Published in final edited form as:

Muscle Nerve. 2009 April ; 39(4): 421–422. doi:10.1002/mus.21181.

Dynametric Assessment in CIDP

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Keywords

CIDP; manual muscle testing; isokinetic dynamometry; SF-36

In this issue, Harbo and colleagues,³ use a number of common measures, including manual muscle testing, as done in the Neuropathy Impairment Score (NIS), attributes of nerve conduction (NCs), quantitative sensation testing (QST) using CASE IV, functional activity scales (9-hole peg and 40-meter walk), and short SF-36 quality of life scales for comparison with muscle force measurements of the Biodex System 3 PRO dynamometer (CIMP) in a trial of withholding and re-instituting IVIg treatment in patients with CIDP. They found that muscle force decreased by about 15 percent when treatment was withheld, and it improved by approximately 6 and 12 percent by days 5 and 10 after restarting IVIg treatment. These measured changes were significantly associated with “improved walking velocity and hand function.” With retreatment, the F-wave latency decreased, but manual muscle testing, NCs, QST and SF-36 did not show significant concomitant changes. They conclude that isokinetic dynamometry “...is a sensitive and clinically relevant method for monitoring the acute response to IVIG treatment in CIDP.”

I find their composite assessment of maximal muscle force as a measure of overall severity of CIDP and as a measure of worsening or improvement to be as good (or perhaps better) than other methods now available. The reasons why it is a good test are: first, it is a measure of muscle force – the major functional impairment in CIDP. Second, both proximal and distal muscles can be assessed, and composite scores can be developed. Third, it can be assessed serially to track course. Fourth, it employs a standard protocol so as to obtain maximal effort and consistent results; and fifth, it is a primary measure of dysfunction in CIDP. Therefore, in medical centers that have this technology available, it is an entirely reasonable approach to track muscle weakness over time with the goal of adjusting frequency and dose of IVIg treatment to need and response.

However, it is important to note that results in this study are based on an open study, and the worsening and improvement observed may have been due, at least in part, to patient or observer bias. The study results would have been more convincing if a double-blind design and sham infusions had also been included. In addition, the number of patients studied was small, and only one infusion of IVIg was used. This is generally not sufficient to obtain an unequivocal favorable response.

Accepting the authors’ viewpoint that composite measurement of muscle force is a good approach to monitoring overall severity of CIDP status, it is important to also note shortcomings. The authors list the high cost of the equipment, but of course this may not be

a problem in medical centers that already have it. However, most neurologic departments may not have this equipment and may have difficulty with access to it. If this measurement is to be used for initiation of immunotherapy, it would be important to develop reference values corrected for applicable variables of age, gender, anthropomorphic variables and physical fitness.

One might infer from this report that manual muscle testing (as done in the NIS) and NCs are not useful for monitoring the course of CIDP, but that would be an incorrect inference. Double-blind trials of plasma exchange and IVIg have already demonstrated the value of both measurements.^{1,2} This can be illustrated by consideration of our observer-blinded studies of NIS and summated motor amplitudes of ulnar, median and peroneal nerves of patients who received either plasma exchange or IVIg for a period of 6 weeks, followed by a period of wash-out and cross over to the alternative therapy – a design similar, in some respects, to that used in the Harbo, et al. study.³ Using ordinal grading, we recognized an improvement of muscle strength of 6.1% and 11.1% (of the maximal score) with use of PE and IVIg and a worsening of 13.5% and 5.9% of the maximal NIS score after wash-out. These differences were significant at $p = 0.003$ and $p = 0.001$ using a 2 sample t test. Composite amplitudes of motor nerves (ulnar, median and peroneal) increased by a mean of 12 mV with PE and 12 mV with IVIg and worsening of 15 mV and 8 mV after wash-out ($p = < .003$ and $< .001$). Although our study¹ was designed to test for difference in response between PE and IVIg, the study clearly shows that manual muscle testing and composite motor amplitude measurements can be used to track severity of CIDP and responsiveness to treatment. The reason why Harbo et al. did not find a significant effect using these measurements might relate to the small number of patients, use of a single treatment of IVIg, failure to use summated scores of amplitudes of NCs or other unknown reasons.

Finally, the decision about which measurements might be used to track CIDP severity is perhaps not as important as that such monitoring be done and be done well at periodic intervals.⁴ In my referral practice, I encounter many patients whose immunotherapy has been started or altered without adequate surveillance of severity of symptoms, signs or nerve tests. A decision is made to begin, stop or alter treatment based simply on the diagnosis and a patient's statement that he is better or worse. I suggest that surveillance occur at regular intervals. Impairment should be assessed initially before any inquiry about symptoms and course is made, so the observer remains masked while assessing impairments. Such assessments should be done rigorously and accurately, and the results should be recorded as a composite score. Whether isokinetic dynamometry, manual testing or timed activities are measured, it is important that the patient put his "best foot forward" (maximal effort), and if such effort is not used this must be recognized and recorded. In adjusting immunotherapy to response, it is therefore helpful to have a record of a single sum-score value of muscle weakness or neurologic signs and symptoms which can be compared to the same score assessed at previous occasions.⁴

To keep costs and treatment risk to a minimum it is further important to recognize that response to immunotherapy varies considerably among patients. It is therefore advisable to adjust treatment dosage to response, while modifying dosage periodically rather than simply prescribing the schedule used in controlled trials.^{2,4}

Acknowledgments

Supported in part by a grant obtained from the National Institutes of Neurological Disorders and Stroke (NS36797).

Abbreviations

CIDP	chronic inflammatory demyelinating polyradiculoneuropathy
CIMP	isotonic dynamometry
NCs	nerve conductions
NIS	Neuropathy Impairment Score
QSTing	quantitative sensation testing

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