Traumatic brain injury (TBI) affects 1.4 million Americans annually, and severity can range from mild to severe. Mild traumatic brain injury (MTBI) accounts for approximately 75% of those injured. Following evaluation, many patients with mild noncomplicated TBI can be safely treated and released from the emergency department. In addition to those that are treated for their injury, there is an estimated 25% to 42% of persons who experience MTBI and do not seek treatment; thus, the true prevalence of MTBI is unknown.

Symptoms are common following MTBI/concussion. Among the most commonly reported symptoms following MTBI are headache, dizziness, anxiety, dizziness, and fatigue. Overall, these symptoms tend to occur immediately or within days after injury and resolve within 3 months after the injury. Although this symptom trajectory may seem short compared with symptoms of chronic illness, presence of the symptoms has been associated with decreased ability to return to pre-injury activities. This situation can be problematic for several reasons: (1) persons usually are not monitored by health care providers, so aside from ED instructions, no further professional help is provided for symptom management; (2) persons are expected to return to work or school, which may be especially difficult while experiencing cognitive symptoms or fatigue; and (3) persons who attempt to return to work or school may fail because of symptom load and lack of symptom relief.

For those with mild injury who seek treatment in an emergency department, there is inconsistency in ED management and follow-up recommendations. Bazarian and colleagues found that approximately 38% of patients treated in the emergency department for MTBI were discharged with no recommendations for follow up. Discharge instruction sheets often do not completely address key areas of MTBI, including what symptoms may be experienced following the injury. In addition, the reading levels of the discharge forms are often too difficult to understand, and instructions often are not remembered. The American College of Emergency Physicians states, “a glaring omission from most MTBI discharge instruction sheets is the lack of any mention of the possibility of the patient developing postconcussive symptoms.” A close examination of discharge processes is important for emergency departments across the United States in order to standardize practices among centers and improve quality of care delivered. ED nurses play a key role in presenting the discharge instructions to patients and thus should be actively involved in improving the discharge process for patients with MTBI.

The purpose of this article is to provide nurses in practice with expanded knowledge about the current state of the science on the expected trajectory of recovery and best practices in discharge teaching for persons with MTBI.

Trajectory of MTBI

Previous research on symptoms experienced by persons following TBI has established that symptoms for those with MTBI typically follow a course toward resolution of symptoms within weeks (for milder, noncomplicated injuries such as sports concussions) to months (longer recovery for those with advanced age and complicated injuries, ie, other trauma-associated fractures or injuries). Longitudinal studies better describe the trajectory of symptom resolution following MTBI because symptoms are known to resolve over time.

Bazarian and Atabaki performed a prospective observational study including 69 persons with MTBI presenting to the emergency department and report that 58% of those subjects complained of symptoms related to their injury at 1 month after the injury. Lundin and colleagues followed their population of 122 persons with MTBI at 1, 7, and 14 days and at 3 months after the injury. They found that symptom complaints decreased from 86% of persons reporting one or more symptom to 48% by 3 months after the injury. Yang and colleagues report that symptoms decreased from 85% of patients reporting at least one symptom to 48% by 3 months after the injury.
symptom at 1 week, 55% at 2 weeks, 23% at 4 weeks, and 13% at 8 weeks after the injury.

A large cohort study including 2602 patients with MTBI in Sweden supports previous research that symptoms for the majority (56%) resolve by 3 months after the injury, while 44% continue to report one or more symptoms.12 This study highlights that the expected course is toward symptom resolution or reduction by 3 months after the injury; however, 44% of persons continuing to experience symptoms represents a large number of people within the MTBI population who are not symptom free by 3 months.

Symptoms do not always follow the expected course of resolution, with some persons experiencing prolonged symptoms. Predictors of prolonged symptoms following TBI include skull fracture, increased levels of serum 100B (a protein shown to correlate with brain injury severity), and dizziness or headache complaints immediately following injury.5,18 In addition, McCauley and colleagues19 found that female gender, poor social support, and increased depressive symptoms predicted symptom persistence at 3 months after injury. In their study of 180 persons with MTBI, Dischinger and colleagues20 found that anxiety among women and noise sensitivity were predictors of prolonged symptoms at 3 months. These study findings support a decrease in symptoms over time, usually within the first weeks to months after injury; however, how well persons manage those symptoms in this period is not well known.

