Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology.

Bibliographic Source(s)

Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. Anesthesiology. 2016 Feb;124(2):270-300. [228 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Anesthesiology. 2007 Apr;106(4):843-63.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- December 14, 2016 – General anesthetic and sedation drugs: The U.S. Food and Drug Administration (FDA) is warning that repeated or lengthy use of general anesthetic and sedation drugs during surgeries or procedures in children younger than 3 years or in pregnant women during their third trimester may affect the development of children's brains. Consistent with animal studies, recent human studies suggest that a single, relatively short exposure to general anesthetic and sedation drugs in infants or toddlers is unlikely to have negative effects on behavior or learning. However, further research is needed to fully characterize how early life anesthetic exposure affects children's brain development.
- August 31, 2016 – Opioid pain and cough medicines combined with benzodiazepines: A U.S. Food and Drug Administration (FDA) review has found that the growing combined used of opioid medicines with benzodiazepines or other drugs that depress the central nervous system (CNS) has resulted in serious side effects, including slowed or difficult breathing and deaths. FDA is adding Boxed Warnings to the drug labeling of prescription opioid pain and prescription opioid cough medicines and benzodiazepines.
- March 22, 2016 – Opioid pain medicines: The U.S. Food and Drug Administration (FDA) is warning about several safety issues with the entire class of opioid pain medicines. These safety risks are potentially harmful interactions with numerous other

medications, problems with the adrenal glands, and decreased sex hormone levels. They are requiring changes to the labels of all opioid drugs to warn about these risks.

Recommendations

Major Recommendations

Perianesthetic Evaluation and Preparation

History and Physical Examination

- Conduct a focused history and physical examination before providing anesthesia care.
  - This should include, but is not limited to, a maternal health and anesthetic history, a relevant obstetric history, a baseline blood pressure measurement, and an airway, heart, and lung examination, consistent with the National Guideline Clearinghouse (NGC) summary of the American Society of Anesthesiologists (ASA) guideline Practice advisory for preanesthesia evaluation.
  - When a neuraxial anesthetic is planned or placed, examine the patient's back.
  - Recognition of significant anesthetic or obstetric risk factors should encourage consultation between the obstetrician and the anesthesiologist.
- A communication system should be in place to encourage the early and ongoing contact between obstetric providers, anesthesiologists, and other members of the multidisciplinary team.

Intrapartum Platelet Count

- The anesthesiologist's decision to order or require a platelet count should be individualized and based on a patient's history (e.g., preeclampsia with severe features), physical examination, and clinical signs.*
  - A routine platelet count is not necessary in the healthy parturient.

*A specific platelet count predictive of neuraxial anesthetic complications has not been determined.

Blood Type and Screen

- A routine blood cross-match is not necessary for healthy and uncomplicated parturients for vaginal or operative delivery.
- The decision whether to order or require a blood type and screen or cross-match should be based on maternal history, anticipated hemorrhagic complications (e.g., placenta accreta in a patient with placenta previa and previous uterine surgery), and local institutional policies.

Perianesthetic Recording of Fetal Heart Rate Patterns

- Fetal heart rate patterns should be monitored by a qualified individual before and after administration of neuraxial analgesia for labor.
- *Continuous* electronic recording of fetal heart rate patterns may not be necessary in every clinical setting and may not be possible during placement of a neuraxial catheter.†

†American College of Obstetricians and Gynecologists: ACOG Practice Bulletin No. 106: Intrapartum fetal heart rate monitoring: Nomenclature, interpretation, and general management principles. Obstet Gynecol 2009; 114:192–202.

Aspiration Prevention

Clear Liquids

- The oral intake of moderate amounts of clear liquids may be allowed for uncomplicated laboring patients.
- The uncomplicated patient undergoing elective surgery may have clear liquids up to 2 h before induction of anesthesia.
  - Examples of clear liquids include, but are not limited to, water, fruit juices without pulp, carbonated beverages, clear tea, black coffee, and sports drinks.
  - The volume of liquid ingested is less important than the presence of particulate matter in the liquid ingested.
- Laboring patients with additional risk factors for aspiration (e.g., morbid obesity, diabetes mellitus, and difficult airway) or patients at increased risk for operative delivery (e.g., nonreassuring fetal heart rate pattern) may have further restrictions of oral intake, determined on a case-by-case basis.

