Systematic Review of the Literature on Pain in Patients with Polytrauma including Traumatic Brain Injury

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Disclosure

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Outline

- Background on Pain and Polytrauma
- Study Methods
- Results*
- Active and Future Research
- Limitations
- Questions

FULL REPORT AVAILABLE AT:

http://www.hsrd.research.va.gov/publications/esp/Pain-in-Polytrauma-2008.pdf

Background

- Soldiers injured and who survive in current wars have more complex and multiple injuries than typically seen in previous wars
- Orthopedic, soft-tissue injury, TBI, hearing loss and emotional injury often co-occur
- Blast common source of injury
- Pain close to universal among veterans at polytrauma network sites/centers

Definitions of polytrauma:

- VHA 2005: "Injury to the brain in addition to other body parts or systems resulting in physical, cognitive, psychological, or psychosocial impairments and functional disability"
- More recently: Injury to 2 or more body parts or systems resulting in cognitive, physical, psychological, or other psychosocial impairments

Special challenges in treating pain

- How best to assess and monitor pain in veterans with TBI?
- What are benefits and harms of commonly used medications to treat pain in this group?
- How does blast related (headache) pain differ in terms of phenomenology and treatment from other types of pain?

5 Key Questions:

- KQ1: Have reliable and valid measures and assessment tools been developed to measure pain intensity and pain-related function 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?
- KQ2: Which treatment approaches are most likely to be effective in improving *pain outcomes* in polytrauma patients? Which pain treatment approaches are most likely to enhance *overall rehabilitation efforts*?

- KQ3: Does blast-related headache pain differ in terms of phenomenology and treatment from other types of headache pain? Which treatments are best for persistent blast-related headache pain?
- KQ4: 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?

- KQ5: What are the unique provider and system barriers to detecting and treating pain among polytrauma patients? Have interventions been developed to effectively address these barriers?

- Additional Aim: Identify active research addressing Key Questions; Ask experts to prioritize topics and areas for future research

Methods

- Topic nomination
- Key Questions and Scope reviewed and refined with Expert Panel; draft later reviewed
- Definition of Polytrauma for Review:
  - Concurrent injury to 2 or more body parts or systems resulting in cognitive, physical, psychological or other psychosocial impairments.
  - Combat-related mental conditions co-occurring with injury to at least one other system also constituted polytrauma.

Scope Includes:

- Assessment and treatment in *rehabilitation and post-rehabilitation* care settings
- Studies measuring pain-related outcomes, specifically pain intensity and pain-related function or interference,
- Measurements *3 or more months* from the date of injury.

Scope Excludes:

- Short-term (<3 months) outcomes only
- Battlefield or acute management
- Unilateral amputation unless other concurrent conditions or injuries
- Spinal cord injury unless other concurrent conditions or injuries

Also did not include:

- Choice of specific surgical strategy or procedures for particular orthopedic injuries
- *Perioperative* management of traumatic injuries (including burn injuries).
- Post-traumatic/post-concussive headache unrelated to blast injury, unless sample included pts. with *moderate or greater* TBI.
- Functional outcomes of polytrauma unless pain measures included