Symptoms experienced can be categorized as physical, cognitive, and affective. The following section provides an overview of each category of symptoms, followed by interventions that may be helpful for providers to discuss with patients or to incorporate into discharge instructions.

Physical Symptoms

Physical symptom complaints may include headache, dizziness, neck pain, sleep-wake disturbances, and visual difficulties.1,4,21 Physical complaints can be due to the mechanism of injury, such as the force of an acceleration/deceleration motor vehicle crash, or from neural sheering, or a combination of both. The rate of headache has been reported to be as high as 90% soon after injury and is present in up to 44% of patients with mild injury at 6 months.22 Kraus and colleagues21 reported headache as a symptom complaint in 36% of their study subjects with MTBI. In a study of early symptom complaints following MTBI, Lundin and colleagues8 reported that although symptoms decreased from 1 to 3 months following injury, sleep disturbance and fatigue were among the most common symptoms reported. In addition, they found that early symptom complaints correlated with later symptom complaints and that symptoms and disability scores were correlated (r = .60, P < .001). Similarly, Kraus and colleagues21 found that up to 6 months after injury, persons with MTBI continued to have physical symptoms of headache, dizziness, and visual difficulties.

Emotional Symptoms

Psychological and emotional symptoms such as depression, anxiety, irritability, mood changes, and post-traumatic stress can be found within the TBI populations, including those with mild injuries.7,23 One year after TBI, Deb and colleagues24 reported a 13% rate of depression and 9% rate of panic disorder among their TBI population, which is significantly higher than rates for the general population. Kashluba and colleagues30 reported irritability (56%) and anxiety (51%) among the top 5 symptom complaints in their MTBI population. Bay and Bergman25 found a significant relationship of both. The rate of headache has been reported to be as high as 90% soon after injury and is present in up to 44% of patients with mild TBI, with an incidence of 14% to 22% reported.27,28 Factors that may increase the likelihood of experiencing PTSD include substance abuse, co-morbid depression, anxiety disorders, or stress of litigation.29 Links have been identified between post-traumatic stress and other TBI-related symptoms, such as pain. Bay and colleagues30 found that pre and post-injury stress were related to post-TBI depressive symptoms.

Cognitive Symptoms

Cognitive symptoms common after TBI include difficulty with memory,2,21,31,32 attention, concentration,33 problem solving,24 and executive functioning.35 Mathias, Beall, and Bigler36 studied a group of 40 patients with MTBI and found that during the first month after injury, they had more difficulty in attention and memory than did the control subjects. Belanger and Vanderploeg47 also performed a meta analysis and found that soon after injury (<3 months), effects were greatest for problems with delayed memory and fluency (d = 1.03 and .89). The authors also note that litigation status was associated with stable or worsening cognitive functioning over time, emphasizing the need to consider this factor when assessing post-TBI symptoms.

These studies help emphasize the need for clinicians to be aware of the often subtle but frequently present difficulties that persons with relatively mild brain injury can experience, especially soon after injury. It is possible that
persons who experience more cognitive symptoms may have decreased ability to self-manage their symptoms because of lack of concentration, poor ability to plan, and memory difficulties. ED nurses may be able to provide patients and families with useful recommendations to help with these difficulties.

Interventions Delivered by Health Care Professionals

Discharge instructions vary widely in use between providers and between facilities. Although guidelines exist for the management of MTBI, they largely are aimed at how to assess and safely discharge patients and do not specify what symptom management strategies should be taught. As the previous section suggests, persons with MTBI may experience multiple symptoms, and therefore the discharge instructions should not only make persons aware of the symptom possibilities but also should give recommendations for management of such symptoms.

