

Neutropenia develops after intravenous immunoglobulin administration in a patient with multifocal motor neuropathy and conduction block.

Sung-Yeon Sohn

Sung-Yeon Sohn, Department of Neurology, Eulji University Hospital 95, Dunsanse-ro, Seo-gu, Daejeon, Republic of Korea

Corresponding Author: Sung-Yeon Sohn, Department of Neurology, Eulji University Hospital 95, Dunsanse-ro, Seo-gu, Daejeon, Republic of Korea

Received Date : Sep 04, 2023

Accepted Date : Sep 05, 2023

Published Date : Oct 07, 2023

ABSTRACT

The preferred treatment for those with multifocal motor neuropathy with conduction block is intravenous immunoglobulin (IVIg) (MMNCB). Neutropenia following IVIg infusion has been identified as a rare hematologic adverse effect, despite the fact that IVIg is typically regarded as safe. Here, we present information about a patient with MMNCB who experienced significant neutropenia after receiving IVIg.

A 41-year-old lady who frequently experienced muscle cramps and growing weakening in her left lower leg presented. Right ulnar and right tibial nerves showed noticeable conduction blockages in a nerve conduction examination. Anti-GM1 serum IgM antibody was found. After receiving IVIg, the neutrophil count began to decline on day 2 and then began to increase two weeks later. Although it can be a significant clinical concern, neutropenia following IVIg infusion in MMNCB has never been separately discussed to our knowledge.

INTRODUCTION

It is uncommon for multifocal motor neuropathy with conduction block (MMNCB), an immune-mediated polyneuropathy, to develop less than 1 per 100000 is known to exist [1]. Although uncommon, MMNCB is a curable illness if caught early and handled properly. Because MMNCB is resistant to corticosteroids and plasmapheresis, it should be recognised from other chronic acquired demyelinating polyneuropathies [2]. Due to its outstanding safety profile and clinical efficacy, intravenous immunoglobulin (IVIg) injection has been the cornerstone of MMNCB therapy to date [3,4].

Although hematologic toxicities were noted in a number of clinical applications, including idiopathic thrombocytopenia purpura, systemic lupus erythematosus, pemphigus vulgaris, Guillain-Barre syndrome (GBS), chronic inflammatory demyelinating polyradiculoneuropathy (CIDP), and polymyositis [6,] intravenous immunoglobulin is generally regarded as safe. As far as we are aware, leukopenia Although it can be a significant clinical concern, particularly for individuals with MMNCB, after IVIg therapy in MMNCB has never been separately discussed. We describe a patient with MMNCB who experienced leukopenia after receiving IVIg.

Neutropenia has been documented as a rare side effect since the debut of IVIg therapy for a variety of immunological disorders. Patients with idiopathic thrombocytopenia purpura were the first to exhibit neutropenia after IVIg [7,8]. A patient with active systemic lupus erythematosus who had two courses of IVIg infusion was described by Ben-Chetrit et al. [9] in their report. Following each IVIg treatment, marked neutropenia frequently emerged, confirming the link between IVIg infusion and neutropenic occurrence. In this instance, neutropenia began to manifest on day two after the infusion began and peaked on day four. Leukocyte levels of our patient returned to baseline after 2 weeks without any complications, which is consistent with earlier studies [8,10].

It is still unclear how neutropenia following IVIg occurs. Antineutrophil antibodies were found in a child with Guillain-Barre syndrome, according to Tam et al. [11], who also described the case. Atypical

antineutrophil cytoplasmic antibodies (ANCA) have been implicated in several studies [12, 13]. Some researchers hypothesised that IgG aggregates with immune-complex-like activity were to blame for transitory neutropenia [9,14]. Two components found on the surface of neutrophils were the focus of Matsuda et al study [10]: the complement receptor CD11b and the Fc gamma receptor CD16. Only the expression of CD11b, one of the two surface antigens, was shown to be reduced after IVIG. The authors found that spreading IVIG used a. The circulating syndrome, in which the authors identified the presence of antineutrophil antibodies, was concluded by the authors. Atypical antineutrophil cytoplasmic antibodies (ANCA) have been implicated in several studies [12, 13]. Some researchers hypothesised that IgG aggregates with immune-complex-like activity were to blame for transitory neutropenia [9,14]. Two components found on the surface of neutrophils were the focus of Matsuda et al study [10]: the complement receptor CD11b and the Fc gamma receptor CD16. Only the expression of CD11b, one of the two surface antigens, was shown to be reduced after IVIG. The authors found that spreading When CD11b is present, neutrophils may stick to the vascular wall. Neutropenia was shown to be caused by the sialic acid-binding immunoglobulin-like lectin 9 (siglec-9) produced on neutrophils more recently by von Gunten et al. [15,16]. Natural siglec-9 autoantibodies may be present in IVIG preparations, and both caspase-dependent and caspase-independent mechanisms can be used to generate neutropenia by these autoantibodies.