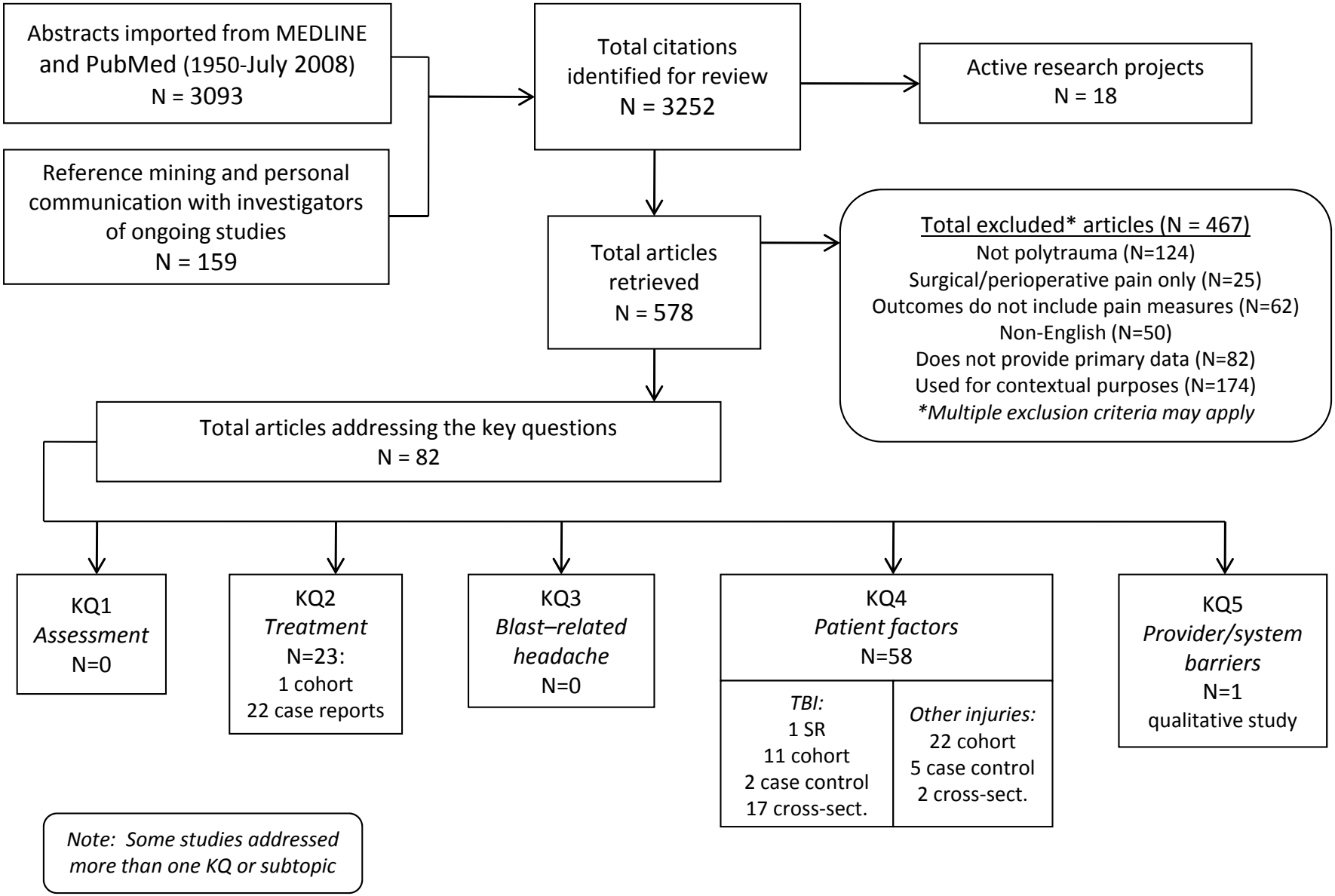
Literature Search

- 2 librarians independently designed strategies.
- Publications between 1950 and July 2008
- Additional articles from reference lists, review articles, and experts
- Searched for relevant studies in:
  - PsychINFO
  - VA PILOTS Database
  - REHABDATA
  - DoD Defense Technical Information Center
  - Cochrane Database of controlled clinical trials.

Study Selection

- 3 investigators reviewed titles and abstracts to select studies for full text review
- Rated quality of RCTs, systematic reviews, cohort and case-control studies using criteria from US Preventive Services Task Force
- Included qualitative studies and case reports and case series for some KQs
- Rated overall quality of evidence for KQs using method from GRADE Working group

