Complete Summary

GUIDELINE TITLE

American Academy of Orthopaedic Surgeons clinical guideline on prevention of symptomatic pulmonary embolism in patients undergoing total hip or knee arthroplasty.

BIBLIOGRAPHIC SOURCE(S)

American Academy of Orthopaedic Surgeons clinical guideline on prevention of symptomatic pulmonary embolism in patients undergoing total hip or knee arthroplasty. Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2007. 63 p. [49 references]

GUIDELINE STATUS

This is the current release of the guideline.

** 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.

- February 28, 2008, Heparin Sodium Injection: The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin production sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.
- August 16, 2007, Coumadin (Warfarin): Updates to the labeling for Coumadin to include pharmacogenomics information to explain that people's genetic makeup may influence how they respond to the drug.

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

Symptomatic pulmonary embolism

GUIDELINE CATEGORY

Prevention
Risk Assessment
Treatment

CLINICAL SPECIALTY

Anesthesiology
Orthopedic Surgery
Physical Medicine and Rehabilitation
Preventive Medicine

INTENDED USERS

Advanced Practice Nurses
Hospitals
Nurses
Physical Therapists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To improve patient care by outlining the appropriate information gathering and decision making processes involved in managing the prevention of symptomatic pulmonary embolism in patients undergoing total hip or knee arthroplasty
- To guide orthopaedic surgeons and other clinicians who provide perioperative care through a series of treatment decisions in an effort to improve the quality and efficiency of care

TARGET POPULATION

All patients undergoing total hip or knee replacement for arthropathies that are not related to acute traumatic injury

INTERVENTIONS AND PRACTICES CONSIDERED

Assessment

Preoperative assessment for risk of:

- Pulmonary embolism (PE)
- Major bleeding

Management/Treatment

1. Chemoprophylaxis
    - Aspirin
    - Low molecular weight heparin
    - Synthetic pentasaccharides
    - Warfarin
2. Vena cava filter placement
3. Intraoperative, immediate postoperative, and/or continued mechanical prophylaxis
4. Regional anesthesia
5. Postoperative mobilization
6. Patient education about common symptoms of deep vein thrombosis and pulmonary embolism

MAJOR OUTCOMES CONSIDERED

- Incidence of deep venous thrombosis
- Incidence of symptomatic pulmonary embolism (PE)
- Other PE-related clinical events
- Deaths (PE-related, bleeding-related, and all-cause)
- Adverse events, including incidence of major bleeding complications after chemoprophylaxis for PE and major infection
- Rehospitalization due to venous thromboembolism or bleeding

METHODOLOGY

METHODS USED TO COLLECT/SELECT 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

Literature Searches

The Work Group searched Medline from 1970 through August 2006 to identify all citations relevant for the guideline. Search terms included arthroplasty, replacement, knee prosthesis, hip prosthesis, and specific terms for anticoagulants, and mechanical intervention. The search strategies are provided

(see Appendix Table 1 of the original guideline document). Additional articles, including later publications, were suggested by the Work Group members. These articles were screened in accordance with the same criteria as those found by the Medline search.

Article Eligibility Criteria

During citation screening, only full journal articles that reported original data were included. Editorials, letters, abstracts, unpublished reports and articles published in non-peer reviewed journals were not included. Selected review articles and key meta-analyses were retained from the searches for background material. Members of the Evidence Review Team (ERT) screened the abstracts identified via the Medline search for relevance. Eligibility criteria were developed for each Key Question. For each key question, clear and explicit criteria were agreed on for the population, intervention, comparator, and outcomes of interest. Additional study eligibility criteria were applied based on study design, minimal sample size, minimal follow-up duration, and the calendar year in which the patient had the surgery. In general, eligibility criteria were determined based on clinical value, relevance to the guidelines and clinical practice (applicability), determination whether a set of studies would affect guidelines or the strength of evidence, and practical issues such as available time and resources. Full articles of relevant abstracts were retrieved and were rescreened using the pre-defined eligibility criteria (see Appendix Table 2 of the original guideline document). Work Group members reviewed the final list of potentially relevant citations and also suggested additional articles that were not identified by the electronic database searches. These additional articles were also screened using the same set of eligibility criteria.

