Table 104. Strength of applicability for the body of evidence evaluating pulmonary embolism in patients who had major orthopedic surgery

| Comparison | Strength of applicability | Conclusion with description of applicability |
| --- | --- | --- |
| Incidence of pulmonary embolism in total hip replacement | Low | The pooled incidence of pulmonary embolism in patients who had total hip replacement surgery was 6 percent. Overall applicability is limited because all trials were conducted outside of the United States and four of the five trials were published in the 1980’s.  |
| Incidence of pulmonary embolism in total knee replacement | Low | The pooled incidence of pulmonary embolism in patients who had total knee replacement surgery was 1 percent. Overall applicability is limited because both trials were conducted outside of the United States. |
| Incidence of pulmonary embolism in hip fracture surgery | Low | Based on one trial, the incidence of pulmonary embolism was 3 percent in patients who had hip fracture surgery. Overall applicability is limited because this trial was conducted in Canada and published in 1989. |
| General versus regional anesthesia | Low | There is insufficient data to determine the impact of general versus regional anesthesia on the risk of pulmonary embolism. Data is not applicable to knee replacement or hip fracture surgery. Data is highly applicable to hip replacement surgery although both trials were conducted outside of the United States with anesthetics currently unavailable in the United States. |
| Cemented versus noncemented arthroplasty | Low | There was insufficient data to determine the impact of cemented versus noncemented arthroplasty on the risk of pulmonary embolism. Data is highly applicable to primary hip replacement surgery although overall applicability is limited as this trial was conducted in Canada and had a short duration of followup. Data is not applicable to knee replacement or hip fracture surgery. |
| Impact of age | Moderate | Age increases the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration n=of followup. |
| Impact of genitourinary infection | Moderate | Genitourinary infection increases the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of cardiovascular disease | Moderate | Cardiovascular disease decreases the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of phlebitis | Moderate | Phlebitis has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of thyroid hormone replacement therapy | Moderate | Thyroid hormone replacement therapy has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of a history of pulmonary embolism | Moderate | History of pulmonary embolism has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of varicosity | Moderate | Varicosity has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of phlebitis in the other extremity | Moderate | Phlebitis in the other extremity has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Impact of peripheral vascular disease | Moderate | Peripheral vascular disease has no impact on the odds of pulmonary embolism. Data is applicable to hip or knee replacement surgery although is not applicable to hip fracture surgery. Overall applicability is limited due to shorter duration of followup. |
| Pharmacologic prophylaxis versus no prophylaxis | Low | Compared to no prophylaxis, patients who had major orthopedic surgery and received pharmacologic prophylaxis did not have a difference in the odds of pulmonary embolism. Data is highly applicable to total hip replacement. Applicability to total knee replacement and primary versus revisions surgery is limited. Data is not applicable to hip fracture surgery. Applicability is limited due to the short duration of follow up and because the majority of trials were conducted outside of the United States. |
| Mechanical prophylaxis versus no prophylaxis  | NA | No data |
| Oral antiplatelet agents versus oral vitamin K antagonists | Low | Compared with oral vitamin K antagonists, patients who had major orthopedic surgery and received oral antiplatelet agents did not have a difference in the odds of pulmonary embolism. Data is highly applicable to hip fracture surgery. Applicability Is limited because the type of surgery; primary or revision was not reported. Data is not applicable to primary or revision total hip or knee replacement surgery. |
| Oral antiplatelet agents versus mechanical prophylaxis | Low | Compared with mechanical prophylaxis, patients who had major orthopedic surgery and received oral antiplatelet agents did not have a difference in the odds of pulmonary embolism. Data is highly applicable to primary hip fracture surgery. Data is not applicable to primary or revision total hip or knee replacement surgery. |
| Injectable low molecular weight heparin agents versus injectable unfractionated heparin | Low | Compared with injectable unfractionated heparin, patients who had major orthopedic surgery and received injectable low molecular weight heparin had a decreased in the odd of pulmonary embolism. Data is moderately applicable to total hip replacement surgery. Data has limited applicability to total knee and hip fracture surgery. Applicability Is limited because the type of surgery; primary or revision was not reported, there was a short duration of follow up and the majority of trials were conducted outside of the United States. |