Results


Abstracts imported from MEDLINE and PubMed (1950-July 2008)
N = 3093
Reference mining and personal communication with investigators of ongoing studies
N = 159
Total citations identified for review
N = 3252
Active research projects
N = 18
Total articles retrieved
N = 578
Total excluded* articles (N = 467)
Not polytrauma (N=124)
Surgical/perioperative pain only (N=25)
Outcomes do not include pain measures (N=62)
Non-English (N=50)
Does not provide primary data (N=82)
Used for contextual purposes (N=174)
*Multiple exclusion criteria may apply
Total articles addressing the key questions
N = 82
KQ1
Assessment
N=0
KQ2
Treatment
N=23:
1 cohort
22 case reports
KQ3
Blast–related headache
N=0
KQ4
Patient factors
N=58
TBI:
1 SR
11 cohort
2 case control
17 cross-sect.
Other injuries:
22 cohort
5 case control
2 cross-sect.
KQ5
Provider/system barriers
N=1
qualitative study
Note: Some studies addressed more than one KQ or subtopic

Key Question 1—Results

- No published studies that assessed reliability and validity of measures of pain intensity or pain-related function among patients with cognitive deficits due to TBI.

KQ1—Secondary Findings

- Some cross-sectional and case-control studies suggest that pain may interfere with neurocognitive functioning among TBI patients.
- Only a few studies adjusted for confounders
- Several studies suggest that most individuals with cognitive impairment due to dementia can understand at least one pain self-assessment measure.

Key Question 2

- 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.

- One fair-quality retrospective cohort study of patients who had undergone amputation at an urban trauma center
- 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)

KQ2—Secondary Findings

- 22 manuscripts presented cases or case series describing pain treatment approaches and outcomes among patients with polytrauma including TBI.
- 5 reports: Intrathecal baclofen may be helpful for spasticity associated with TBI or SCI
- 1 report: Capsaicin helped complex regional pain syndrome I
- 1 report: Spinal cord stimulation decreased pain and opioid use among active duty personnel with complex regional pain syndrome I

Key Question 3

- 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 headache pain

KQ3—Secondary Findings

- 1 good quality systematic review of post-traumatic headache in TBI
- Blast exposure not specifically identified or studied as characteristic in any of the studies.
- Most PTH resolves in 6-12 months, but headaches persist beyond 1 year in 18% - 33%
- Many patients with PTH have presentations similar to tension-type headache or migraine
- Many clinicians treat PTH as they would primary headache.

Key Question 4

- No randomized controlled trials
- 1 systematic review, 11 cohort, 2 case-control, and 17 cross-sectional studies provided information about patient factors associated with pain-related outcomes in *TBI patients*
- 20 cohort, 2 cross-sectional, and 5 case-control studies provided information about patient factors associated with pain-related outcomes in *other polytrauma patients*

KQ4—TBI

- 1 recent fair-quality systematic review showed that overall, 58% of patients with TBI have chronic headache. Brain injury associated with headache even after adjustment for PTSD.
- These findings are consistent with our review: Among patients with TBI, headache present in one-third to one-half of patients up to five years after injury. (GRADE: Low)

TBI severity and headache

- The recent review also found that patients with mild TBI more likely to have HA than patients with moderate or severe TBI.
- However, our review showed very mixed findings regarding association between TBI severity and pain (GRADE: Very Low)

- 1 fair-quality retrospective cohort study, 1 fair-quality case-control study, and 5 cross-sectional studies showed:
  - Higher prevalence of HA among pts with mild TBI compared with more severe TBI
  - Patients with mild TBI who attend outpatient brain injury clinics are 2 to 3 times more likely to report HA than patients with more severe TBI
- 1 retrospective and 4 prospective cohort studies of varying quality and 3 cross-sectional studies showed no differences in prevalence of HA according to severity of head injury.

So why the differences?

- Most *cross-sectional* studies done in outpatient settings, up to several years post-injury, and did not adjust for potential confounders.
- Most samples in the *cohort studies* assembled at the time of admission to hospital or inpatient rehabilitation setting.
- <u>Suggests</u>
  - Confounders may be important
  - Patients with mild TBI may be more likely attend outpatient follow-up visits when they have bothersome or persistent symptoms such as HA.