Interventions for symptom management of MTBI have been aimed at education to reduce anxiety and symptoms and psychological treatment to reduce severity and duration of symptoms. A recent study by Bell and colleagues utilized a randomized controlled trial to determine the effect of telephone counseling on symptom reduction and functional outcome. The group that received the structured telephone counseling had significantly better symptom reduction compared with the control group. Although these interventions show promise for symptom reduction, they are not the standard practice among health care providers.

The Centers for Disease Control and Prevention (CDC) offers a tool to assist with the symptom management of persons with MTBI. The Acute Concussion Evaluation (ACE) (Figure 1) and ACE Care Plan (Figure 2) are available from the CDC as downloadable forms, free to use. The ACE is a tool focusing on assessment of mild TBI/concussion. Categories for the evaluation include (1) injury characteristics, (2) symptom checklist, (3) concussion history, (4) diagnosis, and (5) follow-up action plan. In the areas of follow-up action plan, the box for “referral to PCP for office monitoring” is pre-checked, suggesting that all persons should follow up with primary care at a minimum. Other options for follow up are neuropsychological testing and physician choices such as neurosurgery, neurology, sports medicine, physiatry, psychiatry, and other. The ACE can be completed in about 5 to 6 minutes and is supported by internal consistency reliability of .82, and factor analysis supports its construct validity of measuring symptoms in four areas common for TBI.

The ACE Care Plan helps guide patients following their concussion in the categories of (1) rest, (2) reported symptoms, (3) red flags to contact physician or go to emergency department, (4) returning to daily activities, and (5) returning to work, school, or sports. This care plan focuses on gradual return to activities and uses presence of symptoms as a guide for moving forward with activities or refraining from activities. The care plan emphasizes rest, naps, and nutrition as interventions for symptoms, and it emphasizes that the patient should re-evaluate the symptoms present to help guide recovery. This tool also is available at the CDC.gov Web site as part of the Heads Up: Brain Injury in Your Practice tool kit.

For nurses in the emergency department, the ACE can be used as a quick checklist to ensure that the most common post-TBI symptoms are addressed and to serve as a guide for self-management recommendations. The ACE Care Plan then can be given to the patient to provide suggestions for symptom management as well as serve as a guide for returning to the emergency department if needed. In addition to the ACE and ACE Care Plan, options for providing individualized information to patients regarding specific symptoms are provided in the next section.

Interventions for Physical Symptom Complaints

Persons who have physical complaints such as headache, dizziness, and fatigue may benefit from interventions in the post-discharge phase. General recommendations such as those in the CDC ACE tool kit are for gradual return to physical activities upon resolution of symptoms. Included in the recommendations are increased rest periods for fatigue and not driving while symptoms persist. More symptom-specific recommendations can be found in individual articles describing the recovery for MTBI.

Self-management of headache can be improved with rest, over-the-counter pain medications, and possibly spinal mobilization techniques. Pain such as headache and neck pain following MTBI may be a result of whiplash-type movements that occur during the trauma, and thus, intuitively, rest and over-the-counter pain relievers may be useful. Bronfort and colleagues reviewed research for several types of headache, including post-trauma headache, to evaluate the utility of noninvasive management of headache. They found only weak evidence of one therapy being more beneficial, which was spinal mobilization (stretching) over cold compress for post-traumatic headache. Treatment of headache and somatic pain may require a multifaceted and multidisciplinary approach because pain can have interaction with cognitive, emotional, and personality disorders, complicating its management. Persons with headache pain that cannot be managed via self-care measures should be referred to their primary care provider for further...
### FIGURE 1


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**ACUTE CONCUSSION EVALUATION (ACE)**

**Emergency Department (ED) Version v1.4**

Gerard Gioia, PhD & Micky Collins, PhD

*Children’s National Medical Center*

University of Pittsburgh Medical Center

---

**Patient Name:**

**DOB:**

**Age:**

**Date:**

**ID/MR#:**

---

**A. Injury Characteristics**

<table>
<thead>
<tr>
<th>Date/Time of Injury</th>
<th>Reporter: Patient Parent Spouse Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Injury Description:**