| Injectable low molecular weight heparin agents versus injectable or oral factor Xa inhibitors | Low | Compared with injectable or oral factor Xa inhibitors, patients who had major orthopedic surgery and received injectable low molecular weight heparin agents did not have a difference in the odds of pulmonary embolism. Data is highly applicable to revision surgery for total knee replacement and total hip replacement surgery. Although the one trial evaluating hip replacement was conducted in Japan. Data is not applicable to hip fracture surgery. |
| Injectable low molecular weight heparin agents versus injectable or oral direct thrombin inhibitors | Low | Compared with injectable or oral direct thrombin inhibitors, patients who had major orthopedic surgery and injectable low molecular weight heparin agents did not have a difference in the risk of pulmonary embolism. Data is moderately applicable to primary total hip replacement surgery. Data has low applicability to primary total knee replacement surgery. Applicability is limited because all of the trials were conducted outside of the United States. Data is not applicable to primary or revision surgery for hip fracture. |
| Injectable low molecular weight heparin agents versus oral vitamin K antagonists | Moderate | Compared with oral vitamin K antagonists, patients who had major orthopedic surgery and received injectable low molecular weight heparin agents did not have a difference in the odds of pulmonary embolism. Applicability is limited due to the short duration of follow up. Data has high applicability to total hip replacement surgery and moderate applicability to total knee replacement surgery. Data is not applicable to hip fracture surgery. |
| Injectable low molecular weight heparin agents versus mechanical prophylaxis | Low | Compared with mechanical prophylaxis, patients who had major orthopedic surgery and received injectable low molecular weight heparin agents did not have a difference in the odds of pulmonary embolism. Data is highly applicable primary total hip replacement surgery. Data is not applicable to primary or revision total knee or hip fracture surgery and has limited applicability because the one available trial was conducted in the United Kingdom. |
| Injectable unfractionated heparin versus injectable or oral direct thrombin inhibitors | Low | Compared with injectable or oral direct thrombin inhibitors, patients who had major orthopedic surgery and received injectable unfractionated heparin did not have a difference in the odds of pulmonary embolism. Data is highly applicable to primary total hip replacement surgery. Data is not applicable to primary or revision total knee or hip fracture surgery and has limited applicability because the trials were conducted outside of the United States. |
| Injectable unfractionated heparin versus injectable or oral factor Xa inhibitors | NA | No data |
| Injectable unfractionated heparin versus mechanical prophylaxis | NA | No data |
| Oral vitamin K antagonists versus mechanical prophylaxis | NA | No data |
| Enoxaparin versus other low molecular weight heparin agents  | NA | No data |
| Intermittent pneumatic compression by Kendall versus Venaflow intermittent pneumatic compression devices | Low | Compared to intermittent pneumatic compression device by Kendall, patients who had major orthopedic surgery and received prophylaxis with the Venaflow intermittent pneumatic compression device did not have a difference in the odds of pulmonary embolism. Data is highly applicable to primary or revision total knee replacement surgery. Data is not applicable to primary or revision total hip replacement or hip fracture surgery. |
| ActiveCare intermittent pneumatic compression device versus Flowtron intermittent pneumatic compression device | NA | No data |
| Intermittent pneumatic compression versus graduated compression  | NA | No data |
| Pharmacologic plus mechanical prophylaxis versus pharmacologic prophylaxis | Moderate | Compared with pharmacologic prophylaxis alone, patient who had major orthopedic surgery and received pharmacologic plus mechanical prophylaxis had no difference in the odds of pulmonary embolism. Data is highly applicable to total hip replacement surgery, moderately applicable to total knee replacement surgery and not applicable to hip fracture surgery or revision surgery.  |
| Pharmacologic plus mechanical prophylaxis versus mechanical prophylaxis | Low | Compared with mechanical prophylaxis alone, patient who had major orthopedic surgery and received pharmacologic plus mechanical prophylaxis had no difference in the risk of pulmonary embolism. Applicability is limited due to the short duration of followup. Data is highly applicable to primary or revision total hip replacement surgery and not applicable to total knee replacement or hip fracture surgery.  |
| Effect of prolonging prophylaxis for 28 days compared to prophylaxis for 7 to 10 days | Low | Compared to 7 to 10 days of prophylaxis, patients who had major orthopedic surgery and received 28 days or more of prophylaxis had a decrease in the odds of pulmonary embolism. Applicability is limited due to the short duration of follow up and because the trials were conducted outside of the United States. Data is moderately applicable to the used of injectable low molecular weight heparin agents and has a low level of applicability to the use of injectable factor Xa inhibitors and oral vitamin K antagonists. Data is highly applicable to primary or revision total hip replacement surgery. Data has a low level of applicability to hip fracture surgery and is not applicable to knee replacement surgery.  |
| Inferior vena cava filter versus mechanical prophylaxis | NA | No data |

Abbreviations: NA=not applicable