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Implications of Anti-Ganglioside Antibodies in Isolated Dysphagia Following COVID-19 Infection

Sejoon Kim, MD[1], DongHwan Kim, MD[1], Hae-Yeon Park MD, PhD[2], Geun-Young Park MD, PhD[2], Sun Im MD, PhD[2*]

[1]Department of Rehabilitation Medicine, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea

[2]Department of Rehabilitation Medicine, Bucheon St. Mary`s Hospital, College of Medicine, The Catholic University of Korea

BACKGROUND

The occurrence of dysphagia following the coronavirus disease 2019 (COVID-19) infection has been frequently reported. While the detailed pathology and epidemiologic link between COVID-19 and dysphagia are not fully understood, known causes include infection-related nervous system damage, muscle disease or neuropathy associated with intensive care unit (ICU) stay, and damage to the swallowing structure due to intubation. Building on these findings, our study investigates a novel aspect: the presence of anti-ganglioside antibodies in patients with unexplained dysphagia that worsened post-COVID-19. We explore the potential mechanisms, including the link between anti-ganglioside antibodies specific to NeuNAc(α2-3)Gal epitope and its affinity for the spike glycoprotein of SARS-CoV-2.

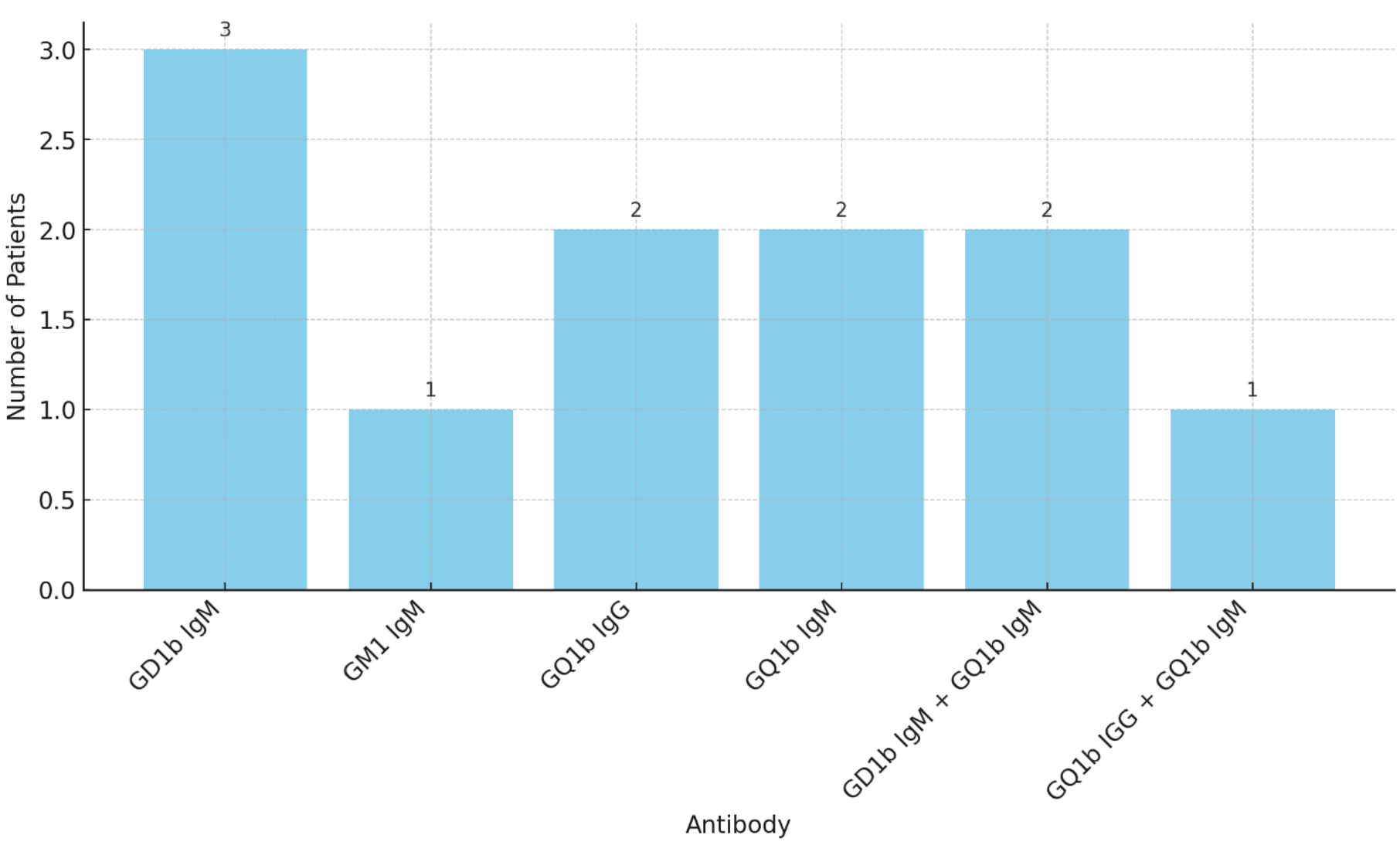
METHOD

We conducted a retrospective analysis of electronic medical records from February 2020 to December 2023 at St. Mary's Hospital in Bucheon. From 80 cases referred to the Department of Rehabilitation Medicine, we focused on 35 patients who demonstrated persistent severe dysphagia exceeding four weeks, requiring total enteral tube feeding, with no motor or sensory signs, and no etiological factors identified through prior imaging or other diagnostic studies.

RESULT

Among these patients, 11 (31.4%) were seropositive for anti-ganglioside antibodies (Figure 1). Specific antibodies detected included anti-GD1b IgM in 3 patients, anti-GM1 IgM in 1, anti-GQ1b IgG in 2, and anti-GQ1b IgM in 2. Furthermore, dual expressions were noted, with anti-GD1b IgM and anti-GQ1b IgM concomitantly present in 2 patients, and anti-GQ1b IGG alongside anti-GQ1b IgM in 1 patient. These antibodies are often linked with various neuropathies and immunological responses. Despite thorough clinical, imaging, and laboratory investigations, no alternative significant etiologies for dysphagia were found in these cases. All patients exhibited isolated dysphagia with severe aspiration but without areflexia, extremity weakness, or ataxia, necessitating prolonged enteral nutrition.

Figure 1. Bar graph depicting the prevalence of anti-ganglioside antibodies in patients with dysphagia following COVID-19 infection.



CONCLUSION

Our findings indicate a significant presence of anti-ganglioside antibodies in patients with isolated dysphagia post-COVID-19. One potential etiology is a variant of Guillain-Barré Syndrome. Because only isolated dysphagia with sparing of the facial and extraocular muscles was evident in these cases, we explore the association between anti-ganglioside antibodies specific to NeuNAc(α2-3)Gal epitope, which has been frequently associated with the development of bulbar dysfunction. Given that NeuNAc(α2-3)Gal exhibits an affinity for the spike glycoprotein of SARS-CoV-2, a cross-reaction may contribute to dysphagia post-COVID-19 infection. This study provides novel insights into the pathogenesis of this uncommon manifestation and highlights the potential role of anti-ganglioside antibodies in COVID-19-related dysphagia, opening avenues for future therapeutic strategies.