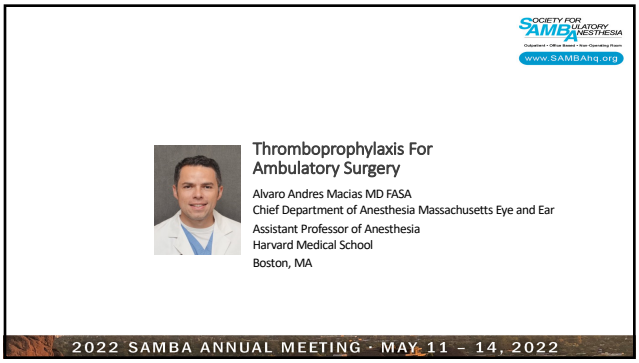
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Thromboprophylaxis For Ambulatory Surgery
Alvaro Andres Macias MD FASA
Chief Department of Anesthesia Massachusetts Eye and Ear
Assistant Professor of Anesthesia
Harvard Medical School
Boston, MA
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No Disclosures
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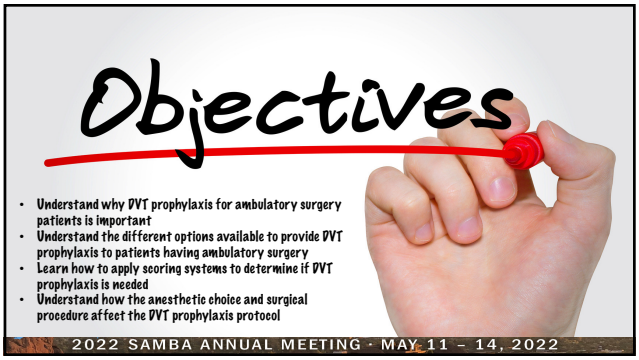
Objectives
Understand why DVT prophylaxis for ambulatory surgery patients is important
Understand the different options available to provide DVT prophylaxis to patients having ambulatory surgery
Learn how to apply scoring systems to determine if DVT prophylaxis is needed
Understand how the anesthetic choice and surgical procedure affect the DVT prophylaxis protocol
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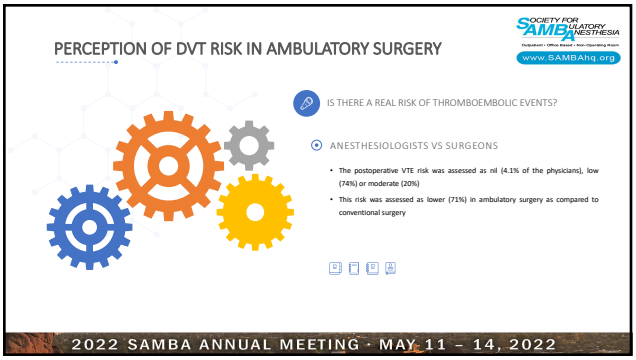
PERCEPTION OF DVT RISK IN AMBULATORY SURGERY
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IS THERE A REAL RISK OF THROMBOEMBOLIC EVENTS?
ANESTHESIOLOGISTS VS SURGEONS
The postoperative VTE risk was assessed as nil (4.1% of the physicians), low (74%) or moderate (20%)
This risk was assessed as lower (71%) in ambulatory surgery as compared to conventional surgery
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PERCEPTION OF DVT RISK IN AMBULATORY SURGERY
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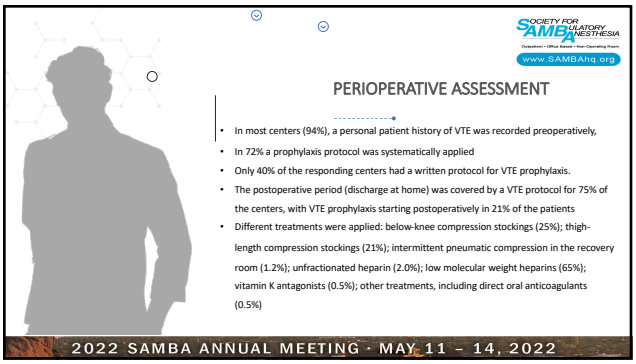
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PERIOPERATIVE ASSESSMENT
In most centers (94%), a personal patient history of VTE was recorded preoperatively,
In 72% a prophylaxis protocol was systematically applied
Only 40% of the responding centers had a written protocol for VTE prophylaxis.
The postoperative period (discharge at home) was covered by a VTE protocol for 75% of the centers, with VTE prophylaxis starting postoperatively in 21% of the patients
Different treatments were applied: below-knee compression stockings (25%); thigh-length compression stockings (21%); intermittent pneumatic compression in the recovery room (1.2%); unfractionated heparin (2.0%); low molecular weight heparins (65%); vitamin K antagonists (0.5%); other treatments, including direct oral anticoagulants (0.5%)
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CHANGE IN TYPES OF AMBULATORY PROCEDURES

