NGC banner

Guideline Summary NGC-8514

Guideline Title

Head (trauma, headaches, etc., not including stress & mental disorders).

Bibliographic Source(s)

Work Loss Data Institute. Head (trauma, headaches, etc., not including stress & mental disorders). Encinitas (CA): Work Loss Data Institute; 2011. Various p.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Work Loss Data Institute. Head (trauma, headaches, etc., not including stress & mental disorders). Corpus Christi (TX): Work Loss Data Institute; 2008. 152 p.

The *Official Disability Guidelines* product line, including *ODG Treatment in Workers Comp*, is updated annually, as it has been since the first release in 1996.

Scope

Disease/Condition(s)

Work-related head trauma and headaches, not including stress and mental disorders

Guideline Category

Diagnosis

Evaluation

Management

Treatment

Clinical Specialty

Emergency Medicine

Family Practice

Internal Medicine

Neurological Surgery

Neurology

Physical Medicine and Rehabilitation

Radiology

Surgery

Intended Users

Advanced Practice Nurses

Health Care Providers

Health Plans

Nurses

Occupational Therapists

Physical Therapists

Physician Assistants

Physicians

Utilization Management

Guideline Objective(s)

To offer evidence-based step-by-step decision protocols for the assessment and treatment of workers' compensation conditions

Target Population

Workers with occupational head trauma or headache

Interventions and Practices Considered

The following interventions/procedures were considered and recommended as indicated in the original guideline document:

1. Acupuncture for headaches
2. Anticonvulsants
3. Audiometry
4. Bed rest
5. Behavioral therapy/cognitive therapy
6. Botulinum toxin
7. Causality (determination)
8. Manipulation for headache/chiropractic
9. Cognitive skills retraining
10. Cognitive therapy
11. Computed tomography (CT)/x-rays
12. Concussion/mild traumatic brain injury (mTBI) assessment
13. Concussion/mTBI treatment
14. Concussion severity
15. Craniectomy/craniotomy
16. Cranioplasty
17. Driver assessment & training
18. Electroencephalography (EEG) (neurofeedback)
19. Electrodiagnostic studies (electromyography [EMG], nerve conduction studies [NCS], dynamic electromyographies, evoked potential responses [EP])
20. Exercise
21. Fluid resuscitation
22. Glasgow Coma Scale (GCS)
23. Hearing aids
24. Hearing protection
25. Home health services
26. Hospital length of stay (LOS)
27. Hyperventilation
28. Hypothermia
29. Interdisciplinary rehabilitation programs
30. Intraoperative neurophysiological monitoring (during surgery)
31. Lumbar puncture
32. Magnetic resonance imaging (MRI)
33. Mannitol
34. Methylphenidate
35. Modafinil (Provigil®)
36. Modified Ashworth Scale (MAS)
37. Multidisciplinary community rehabilitation
38. Neuroendocrine screenings
39. Neuropsychological testing
40. Nutrition
41. Office visits
42. Physical medicine treatment/occupational therapy
43. Relaxation treatment (for migraines)
44. Rhinoplasty
45. Sedation
46. Septoplasty

47. Sleep aids
48. Triptans
49. Vestibular studies
50. Vision evaluation
51. Work/activity restrictions

The following interventions/procedures are under study and are not specifically recommended:

1. Antidepressants
2. Botulinum toxin for prevention of headache in patients with chronic migraine
3. Branched-chain amino acids (BCAAs)
4. Cell transplantation therapy
5. Ginseng
6. Greater occipital nerve block (GONB)
7. Nintendo virtual reality Wii gaming system (for brain damage)
8. Oxygen therapy (hyperbaric oxygen therapy)
9. Positron emission tomography (PET)
10. Wilsonii injecta

The following interventions were considered, but are not recommended:

1. Botulinum toxin for tension headache
2. Corticosteroids (for acute traumatic brain injury)
3. Electrodiagnostic studies (electroretinogram [ERG], cognitive event-related potential, somatosensory evoked potential [SSEP])
4. Post-concussion syndrome as a diagnosis
5. Quantitative electroencephalogram (QEEG) (brain mapping)
6. Single photon emission computed tomography (SPECT)