---

1a. Is there evidence of a forceful blow to the head (direct or indirect)?  
   - Yes  
   - No  
   - Unknown

1b. Is there evidence of intracranial injury or skull fracture?  
   - Yes  
   - No  
   - Unknown

1c. Location of Impact:  
   - Frontal  
   - Lt Temporal  
   - Rt Temporal  
   - Lt Parietal  
   - Rt Parietal  
   - Occipital  
   - Neck  
   - Indirect Force

2. **Cause:**  
   - MVC  
   - Pedestrian-MVC  
   - Fall  
   - Assault  
   - Sports (specify)  
   - Other

3. **Amnesia Before (Retrograde)**
   - Are there any events just BEFORE the injury that your person has no memory of (even brief)?  
   - Yes  
   - No  
   - Duration

4. **Amnesia After (Anterograde)**
   - Are there any events just AFTER the injury that your person has no memory of (even brief)?  
   - Yes  
   - No  
   - Duration

5. **Loss of Consciousness:**
   - Did you/your person lose consciousness?  
   - Yes  
   - No  
   - Duration

6. **EARLY SIGNS:**
   - Appears dazed or stunned  
   - Is confused about events  
   - Answers questions slowly  
   - Repeats Questions  
   - Forgetful (recent info)

7. **Seizures:**
   - Were seizures observed?  
   - No  
   - Yes  
   - Detail

---

**B. Symptom Check List**

Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day?

*Indicate presence of each symptom (G=No, 1=Yes).*

<table>
<thead>
<tr>
<th>Physical (10)</th>
<th>Cognitive (4)</th>
<th>Sleep (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Headache
- Nausea
- Vomiting
- Balance problems
- Dizziness
- Visual problems
- Fatigue
- Sensitivity to light
- Sensitivity to noise
- Numbness/tingling

**PHYSICAL (10) EMOTIONAL (4)**

<table>
<thead>
<tr>
<th>SLEEP (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1</td>
</tr>
</tbody>
</table>

**Cognitive (4):**

1. Feeling mentally foggy
2. Difficulty concentrating
3. Difficulty remembering
4. Difficulty falling asleep

**Sleep (4):**

1. Drowsiness
2. Sleeping less than usual
3. Sleeping more than usual
4. Trouble falling asleep

**Dizziness:**

1. 0 1

**Visual problems:**

1. 0 1

**Fatigue:**

1. 0 1

**Sensitivity to light:**

1. 0 1

**Sensitivity to noise:**

1. 0 1

**Numbness/tingling:**

1. 0 1

**PHYSICAL Total (0-10) EMOTIONAL Total (0-4):**

**Add Physical, Cognitive, Emotion, Sleep totals:**

**Total Symptom Score (0-22):**

---

**Patient Participation:**

- Full
- Partial
- None

**Reason for Partial/None:**

- Young Age
- Confused
- Inattentive
- Low arousal
- Emotional Upset
- In Pain
- Other

---

**C. Concussion History:**

*Previous:*

0 1 2 3 4 5

<table>
<thead>
<tr>
<th>Date(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Headache History:**

- Prior treatment for headache
  - N
  - Y
  - Details

---

**D. Diagnosis (ICD):**

- Concussion w/o LOC 850.0
- Concussion w/ LOC 850.1
- Concussion (Unspecified) 850.9
- Other (854)

**No diagnosis**

---

**E. Follow-Up Action Plan:**

- MD Name
- MD RN
- NP

---

**Action Plan:**

- Referral to PCP for Office Monitoring
- Other

---

Neuropsychological Testing (recommended for Return to Sport decisions and academic/behavioral management)

- Physician
- Neurosurgery
- Neurology
- Sports Medicine
- Physical Therapy
- Psychiatry

