus reflex was+ve. A CT scan and MRI were performed and showed a burst fracture of the L2 vertebral body with retropulsion, which compromised the spinal canal, causing severe spinal cord injury.

On October 31, 2018, he underwent urgent T12-L4 transpedicular screw fixation and a T12 and L1 laminectomy. He was kept postoperatively in the trauma ICU for observation. A follow-up X-ray of his spine showed satisfactory alignment and placement of the screws.

The patient was reviewed by the rehabilitation physician, who agreed to move the patient to the Qatar Rehabilitation Institute for an active rehabilitation program.

On November 8, 2018, the patient was transferred from the neurosurgery ward to QRI.

The patient underwent rehabilitation by a multidisciplinary team in a spinal cord injury rehabilitation unit.

On admission to QRI, the patient was paraplegic ASIA B level L2.[4] He had no power in both lower limbs but had intact sensations. He was dependent for activities of daily living with a functional independence measure (FIM) score of 69/126.[5]

He was on gabapentin 300 mg, three times a day, for neuropathic pain in his lower limbs. He was also taking dalteparin sodium, senna, and a multivitamin. His pain score was a numeric rating score (NRS) 6/10.[6] His pain was not relieved but was increasing.
On November 13, 2018 (day 13 postinjury), the dose of gabapentin was increased to 600 mg, three times a day. On the next day, (day 14 postinjury), he complained of increased lower limb and whole-body pain of NRS 8/10. On examination, he had severe muscle tenderness throughout his whole body, including his upper and lower limbs (NRS 9-10/10). He was observed for a few days presuming that the pain was due to exercise and the preexisting pain. When his pain had not improved, an internal medicine consultation was performed. A blood workup was sent on suspicion of myositis on 5th December 2019 and returned with the following results: serum creatine kinase (CK) was high- 747 U/L (reference range, 39 – 308 U/L), myoglobin was high- 152 ng/ml (reference range, 28 – 72 ng/ml), C-reactive protein(CRP) was high- 22.9 mg/L (reference range, 0 – 5 mg/L), ALT was high- 75 U/L (reference range, 0 – 41 U/L), AST was high- 46 U/L (reference range, 0 – 40 U/L), and the creatinine level was normal. Unfortunately, his CK and myoglobin levels before the increase of gabapentin dose were not available.

A diagnosis of gabapentin-induced myositis was made from the background of blood investigations (increase CK and myoglobin), clinical profile (new-onset generalized muscle pain and tenderness), and Adverse Drug Reaction Probability Scale (Naranjo algorithm) score of 6 of gabapentin. The Naranjo algorithm score of 6 indicated that gabapentin is the probable cause of myositis.[7,8] Other medications- senna, dalteparin sodium, and the multivitamin were excluded as causes of myositis by their negative Naranjo algorithm scores (senna -2, dalteparin sodium -2, and multivitamin -2). On December 12, 2018 (day 42 postinjury), gabapentin was discontinued. His severe muscle pain of the whole body reduced dramatically in the next three days after discontinuation of the gabapentin. His follow-up blood workup on December 19, 2018 (day 49 postinjury) showed a CK of 203 U/L (previously 747 459 U/L) and myoglobin 90 ng/ml (previously 152 ng/ml). After discontinuation of gabapentin, his pain was managed effectively with paracetamol 1000 mg, when necessary, three times daily (if pain NRS 4/10 or more).

On January 16, 2019 (day 77 postinjury), the patient was discharged from QRI. On discharge, the patient was ASIA C level L2. He was on selfintermittent catheterization and was wheelchair bound (self-propelled) for indoor and outdoor mobility. His FIM score was 111/126 (FIM on admission to QRI: 69/126). There were no adverse effects after discontinuing gabapentin. He was followed up in an outpatient rehabilitation program. Table 1 describes the timeline of important clinical developments of the case.

Table 1. Important clinical history and progress of the patient

Dates	Important history	Pain scale (NRS)	FIM
October 31, 2018	The patient presented to the emergency department of Hamad General Hospital with paraplegia.	Not available	Not performed
October 31, 2018	He underwent urgent T12-L4 transpedicular screw fixation and T12 and L1 laminectomy.	Not available	Not performed
November 8, 2018	He was transferred from the neurosurgery ward to QRI.	3/10	69/126
November 13, 2018	Gabapentin was increased to 600 mg, 3 times a day from 300 mg, 3 times a day.	6/10	72/126
November 14, 2018	The patient started having severe muscle tenderness in his whole body.	8/10 lower limbs pain score 9-10/10 muscle tenderness pain score	72/126
December 12, 2018	Gabapentin was discontinued after a diagnosis of gabapentin myositis.	8-10/10	101/126
December 15, 2018	His pain improved dramatically in three days after discontinuation of gabapentin. His blood workups showed normal levels within 2 weeks	1/10	101/126
January 16, 2019	He was discharged from QRI.	0/10	111/126

NRS: numeric rating score; FIM: Functional Independence Measure; QRI: Qatar Rehabilitation Institute

DISCUSSION

Myositis and rhabdomyolysis are the same forms of myopathy; however, rhabdomyolysis is the more severe form of myopathy with CK levels more than 11 times greater than normal in the blood.[9] The CK level of our patient was 747 U/L, and so we used the term myositis instead of rhabdomyolysis.