Major Outcomes Considered

- Sensitivity and specificity of diagnostic tests
- Effectiveness of treatments for relief of pain and symptoms

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Work Loss Data Institute (WLDI) conducted a comprehensive medical literature review (now ongoing) with preference given to high quality systematic reviews, meta-analyses, and clinical trials published since 1993, plus existing nationally recognized treatment guidelines from the leading specialty societies. WLDI primarily searched MEDLINE and the Cochrane Library. In addition, WLDI also reviewed other relevant treatment guidelines, including those in the National Guideline Clearinghouse, as well as state guidelines and proprietary guidelines maintained in the WLDI guideline library. These guidelines were also used to suggest references or search terms that may otherwise have been missed. In addition, WLDI also searched other databases, including MD Consult, eMedicine, CINAHL, and conference proceedings in occupational health (i.e., American College of Occupational and Environmental Medicine [ACOEM]) and disability evaluation (i.e., American Academy of Disability Evaluating Physicians [AADEP], American Board of Independent Medical Examiners [ABIME]). Search terms and questions were diagnosis, treatment, symptom, sign, and/or body-part driven, generated based on new or previously indexed existing evidence, treatment parameters and experience.

In searching the medical literature, answers to the following questions were sought: (1) If the diagnostic criteria for a given condition have changed since 1993, what are the new diagnostic criteria? (2) What occupational exposures or activities are associated causally with the condition? (3) What are the most effective methods and approaches for the early identification and diagnosis of the condition? (4) What historical information, clinical examination findings or ancillary test results (such as laboratory or x-ray studies) are of value in determining whether a condition was caused by the patient's employment? (5) What are the most effective methods and approaches for treating the condition? (6) What are the specific indications, if any, for surgery as a means of treating the condition? (7) What are the relative benefits and harms of the various surgical and non-surgical interventions that may be used to treat the condition? (8) What is the relationship, if any, between a patient's age, gender, socioeconomic status and/or racial or ethnic grouping and specific treatment outcomes for the condition? (9) What instruments or techniques, if any, accurately assess functional limitations in an individual with the condition? (10) What is the natural history of the disorder? (11) Prior to treatment, what are the typical functional limitations for an individual with the condition? (12) Following treatment, what are the typical functional limitations for an individual with the condition? (13) Following treatment, what are the most cost-effective methods for preventing the recurrence of signs or symptoms of the condition, and how does this

vary depending upon patient-specific matters such as underlying health problems?

Criteria for Selecting the Evidence

Preference was given to evidence that met the following criteria: (1) The article was written in the English language, and the article had any of the following attributes: (2) It was a systematic review of the relevant medical literature, or (3) The article reported a controlled trial – randomized or controlled, or (4) The article reports a cohort study, whether prospective or retrospective, or (5) The article reports a case control series involving at least 25 subjects, in which the assessment of outcome was determined by a person or entity independent from the persons or institution that performed the intervention the outcome of which is being assessed.

More information about the selection of evidence is available in the "Methodology Outline" and "Appendix A. *ODG Treatment in Workers' Comp.* Methodology description using the AGREE instrument" (see "Availability of Companion Documents" field).

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Ranking by Type of Evidence

1. Systematic Review/Meta-Analysis
2. Controlled Trial - Randomized (RCT) or Controlled
3. Cohort Study - Prospective or Retrospective
4. Case Control Series
5. Unstructured Review
6. Nationally Recognized Treatment Guideline (from www.guideline.gov)
7. State Treatment Guideline
8. Other Treatment Guideline
9. Textbook
10. Conference Proceedings/Presentation Slides

Ranking by Quality within Type of Evidence

a. High Quality
b. Medium Quality
c. Low Quality

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

The Work Loss Data Institute (WLDI) reviewed each article that was relevant to answering the question at issue, with priority given to those that met the following criteria: (1) The article was written in the English language, and the article had any of the following attributes: (2) It was a systematic review of the relevant medical literature, or (3) The article reported a controlled trial – randomized or controlled, or (4) The article reported a cohort study, whether prospective or retrospective, or (5) The article reported a case control series involving at least 25 subjects, in which the assessment of outcome was determined by a person or entity independent from the persons or institution that performed the intervention the outcome of which is being assessed.