SMALL SURGERIES → BETTER SURGICAL TECHNIQUES → BETTER SAFETY AND ANESTHESIA → MJR

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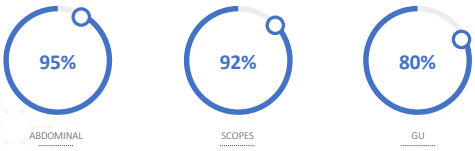
TOP PROCEDURES DONE IN AMBULATORY SURGI-CENTERS



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Outpatient Surgery and Sequelae

An Analysis of the AAAASF Internet-based Quality Assurance and Peer Review Database

Ali M. Soltani, MD[a], Geoffrey R. Keyes, MD[a,c,*], Robert Singer, MD[a,d], Lawrence Reed, MD[b], Peter B. Fodor, MD[a]

Clin Plastic Surg 40 (2013) 465–473

Summary:

- 5.5 million plastic surgery cases
- 22,000 sequelae (0.4% incidence)
- 94 deaths 2001-12 (0.0017%)
- Risk in plastic surgery=1/41,726
- PE most common 40 deaths
- Abdominoplasty incidence 0.925%
- Abdominoplasty 5.5 risk of VTE vs other

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Venous Thromboembolism in the Cosmetic Patient: Analysis of 129,007 Patients

Aesthetic Surgery Journal
2017, Vol 37(3) 337–349

DOI: 10.1093/asj/sjw173
www.aestheticsurgeryjournal.com
OXFORD UNIVERSITY PRESS

Julian Winocour, MD; Varun Gupta, MD, MPH; Christodoulos Kaoutzanis, MD; Hanyuan Shi, BA; R. Bruce Shack, MD; James C. Grotting, MD; and K. Kye Higdon, MD

- CosmetAssure data 2008-13 (prospective)
- 116 (0.09%) VTE
- **Significant risk factors: BMI, region of body, combined procedures**
- Not: Gender, diabetes, smoking, type of facility

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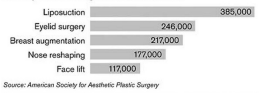
Popularity and perils of liposuction

Liposuction, which removes fat, has become the most common plastic surgery procedure in the United States. But there are risks.

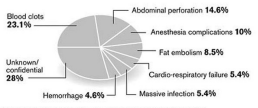
Most common plastic surgery procedures

Listed by number of surgeries in the U.S. in 2001:



Source: American Society for Aesthetic Plastic Surgery

Most frequent fatal complications in liposuction



Note: Percentages do not add up to 100% because of rounding.

Source: Plastic and Reconstructive Surgery, January 2000

Chronicle Combie

Complication and Mortality Rates of Cosmetic Surgery

Cosmetic Procedure	Minor Complications		Major Complications	
	Hematoma, %	Infection, %	VTE, %	Mortality
Abdominoplasty[2]	2	2–7	0.4	1:13,000
Buttock augmentation (fat grafting)[3]	NR	NR	NR	1:20,000
Liposuction[4]	0.15	0.10	<0.1	1:3:50,000
Face[5]	1.5	0.3	<0.1	NR
Breast[6,7]	1.5	1.1	<0.1	NR

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ESPECIAL CATEGORY

PLASTIC SURGERY

"The overall rate of 30-day symptomatic VTE among aesthetic surgery patients is 0.09%, based on data from 129,007 CosmetAssure patients. Although rare, VTE remains important: a recent review of American Association for Accreditation of Ambulatory Surgery Facilities data showed that pulmonary embolus (PE) accounted for the majority of unexpected deaths after ambulatory surgical procedures and that patients who died of PE had high rates of inaccurate VTE risk stratification."