Solids

- Solid foods should be avoided in laboring patients.
- The patient undergoing elective surgery (e.g., scheduled cesarean delivery or postpartum tubal ligation) should undergo a fasting period for solids of 6 to 8 h depending on the type of food ingested (e.g., fat content).

Antacids, H_2-receptor Antagonists, and Metoclopramide

- Before surgical procedures (e.g., cesarean delivery and postpartum tubal ligation), consider the timely administration of nonparticulate antacids, histamine (H_2) receptor antagonists, and/or metoclopramide for aspiration prophylaxis.

Anesthetic Care for Labor and Vaginal Delivery

Timing of Neuraxial Analgesia and Outcome of Labor

- Provide patients in early labor (i.e., less than 5 cm dilation) the option of neuraxial analgesia when this service is available.
- Offer neuraxial analgesia on an individualized basis regardless of cervical dilation.
    - Reassure patients that the use of neuraxial analgesia does not increase the incidence of cesarean delivery.

Neuraxial Analgesia and Trial of Labor after Prior Cesarean Delivery

- Offer neuraxial techniques to patients attempting vaginal birth after previous cesarean delivery.
- For these patients, consider early placement of a neuraxial catheter that can be used later for labor analgesia or for anesthesia in the event of operative delivery.

Analgesia/Anesthetic Techniques

Early Insertion of a Neuraxial (i.e., Spinal or Epidural) Catheter for Complicated Parturients

- Consider early insertion of a neuraxial catheter for obstetric (e.g., twin gestation or preeclampsia) or anesthetic indications (e.g., anticipated difficult airway or obesity) to reduce the need for general anesthesia if an emergent procedure becomes necessary.
    - In these cases, the insertion of a neuraxial catheter may precede the onset of labor or a patient's request for labor analgesia.

Continuous Infusion Epidural Analgesia

- Continuous epidural infusion may be used for effective analgesia for labor and delivery.
- When a continuous epidural infusion of local anesthetic is selected, an opioid may be added to reduce the concentration of local anesthetic, improve the quality of analgesia, and minimize motor block.

Analgesic Concentrations

- Use dilute concentrations of local anesthetics with opioids to produce as little motor block as possible.

Single-injection Spinal Opioids with or without Local Anesthetics

- Single-injection spinal opioids with or without local anesthetics may be used to provide effective, although time-limited, analgesia for labor when spontaneous vaginal delivery is anticipated.
- If labor duration is anticipated to be longer than the analgesic effects of the spinal drugs chosen, or if there is a reasonable possibility of operative delivery, then consider a catheter technique instead of a single-injection technique.
- A local anesthetic may be added to a spinal opioid to increase duration and improve quality of analgesia.

Pencil-point Spinal Needles

- Use pencil-point spinal needles instead of cutting-bevel spinal needles to minimize the risk of postdural puncture headache.

Combined Spinal–Epidural Analgesia

- If labor duration is anticipated to be longer than the analgesic effects of the spinal drugs chosen, or if there is a reasonable possibility of operative delivery, then consider a catheter technique instead of a single-injection technique.
- Combined spinal–epidural techniques may be used to provide effective and rapid onset of analgesia for labor.

Patient-controlled Epidural Analgesia (PCEA)

- PCEA may be used to provide an effective and flexible approach for the maintenance of labor analgesia.
- The use of PCEA may be preferable to fixed-rate continuous infusion epidural analgesia for administering reduced dosages of local anesthetics.
- PCEA may be used with or without a background infusion.

Removal of Retained Placenta

Anesthetic Techniques

- In general, there is no preferred anesthetic technique for removal of retained placenta.
    - If an epidural catheter is in place and the patient is hemodynamically stable, consider providing epidural anesthesia.
- Assess hemodynamic status before administering neuraxial anesthesia.
- Consider aspiration prophylaxis.
- Titrate sedation/analgesia carefully due to the potential risks of respiratory depression and pulmonary aspiration during the immediate postpartum period.
- In cases involving major maternal hemorrhage with hemodynamic instability, general anesthesia with an endotracheal tube may be considered in preference to neuraxial anesthesia.

Nitroglycerin for Uterine Relaxation

- Nitroglycerin may be used as an alternative to terbutaline sulfate or general endotracheal anesthesia with halogenated agents for uterine relaxation during removal of retained placental tissue.
    - Initiating treatment with incremental doses of intravenous (IV) or sublingual (i.e., tablet or metered dose spray) nitroglycerin may be done to sufficiently relax the uterus.