NUMBER OF SOURCE DOCUMENTS

The literature search resulted in 2712 citations. Ten additional articles were suggested by the Work Group for evaluation. Among these, 42 studies met criteria. All 5 eligible studies recommended by the Work Group were published after the original literature search.

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

The quality of evidence was rated using an evidence hierarchy for each of four different study types: therapeutic, prognostic, diagnostic, and economic or decision modeling. These hierarchies are shown below. These hierarchies were predefined by the American Academy of Orthopaedic Surgeons (AAOS) and appear on the AAOS web site at http://www2.aaos.org/aaos/archives/bulletin/feb03/fline1.htm.

Level I evidence is from high quality randomized clinical trials (e.g., a randomized trial comparing revision rates in patients treated with cemented and uncemented total hip arthroplasty).

Level II evidence is from cohort studies (e.g., revision rates in patients treated with uncemented total hip arthroplasty compared with a control group of patients treated with cemented total hip arthroplasty at the same time and institution).

Level III evidence is from case-control studies (e.g., the rates of cemented and uncemented total hip arthroplasty in patients with a particular outcome called "cases"; i.e. revised total hip arthroplasty, are compared to those who did not have outcome, called "controls"; i.e. non-revised total hip arthroplasty).

Level IV evidence is from an uncontrolled case series (e.g., a case series of patients treated with uncemented total hip arthroplasty).

Level V evidence is from expert opinion.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Data Extraction

The Evidence Review Team (ERT) designed data extraction forms to capture information on various aspects of the primary studies. Data fields for each study included study setting, funding source, eligibility criteria, study design characteristics, patient demographics, co-morbidities, number of subjects, description of surgical and anesthetic techniques, description of relevant risk factors or interventions, description of outcomes, statistical methods, results, study quality, applicability (see below), and free text fields for comments and assessment of biases. Work Group members were apprised of the entire data extraction process. They also reviewed the data extraction form.

Data from each article were extracted by one member of the ERT. A second member verified each set of data extraction, and discrepancies were resolved through discussions. Work Group members reviewed the results of the data extraction.

Outcomes of interest included symptomatic, clinically documented pulmonary embolism (PE) including treatment for PE, clinically documented PE-related death, all-cause death, other PE-related clinical events, rehospitalization due to venous thromboembolism or bleeding, major infection (not including superficial infections), major bleeding (as defined by authors, but generally including life threatening, intraocular, intracerebral, a bleed requiring more than a specified number of transfusions, extending the length of hospital stay, or resulting in a return to the operating room), and bleeding-related death.

Summary Tables

Summary tables describe the studies according to four dimensions: study size and important characteristics, results, methodological quality, and applicability. The ERT generated summary tables using data from extraction forms and/or the articles. Work Group members reviewed the summary tables.

Grading of Individual Studies

Methodological Quality Assessment

Methodological quality (or internal validity) refers to the design, conduct, and reporting of the clinical study. Many methods have been devised to measure study quality. There remains controversy regarding how different aspects of study design and quality may impact study results. The ERT used a three-category grading system (A, B, C) to denote the methodological quality of each study. This system has been used for a range of systematic reviews and clinical practice guidelines. It defines a generic grading system that is applicable to different study designs. The quality rating was based primarily on the study design and the quality of reporting pertained specifically to PE, major bleeding, and death.

