CONSISTENCY OVER TIME OF STRENGTH AND DISABILITY MEASUREMENTS IN PATIENTS WITH CIDP ON STABLE IgG THERAPY

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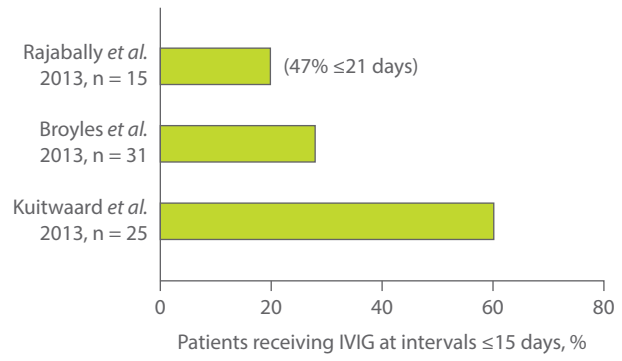
Introduction

- Patients with chronic inflammatory demyelinating polyneuropathy (CIDP) and other chronic autoimmune neuromuscular diseases are treated with long-term intravenous immunoglobulin (IVIG) therapy
- Common IVIG dosing regimens are based on an initial loading dose of 2 g/kg followed by 1 g/kg every 3–4 weeks[1]
- Anecdotal reports of dynamometry measurements and small studies of electrophysiological responses[2,3] suggest that the effects of IVIG become detectable very rapidly after infusion, often peaking within 7–14 days, but diminish (wear-off) before the next dose is due
- In real life, many patients receive IVIG at intervals ≤21 days (**Figure 1**);[4–6] presumably to avoid reaching the low serum IgG levels considered responsible for these wear-off or end-of-dose weakness effects

Figure 1. Proportion of patients with CIDP receiving IVIG at intervals ≤15 days



CIDP, chronic inflammatory demyelinating polyneuropathy; IVIG, intravenous immunoglobulin

Objectives

- This analysis aims to establish the basis for the GRIPPER study – a future prospective study designed to determine the proportion of patients with CIDP who experience wear-off effects during IVIG therapy
  - In the GRIPPER study, daily recordings of grip strength and weekly assessment of disability would allow measuring the extent of variations in treatment effect between IVIG infusions
- Here, we review results recorded in the CareExchange® database to determine the consistency over time of strength and disability metrics measured just before every IVIG infusion

Methods

- Records of patients with CIDP receiving home-based IVIG infusions from AxelaCare were reviewed
- Grip strength and disability scores were assessed every 3–4 weeks by trained nurses, just prior to dispensing IVIG infusions at home, and results were recorded wirelessly in the CareExchange® database using an iPad™
- Grip strength was measured using Jamar dynamometers. Standardized forms were used to assess disability according to Rasch-built Overall Disability Scale (R-ODS) and Overall Neuropathy Limitations Scale (ONLS)
- For every patient, the mean, standard deviation (SD) and range of strength and disability scores were calculated
- The variations in strength and disability metrics between consecutive measurements (visit-to-visit variations), as well as their mean, SD, and range were calculated for each patient. These data were used to determine the overall mean variations over the entire patient cohort

Table 1. Study population demographics

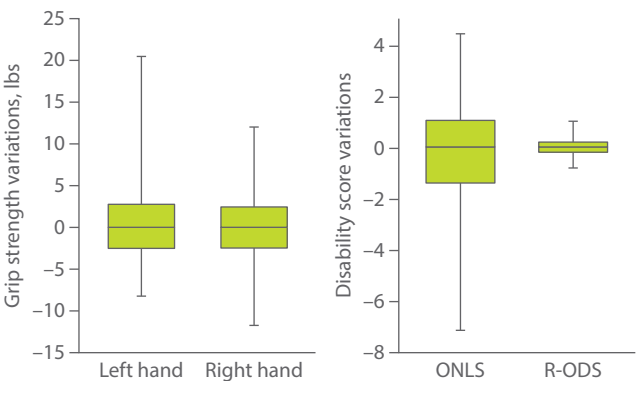
All patients, N	181
Mean age, years	57
Gender, % male	45
Mean weight, kg	67.1
Mean monthly IVIG dose, g/kg bw	1.3
Mean interval between doses, days	22.9

Bw, body weight; IVIG, intravenous immunoglobulin G; N, number of patients

Figure 2. Example of CareExchange® data set of an individual patient: grip strength, R-ODS and ONLS