Anesthetic Care for Cesarean Delivery

Equipment, Facilities, and Support Personnel

- Equipment, facilities, and support personnel available in the labor and delivery operating suite should be comparable to those available in the main operating suite.
- Resources for the treatment of potential complications (e.g., failed intubation, inadequate analgesia/anesthesia, hypotension, respiratory depression, local anesthetic systemic toxicity, pruritus, and vomiting) should also be available in the labor and delivery operating suite.
- Appropriate equipment and personnel should be available to care for obstetric patients recovering from neuraxial or general anesthesia.

General, Epidural, Spinal, or Combined Spinal–Epidural Anesthesia

- The decision to use a particular anesthetic technique for cesarean delivery should be individualized, based on anesthetic, obstetric, or fetal risk factors (e.g., elective vs. emergency), the preferences of the patient, and the judgment of the anesthesiologist.
    - Uterine displacement (usually left displacement) should be maintained until delivery regardless of the anesthetic technique used.
- Consider selecting neuraxial techniques in preference to general anesthesia for most cesarean deliveries.
- If spinal anesthesia is chosen, use pencil-point spinal needles instead of cutting-bevel spinal needles.
- For urgent cesarean delivery, an indwelling epidural catheter may be used as an alternative to initiation of spinal or general anesthesia.
- General anesthesia may be the most appropriate choice in some circumstances (e.g., profound fetal bradycardia, ruptured uterus, severe hemorrhage, severe placental abruption, umbilical cord prolapse, and preterm footling breech).

IV Fluid Preloading or Coloading

- IV fluid preloading or coloading may be used to reduce the frequency of maternal hypotension after spinal anesthesia for cesarean delivery.
- Do not delay the initiation of spinal anesthesia in order to administer a fixed volume of IV fluid.

Ephedrine or Phenylephrine

- Either IV ephedrine or phenylephrine may be used for treating hypotension during neuraxial anesthesia.
- In the absence of maternal bradycardia, consider selecting phenylephrine because of improved fetal acid–base status in uncomplicated pregnancies.

Neuraxial Opioids for Postoperative Analgesia

- For postoperative analgesia after neuraxial anesthesia for cesarean delivery, consider selecting neuraxial opioids rather than intermittent injections of parenteral opioids.

Postpartum Tubal Ligation

- Before a postpartum tubal ligation, the patient should have no oral intake of solid foods within 6 to 8 h of the surgery, depending on the type of food ingested (e.g., fat content).
- Consider aspiration prophylaxis.
- Both the timing of the procedure and the decision to use a particular anesthetic technique (i.e., neuraxial vs. general) should be individualized, based on anesthetic and obstetric risk factors (e.g., blood loss) and patient preferences.
- Consider selecting neuraxial techniques in preference to general anesthesia for most postpartum tubal ligations.
    - Be aware that gastric emptying will be delayed in patients who have received opioids during labor.
    - Be aware that an epidural catheter placed for labor may be more likely to fail with longer post-delivery time intervals.
    - If a postpartum tubal ligation is to be performed before the patient is discharged from the hospital, do not attempt the procedure at a time when it might compromise other aspects of patient care on the labor and delivery unit.‡

‡The American College of Obstetricians and Gynecologists (ACOG) has indicated that postpartum tubal ligation "should be considered an urgent surgical procedure given the consequences of a missed procedure and the limited time frame in which it may be performed." ACOG Committee Opinion No. 530: Access to postpartum sterilization. Obstet Gynecol 2012; 120:212–5.

Management of Obstetric and Anesthetic Emergencies

Resources for Management of Hemorrhagic Emergencies

- Institutions providing obstetric care should have resources available to manage hemorrhagic emergencies (see Table 1 in the original guideline document).
- In an emergency, type-specific or O-negative blood is acceptable.
- In cases of intractable hemorrhage, when banked blood is not available or the patient refuses banked blood, consider intraoperative cell salvage if available (see the NGC summary of the ASA guideline Practice guidelines for perioperative blood management).