Especially when articles on a specific topic that met the above criteria were limited in number and quality, WLDI also reviewed other articles that did not meet the above criteria, but all evidence was ranked alphanumerically (see the "Rating Scheme for the Strength of the Evidence" field) so that the quality of evidence could be clearly determined when making decisions about what to recommend in the Guidelines. Articles with a Ranking by Type of Evidence of Case Reports and Case Series were not used in the evidence base for the Guidelines. These articles were not included because of their low quality (i.e., they tend to be anecdotal descriptions of what happened with no attempt to control for variables that might affect outcome). Not all the evidence provided by WLDI was eventually listed in the bibliography of the published Guidelines. Only the higher quality references were listed. The criteria for inclusion was a final ranking of 1a to 4b (the original inclusion criteria suggested the methodology subgroup), or if the Ranking by Type of Evidence was 5 to 10, the quality ranking should be an "a."

Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

External Peer Review

Description of Method of Guideline Validation

Prior to publication, select organizations and individuals making up a cross-section of medical specialties and typical end-users externally reviewed the guideline.

Recommendations

Major Recommendations

Note from the Work Loss Data Institute (WLDI) and the National Guideline Clearinghouse (NGC): The following recommendations were current as of April 28, 2011. However, because the Work Loss Data Institute updates their guidelines frequently, users may wish to consult the WLDI Web site for the most current version available.

Initial Diagnosis and Treatment -- Head Injuries

The first priority for the head-injured patient is complete and rapid physiologic resuscitation.

Most minor injuries will regain normal consciousness in the field or emergency department, and if the patient has normal neurological findings on examination and neuroradiological studies when appropriate, he/she may be discharged home with close supervision for the initial twenty-four hours.

Sedation and neuromuscular blockade can be useful in optimizing transport of the head injury patient. However, both treatments interfere with the neurological examination.

Initial Diagnosis

In addition to a physical examination by a practiced practitioner, the following should be part of the process to determine the initial diagnosis in a head-injured patient:

Glasgow Coma Scale Score

The Glasgow Coma Scale (GCS) when performed in the emergency department may aid in predicting the level of traumatic brain injury. Individuals with mild traumatic brain injuries may have a normal score on the GCS. Serial GCS scores may be helpful when intoxication may be a factor.

Neurological Examination

A neurological examination and neuropsychological assessment should be performed by a qualified practitioner to evaluate central nervous system function and diagnose specific behavioral or cognitive deficits or disorders.

Imaging

Computed axial tomography (CT) is a well-established, non-invasive brain imaging x-ray study that should reveal the presence of blood, skull fracture, and/or structural changes in the brain. It should be performed on all patients sustaining a transient neurologic deficit secondary to trauma.

Magnetic resonance imaging (MRI) scans are more sensitive than CT for detecting traumatic cerebral injury. Initially, MRI scans are clinically useful in the following situations to:

- Determine neurological deficits not explained by CT
- Evaluate prolonged interval of disturbed consciousness
- Define evidence of acute changes super-imposed on previous trauma or disease

Lumbar Puncture (LP)

Lumbar puncture is a well-established diagnostic procedure for examination of cerebrospinal fluid (CSF) in neurological disease and injury. The procedure should be performed by qualified and trained physicians under sterile conditions.

Indications for lumbar puncture:

- Neurological disease and injury with no radiographic evidence of extra-axial hemorrhage, mass effect, or impending brain herniation.
- With suspected or known increased intracranial pressure, lumbar puncture should be preceded by fundoscopic examination and by a CT scan or MRI.
- Adult patients with headache exhibiting signs of increased intracranial pressure including papilledema, absent venous pulsations on funduscopic examination, altered mental status, or focal neurologic deficits should undergo a neuroimaging study before having a LP.

