Meta-Analysis of Antiganglioside Antibodies in Peripheral Neuropathies: A Potential Diagnostic Indicator in CIDP, GBS, and MMN

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INTRODUCTION

Autoimmune diseases that attack the peripheral nervous system are rare and difficult to precisely diagnose. Current diagnostic techniques rely heavily on patient symptomatology which proves problematic considering the varying presentations and the interchangeability of symptoms among many peripheral neuropathies. Little is understood about the precise mechanism of pathogenesis which makes obtaining a biomarker challenging, but the presence of autoantibodies that target myelin proteins suggest a humoral component in the degeneration of the myelin sheath. In previous studies, antiganglioside IgG and IgM antibodies that attack myelin have been reported in up to 60% of cases of Guillain-Barre syndrome (GBS) and 50% of cases of multifocal motor neuropathy (MMN). However, there are fewer cases of antiganglioside antibodies reported in chronic inflammatory demyelinating polyneuropathy (CIDP) with some studies citing antibodies in less than 10% of cases. This study aims to examine the current diagnostic criteria and provide insight on antiganglioside antibodies as possible diagnostic indicators by examining previously completed studies.

METHODS

- Primary article selection began with keyword searches in PubMed and Google Scholar
- Keywords: Antiganglioside antibodies in CIDP, GBS, and MMN
- Selected studies from reference lists in primary search
- Defined inclusion criteria:
  - Patient sera
  - IgG or IgM antiganglioside antibodies
  - Comparative study
  - Reported total number of participants
  - Antibody titer threshold
- 9 studies met the defined inclusion criteria
- 5 studies were included in each analysis (1 study provided a comparison for both analyses)
  - Analysis comparing CIDP and GBS
  - Analysis comparing CIDP and MMN
- The random effects meta-analyses were completed using the software Review Manager (RevMan) version 5.4

RESULTS

Meta-Analysis Comparing CIDP and GBS:

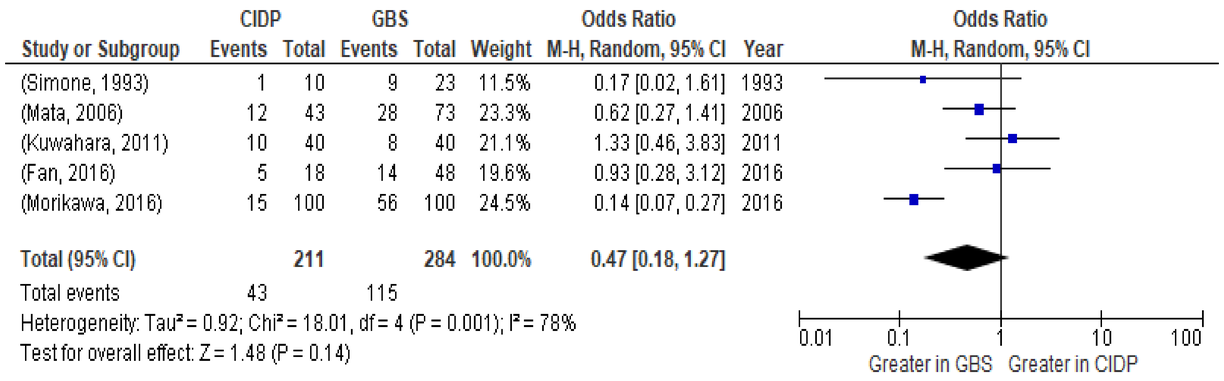

Figure 1. Forest plot of random effects meta-analysis comparing the presence of either IgG or IgM antiganglioside antibodies in CIDP and GBS. The IgG or IgM antiganglioside antibodies were not epitope specific, in that they were not specific to a distinct ganglioside within the myelin. The results revealed considerable heterogeneity across studies (I^2 = 78%). No significant difference was found (P = 0.14) in the presence of antiganglioside antibodies in CIDP and GBS.

Meta-Analysis Comparing CIDP and MMN:

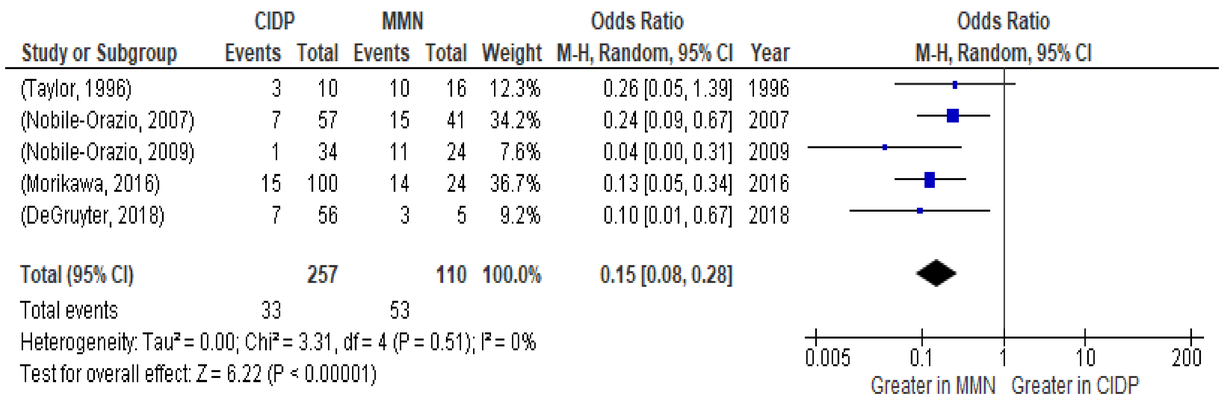

Figure 2. Forest plot of random effects meta-analysis comparing the presence of either IgG or IgM antiganglioside antibodies in CIDP and MMN. The IgG or IgM antiganglioside antibodies were not epitope specific, in that they were not specific to a distinct ganglioside within the myelin. The results revealed little heterogeneity across studies (I^2 = 0%). A significant difference was found (P < 0.00001) in the presence of antiganglioside antibodies in CIDP and MMN, indicating the antibodies appear more often in MMN when compared to CIDP.

CONCLUSION

These findings provide some encouragement for the potential use of antiganglioside antibodies as diagnostic indicators in combination with previously established criteria. According to previous studies it is evident that these antibodies play a role in the pathogenesis of neuropathies like GBS and MMN. Their role in complement fixation and neuroinflammation appears to be a significant contributing factor in the dysfunction of nerve conduction observed in peripheral neuropathies. This makes them an ideal target as a biomarker for MMN or GBS given their implication in pathogenesis. Detection of elevated antiganglioside antibodies in patient serum may also prove useful in eliminating CIDP as the peripheral neuropathy. However, it should be recognized that these diseases are rare with few studies investigating this and further research is needed in disease pathogenesis.

FUTURE DIRECTIONS

- A deeper understanding of disease pathogenesis may give rise to more reliable biomarkers
- Antiganglioside antibodies have been shown to be useful in treatment indications
  - Seropositive patients respond poorly to IVIg
  - Benefit from corticosteroids and plasma exchange
- The lack of precise diagnostic methods and high incidence of misdiagnoses question the validity of current populations studies

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REFERENCES

https://refworks.proquest.com/public-share/jv9OQ1HWyXfjEYBfo4lnPuT52UzHZZpw9jAns13BBHY0