---

**ACE-ED Completed by:**

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**FIGURE 1**

A concussion is an injury to the brain as a result of a force or jolt applied directly or indirectly to the head, which produces a range of possible symptoms, and may or may not involve a loss of consciousness. It is a complex pathophysiologic process affecting the brain, induced by traumatic biomechanical forces secondary to direct or indirect forces to the head. Disturbance of brain function is related to neurometabolic dysfunction, rather than structural injury, and is typically associated with normal structural neuroimaging findings (i.e., CT scan, MRI). Concussion may or may not involve a loss of consciousness (LOC). Concussion results in a constellation of cognitive, somatic, emotional and sleep-related symptoms. Duration of symptoms are variable and may last for as short as several minutes and last as long as several days, weeks, months or even longer in some cases.

ACE ED Instructions

A. Injury Characteristics
1. Injury Description: Ask for description of events resulting in the injury; how the injury occurred, type of force, location on head.
2. Cause: Indicate the cause of injury or write in Other cause.
3. Amnesia: Determine whether child was not registering memories (amnesia) – before (retrograde) and after (anterograde) injury. Estimate length of time for each (Retrograde amnesia “What is the last thing you remember before your injury?” Anterograde amnesia “What is the first thing you remember after your injury?”)
4. Loss of consciousness (LOC): If occurs, determine length of LOC.
5. Early signs observed by others: Ask the individuals who know the patient (parent, spouse, friend, etc.) about signs of the concussion/MTBI that they may have observed. Signs are typically observed early after the injury.
6. Seizures: Inquire whether seizures were observed or not.

B. Symptom Check List:
- Ask patient (and/or parent, if child) to report presence of the 4 categories of symptoms since injury. It is important to assess all listed symptoms as different parts of the brain control different functions. One or all symptoms may be present depending upon mechanisms of injury. If the symptom is not present, circle “0” on the scale. Circle “1” if present.
- Note: Most sleep symptoms are only applicable after a night has passed since the injury. If not applicable, circle N/A. Drowsiness may be present on the day of injury.
- Since symptoms can be present premorbidity at baseline (e.g., inattention, headaches, sleep, sadness), it is important to assess change from its typical presentation. For any symptom - if Patient/Parent indicates “I/He usually has that problem/symptom” – Ask “Are you/they experiencing this symptom more than usual or in a different manner than usual?” If “Yes” circle “1”.
- Scoring: Sum total number of symptoms present per area, and sum all 4 areas into Total Symptom Score. (Note: Most sleep symptoms are only applicable after a night has passed since the injury. Drowsiness may be present on the day of injury.) If symptoms are new and present, there is no lower limit symptom score. Any score ≥ 0 indicates positive symptom history.
- General Impression: Ask how different the person is acting than usual. Circle 0 (No difference) to 6 (Major) to rate degree.
- Patient Participation: Indicate the extent to which the patient is able to participate in the evaluation and, if less than fully, give reason for Partial or No participation.

C. Concussion history: Assess the number and date(s) of prior concussions. History of prior concussions, especially recent (within past several weeks or months) would suggest the need for more conservative decision-making regarding Return to Play, and general post-injury management.

D. Diagnosis: Assign the most appropriate diagnosis given the following:
850.0 (Concussion, with no loss of consciousness) – Positive Injury Description (A1), i.e., forcible direct/indirect blow to the head, plus evidence of active symptoms (B) of any type and number related to the trauma; no evidence of LOC (A5), skull fracture, or other intracranial injury.
850.1 (Concussion, with brief loss of consciousness < 1 hour) - Positive Injury Description (A1), i.e., forcible direct/indirect blow to the head; plus evidence of active symptoms (B) of any type and number related to the trauma, positive evidence of LOC (A5), skull fracture, or other intracranial injury.
850.9 (Concussion, unspecified) - Positive Injury Description (A1), i.e., forcible direct/indirect blow to the head; plus evidence of active symptoms (B) of any type and number related to the trauma; unclear/unknown injury details; unclear evidence of LOC (A5), no skull fracture, or other intracranial injury.