REFERENCES

1. Bromberg MB, Franssen H (2015) Practical rules for electrodiagnosis in suspected multifocal motor neuropathy. *J Clin Neuromuscul Dis* 16:141-152.
2. Latov N (2014) Diagnosis and treatment of chronic acquired demyelinating polyneuropathies. *Nat Rev Neurol* 10: 435-446.
3. Lawson VH, Arnold WD (2014) Multifocal motor neuropathy: A review of pathogenesis, diagnosis, and treatment. *Neuropsychiatr Dis Treat* 10:567-576.
4. Brannagan TH (2002) Intravenous gammaglobulin (IVIg) for treatment of CIDP and related immune-mediated neuropathies. *Neurology* 59: S33-S40.
5. Katz U, Achiron A, Sherer Y, Shoenfeld Y (2007) Safety of intravenous immunoglobulin (IVIg) therapy. *Autoimmun Rev* 6: 257-259.
6. Baxley A, Akhtari M (2011) Hematologic toxicities associated with intravenous immunoglobulin therapy. *Int Immunopharmacol* 11:1663-1667.
7. Veys PA, Macey MG, Owens CM, Newland AC (1988) Neutropenia following intravenous immunoglobulin. *Br Med J (Clin Res Ed)* 296:1800.
8. Berkovitch M, Dolinski G, Tauber T, Aladjem M, Kaplinsky C (1999) Neutropenia as a complication of intravenous immunoglobulin (IVIg) therapy in children with immune thrombocytopenic purpura: Common and non-alarming. *Int J Immunopharmacol* 21: 411-415.
9. Ben-Chetrit E, Putterman C (1992) Transient neutropenia induced by intravenous immune globulin. *N Engl J Med* 326: 270-271.
10. Matsuda M, Hosoda W, Sekijima Y, Hoshi K, Hashimoto T, et al. (2003) Neutropenia as a complication of high-dose intravenous immunoglobulin therapy in adult patients with neuroimmunologic disorders. *Clin Neuropharmacol* 26: 306-311.
11. Tam DA, Morton LD, Stroncek DF, Leshner RT (1996) Neutropenia in a patient receiving intravenous immune globulin. *J Neuroimmunol* 64:175-178.
12. Jolles S, Deacock S, Turnbull W, Silvestrini R, Bunn C, et al. (1999) Atypical c-ANCA following high dose intravenous immunoglobulin. *J Clin Pathol* 52: 177-180.
13. Jarius S, Eichhorn P, Albert MH, Wagenpfeil S, Wick M, et al. (2007) Intravenous immunoglobulins contain naturally occurring antibodies that mimic antineutrophil cytoplasmic antibodies and activate neutrophils in a TNFalpha-dependent and Fc-receptor-independent way. *Blood* 109: 4376-4382.
14. O'Donnell J, Ahern M, Roberts T P, Bradley J (1988) Alteration in circulating neutrophil CR3 density associated with immunoglobulin infusion. *Australian and New Zealand Journal of Medicine* 18:95-100.

15. von Gunten S, Simon HU (2008) Natural anti-siglec autoantibodies mediate potential immunoregulatory mechanisms: Implications for the clinical use of intravenous immunoglobulins (IVIg). *Autoimmun Rev* 7: 453-456.
16. von Gunten S, Schaub A, Vogel M, Stadler BM, Miescher S, et al. (2006) Immunologic and functional evidence for anti-siglec-9 autoantibodies in intravenous immunoglobulin preparations. *Blood* 108: 4255-4259.
17. Khan S, Sewell WA (2007) Risks of intravenous immunoglobulin in sepsis alect trial design. *Ann Intern Med* 147: 813-814.
18. Misbah SA, Baumann A, Fazio R, Dacci P, Schmidt DS, et al. (2011) A smooth transition protocol for patients with multifocal motor neuropathy going from intravenous to subcutaneous immunoglobulin therapy: An open-label proof-of-concept study. *J Peripher Nerv Syst* 16: 92-97.
19. Harbo T, Andersen H, Jakobsen J (2010) Long-term therapy with high doses of subcutaneous immunoglobulin in multifocal motor neuropathy. *Neurology* 75: 1377-1380.
20. Hadden RD, Marreno F (2015) Switch from intravenous to subcutaneous immunoglobulin in CIDP and MMN: Improved tolerability and patient satisfaction. *HerapeutLc Advances in Neurological Disorders* 8: 14-19.