Equipment for Management of Airway Emergencies

- Labor and delivery units should have personnel and equipment readily available to manage airway emergencies consistent with the NGC summary of the ASA guideline Practice guidelines for management of the difficult airway, to include a pulse oximeter and carbon dioxide detector.
    - Basic airway management equipment should be immediately available during the provision of neuraxial analgesia (see Table 2 in the original guideline document).
    - Portable equipment for difficult airway management should be readily available in the operative area of labor and delivery units (see Table 3 in the original guideline document).
    - A preformulated strategy for intubation of the difficult airway should be in place.
    - When tracheal intubation has failed, consider ventilation with mask and cricoid pressure or with a supraglottic airway device (e.g., laryngeal mask airway, intubating laryngeal mask airway, and laryngeal tube) for maintaining an airway and ventilating the lungs.
    - If it is not possible to ventilate or awaken the patient, a surgical airway should be performed.

Cardiopulmonary Resuscitation

- Basic and advanced life-support equipment should be immediately available in the operative area of labor and delivery units.
- If cardiac arrest occurs, initiate standard resuscitative measures.
    - Uterine displacement (usually left displacement) should be maintained.
    - If maternal circulation is not restored within 4 min, cesarean delivery should be performed by the obstetrics team.¶

¶More information on management of cardiac arrest can be found in: Lipman S, Cohen S, Einav S, Jeejeebhoy F, Mhyre JM, Morrison LJ, Katz V, Tsen LC, Daniels K, Halamek LP, Suresh MS, Arafeh J, Gauthier D, Carvalho JC, Druzin M, Carvalho B; Society for Obstetric Anesthesia and Perinatology: The Society for Obstetric Anesthesia and Perinatology consensus statement on the management of cardiac arrest in pregnancy. Anesth Analg 2014; 118:1003.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Intrapartum and postpartum pain

Guideline Category

Evaluation

Management

Clinical Specialty

Anesthesiology

Obstetrics and Gynecology

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Nurses

Other

Physician Assistants

Physicians

Guideline Objective(s)

To enhance the quality of anesthetic care for obstetric patients, improve patient safety by reducing the incidence and severity of anesthesia related complications, and increase patient satisfaction

Target Population

Intrapartum and postpartum patients with uncomplicated pregnancies or with common obstetric problems

Note: These guidelines do not apply to patients undergoing surgery during pregnancy, gynecologic patients, or parturients with chronic medical disease (e.g., severe cardiac, renal or neurologic disease).

Interventions and Practices Considered

1. Perianesthetic evaluation
    - History and physical examination
    - Intrapartum platelet count
    - Blood type and screen or cross-match
    - Perianesthetic recording of fetal heart rate
2. Aspiration prevention
    - Fasting times for clear liquids and solids for labor and delivery

    - Administration of non-particulate antacids, histamine (H_2) receptor antagonists, and/or metoclopramide
3. Anesthetic care for labor and delivery
    - Timing of neuraxial analgesia and outcome of labor
    - Neuraxial analgesia and trial of labor after caesarian delivery
    - Techniques with or without local anesthetics and/or opioids (concentrations, continuous infusion epidural, single-injection spinal opioids with or without local anesthetics, pencil-point spinal needles, combined spinal-epidural anesthetics, patient-controlled epidural analgesia)
4. Removal of retained placenta
    - Anesthetic choices
    - Nitroglycerin for uterine relaxation
5. Anesthetic care for cesarean delivery
    - Considerations for equipment, facilities, and support personnel
    - Spinal, epidural, combined spinal-epidural and/or general anesthesia
    - Use of intravenous fluid preloading or coloading
    - Ephedrine/phenylephrine as supportive care
    - Neuraxial opioids for postoperative analgesia
6. Postpartum tubal ligation and anesthetic options
7. Management of obstetric and anesthetic emergencies
    - Availability of management resources for hemorrhagic emergencies
    - Equipment for airway emergencies
    - Cardiopulmonary resuscitation

Major Outcomes Considered

- Maternal, fetal and neonatal anesthetic complications
- Maternal, fetal and neonatal obstetric complications
- Patient satisfaction

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

Scientific evidence used in the development of these updated guidelines is based on cumulative findings from literature published in peer-reviewed journals. Literature citations are obtained from PubMed and other healthcare databases, direct Internet searches, Task Force members, liaisons with other organizations, and manual searches of references located in reviewed articles.

State of the Literature

For the literature review, potentially relevant clinical studies were identified via electronic and manual searches of the literature. The updated searches covered an 11-yr period from January 1, 2005 to July 31, 2015. New citations were reviewed and combined with pre-2005 articles used in the previous update, resulting in a total of 478 articles that contained direct linkage-related evidence. Search terms consisted of the interventions indicated in Appendix 2 of the original guideline document guided by the appropriate inclusion/exclusion criteria as stated in the "Focus" section in the original guideline document. A complete bibliography used to develop these Guidelines, organized by section, is available (see the "Availability of Companion Documents" field).

