Most Widespread Pain Present 1 Year after Motor Vehicle Collision (MVC) Begins within Weeks of the MVC: Results of a Multicenter Prospective Cohort Study

INTRODUCTION

Over 4 million adults present to US emergency departments (EDs) each year after motor vehicle collision (MVC). The great majority of these individuals are discharged to home after ED evaluation.

A subset of these individuals develop MVC-related widespread pain (MWP), which is characterized by substantial suffering and functional loss.1 Whether MWP develops via progressive extension of pain (“accumulation trajectory”) or early development of widespread pain with non-recovery (“non-recovery trajectory”) is unknown (Figure 1). Determining the course of MVC development would advance understanding of this vexing and poorly understood disorder.

In this study, we sought to determine if either of the above trajectory models accurately describe MVC development. We hypothesized a non-recovery model based on evidence that a substantial proportion of patients have MWP in the hours after MVC.2

METHODS

Data for these analyses were drawn from a cohort of European Americans ≥18 years of age who presented to the ED after MVC (median 1 hour 14 min) and were discharged home after ED evaluation.3 Participants completed interview evaluation in the ED and six weeks, six months, and one year following MVC. Pain prior to MVC was also assessed at the ED timepoint.

At evaluation, each time point included an assessment of pain (0-10 on a numerical pain scale), number of body regions with pain, MVC-relatedness of the pain was assessed. Only MVC-related pain was included in analyses.

Figure 2. Trajectory analysis performed using study data indicated that widespread pain after MVC develops via non-recovery.

Widespread pain (WP) was defined according to ACR 1990 criteria.4 Number of body regions with pain at each timepoint was defined as the number of body regions in which MVC-related pain was reported.

Descriptive and trajectory analyses of extent of pain across time were performed using SAS 9.3. Trajectory analyses were performed using PROC TRAJ.5

CONCLUSION

Together these data support the hypothesis that individuals with MVC-related WP develop a “non-recovery” trajectory, with initial widespread pain symptoms after MVC that do not remit.

Further studies are needed to determine biopsychosocial factors that mediate the development of early MVC and non-recovery. Such understanding will inform the development of secondary preventive interventions.

REFERENCES


RESULTS

Even among the 30% of individuals with MVC-related widespread pain (MWP) who experienced the greatest increase in number of body regions with pain between 6 weeks and 1 year (“speed of pain group”), 4 body region increase, their pain characteristics in the emergency department (ED) and at week 6 most closely resembled the MWP group. This further supports a non-recovery model of MWP development.

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Figure 1. Candidate trajectory models of widespread pain development one year after motor vehicle collision.


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Figure 3. Further supporting a non-recovery model, relatively few individuals experienced a substantial increase in the number of body regions with pain from 6 weeks to 1 year. (E.g., only 30% of individuals experienced an increase of ≥ 4 body regions with pain.)

Figure 4. Even among the 30% of individuals with MVC-related widespread pain (MWP) who experienced the greatest increase in number of body regions with pain between 6 weeks and 1 year (“speed of pain group”), 4 body region increase, their pain characteristics in the emergency department (ED) and at week 6 most closely resembled the MWP group. This further supports a non-recovery model of MWP development.

Figure 5A. Individuals with MWP experienced substantially worse depressive symptoms (CES-D) and PTSD symptoms (IES-R) over time.

Figure 5B. Number of body regions with pain at the ED of the “spread of pain” group were most consistent with the MWP group. This further supports a non-recovery model of MWP development.