> **A Good quality**: Likely to have the least bias and results are considered valid. Clear protocol, clear description of the population, setting, and interventions; appropriate measurement of and reporting of rates of PE or death due to PE; appropriate statistical and analytic methods; no obvious reporting errors; less than 20% dropout; clear explanation of dropouts; and no obvious bias.
>
> **B Fair quality**: Susceptible to some bias, but not sufficient to invalidate the results. They do not meet all the criteria in good quality studies because they have some deficiencies, but none are likely to cause major biases. The studies may be missing information, making it difficult to assess limitations and potential problems.
>
> **C Poor quality**: Significant bias that may invalidate the results. These studies have serious errors in design, analysis, or reporting; have large amounts of missing information, or discrepancies in reporting. Studies that reported results for a specific outcome that were poorly defined were downgraded to poor for that specific outcome (e.g., if it was unclear whether all the PEs reported were confirmed).

Applicability Assessment

Applicability addresses the relevance of a given study to a population of interest. Every study applies certain eligibility criteria when selecting study subjects. Most of these criteria are explicitly stated (e.g., disease status, age, comorbidities). Some of them may be implicit or due to unintentional biases, such as those related to location (e.g., multicenter vs. single center; urban vs. rural setting), intervention (e.g., an outmoded dose), factors resulting in study withdrawals, or issues related to compliance with stated criteria, and others. The applicability of a study is dictated by the key questions, the populations, and the interventions that are of interest only to these specific guidelines (as opposed to those of interest to the original investigators).

The Work Group determined that short duration studies (follow-up duration of less than 6 weeks) were of limited applicability for estimating rates of PE and total death after arthroplasty. It was also the opinion of the Work Group that surgical techniques and post-operative management had changed significantly over time. Because of these changes, the care of patients enrolled prior to 1996 was sufficiently different than current practice. The consensus was reached to exclude these patients from the review.

To address these issues, we categorized studies within a target population into 3 categories of applicability that are defined as follows:

> **Wide**: Sample is representative of the target population. It should be sufficiently large to cover a range of patient ages, other demographic features, and reasons for arthroplasty. Minimal exclusions based on age, comorbidities, or underlying risk of bleeding or venous thromboembolism. In addition, the intervention should be applicable to currently used interventions, including dose and duration of intervention. Complete reporting of baseline characteristics. Follow-up duration for at least 6 weeks with respect to the PE-related outcomes and total death
>
> **Moderate**: Sample is representative of a relevant sub-group of the target population, but not the entire population. Limitations include such factors as exclusion of patients based on medical or surgical history, or narrow age range. Adequate reporting of baseline characteristics. Follow-up duration for at least 6 weeks with respect to the PE-related outcomes and total death.
>
> **Narrow**: Sample is representative of a narrow subgroup of subjects only, and is of limited applicability to other subgroups. Multiple deficiencies regarding applicability or poor reporting of eligibility criteria and/or baseline characteristics. Follow-up duration may have been less than 6 weeks. Studies with less than 6 weeks follow-up may have been graded Narrow for PE, PE-related death, and total death, but Moderate or Wide for bleeding-related outcomes.

Statistical Methods

The primary units of analyses were rates of clinical outcomes. For the few relevant randomized trials with two interventions of interest or an intervention and a no intervention control, the odds ratios for the clinical outcomes were also analyzed. Rates of clinical outcomes of interest were calculated for each study based on the number of reported events and the best estimate of the denominator (the number of evaluated patients). For each event rate, a 95% confidence interval of the rate was calculated using an exact confidence interval approach.

Several of the studies reported only event rates after hospitalization. These studies randomized patients at discharge and specifically evaluated post-hospitalization interventions. Since these studies excluded patients who had thromboembolic events—including PE—during hospitalization, they were not included in our calculations of rates of events after arthroplasty.

However, these studies were fully evaluated and reviewed by the Work Group members. Because the event rates for most outcomes of interest were very small (less than 1%) and none of the studies included sufficient numbers of patients to provide estimates of the outcomes of interest, the estimated event rates were not normally distributed in the studies. In this situation, there are not adequate (i.e., reliable) methods of meta-analyzing rates. However, to provide the best estimates of event rates for different interventions, four different statistical approaches were used to pool the data.

Medians. For each analysis in which there were at least 3 cohorts of patients, the median value across cohorts was documented. The size of the cohorts and the confidence intervals of the study rates were not considered.