Pannucci, C. J. (2019). Venous thromboembolism in aesthetic surgery: risk optimization in the preoperative, intraoperative, and postoperative settings. *Aesthetic Surgery Journal*, 39(2), 209-219.

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GUIDELINES

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PROCEDURE SELECTION

"Published VTE rates for breast augmentation and facial rhytidectomy are as low as 0.02% and circumferential abdominoplasty as high as 3.4%. Abdominoplasty alone carries a VTE risk of 0.34%, but this nearly doubles (to 0.67%) with concomitant procedures and increases over 6-fold (to 2.1%) when combined with an intraabdominal procedure."

Pannucci, C. J. (2019). Venous thromboembolism in aesthetic surgery: risk optimization in the preoperative, intraoperative, and postoperative settings. *Aesthetic Surgery Journal*, 39(2), 209-219.

RIGHT PATIENT | RIGHT LOCATION

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GUIDELINES

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PATIENT SELECTION

"VTE risk quantification using procedure type alone ignores the important contributions of patient-centric factors such as body mass index, personal or family history of VTE, and genetic hypercoagulability. Patient and procedure-centric factors, including increased age, body procedures, and combined procedures, are known to be independent predictors of 30-day VTE risk."

Pannucci, C. J. (2019). Venous thromboembolism in aesthetic surgery: risk optimization in the preoperative, intraoperative, and postoperative settings. *Aesthetic Surgery Journal*, 39(2), 209-219.

ELECTIVE SURGERY! | OPTIMIZATION

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RISK STRATIFICATION

For patients undergoing plastic/reconstructive surgery a validation study reported a lower risk of VTE for a given Caprini score in this population (0.6 percent among those with a score of 3 to 4, 1.3 percent with a score of 5 to 6, 2.7 percent with a score 7 to 8, and 11.3 percent with a score of >8)

Modified Caprini risk assessment model for VTE in general surgical patients

Risk score			
1 point	**2 points**	**3 points**	**5 points**
Age 41 to 60 years	Age 61 to 74 years	Age ≥75 years	Stroke (<1 month)
Minor surgery	Arthroscopic surgery	History of VTE	Elective arthroplasty
BMI >25 kg/m²	Major open surgery (>45 minutes)	Family history of VTE	Hip, pelvis, or leg fracture
Swollen legs	Laparoscopic surgery (>45 minutes)	Factor V Leiden	Acute spinal cord injury (<1 month)
Varicose veins	Malignancy	Prothrombin 20210A	
Pregnancy or postpartum	Confined to bed (>72 hours)	Lupus anticoagulant	
History of unexplained or recurrent spontaneous abortion	Immobilizing plaster cast	Anticardiolipin antibodies	
Oral contraceptives or hormone replacement	Central venous access	Elevated serum homocysteine	
Sepsis (<1 month)		Heparin-induced thrombocytopenia	
Serious lung disease, including pneumonia (<1 month)		Other congenital or acquired thrombophilia	
Abnormal pulmonary function			
Acute myocardial infarction			
Congestive heart failure (<1 month)			
History of inflammatory bowel disease			
Medical patient at bed rest			

Interpretation		
Surgical risk category*	**Score**	**Estimated VTE risk in the absence of pharmacologic or mechanical prophylaxis (percent)**
Very low (see text for definition)	0	<0.5
Low	1 to 2	1.5
Moderate	3 to 4	3.0
High	≥5	6.0

VTE: venous thromboembolism; BMI: body mass index.
* This table is applicable only to general, abdominal pelvic, bariatric, vascular, and plastic and reconstructive surgery. See text for other types of surgery (eg, cancer surgery).

From: Gould MK, Garcia DA, Wren SM, et al. Prevention of VTE in nonorthopedic surgical patients: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest 2012; 141:e227S. Copyright © 2012, Reproduced with permission from the American College of Chest Physicians.

