Complete Summary

GUIDELINE TITLE

Practice advisory for perioperative visual loss associated with spine surgery. A report by the American Society of Anesthesiologists Task Force on Perioperative Blindness.

BIBLIOGRAPHIC SOURCE(S)

Practice advisory for perioperative visual loss associated with spine surgery: a report by the American Society of Anesthesiologists Task Force on Perioperative Blindness. Anesthesiology 2006 Jun;104(6):1319-28. [31 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Perioperative visual loss associated with spine surgery, including:

- Posterior ischemic optic neuropathy
- Anterior ischemic optic neuropathy
- Central retinal artery occlusion

GUIDELINE CATEGORY

Evaluation
Management

Prevention
Risk Assessment

CLINICAL SPECIALTY

Anesthesiology
Neurological Surgery
Neurology
Nursing
Ophthalmology
Orthopedic Surgery

INTENDED USERS

Advanced Practice Nurses
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To enhance awareness of perioperative visual loss and to reduce its frequency

TARGET POPULATION

Patients at high risk for visual loss during spine surgery (i.e., patients who are undergoing spine procedures while positioned prone and receiving general anesthesia)

Note: This Advisory does not address the perioperative management of patients who receive regional anesthesia or sedation. This Advisory also does not include: (1) other causes of visual loss such as cortical blindness and (2) nonspine surgical procedures such as cardiac surgery or radical neck dissection. In addition, this advisory does not apply to young children because of the rarity of visual loss in children younger than 12 years undergoing spine surgery.

INTERVENTIONS AND PRACTICES CONSIDERED

Preoperative Patient Evaluation and Preparation

1. Ophthalmic or neuro-ophthalmic evaluation (considered but not recommended)
2. Assessment of risk factors for vision loss and informing patients of risk factors

Intraoperative Management

1. Blood pressure management (deliberate hypotensive techniques)
2. Management of intraoperative fluids (e.g., use of colloids, crystalloids; central venous pressure monitoring)
3. Management of anemia (monitoring of hemoglobin, hematocrit)
4. Use of vasopressors

5. Patient positioning (maintenance of neutral forward position)
6. Use of staged spine surgical procedures

Postoperative Management

1. Assessing a high-risk patient's vision when the patient becomes alert
2. Optimizing hemoglobin or hematocrit levels, hemodynamic status, and arterial oxygenation
3. Magnetic resonance imaging
4. Use of antiplatelets, steroids, intraocular pressure-lowering agents (considered but not recommended)

MAJOR OUTCOMES CONSIDERED

Risk for and incidence of visual loss in relation to:

- Perioperative blood loss
- Anemia
- Blood pressure
- Duration of surgery
- Surgical positioning
- Intravascular volume
- Use of vasopressors
- Preoperative and postoperative management

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

For this Advisory, a literature review was used in combination with opinions obtained from experts and other sources (e.g., professional society members, open forums, Web-based postings) to provide guidance to practitioners regarding the perioperative management of patients undergoing spine procedures who may be at risk of perioperative visual loss. Both the literature review and opinion data were based on evidence linkages, consisting of directional statements about relationships between specific perioperative management activities (i.e., associated with a spine procedure during which general anesthesia is administered) and permanent impairment or total loss of sight.

A study or report that appears in the published literature is included in the development of an advisory if the study (1) is related to one of the specified linkage statements, (2) reports a finding or set of findings that can be tallied or measured (e.g., articles that contain only opinion are not included), and (3) is the product of an original investigation or report (i.e., review articles or follow-up studies that summarize previous findings are not included).

For the literature review, potentially relevant studies were identified via electronic and manual searches of the literature. The electronic search covered a 40-year period from 1966 through 2005. The manual search covered a 73-year period from 1933 through 2005. More than 500 citations were initially identified, yielding a total of 451 non-overlapping articles that addressed topics related to the evidence linkages. After review of the articles, 424 studies did not provide direct evidence and were subsequently eliminated.

NUMBER OF SOURCE DOCUMENTS

A total of 27 articles contained direct linkage-related evidence.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Literature Review

Few of the reviewed studies exhibited sufficiently acceptable quantitative methods and analyses to provide a clear indication of causality. Therefore, the published literature could not be used as a source of quantitative support (required for the development of practice guidelines). However, many published studies were evaluated that provided the Task Force with important non causal evidence. For example, descriptive literature (i.e., reports of frequency or incidence) is often useful in providing an indication of the scope of a problem, and case reports may be useful in identifying perioperative events that may be precursors to permanent visual impairment or total loss of sight.

Inter-observer agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a kappa (k) statistic for two-rater agreement pairs were as follows: (1) type of study design, k = 0.64 - 0.78; (2) type of analysis, k = 0.74 - 0.87; (3) evidence linkage assignment, k = 0.69 - 0.94; and (4) literature inclusion for database, k = 0.77 - 1.00. Three-rater chance-corrected agreement values were (1) study design, Sav = 0.69, Var (Sav) = 0.022; (2) type of analysis, Sav = 0.82, Var (Sav) = 0.017; (3) linkage assignment, Sav = 0.79, Var (Sav) = 0.007; and (4) literature database inclusion, Sav = 0.86, Var (Sav) = 0.030. These values represent moderate to high levels of agreement.