Contraindications for lumbar puncture:

- Acute trauma to the spinal column
- Certain infections
- Increased intracranial pressure due to space occupying lesions
- Some coagulation disorders or defects

- Cutaneous infections in the region of the puncture site
- If CT or MRI shows intracerebral, intraventricular, or subarachnoid blood, lumbar puncture should be withheld until neurological consultation is obtained.

Official Disability Guidelines (ODG) Return-To-Work Pathways
Concussion
Mild concussion: 3 to 7 days
Severe concussion, non-cognitive/modified work: 14 days to indefinite
Severe concussion, cognitive work: 84 days to indefinite
Skull fracture
Minor, clerical/modified work: 7 days
Manual work: 21 days
Heavy manual work: 49 days
(See ODG Capabilities & Activity Modifications for Restricted Work under "Work" in Procedure Summary of the original guideline document)

Initial Management

Hypotension

Hypotension (systolic blood pressure [SBP] <90 mm Hg) or hypoxia (apnea, cyanosis, or an oxygen [O_2] saturation <90% in the field or a partial pressure of oxygen in arterial blood [PaO_2] <60 mm Hg) must be monitored and scrupulously avoided, if possible, or corrected immediately in severe traumatic brain injury patients.

- Mean arterial blood pressure should be maintained above 90 mm Hg through the infusion of fluids throughout the patient's course to attempt to maintain cerebral perfusion pressure (CPP) greater than 60 mm Hg.
- Patients with a Glasgow Coma Scale score less than 9, who are unable to maintain their airway or who remain hypoxemic despite supplemental O_2, require that their airway be secured, preferably by endotracheal intubation.

Hypertension

If there are signs of transtentorial herniation or progressive neurological deterioration (not attributable to extracranial explanations), assume that intracranial hypertension is present and treat it aggressively. Hyperventilation should be rapidly established.

Hyperventilation

In the absence of increased intracranial pressure (ICP), avoid unnecessary or prophylactic hyperventilation ($PaCO_2$ less than 26), in the first 24-hours after injury.

Hyperventilation therapy may be necessary for brief periods when there is:

- Acute neurologic deterioration not attributable to systemic pathology (i.e., hypotension)

Hyperventilation therapy may be necessary for longer periods if there is:

- Intracranial hypertension refractory to sedation
- Paralysis
- Cerebrospinal fluid drainage
- Osmotic diuretics

Intracranial Pressure

Intracranial pressure should be monitored in all patients with severe head injury following an abnormal CT scan. Abnormal findings may include one or more of the following:

- Hematomas
- Contusions
- Edema
- Compressed basal cisterns

In the absence of abnormal CT findings, ICP should also be monitored if two or more of the following are noted at admission:

- Patient is over 40 years old
- Unilateral or bilateral motor posturing
- Systolic blood pressure of less than 90 mm Hg

Interpretation and treatment of ICP should be corroborated by frequent clinical examination and cerebral perfusion pressure (CPP) data. In general, it is desirable to:

1. Maintain ICP less than 20 to 25 mm Hg.
2. Maintain mean arterial pressure (MAP) above 90.
3. Maintain CPP (MAP at head level minus ICP) at or above 70 mm Hg.

Mannitol in doses ranging from 0.25 g/kg to 1 g/kg body weight is effective for control of raised ICP after severe head

injury.

Mild or moderate head injury does not need to be monitored for ICP unless the conscious patient has traumatic mass lesions.

Cerebral Perfusion Pressure

CPP should be maintained at a minimum of 60 mm Hg (60 to 70). In the absence of cerebral ischemia, aggressive attempts to maintain cerebral perfusion pressure above 70 mm Hg with fluids and pressors should be avoided because of the risk of adult respiratory distress syndrome.

Nutrition

Nutritional support should be aggressively initiated as soon as practicable. Preferable route is jejunal by gastrojejunostomy.

Anticonvulsants

Anticonvulsant treatment may be used to prevent early posttraumatic seizures in the high-risk individual, and are usually administered for one week in those with intracranial hemorrhage.

Prevention of early seizures has no statistically significant impact on long-term outcome or the development of late seizures or chronic epilepsy although the prevention of early seizures usually helps to reduce seizure-associated complications during acute management.

