Society of Rural Physicians of Canada
26TH ANNUAL RURAL AND REMOTE MEDICINE COURSE
ST. JOHN'S NEWFOUNDLAND AND LABRADOR
APRIL 12 - 14, 2018

• 221

Dr. Andrew Kotaska • YELLOWKNIFE • NT

VENOUS THROMBOEMBOLISM PROPHYLAXIS: WHO REALLY NEEDS SNAKE OIL?

Most DVT identified in screening studies of hospitalized patients remain clinically insignificant. These studies markedly overestimate the risk of clinical VTE and the benefit of heparin prophylaxis, yet form the basis of the 'Getting Started Kit' recommended by Accreditation Canada to help hospitals develop VTE guidelines. In compliance, most Canadian hospitals have instituted VTE guidelines that vastly over-recommend low molecular weight heparin. Most hospitalized patients have a risk of clinical VTE lower than the bleeding risk from heparin. They should not receive heparin until and unless randomized controlled trials demonstrate more benefit than harm. The author of the Getting Started Kit was removed from involvement with the latest edition of the American College of Chest Physicians VTE Guidelines because of conflict of interest, including financial ties to six companies that produce anticoagulants.

1. State the approximate magnitude of clinical VTE risk in typical hospitalized patients 2. List the five REAL major risk factors that warrant thromboprophylaxis 3. Describe the use of standard evidence-based medicine tools to critically evaluate VTE guidelines 4. Estimate the magnitude of benefit and harm from low-molecular weight heparin in typical hospitalized patients 5. Explain why it is critical for real and potential conflicts of interest to be openly declared by academic clinicians and authors of guidelines

Who Really Needs VTE Prophylaxis

Stanton Grand Rounds
March 8th, 2018

Andrew Kotaska MD FRCSC

Accreditation Canada 2011

Required Organizational Practice (ROP):

- There is a written VTE prophylaxis policy or guideline.
- Clients at risk for VTE are identified and provided with appropriate evidence-informed VTE prophylaxis.
- Major orthopedic surgery clients who require post-discharge prophylaxis are identified and there is a process to provide them with appropriate post-discharge prophylaxis.

What is the magnitude of risk of VTE in hospitalized patients?

Who benefits from thromboprophylaxis?

How much benefit?

How much risk of bleeding?

“Getting Started Kit”

Reducing Harm | Improving Healthcare | Protecting Canadians

VENOUS THROMBOEMBOLISM PREVENTION IN ACUTE CARE

safer healthcare *now!*

Goal

TO PREVENT VTE IN HOSPITALIZED ADULT PATIENTS BY IMPLEMENTING STRATEGIES WHICH INCREASE THE USE OF EVIDENCE-BASED THROMBOPROPHYLAXIS

“Getting Started Kit”

Background

- Venous thromboembolism (VTE) is one of the most common, costly and preventable complications of hospitalization.[1,2]
- VTE comprises both deep vein thrombosis (DVT) and pulmonary embolism (PE).
- The risk of VTE in hospitalized patients, if thromboprophylaxis is not used, is 10 to 80%.[1]
- Almost all hospitalized patients are at risk for VTE and this risk may persist after discharge.
- The routine use of thromboprophylaxis has unequivocally been shown to substantially reduce clinically-important thromboembolic complications after hospitalization.[1,3]
- The prevention of VTE is the #1 ranked patient safety practice for hospitals.[4]

Figure 2 - Risk of Deep Vein Thrombosis in Hospitalized Patients[1]

Patient Group	DVT Incidence (%)
Medical patients	10-26
Major gynecologic, urologic, or general surgery	15-40
Neurosurgery	15-40
Tibial fracture	20-40
Congestive heart failure	20-40
Stroke	11-75
Knee/hip arthroplasty	40-60
Hip fracture	40-60
Major trauma	40-80
Spinal cord injury	60-80
Critical care patients	15-80

“Getting Started Kit”

“Table 2 lists the DVT incidence for various hospitalized patient groups if no prophylaxis is given and screening for asymptomatic DVT is performed. Based on the significant, known rates of VTE as well as its acute and long-term consequences, it can be seen that nearly every hospitalized patient should receive thromboprophylaxis.”

PREVENT VENOUS THROMBOEMBOLISM

safer healthcare now!

The 4 Steps of Thromboprophylaxis

Prevention of Venous Thromboembolism (VTE) should be considered for every patient admitted to acute care

STEP 1: Is thromboprophylaxis INDICATED?

