EXECUTIVE SUMMARY

BACKGROUND

Pain resulting from polytraumatic injuries poses numerous challenges during and after rehabilitation treatment. The objectives of this report are to systematically review the literature to address the assessment and management of pain in patients with polytraumatic injuries, to identify patient, clinician and systems factors associated with pain-related outcomes in these patients, and to describe current or planned research addressing the key questions in this report.
The key questions were:

1. Have reliable and valid measures and assessment tools been developed to measure pain intensity and pain-related functional interference among patients with cognitive deficits due to TBI? Which measures and tools are likely to be most useful in assessing pain in polytrauma patients with cognitive deficits due to TBI?

2. A. Which treatment approaches are most likely to be effective in improving pain outcomes (pain intensity and functional interference) in polytrauma patients?
   B. Which pain treatment approaches are most likely to enhance overall rehabilitation efforts?

3. A. Does blast-related headache pain differ in terms of phenomenology and treatment from other types of headache pain?
   B. Which treatments are best for persistent blast-related headache pain?

4. What patient factors are associated with better and worse pain-related clinical outcomes among polytrauma patients? Have interventions been developed to specifically address these factors?

5. What are unique provider and system barriers to detecting and treating pain among polytrauma patients? Have interventions been developed to effectively address these barriers?

We also sought to identify and describe current or planned research that is addressing or will address the key questions.

METHODS

Literature Search
Two research librarians independently designed search strategies based on the key questions, and conducted searches in Medline of literature published from 1950 through July 2008. The results of both searches were combined into a single reference library. Three researchers trained in the critical analysis of literature assessed for relevance the abstracts of citations identified from these literatures searches. Full-text articles of potentially relevant abstracts were retrieved for further review. Reference lists from

articles were reviewed to find additional articles for inclusion. We also searched for in-progress and unpublished trials. Due to a limited number of studies using controls or comparators, we included cross-sectional and case report/case series studies in the review for some key questions, We systematically rated the quality of cohort and case-control design studies.

Active Research

The PI sent email communications inquiring about active or planned research to a number of groups and individuals identified through VA workgroups, personal knowledge of investigators, recent publications, and several web-databases which included information about funded VA and non-VA projects. Email communications described the evidence review project, and asked respondents to describe any relevant projects they were involved in or planning as well as to identify other investigators who might be working in these areas (snowball approach). Initial email messages were sent at the end of January 2008; email messages to newly identified investigators and follow-up communications occurred continuously until August 28, 2008.

RESULTS

We screened 3252 titles and performed a more detailed review of 578 articles. From these, we identified one systematic review, one qualitative research study, and 93 observational studies that addressed at least one of the key questions. Studies were excluded for the following reasons: 1) the study population did not constitute or include polytrauma patients or patients with blast-related headaches; 2) the study addressed perioperative or surgical pain management or management of specific orthopedic injuries or only short term (less than 3 months post-injury) outcomes; 3) the study outcomes did not include measures of pain intensity or pain-related function; 4) the text of the article was non-English. The primary findings for each key question are summarized below. Secondary findings are presented in further detail within the report.

KEY QUESTION #1 Have reliable and valid measures and assessment tools been developed to measure pain intensity and pain-related functional interference among patients with cognitive deficits due to TBI? Which measures and tools are likely to be most useful in assessing pain in polytrauma patients with cognitive deficits due to TBI?

> There were no published studies that assessed measures of pain intensity or pain-related functional interference among patients with cognitive deficits due to TBI.

KEY QUESTION #2 A. Which treatment approaches are most likely to be effective in improving pain outcomes (pain intensity and functional interference) in polytrauma patients? B. Which pain treatment approaches are most likely to enhance overall rehabilitation efforts?

2A: There were no randomized controlled trials, systematic reviews, prospective cohort, case-control, or systematic observational studies that tested the efficacy or effectiveness of specific pain treatment approaches among patients with polytrauma.

2B: One fair-quality retrospective cohort study of patients with trauma-related amputation demonstrated that after controlling for demographic factors, injury characteristics and other medical morbidity, inpatient rehabilitation was marginally associated with increased likelihood of return to work and decreased likelihood of reduced hours of work.(GRADE: Very Low)

KEY QUESTION #3 A. Does blast-related headache pain differ in terms of phenomenology and treatment from other types of headache pain? B. Which treatments are best for persistent blast-related headache pain?

There were no randomized controlled trials, cohort studies, case-control studies, or other systematic observational studies that compared patients with blast-related headache to patients with other types of headache or that specifically addressed treatments for blast-related related headache pain.

KEY QUESTION #4 What patient factors are associated with better and worse clinical outcomes among polytrauma patients? Have interventions been developed to specifically address these factors?

There were no randomized controlled trials. One systematic review, 9 cohort, 3 case-control, and 13 cross-sectional studies specifically addressed patient factors associated with outcomes in TBI patients. Thirty-two cohort, 11 cross-sectional, and 4 case-control studies addressed patient factors associated with outcomes in patients with other types of polytraumatic injuries.

Traumatic Brain Injury

One fair-quality systematic review involving 23 studies and 4,206 patients showed that overall, 58% of patients with TBI have chronic headache, and that brain injury is associated with headache even after adjustment for post-traumatic stress disorder (PTSD). This review also found that patients with mild TBI were more likely to have headache than patients with moderate or severe TBI. However, our review, which included studies not included in the above study, showed mixed findings regarding the association between severity of TBI and pain (GRADE: Very Low).

Psychological factors, including depression and posttraumatic stress disorder (PTSD), and insomnia and fatigue are associated with pain in TBI patients. (GRADE: Low)

Other injuries in polytrauma patients

Characteristics of injuries (location, severity, and whether they are multiple) are associated with clinical outcomes including persistent pain and functional status. Specific factors associated with worse pain-related outcomes include: multiple injuries,

foot injuries or injuries below the knee joint, and concurrent head injury or cognitive disability. (GRADE: Low)

Other factors associated with better outcomes in some studies of patients with polytraumatic injuries other than TBI were younger age, higher educational achievement, having a white collar job or higher income. (GRADE: Very Low)

KEY QUESTION #5 What are unique provider and system barriers to detecting and treating pain among polytrauma patients? Have interventions been developed to effectively address these barriers?

There were no randomized controlled trials, cohort studies, case-control studies, or other systematic observational studies that addressed provider and system barriers to detecting and treating pain among polytrauma patients. One qualitative study of providers from four VA Polytrauma Rehabilitation Centers (PRCs) addressed potential provider and system barriers to treating polytrauma patients. In interviews, providers reported that polytrauma patients are very complex to treat, and that the work with this population is very challenging and emotionally taxing. The investigators and study respondents suggested that increasing use of multidisciplinary and concurrent care and consultation from experts may be necessary to provide the care that is needed.

Results—Active Research

Nineteen relevant active or planned projects were identified and project data were collected on 18 of these projects. Fifteen of the studies should generate information regarding patient factors that may contribute to pain-related outcomes among polytrauma patients (Key Question 4), and 4 studies are testing interventions for pain among polytrauma patients (Key Question 2). One active study will test the reliability and validity of measures to assess pain in cognitively-impaired TBI patients and another study is using primarily qualitative methods to examine the utility of a Computerized Patient Record System (CPRS) pain assessment template module to assist clinicians in evaluating pain in PRC patients with cognitive impairment (Key Question 1). One study is examining the phenomenology and treatment of blast vs. other types of headache (Key Question 3), and one study is addressing provider and systems barriers to detecting and treating pain in polytrauma patients (Key Question 5).