Number of Source Documents

In total, 3509 articles were considered. New citations were reviewed and combined with pre-2005 articles used in the previous update, resulting in a total of 478 articles that contained direct linkage-related evidence.

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

Scientific Evidence

Findings from the aggregated literature are reported in the text of the guidelines by evidence category, level, and direction. Evidence categories refer specifically to the strength and quality of the research *design* of the studies. Category A evidence represents results obtained from randomized controlled trials (RCTs), and Category B evidence represents observational results obtained from nonrandomized study designs or RCTs without pertinent comparison groups. When available, Category A evidence is given precedence over Category B evidence for any particular outcome. These evidence categories are further divided into evidence levels. Evidence levels refer specifically to the strength and quality of the summarized study *findings* (i.e., statistical findings, type of data, and the number of studies reporting/replicating the findings within the evidence categories). In this document, only the highest level of evidence is included in the summary report for each intervention–outcome pair, including a directional designation of benefit, harm, or equivocality for each outcome.

Category A

RCTs report comparative findings between clinical interventions for specified outcomes. Statistically significant ($P < 0.01$) outcomes are designated as either beneficial (B) or harmful (H) for the patient; statistically nonsignificant findings are designated as equivocal (E).

Level 1: The literature contains a sufficient number of RCTs to conduct meta-analysis,‡ and meta-analytic findings from these aggregated studies are reported as evidence.

Level 2: The literature contains multiple RCTs, but the number of RCTs is not sufficient to conduct a viable meta-analysis for the purpose of these updated guidelines. Findings from these RCTs are reported separately as evidence.

Level 3: The literature contains a single RCT, and findings are reported as evidence.

Category B

Observational studies or RCTs without pertinent comparison groups may permit *inference* of beneficial or harmful relations among clinical interventions and clinical outcomes. Inferred findings are given a directional designation of beneficial (B), harmful (H), or equivocal (E). For studies that report statistical findings, the threshold for significance is a P value of less than 0.01.

Level 1: The literature contains observational comparisons (e.g., cohort and case-control research designs) with comparative statistics between clinical interventions for a specified clinical outcome.

Level 2: The literature contains noncomparative observational studies with associative statistics (e.g., relative risk, correlation, or sensitivity/specificity).

Level 3: The literature contains noncomparative observational studies with descriptive statistics (e.g., frequencies and percentages).

Level 4: The literature contains case reports.

Insufficient Literature

The *lack* of sufficient scientific evidence in the literature may occur when the evidence is either unavailable (i.e., no pertinent studies found) or inadequate. Inadequate literature cannot be used to assess relations among clinical interventions and outcomes because a clear interpretation of findings is not obtained due to methodological concerns (e.g., confounding of study design or implementation), or the study does not meet the criteria for content as defined in the "Focus" of the guidelines.

Opinion-based Evidence

All opinion-based evidence (e.g., survey data, Internet-based comments, letters, and editorials) relevant to each topic was considered in the development of these updated guidelines. However, only the findings obtained from formal surveys are reported in the current update. Identical surveys were distributed to expert consultants and a random sample of American Society of Anesthesiologists (ASA) members who practice obstetric anesthesia.

Category A: Expert Opinion

Survey responses from Task Force–appointed expert consultants are reported in summary form in the text, with a complete listing of the consultant survey responses reported in Appendix 2 of the original guideline document.

Category B: Membership Opinion

Survey responses from active ASA members are reported in summary form in the text, with a complete listing of ASA member survey responses reported in Appendix 2 of the original guideline document.

Survey responses from expert and membership sources are recorded using a 5-point scale and summarized based on median values.§

Strongly Agree: Median score of 5 (at least 50% of the responses are 5)

Agree: Median score of 4 (at least 50% of the responses are 4 or 4 and 5)

Equivocal: Median score of 3 (at least 50% of the responses are 3, or no other response category or combination of similar categories contain at least 50% of the responses)

Disagree: Median score of 2 (at least 50% of responses are 2 or 1 and 2)

Strongly Disagree: Median score of 1 (at least 50% of responses are 1)

Category C: Informal Opinion

Open-forum testimony obtained during the development of these guidelines, Internet-based comments, letters, and editorials are all informally evaluated and discussed during the formulation of guideline recommendations.

