

Can long-term impairment in general practitioner whiplash patients be predicted using screening and patient-reported outcomes?

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The objective of this prospective pilot study was to investigate the predictors of outcome at 6 months for whiplash-associated disorder in a general practitioner primary care population. Psychosocial screening questionnaires, patient-reported outcomes of cervical functional impairment, demographic and accident-specific data have been indicated as predictive of future recovery status and treatment requirements. Participants ($n=30$, age = 37 ± 14 years, 77% females) from eight general practitioners were initially screened with a modified Orebro Musculoskeletal Pain Questionnaire, and had recovery status monitored and classified for 6 months using both patient-reported outcomes, quantitatively (Neck Disability Index) and qualitatively (patient status self-classification). Analysis at two separate cutoff levels showed 30% of participants nonrecovered and 17% with moderate/severe impairment. Nonrecovery status and increased treatment was predicted by a 109-point screening score cutoff while moderate/severe impairment was predicted by including the presence of cervical rotation at impact. Initial cervical

functional impairment status measured with the Neck Disability Index was sensitive but not specific for prediction. A larger population study investigating these protocols is warranted. *International Journal of Rehabilitation Research* 31:79–80 © 2008 Wolters Kluwer Health | Lippincott Williams & Wilkins.

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Introduction

Psychosocial screening tools, such as the Generic Screening Tool (GST) (Gabel *et al.*, 2005) and Orebro Musculoskeletal Pain Questionnaire (OMPQ) (Linton and Boersma, 2003) have been used successfully to predict disability outcome in low-back pain and general workers compensation musculoskeletal patient groups (Gabel 2003; Dunstan *et al.*, 2005). Recent research on whiplash-associated disorder (WAD) has shown that the use of psychological testing tools for distress and acute posttraumatic stress in conjunction with sensory hypersensitivity and motor dysfunction can indicate patients at risk of persistent moderate/severe symptoms at 6 months postinjury (Sterling and Kenardy, 2006). Other research determines that prediction of severity and delayed recovery can be made based on demographic data, initial levels of intensity, the presence of cervical rotation at impact and the type of accident (Radanov *et al.*, 1995; Suissa, 2003).

The purpose of this research was to investigate in a pilot study whether long-term functional impairment after a WAD could be predicted in a general practitioner (GP) population using self-administered patient report outcomes (PROs). Functional impairment was measured

quantitatively using the Neck Disability Index (NDI) (Vernon and Mior, 1991) PRO and qualitatively from patient-reported recovery status. The hypothesized predictors were the score on the psychosocial GST (Gabel *et al.*, 2005), the presence of cervical rotation at impact, demographic details and the initial level of severity on the NDI.

Method

Participants

Participants with WAD ($n = 35$, age 37 ± 14 years, 77% females, 83% receiving physiotherapy treatment) were recruited and managed under the standard care procedures of eight GPs. Five patients withdrew from the study leaving $n = 30$.

Measures and procedures

At initial assessment demographic data, the presence of cervical rotation at impact, psychosocial screening scores and baseline PROs were obtained. The screening was measured by the GST – a modified OMPQ that combines psychosocial yellow flag and physical impairment signs. The PROs were the NDI and patient-reported recovery being a dichotomous self-classification for recovery status

(full/nearly versus not) and symptoms/impairment (none/mild vs. moderate/severe). The PROs were repeated at 1, 3 and 6 months. The NDI overall score (out of 100%) is calculated by totaling the responses of each individual item and multiplying by 2 (0% being no impairment, 100% being worst possible). A dichotomous classification was used to indicate participant status using a combination of the original three categories defined by Vernon (1996) and validated by Sterling *et al.* (2003). These were recovered ($\leq 8\%$) versus nonrecovered ($> 8\%$) and moderate/severe ($> 28\%$) versus nonsevere ($\leq 28\%$). Sensitivity and specificity with subsequent likelihood ratios (LRs) were used to analyse the effectiveness of screening in predicting chronicity as determined by the NDI classification at 6 months and the patient-reported classification status.

Results

Symptoms classification at 6 months found nine (30%) participants nonrecovered on both quantitative and qualitative classification with moderate/severe impairment for five (17%) on quantitative and four (13%) on qualitative classification – 80% correlation. Demographic data gave the poorest prediction of nonrecovery, however, female classification was predictive. Employment status was not significant. For screening, a GST cutoff score of ≥ 109 was 78% sensitive and 86% specific of nonrecovery with a LR of 5.4. Combining GST ≥ 109 and cervical rotation at impact was 100% sensitive and 87% specific for moderate/severe impairment with a LR of 7.7.

The total treatments provided were 252, ranging from 0 to 22 at an average of 8.4 ± 7.5 . There was a statistically significant difference ($P = 0.001$) between those classified as nonrecovered (average of 15 treatments) and those who were classified as recovered (average of 8.2 treatments). A similar significant difference between those who were classified with moderate/severe impairment (average of 14.6 treatments) and those not impaired severely (average of nine treatments). Using these average treatment values of more than or equal to 15 treatments and less than or equal to nine treatments, the GST ≥ 109 cutoff was predictive being 80% sensitive and 90% specific of more than or equal to 15 treatments with a LR of 8.0 and 100% sensitive and 75% specific for being moderate/severely impaired with a LR of 4.0. Initial NDI score was 100% sensitive but only 40% specific for being moderate/severely impaired.

Discussion

This pilot study demonstrated that initial information at injury, specifically a GST cutoff score of ≥ 109 and the presence of ‘cervical rotation at impact’, are predictive of impairment at 6 months after a WAD injury. These baseline measures are also indicative of who will, respectively, be recovered or have moderate/severe impairment. The GST cutoff score ≥ 109 was also indicative of who would require more treatment. Use of the combined GST > 109 and the presence of ‘cervical rotation at impact’ were strong indicators of the risk of not being recovered at 6 months postinjury. By using a screening tool and determining the presence of rotation at injury, GPs would be able to have an early indication of patients who are at a higher risk of chronicity and increased treatment. This would facilitate appropriate early referral and management strategies to reduce the associated incidence and morbidity for WAD patients. A further larger population study is warranted.

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