NOTE: If there is evidence of skull fracture of structural intracranial injury to the brain, consider 854 (Intracranial injury of other and unspecified nature); 854.0 Without mention of open intracranial wound, 854.1 With open intracranial wound. Avoid using nonspecific Head injury NOS (959.01) whenever possible.

E. Follow-Up Action: Determine a plan of action for follow-up of symptomatic patients. Serial evaluation of the concussion is critical as symptoms may resolve, worsen, or ebb and flow depending upon a variety of factors (e.g., cognitive/physical exertion, emotions). Referral to a specialist can be particularly valuable to help manage certain aspects of the patient’s condition.
(a) Patient monitoring in the primary care physician office.
(b) Referral to a specialist: particularly valuable to help manage certain aspects of the patient’s condition.
- Neuropsychological Testing: particularly relevant for cognitive and/or behavioral dysfunction affecting school, home or work activities, for purpose of treatment planning. Testing is also recommended when a patient may be returning to sports or other at-risk activities.
- Physician Evaluation: particularly relevant for medical evaluation and management of concussion. Also, critical for evaluation and management of focal neurologic, sensory, vestibular and motion concerns. May be useful for medication management (e.g., headaches, sleep disturbance, depression) if post-concussive problems persist.
FIGURE 2
Acute Concussion Evaluation Care Plan. Reprinted with permission from the Centers for Disease Control and Prevention.
Returning to Sports

1. **You should NEVER return to play if you still have ANY symptoms** – (Be sure that you do not have any symptoms at rest and while doing any physical activity and/or activities that require a lot of thinking or concentration.)
2. Be sure that the PE teacher, coach, and/or athletic trainer are aware of your injury and symptoms.
3. It is normal to feel frustrated, sad and even angry because you cannot return to sports right away. With any injury, a full recovery will reduce the chances of getting hurt again. It is better to miss one or two games than the whole season.

**The following are recommended at the present time:**
- Do not return to PE class at this time
- Return to PE class
- Do not return to sports practices/games at this time
- Gradual return to sports practices under the supervision of an appropriate health care provider (e.g., athletic trainer, coach, or physical education teacher).
  - Return to play should occur in gradual steps beginning with aerobic exercise only to increase your heart rate (e.g., stationary cycle); moving to increasing your heart rate with movement (e.g., running); then adding controlled contact if appropriate; and finally return to sports competition.
  - Pay careful attention to your symptoms and your thinking and concentration skills at each stage of activity. Move to the next level of activity only if you do not experience any symptoms at the each level. If your symptoms return, let your health care provider know, return to the first level, and restart the program gradually.

Gradual Return to Play Plan

1. No physical activity
2. Low levels of physical activity (i.e., symptoms do not come back during or after the activity). This includes walking, light jogging, light stationary biking, light weightlifting (lower weight, higher reps, no bench, no squat).
3. Moderate levels of physical activity with body/head movement. This includes moderate jogging, brief running, moderate-intensity stationary biking, moderate-intensity weightlifting (reduced time and/or reduced weight from your typical routine).
4. Heavy non-contact physical activity. This includes sprinting/running, high-intensity stationary biking, regular weightlifting routine, non-contact sport-specific drills (in 3 planes of movement).
5. Full contact in controlled practice.
6. Full contact in game play.

*Neuropsychological testing can provide valuable information to assist physicians with treatment planning, such as return to play decisions.

This referral plan is based on today’s evaluation:

- Return to this office. Date/Time
- Refer to: Neurosurgery_____ Neurology____ Sports Medicine____ Physiatrist_____ Psychiatrist____ Other____
- Refer for neuropsychological testing
- Other__________________________

ACE Care Plan Completed by: ____________________________

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evaluation. From there, the need for more intense therapies can be examined.