‡All meta-analyses are conducted by the ASA methodology group. Meta-analyses from other sources are reviewed but not included as evidence in this document.

§When an equal number of categorically distinct responses are obtained, the median value is determined by calculating the arithmetic mean of the two middle values. Ties are calculated by a predetermined formula.

Methods Used to Analyze the Evidence

Meta-Analysis

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Each pertinent outcome reported in a study was classified by evidence category and level, and designated as either beneficial, harmful, or equivocal. Findings were then summarized for each evidence linkage. Literature pertaining to 13 evidence linkages contained enough studies with well-defined experimental designs and statistical information sufficient to conduct meta-analyses (see Table 4 in the original guideline document). These linkages were (1) early versus late epidural anesthetics, (2) epidural local anesthetics with opioids versus equal concentrations of epidural local anesthetics without opioids, (3) continuous infusion epidural of local anesthetics with opioids versus higher concentrations of local anesthetics without opioids, (4) pencil-point versus cutting-bevel spinal needles, (5) combined spinal–epidural local anesthetics with opioids versus epidural local anesthetics with opioids, (6) patient-controlled epidural analgesia (PCEA) versus continuous infusion epidural anesthetics, (7) PCEA with a background infusion versus PCEA, (8) general anesthesia versus epidural anesthesia for cesarean delivery, (9) combined spinal–epidural anesthesia versus epidural anesthesia for cesarean delivery, (10) fluid preloading versus coloading for cesarean delivery, (11) ephedrine versus placebo for cesarean delivery, (12) ephedrine versus phenylephrine for cesarean delivery, and (13) neuraxial versus parenteral opioids for postoperative analgesia.

General variance-based effect-size estimates or combined probability tests were obtained for continuous outcome measures, and Mantel–Haenszel odds ratios were obtained for dichotomous outcome measures. Two combined probability tests were used as follows: (1) the Fisher combined

test, producing chi-square values based on logarithmic transformations of the reported *P* values from the independent studies, and (2) the Stouffer combined test, providing weighted representation of the studies by weighting each of the standard normal deviates by the size of the sample. An odds ratio procedure based on the Mantel–Haenszel method for combining study results using 2 × 2 tables was used with outcome frequency information. An acceptable significance level was set at a *P* value of less than 0.01 (one tailed). Tests for heterogeneity of the independent studies were conducted to assure consistency among the study results. DerSimonian–Laird random-effects odds ratios were obtained when significant heterogeneity was found ($P < 0.01$). To control for potential publishing bias, a "fail-safe n" value was calculated. No search for unpublished studies was conducted, and no reliability tests for locating research results were done. To be accepted as significant findings, Mantel–Haenszel odds ratios must agree with combined test results whenever both types of data are assessed. In the absence of Mantel–Haenszel odds ratios, findings from both the Fisher and weighted Stouffer combined tests must agree with each other to be acceptable as significant.

For the previous update, interobserver agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a κ statistic for two-rater agreement pairs were as follows: (1) type of study design, κ = 0.83 to 0.94; (2) type of analysis, κ = 0.71 to 0.93; (3) evidence linkage assignment, κ = 0.87 to 1.00; and (4) literature inclusion for database, κ = 0.74 to 1.00. Three-rater chance-corrected agreement values were as follows: (1) study design, Sav = 0.884, Var (Sav) = 0.004; (2) type of analysis, Sav = 0.805, Var (Sav) = 0.009; (3) linkage assignment, Sav = 0.911, Var (Sav) = 0.002; (4) literature database inclusion, Sav = 0.660, Var (Sav) = 0.024. These values represent moderate to high levels of agreement.

Consensus-based Evidence

For the previous update, consensus was obtained from multiple sources, including (1) survey opinion from consultants who were selected based on their knowledge or expertise in obstetric anesthesia or maternal and fetal medicine, (2) survey opinions solicited from active members of the American Society of Anesthesiologists (ASA), (3) testimony from attendees of publicly-held open forums at two national anesthesia meetings, (4) Internet commentary, and (5) Task Force opinion and interpretation. The survey rate of return was 75% (n = 76 of 102) for the consultants, and 2,326 surveys were received from active ASA members. Results of the surveys are reported in tables 5 and 6, and in the text of the original guideline document.

