

SAGES VTE prophylaxis for laparoscopic surgery guidelines: an update

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the SAGES Guidelines Committee

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Since the publication of the SAGES guidelines for venous thromboembolism (VTE) prophylaxis during laparoscopic surgery in 2007 [1], the American College of Chest Physicians (ACCP) has published their comprehensive guidelines that address VTE prophylaxis for non-orthopedic surgery patients [2]. After careful review, the SAGES guidelines committee has approved the endorsement of the ACCP guidelines rather than updating our previous VTE guidelines.

The ACCP guidelines utilize the VTE risk stratification systems by Rogers et al. [3] and Caprini [4] and outline prophylaxis strategies based on the calculated risk of VTE. For very low-risk patients, ambulation without chemoprophylaxis or mechanical prophylaxis is recommended. For low-risk patients, mechanical prophylaxis with intermittent pneumatic compression (IPC) is advised. For patients at moderate risk for VTE, the guidelines suggest low molecular weight heparin (LMWH), unfractionated heparin (UH), or mechanical prevention with IPC. For high-risk patients, the ACCP guidelines recommend LMWH or UH plus elastic stockings or IPC.

The 2012 ACCP guidelines are easy to use, are more comprehensive, and are based on stronger evidence than the 2007 SAGES VTE prevention guidelines. However, they are not specifically directed at laparoscopic surgery patients. There are differences in VTE risk between open procedures compared with those performed laparoscopically. In a study comparing the incidence of VTE following laparoscopic versus open surgery in 138,595 patients, there was a statistically significant reduction in risk of VTE after laparoscopic surgery compared to open surgery [5]. The specific type of procedure is not considered in the calculation of VTE risk.

A meta-analysis on laparoscopic cholecystectomy indicated that routine use of VTE chemoprophylaxis was likely to be unnecessary and suggested considering its use only in higher-risk patients based on risk stratification [6]. The overall incidence of clinically evident deep venous thrombosis (DVT) was 1.6% without prophylaxis. Two randomized studies included in that analysis reported on the risk of major bleeding; one reported no major bleeding, while the other study reported major bleeding in 2% in the heparin group versus 3% in the group without chemoprophylaxis. Using the ACCP guidelines, many patients from this study may have been at low to moderate risk using either of the scoring systems and would be given no prophylaxis for a Caprini score of 0, IPC for a score of 1–2, or UH, LMWH, or IPC for a score of 3–4 (moderate risk). Based on the meta-analysis, there was no significant benefit of chemoprophylaxis in cholecystectomy patients.

Among patients undergoing colon surgery with or without cancer, there is a reduction in VTE using a combination of IPC and chemoprophylaxis. Data from the Michigan Collaborative of 3464 patients on dual therapy showed a 1.7% risk of VTE with laparoscopic left versus 0.5% for right colectomy [7]. In this study, older patients,

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those with higher body mass index (BMI), and patients with angina and postoperative infection had an increased risk of VTE. With either IPC or chemoprophylaxis alone (single therapy), the risk of VTE was almost twice the risk of using both therapies. They found no difference in VTE risk with UH versus LMWH. An increased risk of bleeding was not observed. In general, these patients fell in the moderate- to high-risk Caprini group, and dual therapy would have been appropriate. The optimal duration of thromboprophylaxis was studied in a randomized trial of 225 patients undergoing laparoscopic colectomy for cancer. The incidence of VTE with 1 week of heparin prophylaxis was 9.7 versus 0% of patients who received 4 weeks. The authors concluded that prolonged use of chemoprophylaxis is safe and reduces the risk of VTE compared to using 1 week of heparin [8]. These recommendations are aligned with the ACCP guidelines, but the small number of patients in this single study limits our ability to support extended chemoprophylaxis strongly.

VTE is a challenging problem after bariatric surgery, but there are few randomized controlled trials studying thromboprophylaxis in this population. Most bariatric surgery patients carry multiple risk factors for VTE and therefore are at least at moderate risk of VTE postoperatively. Despite the elevated VTE risk, the incidence of postoperative VTE is low. A meta-analysis of 19 studies with 3991 patients demonstrated a weighted mean incidence of PE of 0.5% with fixed-dose chemoprophylaxis and an incidence of symptomatic VTE of 0.6% with weight-based chemoprophylaxis [9]. The risk of VTE is lower for laparoscopic compared with open bariatric surgery patients (0.34 vs. 1.54%) [10]. Based on the ACCP guidelines, LMWH, unfractionated heparin, or mechanical prophylaxis with IPC are recommended [2]. There is no consensus on the standard of care for chemoprophylactic agent, dosing, timing, or duration. Dosing of pharmacologic prophylaxis is challenging in postsurgical bariatric surgery patients because dosing by body weight may lead to excessive anticoagulation and bleeding. Some studies utilize anti-factor Xa levels to determine adequacy of anticoagulation, but therapeutic levels do not necessarily predict a reduction in VTE. The ACCP guidelines recommend consulting with a pharmacist to determine dosing in obese patients [2].

Prophylactic removable inferior vena cava (IVC) filter use had previously been recommended in high-risk bariatric patients such as those with BMI > 60, severe pulmonary hypertension, or previous VTE [11]. More recent data argue against the use of prophylactic IVC filter placement. In 322 of 97,218 patients who received IVC filters and had either gastric bypass or gastric band, there was an increased risk of DVT, length of hospital stay, and mortality compared to the non-IVC group [12]. In this study, there was no benefit for

prophylactic insertion of IVC filters. A meta-analysis of prophylactic IVC filters in bariatric surgery demonstrated an increase in the risk of DVT by threefold, while the increase in mortality was not statistically significant [13]. Long-term complications associated with IVC filters are concerning [14], and most filters are never retrieved [15]. There is insufficient data from randomized studies to support the use of prophylactic IVC filters.

All general surgical patients should be assessed for risk of VTE because of the potential for fatal consequences. Our endorsement of the ACCP guidelines comes with several caveats. First, there are very few prospective randomized trials available in the literature addressing VTE prophylaxis in minimally invasive surgery. The specific type of laparoscopic procedure is not represented in the two VTE risk stratification systems used in the ACCP guidelines. Bleeding resulting from anticoagulation should be considered when administering and dosing chemoprophylaxis in the postoperative patient. The optimal agent, dosing, duration, and timing of pharmacologic prophylaxis have not yet been determined. An individual patient's specific risk factors for VTE, other medical comorbidities, and the type of procedure must be taken into consideration in cases in which the guidelines do not provide specific recommendations.

Compliance with ethical standards

Disclosures Drs. William Richardson and Giselle Hamad have no conflicts of interest of financial ties to disclose. Dr. Stefanidis reports personal fees from WL Gore and Davol.

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