Operative Procedures

Craniectomy

Recommended for diffuse brain swelling, midline shift, and/or elevated ICP refractory to medical management and not fully alleviated by evacuation of mass lesion/hematoma (or in the absence of mass lesion/hematoma) -- (bone flap stored in freezer, or in the individual's abdominal wall).

Craniotomy

If there is immediate onset of total facial paralysis (uncommon) or if the electroneuronography (EnoG) shows greater than 90% degeneration of the facial nerve, exploration of the path of the facial nerve is indicated. This usually involves a middle fossa craniotomy and mastoidectomy in order to completely decompress the facial nerve. Also initially depressed skull fracture and removal of mass lesions.

ODG Return-To-Work Pathways
Without neurologic deficit, medical treatment: 14 days
Aneurysmectomy, clerical/modified work: 28 days
Aneurysmectomy, manual work: 42 days
Craniectomy, clerical/modified work: 28 days
Craniectomy, manual work: 42 days
Craniotomy, clerical/modified work: 28 days
Craniotomy, manual work: 42 days

Long-term Management

Postconcussion Syndrome

Approximately 38% of patients who sustain head trauma characterized by a brief disturbance of consciousness and clinically unremarkable neuroradiologic findings meet International Classification of Diseases 10th edition (ICD-10) diagnostic criteria for postconcussion syndrome (PCS). Symptoms could involve complaints of irritability, fatigue, headache, difficulty concentrating, dizziness and memory problems. Anxiety and depression are also frequently present, especially later in its course.

Although PCS has often been thought to reflect a psychological response to injury, there is considerable recent evidence to suggest that it is primarily a physiologic disturbance. For most individuals, treatment consists primarily of education of the patient and his/her family, along with supportive counseling regarding emerging problems at work or at home. A subgroup of patients, however, may require psychopharmacologic intervention. Avoid attempts of multiple parallel processing in a postconcussive stage.

Widely accepted treatments for post-traumatic headache may include, but are not limited to, interdisciplinary treatment, pharmacology, joint manipulation, physical therapy, massage, acupuncture, biofeedback, psychotherapy, and diet. These procedures should only be continued if functional gains are documented.

Electroencephalography (EEG)

Electroencephalography is not generally indicated in the immediate period of emergency response, evaluation, and treatment. Following initial assessment and stabilization, the individual's course should be monitored. If during this period there is failure to improve, or the medical condition deteriorates, an EEG may be indicated to assist in the diagnostic evaluation.

Physical Therapy

Patient rehabilitation after traumatic brain injury is divided into two periods: acute and subacute. In the beginning of rehabilitation, physical therapist evaluates patient's functional status; later he uses methods and means of treatment and evaluates effectiveness of rehabilitation. Early ambulation is very important for patients with coma. Physical therapy consists of prevention of complications, improvement of muscle force and range of motions, balance, movement coordination, endurance, and cognitive functions. Early rehabilitation is necessary for traumatic brain injury

patients and use of physical therapy methods can help to regain lost functions and to return to society.

Clinical Algorithm(s)

None provided

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

During the comprehensive medical literature review, preference was given to high quality systematic reviews, meta-analyses, and clinical trials over the past ten years, plus existing nationally recognized treatment guidelines from the leading specialty societies.

The heart of each Work Loss Data Institute guideline is the Procedure Summary (see the original guideline document), which provides a concise synopsis of effectiveness, if any, of each treatment method based on existing medical evidence. Each summary and subsequent recommendation is hyper-linked into the studies on which they are based, in abstract form, which have been ranked, highlighted and indexed.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

These guidelines unite evidence-based protocols for medical treatment with normative expectations for disability duration. They also bridge the interests of the many professional groups involved in diagnosing and treating work-related head trauma or headaches.

Potential Harms

- Hypothermia increases the risk of pneumonia and has other potentially harmful side effects.
- All patients taking methylphenidate should be monitored because a few individuals experienced significant changes in vital signs and adverse effects.
- Decompressive craniectomy was associated with a greater risk for unfavorable outcome at 6 months for patients with diffuse traumatic brain injury compared with standard care.
- Adverse effects of medication for migraine treatment.