Consensus-Based Evidence

Consensus was obtained from multiple sources, including (1) survey opinion from consultants who were selected based on their knowledge or expertise regarding perioperative visual impairment or total loss of sight associated with a spine procedure during which general anesthesia is administered; (2) survey opinions from selected samples of active members of the Society for Neurosurgical Anesthesia and Critical Care, North American Neuro-Ophthalmology Society, and North American Spine Society; (3) testimony from attendees of a publicly held open forum at a national anesthesia meeting; (4) Internet commentary; and (5) Task Force opinion and interpretation. The consultant survey rate of return was 60% (n=18 of 30). Survey results are presented in the text of the document as well as in-text tables.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The American Society of Anesthesiologists (ASA) appointed a Task Force of 12 members to (1) review and assess currently available scientific literature, (2) obtain expert consensus and public opinion, and (3) develop a practice advisory. The Task Force members consisted of four anesthesiologists from various geographic areas of the United States, three neuro-ophthalmologists (one neurologist, two ophthalmologists), an orthopedic spine surgeon, a neurosurgeon, and two methodologists from the ASA Committee on Practice Parameters. Three physicians served as official liaisons from national organizations. They included a neuro-ophthalmologist (North American Neuro-Ophthalmology Society [NANOS]), an orthopedic surgeon (American Academy of Orthopedic Surgery), and a neurosurgeon (American Association of Neurologic Surgeons).

The Task Force used a six-step process. First, it reached consensus on the criteria for evidence of effective perioperative interventions for the prevention of visual loss. Second, original published articles from peer-reviewed journals relevant to these issues were evaluated. Third, consultants who had expertise or interest in perioperative visual loss and who practiced or worked in various settings (e.g., academic and private practice) were asked to (1) participate in opinion surveys on the effectiveness of various perioperative management strategies and (2) review and comment on a draft of the Advisory developed by the Task Force. Fourth, additional opinions were solicited from active members of the Society for Neurosurgical Anesthesia and Critical Care (SNACC), NANOS, and the North American Spine Society (NASS). Fifth, the Task Force held an open forum at a national anesthesia meeting to solicit input on the key concepts of this Advisory. Sixth, all available information was used to build consensus within the Task Force on the Advisory.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The draft document was made available for review on the American Society of Anesthesiologists (ASA) Web site, and input was invited via e-mail announcement to all ASA members. All submitted comments were considered by the Task Force in preparing the final draft.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

A summary of the Practice Advisory is presented below:

- There is a subset of patients who undergo spine procedures while they are positioned prone and receiving general anesthesia that has an increased risk for development of perioperative visual loss. This subset includes patients who are anticipated preoperatively to undergo procedures that are prolonged, have substantial blood loss, or both (high-risk patients).
- Consider informing high-risk patients that there is a small, unpredictable risk of perioperative visual loss.
- The use of deliberate hypotensive techniques during spine surgery has not been shown to be associated with the development of perioperative visual loss.
- Colloids should be used along with crystalloids to maintain intravascular volume in patients who have substantial blood loss.
- At this time, there is no apparent transfusion threshold that would eliminate the risk of perioperative visual loss related to anemia.
- High-risk patients should be positioned so that their heads are level with or higher than the heart when possible. In addition, their heads should be maintained in a neutral forward position (e.g., without significant neck flexion, extension, lateral flexion, or rotation) when possible.
- Consideration should be given to the use of staged spine procedures in high-risk patients.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The advisory statements contained in this document represent a consensus of the current spectrum of clinical opinion and literature-based findings.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Reduction in the frequency and severity of perioperative visual loss (posterior ischemic optic neuropathy, anterior ischemic optic neuropathy, and central retinal artery occlusion) in at-risk patients

POTENTIAL HARMS

The use of staged spine surgery procedures in high-risk patients may entail additional costs and patient risks (e.g., infection, thromboembolism, neurologic injury), but it also may decrease these risks and the risk of perioperative visual loss in some patients.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Practice advisories are systematically developed reports that are intended to assist decision-making in areas of patient care. Advisories provide a synthesis and analysis of expert opinion, clinical feasibility data, open forum commentary, and consensus surveys. Advisories are not intended as standards, guidelines, or absolute requirements. They may be adopted, modified, or rejected according to clinical needs and constraints.
- The use of practice advisories cannot guarantee any specific outcome. Practice advisories summarize the state of the literature and report opinions derived from a synthesis of task force members, expert consultants, open forums, and public commentary. Practice advisories are not supported by scientific literature to the same degree as standards or guidelines because of the lack of sufficient numbers of adequately controlled studies. Practice advisories are subject to periodic revision as warranted by the evolution of medical knowledge, technology, and practice.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Safety

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 Jun

GUIDELINE DEVELOPER(S)

American Society of Anesthesiologists - Medical Specialty Society

SOURCE(S) OF FUNDING

American Society of Anesthesiologists

GUIDELINE COMMITTEE

Task Force on Perioperative Blindness

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Anesthesiology Journal Web site.

Print copies: Available from the American Society for Anesthesiologists, 520 North Northwest Highway, Park Ridge, IL 60068-2573.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on June 29, 2006. The information was verified by the guideline developer on July 5, 2006.

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Date Modified: 10/6/2008