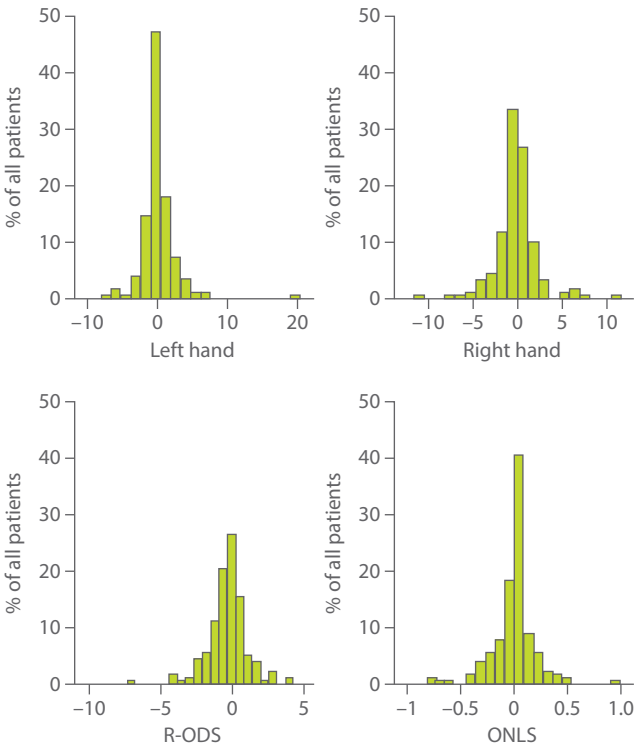
Error bars in grip strength measurements represent SD from 3 independent measurements. ONLS, Overall Neuropathy Limitations Scale; R-ODS, Rasch-built Overall Disability Scale; SD, standard deviation

Figure 3. Distribution of the visit-to-visit variation of grip strength and disability metrics over the entire patient cohort



Boxes represent mean ± SD calculated over the entire study population; bars show minimum and maximum variation recorded for each parameter.
ONLS, Overall Neuropathy Limitations Scale; R-ODS, Rasch-built Overall Disability Scale; SD, standard deviation

Figure 4. Distribution of the mean visit-to-visit variation in grip strength and disability metrics in individual patients



ONLS, Overall Neuropathy Limitations Scale; R-ODS, Rasch-built Overall Disability Scale

Table 2. Mean scores calculated over the entire study population and SDs of visit-to-visit variation

Parameter	Cohort mean	SD of variation	Relative SD (% of the cohort mean)
Left hand grip strength, lbs	42.5	2.5	5.9
Right hand grip strength, lbs	44.8	2.5	5.6
R-ODS	55.9	0.2	0.4
ONLS	3.9	1.4	35.9

ONLS, Overall Neuropathy Limitations Scale; R-ODS, Rasch-built Overall Disability Scale; SD, standard deviation

Results

- We reviewed CareExchange® records of 181 patients managed by 62 physicians. There were slightly more women (55%) than men; the mean patient age was 57 years (**Table 1**)
- An example of data collected from an individual 59-year-old male patient is shown in **Figure 2**. The mean ± SD (range) values calculated for this patient were 89.0 ± 8.5 lbs (63.3–106.7 lbs) for left hand grip strength, 87.3 ± 6.7 lbs (74.7–104.0 lbs) for right hand grip strength, 42.7 ± 3.4 (39.0–54.0) for R-ODS and 2.7 ± 0.6 (2.0–4.0) for ONLS
- Over the entire patient cohort, the mean ± SD (range) visit-to-visit variations in strength and disability scores were close to zero: 0.2 ± 2.5 lbs (-8.0–20.4 lbs) for left hand grip strength, 0.0 ± 2.5 lbs (-11.8–12.0 lbs) for right hand grip strength, 0.0 ± 0.2 (-0.8–1.0) for R-ODS, and -0.4 ± 1.4 (-7.5–4.4) for ONLS (**Figure 3**)
- The SD of visit-to-visit variation in grip strength and R-ODS were relatively small compared with the mean value calculated over the entire patient cohort (**Table 2**)
- Most of the patients had mean visit-to-visit variations <10% of the overall mean of each strength and disability metric (**Figure 4**)

Conclusions

- Grip strength and R-ODS values at the end of an IVIG treatment cycle were consistent over time
- The very low variations in R-ODS and grip strength show that these measurements can be performed reliably by trained infusion nurses
- Given that the variations in grip strength and R-ODS between values recorded at the same time point in *different cycles* of IVIG treatment were much lower than the variations expected at different time points *within individual cycles*, we believe that the mean scores calculated in this work can serve as a baseline for the detection of wear-off related deviations

Outlook

- Frequent assessments of R-ODS and grip strength may be useful in identifying patients with large treatment-related fluctuations
- Multiple cycles of IVIG treatment showing similar strength and disability fluctuation patterns will be needed to identify wear-off effects in patients
- In the future, this information might be useful for tailoring individualized IVIG dosing regimens, and for testing the hypothesis that maintenance of high serum IgG levels results in better outcomes

References

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This study was supported by CSL Behring. Editorial and graphic support was provided by Fishawack Communications GmbH, a member of the Fishawack Group of Companies, supported by CSL Behring. We would like to thank Ron Lindahl for his assistance in the data collection component of this study.