Vestibular rehabilitation is primarily used for management of post-traumatic dizziness. With this intervention, the person performs exercises and activities to compensate for vestibular system dysfunction. These types of exercises are not well known to the general population, and therefore persons with TBI complaining of dizziness benefit from referral to physical therapy or ear specialists for such services. Self-management strategies that are not well described in the literature but may intuitively follow the pathophysiology behind post-traumatic dizziness such as slow movements and gradual changes in raising from the supine to upright position may aid in vestibular dysfunction or orthostatic hypotension. Avoidance of medications that can cause dizziness such as antihypertensive agents, analgesics, and β-blockers may be options. Falling or a sensation of falling may be associated with dizziness, and therefore assistance while ambulating may be necessary during periods of post-traumatic dizziness. These findings should emphasize the need for discharge instructions and brain injury booklets to educate patients on the possibility of having dizziness, as well as self-management or referral options.

Fatigue has been an increasingly evident symptom reported in the TBI literature and has been found to be problematic for brain-injured persons. Fatigue can be managed in the controlled rehabilitation setting with built-in rest periods and gradual increase in activity demands; however, this strategy can be problematic for the persons with milder TBI because often they are back to work or to their normal daily activities soon after their injury. Recently Bay and Xie reported that psychological stress, along with physical symptoms, explained a significant amount of fatigue after mild to moderate TBI, suggesting that stress management may be helpful in attenuating fatigue.

Cognitive behavioral interventions have been shown to reduce symptom severity in patients with cancer who are known to report fatigue as a common symptom. Similarly, Armes and colleagues used behavioral oriented interventions to improve fatigue-related physical functioning limitations. Work from patient populations such as cancer or chronic fatigue syndrome may be useful in the development of fatigue interventions that can be used in the home setting for those with MTBI. Further research will be necessary to establish the utility of such approaches for the TBI population.

**Interventions for Affective Symptoms**

Depression and anxiety as previously described common symptom complaints among the TBI population, including those with relatively mild injuries. Identification or diagnosis of depression or anxiety following the trauma is in itself problematic because we do not have standardized screening for persons following trauma and there is overlap of somatic complaints from the injury and depression. For this reason, it is appropriate that persons discharged home as well as their significant others be aware of the potential for these symptoms and be given instructions for seeking treatment should they occur and be problematic.

Pharmacotherapy for post-MTBI depression has been understudied and lacks sufficient evidence to make treatment recommendations. Treatment of depression or anxiety with pharmacological treatment (ie, antidepressant or anxiolytic agents) or with nonpharmacological treatment via a neuropsychologist or cognitive behavioral therapy may improve the overall functional status of the patient, and thus appropriate referral mechanisms should be in place and be simple for the injured person to initiate.

**Interventions for Cognitive Symptoms**

The ACE tool kit suggests limiting activities that require a lot of thinking or concentrating for as long as symptoms persist, because these activities may make symptoms worse. Although this recommendation may sound overly simple, it is an important point to communicate to persons with MTBI because they often are returning to work or school activities that require the use of memory, attention, and concentration. When limiting cognitive effort and taking rest breaks is insufficient to reduce the effects of cognitive impairment, follow-up with experts may be required. Cognitive rehabilitation with specialists can include strategy training for memory impairment and attention difficulties and strategic planning for improving cognitive functioning during day-to-day activities. For mild cognitive difficulties, the use of lists or other reminders such as electronic devices may help with memory and attention difficulties.

**Resources**

Persistent symptoms have been associated with worse functional status outcomes, such as inability to return to pre-injury activities or work. Providing persons with MTBI with available resources for assistance with symptom management is an important part of ED discharge teaching. Resources that are available will differ based on services available in the region. Options include follow up with primary care, a neuropsychologist, concussion clinics, neurology, psychology, and, when needed, a return to the emergency department.
Conclusion

ED nurses are the primary providers of discharge education and can make an impact on the post-TBI recovery process by providing information that is useful and understandable. Providing information both verbally and in writing will be helpful, making sure that the reading level of the information is appropriate as well. By providing comprehensive information about brain injury, symptoms, and self-management techniques, ED nurses can optimize the post-TBI experience for many patients.

REFERENCES


