THE AMERICAN SOCIETY OF Breast Surgeons - Resource Guide -

Resource Guide on Venous Thromboembolism (VTE) Prophylaxis for Patients Undergoing Breast Operations

Purpose

To outline the approach to venous thromboembolism prophylaxis for patients undergoing breast operations. This replaces the prior document "Consensus Guideline on Venous Thromboembolism (VTE) Prophylaxis for Patients Undergoing Breast Operations" published on November 30, 2016.

Methods

A systematic review of the literature was performed to evaluate incidence, risks, and effectiveness of prevention of VTE in patients undergoing breast operations. The search was performed using Medline (OVID) and PubMed databases (January 1994-April 2023). There were no Cochrane reviews specific to breast surgery and VTE. Eighty-three relevant articles containing information on VTE incidence, risk factors, prevention effectiveness, or risk of pharmacologic thromboprophylaxis were screened. The majority of information was from retrospective data review. Several publications used the National Surgical Quality Improvement Program (NSQIP) database, and it was not possible to determine if there was duplication of patients and outcomes in separate metachronous reports. In addition, the NSQIP database does not include information on which patients received pharmacologic thromboprophylaxis.

ASBrS Recommendations for Venous Thromboembolism Prophylaxis

1. There is insufficient evidence to determine whether the published VTE prophylaxis guidelines for patients undergoing major orthopedic or general surgical operations for cancer should be uniformly applied to breast surgery patients.

2. Decisions regarding VTE prophylaxis in breast surgery patients should be individualized, taking into consideration procedure type, procedure duration, anesthesia type, patient history of prior VTE or hypercoagulability condition, receipt of neoadjuvant systemic therapy and the risk of bleeding complications.

3. Ambulatory patients undergoing breast operations with local or regional anesthesia generally do not require any specific prophylaxis for VTE.

4. Most patients undergoing breast operations with general anesthesia and no reconstruction will have a low risk of VTE with early ambulation and sequential compression devices for prophylaxis.

5. Pharmacologic thromboprophylaxis may be considered for patients receiving general

anesthesia (GA) for breast operations in the following settings:

a. Expectation of duration of GA >3 hours.

b. Patients at "higher" risk for VTE (multiple risk factors as noted above), who are not at high risk for bleeding complications. See the American College of Chest Physicians Executive Summary Guideline references below.

6. Pharmacologic thromboprophylaxis is recommended for all patients undergoing mastectomy with immediate autologous reconstruction unless there is a specific medical contraindication.

7. The drug of choice, timing, and dose of pharmacologic thromboprophylaxis are out of scope for this consensus statement.

Summary of Data Reviewed

The Incidence of VTE (Deep Venous Thrombosis [DVT] and Pulmonary Embolism) After Breast Surgery

The risk of VTE associated with breast surgery is lower than major operations of the abdomen and pelvis, especially compared to those performed for cancer. The risk of VTE in ambulatory outpatients undergoing breast surgery is very low. The risk of VTE is lower in patients undergoing partial mastectomy (lumpectomy) compared to mastectomy.

The aggregate DVT risk for all patient and procedure types was less than 0.4% in more than 100,000 patients undergoing breast surgery published in multiple studies using data from the Nationwide Inpatient Sample and NSQIP. In another retrospective study, using inpatient databases from 4 States including more than 50,000 patients who underwent breast cancer surgery, the incidence of VTE was 0.8%.[1]

In a single institution retrospective review from MD Anderson, the VTE risk was 0.16% in 3,898 patients undergoing breast surgery with sequential compression devices and early ambulation without pharmacologic thromboprophylaxis. Similar findings were demonstrated in a retrospective analysis of a prospectively maintained database including 1,000 consecutive breast cancer patients who underwent breast conserving surgery with mechanical VTE prophylaxis but not pharmacologic thromboprophylaxis, which showed a 30-day rate of significant VTE of 0%.[2] A NSQIP study demonstrated that for patients undergoing mastectomy with reconstruction, the reported VTE risk is higher ranging between 0.2-0.5% depending on the type of reconstruction, with the highest risk observed among women undergoing pedicled or free-flap surgery. The reported pulmonary embolism risk is also variable ranging between 0.2-0.9%.[3] However, it must be noted that no data is available in this study about the use of VTE prophylaxis in this cohort.