It was difficult to diagnose gabapentin-induced myositis clinically because of preexisting neuropathic pain in both lower limbs. The suspicion occurred because of generalized muscle pain and tenderness. Blood tests provided the necessary evidence for myositis. The most important laboratory tests were the measurements of CK and myoglobin in the serum, which are sensitive and pathognomonic, respectively.[10]

The dramatic relief of pain after discontinuation of gabapentin, and the gradual normalization of CK and myoglobin levels following discontinuation of gabapentin, indicated that gabapentin was the most probable cause of the symptoms. The probability of gabapentin as the causative agent of the myositis was determined by the Naranjo Adverse Drug Reaction Probability Scale,[7,8] which showed a score of 8 (probable adverse drug reaction).

Gabapentin-induced myositis can be localized, generalized, or can exacerbate existing pain.[11] In our case, it was generalized muscle pain and tenderness. Gabapentin is frequently used in rehabilitation for patients who have neuropathic pain. The exacerbation of existing pain, or the initiation of generalized pain, should call attention to possible gabapentin-induced myositis if the patient is on gabapentin. Table 2

The mechanism of myositis by gabapentin is not exactly known. The most probable primary cause of myositis, in our case, is medication-induced autoimmune reactions.[12] Idiosyncratic rhabdomyolysis due to gabapentin was reported.[11] In our case, the increase of gabapentin dose with increased generalized muscle pain indicates that it was also dose dependent.

Common side effects of gabapentin include sleepiness and dizziness.[13] Serious side effects include acute renal failure, hepatitis, pancreatitis, Stevens-

Table 2. Important patient lab data

Day	CK	Myoglobin	CRP	ALT	AST
December 5, 2018 (day 22 post-increase dose of gabapentin)	747 U/L (normal range 39 – 308)	152 mg/ml (normal range 28 – 72)	22.9 mg/L (normal range 0 – 5)	75 U/L (normal range 0 – 41)	46 U/L (normal range 0 – 40)
December 19, 2018 (day 7 post-discontinuation of gabapentin)	203 U/L (normal range 39 – 308	90 ng/ml (normal range 28 – 72)	1.1 mg/L (normal range 0 – 5)	34 U/L (normal range 0 – 41)	26 U/L (normal range 0 – 41)

CK: creatine kinase; CRP: C-reactive protein; ALT: alanine aminotransferase; AST: aspartate aminotransferase; U/L: units per liter; ng/ml: nanograms/milliliter; mg/L: milligrams per liter.

Johnson syndrome, suicidal ideation, and thrombocytopenia.[14]

Gabapentin-induced rhabdomyolysis or myositis is rare. We could not find myopathy, myositis, or rhabdomyolysis as the side effects of gabapentin in the British national formulary BNF70.[14] Rhabdomyolysis is reported as postmarketing experience in the FDA Neurontin (gabapentin) literature. Rhabdomyolysis is not a well-established adverse effect of gabapentin because of the absence of sufficient evidence. We believe that additional similar case reports might help to include myositis as a potential adverse effect of gabapentin in the literature.

The similarity of the clinical presentation of myositis in patients with neuropathic pain might make the diagnosis of myositis difficult. We feel that rehabilitation specialists should be more aware of this condition, for early diagnosis and management of gabapentin-induced myositis.

There are some limitations to this study. Preexisting myositis could not be excluded because of the unavailability of CK and myoglobin levels of the patient. However, preexisting myositis can be excluded indirectly by observing CK levels becoming normal after the discontinuation of gabapentin. Another limitation is that myositis was not confirmed by biopsy or EMG studies. Myositis was diagnosed by new-onset generalized muscle pain and increased CK and myoglobin only.

CONCLUSION

Gabapentin-induced myopathy is rare. Any exacerbation of existing pain, or new generalized muscle pain in patients on gabapentin, should call attention to possible gabapentin-induced myopathy. Clinical findings of muscle tenderness increased CK and myoglobin levels, increased Naranjo Adverse Drug Reaction Probability Scale scores, could collectively confirm the diagnosis. Withdrawal of gabapentin relieves muscle pain rapidly and reduces the values of laboratory parameters.

ABBREVIATIONS

Alanine aminotransferase: ALT

American Spinal Injury Association: ASIA

Aspartate aminotransferase: AST

British national formulary: BNF70

Computed tomography: CT

C-reactive protein: CRP

Creatine kinase: CK

Functional independence measure: FIM

Intensive care unit: ICU

Lumbar: L

Magnetic resonance imaging: MRI

Milligrams Per Liter: mg/L

Nanograms per Milliliter: ng/ml

Numeric rating score: NRS

Thoracic: T

Units per Liter: U/L

DECLARATION

Acknowledgements

We thank Claire Gleeson for her proofreading and editing of the manuscript.

Authors' contributions

SG contributed in design, acquisition, analysis, interpretation, drafting, and revision of the article. SV

and WY contributed in analysis, interpretation, and revision of the article. All authors read and approved the final manuscript.

Ethics approval and consent to participate

This case report is permitted by MRC, Qatar, ID **MRC-04-19-175**.

This case report was written in accordance with the recommendations of the Declaration of Helsinki. The patient is described anonymously and gave written informed consent for the publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

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