Simple Pooling. For each analysis, the total number of events was divided by the total number of patients across studies. This is equivalent to a fixed effects meta-analysis weighted by sample size (or a simple average). The confidence interval for the pooled estimate was calculated using the exact confidence interval approach.

Random Effects Model Meta-Analysis of Logit of Event Rate. The logit [ln(rate/(1-rate))] for each study was calculated. When the event rate was zero, 0.5 was added to all 4 cells of the 2x2 table. The logit values were then meta-analyzed using standard DerSimonian and Laird random effects model meta-analysis. However, a large number of studies had zero event rates and because of the relatively small sample sizes, adding 0.5 to cells frequently caused anomalous results. Use of smaller "fudge factors" (Woolf's corrections) sometimes resulted in exceedingly large confidence intervals. Thus, when summary estimates of rates were outside the range of estimates among the constituent studies, these estimates were discarded.

Bayesian Meta-analysis of Proportions. The event rates in each study were modeled as binomial distributions. Prior probability information was elicited as relatively non-informative beta distributions. Details on the parameterization of the Bayesian models and the specifications of the priors per analysis are available upon request. As specified, the prior distributions are incompatible with a zero event prevalence; therefore we did not perform these analyses when all numerators were zero across studies.

Individual study estimates and all four sets of summary estimates were graphed to highlight the relative rates across interventions and across outcomes. Because of the low event rates of outcomes of interest and the small sample sizes of the randomized trials (frequently resulting in 0 events in both arms), and because only one or two randomized trials were comparable in interventions, controls, and surgeries, the odds ratio of events were not calculated.

For all analyses, studies that reported only outpatient events that failed to adequately describe events during hospitalization were excluded. The Work Group, however, did review these studies.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Nominal Group Technique)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Creation of Panel

The American Academy of Orthopaedic Surgeons (AAOS) Guidelines Oversight Committee and the Evidence Based Practice Committee Chairpersons appointed the Chair of the Work Group and members with clinical domain expertise in hip and knee replacement surgical procedures, who were then, assisted by the 8 physician/clinical research methodologists with expertise in guideline creation from the Evidence Review Team (ERT), contracted by the AAOS. The Work Group, with assistance from the ERT, refined and formulated the final four systematic review research questions using a well-established system.

The ERT developed specific screening criteria and literature search strategies, performed the literature search, screened abstracts and full-text articles, created forms and extracted relevant data from articles, tabulated and confirmed results, conducted statistical analyses, assisted with grading the strength of the evidence, and offered suggestions for guideline development.

Throughout the process, they led discussions on systematic review, literature searches, data extraction, assessment of quality and applicability of articles, evidence synthesis, grading the quality of evidence and the strength of guideline recommendations, and the consensus development process for guideline creation. The ERT were the principal reviewers of the literature, and instructed and coordinated Work Group members in all steps of systematic review, critical literature appraisal, and guideline development. The Work Group reviewed in detail the results and conclusions of the ERT, and took the primary roles of writing the guidelines and rationale statements and grading the levels of evidence and the strength of the recommendations.

Consensus Development

Voting on guideline recommendations and performance measures was conducted using a modification of the nominal group technique defined by AAOS, in which each work group member ranked a recommendation or performance measure on a scale ranging from 1 ("extremely appropriate") to 9 ("extremely inappropriate"). Consensus was obtained if 8 of the 9 Work Group members ranked the recommendation or measure as 7, 8, or 9. When 2 or more Work Group members did not rank a measure in this range, three rounds of discussion and voting were held to resolve disagreements. If disagreements were not resolved after these rounds, no recommendation or performance measure was adopted.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Recommendation Grades

A: Good evidence (Level I Studies with consistent finding) for recommending intervention.

B: Fair evidence (Level II or III Studies with consistent findings) for recommending intervention.

C: Poor quality evidence (Level IV or V) for recommending intervention.