In a recent study using data from Swedish registries, data from more than 160,000 patients who underwent breast cancer surgery was analyzed. The results showed that the 30-day

absolute risk of DVT was 0.16% and for PE 0.10%. These findings have to be interpreted with caution as no information on the type of breast cancer surgery and the use of VTE prophylaxis was provided. However, the observed VTE risk is low, in line with previously reported results.[4]

VTE Risk Factors

VTE risk depends on the operation performed and the patient characteristics. The risk is highest in patients undergoing mastectomy with immediate reconstruction, especially autologous reconstruction. Other reported risk factors for VTE in patients undergoing breast surgery include age >65, obesity, operative time with general anesthesia >3 hours, increased length of hospital stay, recent surgery within 30 days before the breast operation, and a cancer diagnosis.[5] Treatment with neoadjuvant systemic therapy may also be associated with increased risk of VTE as demonstrated in a meta-analysis showing a pooled VTE risk of 7%.[6] However, this finding should be interpreted with caution in the context of breast cancer, as the majority of the studies in the meta-analysis included patients with gastrointestinal cancers.

A potentially useful aid to assess VTE risk factors is the Caprini risk assessment mode. This is a tool which can be used to evaluate a surgical patient's VTE risk and guide decision-making (https://www.mdcalc.com/calc/3970/caprini-score-venous-thromboembolism-2005). However, the Caprini score may overestimate patient risk as breast cancer is associated with lower incidence of VTE than other malignancies.[7]

Risks of VTE Pharmacologic Thromboprophylaxis

Most studies do not indicate an increased risk of hematoma formation, reoperation, or transfusion with pharmacologic thromboprophylaxis compared to no pharmacologic thromboprophylaxis.

The risk of unplanned re-operations for hematoma or any bleeding complication after initial breast surgery ranges from 2-6% and depends on procedure type. The evidence is insufficient to determine if there is a significant increase in risk in patients receiving pharmacologic thromboprophylaxis.

Effectiveness of Pharmacologic Thromboprophylaxis in Patients Undergoing Breast Operations

Some, but not all, studies identify decreases in VTE in breast patients who receive pharmacologic thromboprophylaxis compared to not.[8] Randomized controlled trials with adequate adjustment for patient risk and operation type are lacking.[9,10]

A number of guidelines on VTE prophylaxis have been published by other professional bodies and societies. However, these do not specifically provide recommendations on breast cancer surgery. The American Society of Clinical Oncology (ASCO)[11] guidelines recommend use of VTE pharmacologic thromboprophylaxis in patients undergoing major cancer surgery,

but a definition of what constitutes major surgery was not provided. The European Society of Medical Oncology (ESMO)[12] guidelines also recommend use of VTE pharmacologic thromboprophylaxis in cancer patients undergoing major surgery, defined as surgical procedures >45 minutes duration. The American Society of Hematology guidelines[13] also recommend use of pharmacological prophylaxis for VTE in cancer patients without previous history of VTE undergoing surgery with low bleeding risk. However, a cautious approach is required when interpreting these recommendations. Most available data come from abdominal and pelvic surgery and may not be directly translatable in breast cancer surgery. The guidelines do not provide breast cancer surgery specific recommendations and their adoption would effectively lead to use of pharmacologic thromboprophylaxis for the majority of patients undergoing breast cancer surgery, with no robust data to demonstrate significant benefit in this specific patient population.

Effectiveness of Mechanical Prophylaxis in Patients Undergoing Breast Operations

Use of mechanical prophylaxis against VTE (ie, use of sequential compression devices) is routinely recommended in patients undergoing surgery.[14] This is based on the low risk to benefit ratio from the use of these devices. The American Society of Hematology guidelines recommend use of pharmacological rather than mechanical prophylaxis for cancer patients without VTE that have a lower risk of bleeding. For those at higher risk of bleeding, mechanical over pharmacologic thromboprophylaxis should be considered. However, these recommendations should be interpreted and applied cautiously in the setting of breast surgery. In a study assessing the use of mechanical prophylaxis alone in breast cancer patients undergoing breast conserving surgery, this approach was found to be associated with a low (0%) 30-day VTE rate.[15] In this context, use of mechanical prophylaxis could be considered, either alone or in combination with pharmacologic thromboprophylaxis based on individual risk factors.

The resource guide was reviewed by the Research Committee and approved by the Board of Directors on February 28, 2024.

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