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MULTIPLE PROCEDURES

- Abdominoplasty plus intraabdominal procedure has a 6-fold increased VTE risk when compared to abdominoplasty alone (0.34% vs 2.17%).
- Abdominoplasty plus a second procedure has a 2-fold increased risk (0.34% vs 0.67%).
- A TOPS and CosmetAssure analysis (2009) shows that the risk of VTE increases 5-fold (from 0.02% to 0.1%) among those having breast augmentation vs breast augmentation plus 1 or more procedures and nearly 3-fold (from 0.1% to 0.27%) for those having an abdominoplasty vs abdominoplasty plus 1 or more procedures.
- A more recent review of CosmetAssure (2017) confirmed that breast procedures plus a second procedure carried significantly increased VTE risk, when compared to a breast procedure alone.

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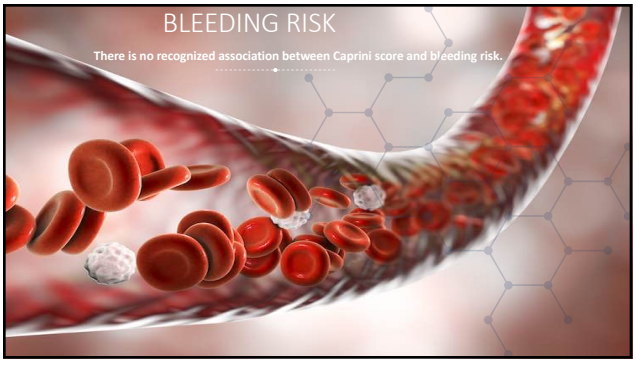
BLEEDING RISK

There is no recognized association between Caprini score and bleeding risk.



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BLEEDING RISK

- The American Association of Plastic Surgeons explicitly recommend against providing chemical prophylaxis to all plastic surgery inpatients, as this practice has an unfavorable risk/benefit relationship.
- Both the American Society of Plastic Surgeons and the American Association of Plastic Surgeons recommend individualized VTE risk stratification with provision of prophylaxis based on Caprini score, as opposed to explicit reliance on procedure type.

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BLEEDING RISK & PROPHYLAXIS

- General/abdominal/ pelvic surgery – 1 percent
- Bariatric surgery – <1 percent
- Plastic and reconstructive surgery – 0.5 to 1.8 percent
- Vascular surgery – 0.3 to 1.8 percent

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RECOMMENDATIONS

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American Society of Plastic Surgeons VTE Task Force Recommendations (2011)

1. Risk stratification: "Should consider completing a 2005 Caprini RAM…to stratify patients into a VTE risk category based on their individual risk factors."
For elective surgery patients with Caprini scores of 7: "**Should consider utilizing risk reduction strategies such as limiting OR times, weight reduction, discontinuing hormone replacement therapy and early postoperative mobilization.**"
3. For body contouring or abdominoplasty under general anesthesia with procedure time >60 minutes:
a. Caprini score 3-6: "Should consider the option to use postoperative low molecular weight heparin or unfractionated heparin."
b. Caprini score >=3: "Should consider the option to utilize mechanical prophylaxis…for non-ambulatory patients."
c. Caprini score >=7: "Should strongly consider the option to use extended (duration) low molecular weight heparin postoperative prophylaxis."

American Association of Plastic Surgeons Consensus Panel (2016)

1. "**We recommend using non-general anesthesia when appropriate. When possible, consideration should be given to using monitored anesthesia care, local anesthesia with sedation, or neuraxial anesthesia instead of general anesthesia.**"
2. "**We recommend using intermittent pneumatic compression to prevent perioperative venous thromboembolism events in plastic surgery patients…intermittent pneumatic compression is superior to elastic compression stockings.**"
3. "We recommend all plastic and reconstructive surgery patients should be risk-stratified for perioperative venous thromboembolism risk using a 2005 Caprini score."
4. "We do not recommend adding chemoprophylaxis to intermittent pneumatic compression for venous thromboembolism prophylaxis in the general non-risk stratified plastic surgery population."
5. "**We recommend that surgeons consider chemoprophylaxis on a case-by-case basis in patients with Caprini score greater than 8.**"
6. "We do not recommend adding routine chemoprophylaxis for venous thromboembolism prophylaxis in non-risk stratified patients undergoing…body contouring."

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RECOMMENDATIONS

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IPC reduces plasminogen activator inhibitor-1 (PAI-1), thereby increasing endogenous fibrinolytic activity

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