Contraindications

Contraindications

Contraindications for Lumbar Puncture

- Acute trauma to the spinal column
- Certain infections
- Increased intracranial pressure due to space occupying lesions
- Some coagulation disorders or defects
- Cutaneous infections in the region of the puncture site
- If computed tomography (CT) or magnetic resonance imaging (MRI) shows intracerebral, intraventricular, or subarachnoid blood, lumbar puncture should be withheld until neurological consultation is obtained.

Contraindications for Hyperventilation

- Avoid prophylactic hyperventilation (if partial pressure of arterial carbon dioxide [$PaCO_2$] is less than 30 mm) in the absence of intracranial pressure (ICP) monitoring or with normal ICP and within the first 24 hours after severe brain injury to reduce the risk of secondary ischemia.
- Avoid chronic hyperventilation to $PaCO_2$ less than 26.

Qualifying Statements

Qualifying Statements

The Treatment Planning section is not designed to be a rule, and therefore should not be used as a basis for Utilization Review. The Treatment Planning section outlines the most common pathways to recovery, but there is no single approach that is right for every patient and these protocols do not mention every treatment that may be recommended. See the Procedure Summaries (in the original guideline document) for complete lists of the various options that may be available, along with links to the medical evidence. The Procedure Summaries are the most important section of Official Disability Guidelines (ODG) Treatment, and that section, not the Treatment Planning section, should be used as a basis for Utilization Review.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Patient Resources

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2006 (revised 2011 Apr 28)

Guideline Developer(s)

Work Loss Data Institute - For Profit Organization

Source(s) of Funding

Not stated

Guideline Committee

Not stated

Composition of Group That Authored the Guideline

Editor-in-Chief, Philip L. Denniston, Jr. and Senior Medical Editor, Charles W. Kennedy, Jr., MD, together pilot the group of approximately 80 members. See the ODG *Treatment in Workers Comp* Editorial Advisory Board.

Financial Disclosures/Conflicts of Interest

There are no conflicts of interest among the guideline development members.

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Guideline Availability

Electronic copies: Available to subscribers from the Work Loss Data Institute Web site.

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Phone: 800-488-5548, 760-753-9992, Fax: 760-753-9995; www.worklossdata.com.

Availability of Companion Documents

The following are available:

- Methodology outline is available from the Work Loss Data Institute (WLDI) Web site.

- Appendix A. *Official Disability Guidelines (ODG) Treatment in Workers' Comp*. Methodology description using the AGREE instrument. Available from the WLDI Web site.
- ODG for eReader. Treatment and disability duration guidelines are available for purchase from the WLDI Web site.

Patient Resources

The following is available:

- Appendix C. *Official Disability Guidelines (ODG) Treatment in Workers' Comp.* Patient information resources.

Electronic copies: Available to subscribers from the Work Loss Data Institute Web site.

Print copies: Available from the Work Loss Data Institute, 169 Saxony Road, Suite 210, Encinitas, CA 92024; Phone: 800-488-5548, 760-753-9992, Fax: 760-753-9995; www.worklossdata.com.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI on April 6, 2006. This summary was updated by ECRI on August 29, 2006, following the U.S. Food and Drug Administration advisory on Triptans, SSRIs, and SNRIs. This NGC summary was updated by ECRI Institute on November 9, 2006, March 29, 2007, August 27, 2007, and December 22, 2008. This summary was updated by ECRI Institute on May 1, 2009 following the U.S. Food and Drug Administration advisory on antiepileptic drugs. This summary was updated by ECRI Institute on May 26, 2009, following the U.S. Food and Drug Administration advisory on Botox, Botox Cosmetic (Botulinum toxin Type A), and Myobloc (Botulinum toxin Type B). This summary was updated by ECRI Institute on August 17, 2009, following the updated FDA advisory on Botox and Botox Cosmetic (Botulinum toxin Type A), and Myobloc (Botulinum toxin Type B). This NGC summary was updated by ECRI Institute on June 6, 2011.

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