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

March 24, 2007: Approved by the American Academy of Orthopaedic Surgeons (AAOS) Guideline Oversight Committee

March 24, 2007: Approved by the AAOS Evidence Based Practice Committee

May 7, 2007: Approved by the AAOS Council on Research, Quality Assessment and Technology

May 18, 2007: Approved by the AAOS Board of Directors

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the levels of evidence (I-V) and grades of recommendation (A-C) and are provided at the end of the "Major Recommendations" field.

The following recommendations are based on a systematic review of the literature and are evidence-based.

Recommendation 3.3: Chemoprophylaxis of patients undergoing hip or knee replacement

Recommendation 3.3.1:

Patients at standard risk of both pulmonary embolism (PE) and major bleeding should be considered for one of the chemoprophylactic agents evaluated in this guideline, including in alphabetical order: aspirin, low-molecular weight heparin (LMWH), synthetic pentasaccharides, and warfarin. (**Level III, Grade B** (choice of prophylactic agent), **Grade C** (dosage and timing)).

Note: The grade of recommendation was reduced from B to C for dosage and timing because of the lack of consistent evidence in the literature defining a clearly superior regime.

Recommendation 3.3.2

Patients at elevated (above standard) risk of PE and at standard risk of major bleeding should be considered for one of the chemoprophylactic agents evaluated in this guideline, including in alphabetical order: LMWH, synthetic pentasaccharides, and warfarin. (**Level III, Grade B** (choice of prophylactic agent), **Grade C** (dosage and timing)).

Note: The grade of recommendation was reduced from B to C for dosage and timing because of the lack of consistent evidence in the literature on risk stratification of patient populations.

Recommendation 3.3.3

Patients at standard risk of PE and at elevated (above standard) risk of major bleeding should be considered for one of the chemoprophylactic agents evaluated in this guideline, including in alphabetical order: aspirin, warfarin, or none. (**Level III, Grade C**)

Note: The grade of recommendation was reduced from B to C for dosage and timing because of the lack of consistent evidence in the literature on risk stratification of patient populations.

Recommendation 3.3.4

Patients at elevated (above standard) risk of both PE and major bleeding should be considered for one of the chemoprophylactic agents evaluated in this guideline, including in alphabetical order: aspirin, warfarin, or none. (**Level III, Grade C**)

Note: The grade of recommendation was reduced from B to C for dosage and timing because of the lack of consistent evidence in the literature on risk stratification of patient populations. No studies currently include patients at elevated risk of major bleeding and/or PE in study groups.

The following additional recommendations are based on the results of the objective American Academy of Orthopaedic Surgeons Consensus Process in which the work group members participated.

Recommendation 1.1

All patients should be assessed pre-operatively for elevated risk (greater than standard risk) of pulmonary embolism. (**Level III, Grade B**)

Recommendation 1.2

All patients should be assessed pre-operatively for elevated risk (greater than standard risk) of major bleeding. (**Level III, Grade C**)

Note: Grade of Recommendation reduced because of lack of consistent evidence on risk stratification of patient populations.

Recommendation 1.3

Patients with known contraindications to anticoagulation should be considered for vena cava filter replacement. (**Level V, Grade C**)

Recommendation 2.1

Patients should be considered for intra-operative and/or immediate postoperative mechanical prophylaxis. (**Level III, Grade B**)

Recommendation 2.2

In consultation with the anesthesiologist, patients should be considered for regional anesthesia. (**Level IV, Grade C**)

Recommendation 3.1

Postoperatively, patients should be considered for continued mechanical prophylaxis until discharge to home. (**Level IV, Grade C**)

Recommendation 3.2

Postoperatively, patients should be mobilized as soon as feasible to the full extent of medical safety and comfort. (**Level V, Grade C**)

Recommendation 3.4

Routine screening for deep venous thrombosis (DVT) or PE postoperatively in asymptomatic patients is not recommended. (**Level III, Grade B**)

Recommendation 4.1

Patients should be encouraged to progressively increase mobility after discharge to home. (**Level V, Grade C**)

Recommendation 4.2

Patients should be educated about the common symptoms of DVT and PE. (**Level V, Grade B**)

Note: The level of evidence is level V, expert opinion, but the strength of recommendation is B rather than C because patient education is consistent with the minimal expected standard of care for today's medical practices.