KQ4—TBI: Other Factors

- Mixed findings regarding association between demographic factors and pain in TBI patients
- 1 cross-sectional study of service members in VA PRC, showed blast exposure not a significant predictor of pain.
- 5 cohort, 2 case-control and 2 cross-sectional studies: Psychological factors (depression, anxiety and PTSD), insomnia and fatigue are associated with pain in TBI patients

  (GRADE: Low)

KQ4 Other injuries in polytrauma pts

- Characteristics associated w/ worse outcomes:
  - Multiple injuries
  - Injuries below the knee
  - Concurrent head injury/cognitive disability

  (GRADE: Low)

- Characteristics associated w/ better outcomes:
  - Younger age, Higher education, Higher income

  (GRADE: Very Low)

Key Question 5

- No RCTs, cohort studies, case-control studies, or other systematic observational studies addressed provider and system barriers to detecting and treating pain in polytrauma patients
- 1 qualitative study of providers from 4 VA Polytrauma Rehabilitation Centers addressed potential provider and system barriers to treating polytrauma patients.

Common Themes

- Patients with blast-related injuries have more injuries and more severe injuries
- Psychiatric disorders and pain are prevalent and complicate rehabilitation for TBI. These factors make this population complex to treat.
- Providers find working with this population very challenging and emotionally taxing.
- Providers increasingly use consultation and co-treatment; teams expanding
- Family members often involved and have their own informational and support needs.

Summary of Literature review

- Very limited empiric information w/ respect to:
  - Assessment of pain in patients with TBI
  - Specific treatment approaches in polytrauma pts
  - Unique aspects/approaches for blast HA
  - Understanding of provider/system barriers
- Very mixed findings regarding relationship between TBI severity and persistent pain
- Limited evidence that psychological factors and insomnia and fatigue are associated with pain
- Limited evidence that injury characteristics associated with worse pain outcomes

Active Research—Process

- Emails sent to:
  - 73 individuals
  - 4 VA workgroups (directly or via Chairs)
  - 5 HSR&D portfolio managers,
- Queries and hand searches of databases
- Responses received from 47 investigators
- 19 relevant projects identified. Project data were collected on 18 of these projects.

Active Research—findings
(as of August 2008)

- KQ1: 1 prospective measurement study
- KQ2: 2 clinical trials; 1 cohort; 1 case series
- KQ3: 1 case series
- KQ4: 7 cohort; 5 cross-sectional studies
- KQ5: 1 qualitative study

Future Research

- Experts reviewed the report and active research; asked to identify research topics.
- Assign priorities based on:
  - degree to which research will address gaps identified in the review
  - quantity and quality of research completed so far
  - feasibility and timeframe necessary
  - barriers that have prevented research from being undertaken before
  - pros and cons of research method

Key Ques.	Future Research: Median priority rank = 1 (most important)
KQ 1	• Quantitative measurement study of reliability and validity of existing pain assessment tools among patients with varying levels of communicativeness and brain injury.
	• Examine discriminant validity of tools for distinguishing pain from other forms of distress and impairment (e.g., restlessness, PTSD sx)
KQ2	• Trials of non-pharmacological interventions of varying intensity, incl. psychological interventions and telephone-based interventions.
	• RCTs of integrated treatment approaches including comprehensive interdisciplinary rehab., collaborative care, tx. involving family
	• Compare individual treatments for common specific core conditions (e.g., TBI; PTSD; Pain) to integrated treatment of these overlapping symptoms.

KQ3	• Trials of pharmacologic and non-pharmacologic treatments, including patients with blast-related headache in one arm of the trial. Non-pharmacologic interventions to test include cognitive behavioral treatment, hypnosis, relaxation training, and biofeedback.
KQ4	• Prospective cohort study measuring pain outcomes over time while adjusting for patient and injury characteristics incl. comorbid conditions as well as multiplicity of injury, pain type, and location.
KQ5	• Establish treatment guidelines for pain in polytrauma based on expert opinion. Disseminate and measure impact of guidelines.

Limitations

- Captures literature through July 2008
- Heterogeneity and generalizability
- Scope
- Publication bias
- Active research
  - Email snowball approach; limited follow-up when non-response
  - Limited communication with non-VA researchers
  - Limitations to search algorithms for databases ongoing trials and studies

QUESTIONS

- Contact: Steven.dobscha@va.gov
- http://www.hsrd.research.va.gov/publications/esp/Pain-in-Polytrauma-2008.pdf