The consultants were asked to indicate which, if any, of the evidence linkages would change their clinical practices if the guidelines were instituted. The rate of return was 35% (n = 36). The percent of responding consultants expecting *no change* associated with each linkage were as follows: perianesthetic evaluation: 97%; aspiration prophylaxis: 83%; anesthetic care for labor and delivery: 89%; removal of retained placenta: 97%; anesthetic choices for cesarean delivery: 97%; postpartum tubal ligation: 97%; and management of complications: 94%. Ninety-seven percent of the respondents indicated that the guidelines would have *no effect* on the amount of time spent on a typical case. One respondent indicated that there would be an increase of 5 min in the amount of time spent on a typical case with the implementation of these guidelines.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Task Force Members and Consultants

In 2014, the American Society of Anesthesiologists (ASA) Committee on Standards and Practice Parameters requested that the updated guidelines published in 2007 be reevaluated. This current update consists of a literature evaluation and the reporting of new survey findings of expert consultants and ASA members. A summary of recommendations is found in Appendix 1 of the original guideline document.

This update was developed by an ASA-appointed Task Force of 11 members, consisting of anesthesiologists in both private and academic practices from various geographic areas of the United States, and consulting methodologists from the ASA Committee on Standards and Practice Parameters. The Task Force developed these updated guidelines by means of a multistep process. First, original published research studies from peer-reviewed journals published subsequent to the previous update were reviewed. Second, a panel of expert consultants was asked to (1) participate in opinion surveys on the effectiveness of various anesthetic management strategies and (2) review and comment on a draft of the update developed by the Task Force. Third, survey opinions about the guideline recommendations were solicited from a random sample of active members of the ASA. Finally, all available information was used to build consensus within the Task Force to finalize the update.

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

Internal Peer Review

Description of Method of Guideline Validation

The guidelines were submitted for publication October 28, 2015; accepted for publication October 28, 2015; and approved by the American Society of Anesthesiologists (ASA) House of Delegates on October 28, 2015.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Evidence was obtained from two principal sources: scientific evidence and opinion-based evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate anesthesia care for obstetric patients. Refer to the "Literature Findings" sections in the original guideline document for potential benefits of specific interventions.

Potential Harms

- The decision whether to order or require a blood type and screen or crossmatch should be based on maternal history, anticipated hemorrhagic complications (e.g., placenta accreta in a patient with placenta previa and previous uterine surgery), and local institutional policies.
- Resources for the treatment of potential complications (e.g., failed intubation, inadequate analgesia/anesthesia, hypotension, respiratory depression, local anesthetic systemic toxicity, pruritus, and vomiting) should also be available in the labor and delivery operating suite.

Qualifying Statements

Qualifying Statements

Practice guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to the clinical needs and constraints and are not intended to replace local institutional policies. In addition, practice guidelines developed by the American Society of Anesthesiologists (ASA) are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by a synthesis and analysis of the current literature, expert and practitioner opinion, open-forum commentary, and clinical feasibility data.

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

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. Anesthesiology. 2016 Feb;124(2):270-300. [228 references] PubMed

Adaptation

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

Date Released

2016 Feb

Guideline Developer(s)

American Society of Anesthesiologists - Medical Specialty Society

Society for Obstetric Anesthesia and Perinatology - Medical Specialty Society

Source(s) of Funding

Support was provided solely from institutional and/or departmental sources.

Guideline Committee

American Society of Anesthesiologists Committee on Standards and Practice Parameters

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Financial Disclosures/Conflicts of Interest

The authors declare no competing interests.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Anesthesiology. 2007 Apr;106(4):843-63.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American Society of Anesthesiologists Web site .

Availability of Companion Documents

The following is available:

- Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. Bibliography. 2016. 29 p. Available from the Anesthesiology Journal Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on May 31, 1999. The information was verified by the guideline developer on July 14, 1999. This summary was updated by ECRI Institute on June 26, 2007. The updated information was verified by the guideline developer on July 5, 2007. This summary was updated by ECRI Institute on April 1, 2009 following the FDA advisory on Reglan (metoclopramide). This summary was updated again by ECRI Institute on May 10, 2016. This summary was updated by ECRI Institute on October 21, 2016 following the U.S. Food and Drug Administration advisory on opioid pain and cough medicines combined with benzodiazepines. This summary was updated by ECRI Institute on February 15, 2017 following the U.S. Food and Drug Administration advisory on general anesthetic and sedation drugs.

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