Of the fourteen recommendations listed above, only recommendations 3.3.1, 3.3.2, 3.3.3, and 3.3.4 are based on the systematic review of the literature conducted between August 2006 and March 2007 by The Center for Clinical Evidence Synthesis at Tufts New England Medical Center. The other recommendations contained in this guideline are based on consensus development methods only.

Definitions:

Levels of Evidence

Level I evidence is from high quality randomized clinical trials (e.g., a randomized trial comparing revision rates in patients treated with cemented and uncemented total hip arthroplasty).

Level II evidence is from cohort studies (e.g., revision rates in patients treated with uncemented total hip arthroplasty compared with a control group of patients treated with cemented total hip arthroplasty at the same time and institution).

Level III evidence is from case-control studies (e.g., the rates of cemented and uncemented total hip arthroplasty in patients with a particular outcome called "cases"; i.e. revised total hip arthroplasty, are compared to those who did not have outcome, called "controls"; i.e. non-revised total hip arthroplasty).

Level IV evidence is from an uncontrolled case series (e.g., a case series of patients treated with uncemented total hip arthroplasty).

Level V evidence is from expert opinion.

Recommendation Grades

A: Good evidence (Level I Studies with consistent finding) for recommending intervention.

B: Fair evidence (Level II or III Studies with consistent findings) for recommending intervention.

C: Poor quality evidence (Level IV or V) for recommending intervention.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is specifically stated for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate risk assessment and thromboprophylactic therapy in patients undergoing hip or knee replacement therapy to prevent serious thromboembolic

complications, bleeding-related risks, and medical adverse effects of total hip and knee replacement

POTENTIAL HARMS

Adverse events including major bleeding

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- This clinical guideline was developed by an American Academy of Orthopaedic Surgeons physician volunteer Work Group and is provided as an educational tool based on an assessment of the current scientific and clinical information and accepted approaches to treatment. It is not intended to be a fixed protocol as some patients may require more or less treatment. Patient care and treatment should always be based on a clinician's independent medical judgment given the individual clinical circumstances.
- This guideline should not be construed as including all proper methods of care or excluding methods of care reasonably directed to obtaining favorable results. The ultimate judgment regarding any specific procedure or treatment must be made in light of each patient's unique presentation and the needs and resources particular to the locality or institution.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Quick Reference Guides/Physician Guides

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

Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Academy of Orthopaedic Surgeons clinical guideline on prevention of symptomatic pulmonary embolism in patients undergoing total hip or knee arthroplasty. Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2007. 63 p. [49 references]

ADAPTATION

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

DATE RELEASED

2007 May 19

GUIDELINE DEVELOPER(S)

American Academy of Orthopaedic Surgeons - Medical Specialty Society

SOURCE(S) OF FUNDING

American Academy of Orthopaedic Surgeons

GUIDELINE COMMITTEE

American Academy of Orthopaedic Surgeons (AAOS) Pulmonary Embolism Work Group

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Dr. P. Lotke disclosed that he received an institutional research grant from DePuy/Johnson and Johnson from 1998-2003. No other members of the panel declared any conflict of interest.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Orthopaedic Surgeons Web site.

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Pulmonary embolism. Summary of recommendations. Prevention of pulmonary embolism evidence tables and extraction tables. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2007. Various p.

Electronic copies: Available in Portable Document Format (PDF) from the American Academy of Orthopaedic Surgeons Web site.

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on July 10, 2007. The information was verified by the guideline developer on July 26, 2007. This

summary was updated by ECRI Institute on September 7, 2007 following the revised U.S. Food and Drug Administration (FDA) advisory on Coumadin (warfarin). This summary was updated by ECRI Institute on March 14, 2008 following the updated FDA advisory on heparin sodium injection.

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