YES

Prophylaxis not indicated if:
- Patient fully mobile AND
- Brief length of stay

Actions:
- No routine prophylaxis
- Reassess daily

STEP 2: Is anticoagulant thromboprophylaxis CONTRAINDICATED?

NO

Reasons:

- Active bleeding
- High risk of bleeding

Actions:

- TED stockings and/or Sequential Compression Devices
- Reassess daily

STEP 3: Provide APPROPRIATE THROMBOPROPHYLAXIS

- Prophylaxis should generally be started within 24 hours of admission or after surgery
- Evidence-based, guideline-recommended prophylaxis should be initiate and continued at least until discharge (and post-discharge where appropriate, e.g. post-major orthopedic surgery)

“The (preferred) approach is to implement routine, standard thromboprophylaxis for all patients in a large group, e.g. orthopedics, major general surgery, general internal medicine, etc. The entire group would receive the same prophylaxis unless a particular patient has a contraindication to the standard option.”

ACCP 8th VTE Guidelines

Prevention of Venous Thromboembolism*

American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition)

William H. Geerts, MD, FCCP; David Bergqvist, MD, PhD; Graham F. Pineo, MD; John A. Heit, MD; Charles M. Samama, MD, PhD, FCCP; Michael R. Lassen, MD; and Clifford W. Colwell, MD

(CHEST 2008; 133:381S–453S)

ACCP 8th VTE Guidelines

Conlict of Interest Disclosures

Dr. Geerts discloses that he has received grant monies from the Canadian Institutes for Health Research, Sanofi-Aventis, and Pfizer. He has received consultant fees from Bayer, Eisai, GlaxoSmithKline, Lilly, Merck, Pfizer, Roche, and Sanofi-Aventis, along with speakers honoraria from Bayer, Calea, Oryx, Pfizer, and Sanofi-Aventis.

ACCP 8th VTE Guidelines: Conflict of interest

Sanofi-Aventis,	→	enoxaparin
Pfizer,	→	dalteparin
Bayer,	→	rivaroxaban
GlaxoSmithKline,	→	nadroparin
Lilly,	→	fondaparinux
Merck,	→	unfract. heparin

ACCP 8th VTE Guidelines

Conlict of Interest Disclosures

Dr. Geerts discloses that he has received grant monies from the Canadian Institutes for Health Research, Sanofi-Aventis, and Pfizer. He has received consultant fees from Bayer, Eisai, GlaxoSmithKline, Lilly, Merck, Pfizer, Roche, and Sanofi-Aventis, along with speakers honoraria from Bayer, Calea, Oryx, Pfizer, and Sanofi-Aventis.

"it can be seen that nearly every hospitalized patient should receive thromboprophylaxis."

Conflict of Interest

The presence of a conflict of interest does not necessarily mean that authors' conclusions are biased; however, transparent disclosure allows editors, guideline committees, peer reviewers, clinicians, and patients to evaluate potential bias and adjust their decisions accordingly.

The striking difference between the analysis and recommendations of the 8th and 9th ACCP VTE guidelines parallels a striking difference in authors' conflicts of interest. Six of seven authors of the 8th edition declared financial relationships to multiple companies involved in the production of antithrombotic drugs. In contrast, one of five authors of the 9th edition declared any financial relationship.

Conflict of Interest

Although harder to identify, intellectual conflicts of interest are also concerning. In practitioners' and researchers' enthusiasm to help patients, there is a tendency to believe that our recommendations and actions are beneficial. When evidence calls previous conclusions into question, objective re-evaluation may be difficult, perhaps more so when research and commercial consulting careers are involved.

Professor Geerts did not declare his conflict of interest in the Getting Started Kit. He did not acknowledge the discrepancy between asymptomatic and clinical VTE outlined in the 9th edition of the ACCP Guideline. Instead, he used data on asymptomatic VTE to exaggerate the importance of VTE.

Evidence-based Medicine: What do you want to know?

Evidence-based Medicine: What do you want to know?

- What is the magnitude of risk of VTE in hospitalized patients?
- Who benefits from thromboprophylaxis?
- How much benefit?
- How much risk of bleeding?

Evidence-based Medicine: What do you want to know?

- What is the magnitude of risk of VTE in hospitalized patients?
- Who benefits from thromboprophylaxis?
- How much benefit?
- How much risk of bleeding?

ARR, ARI, NNT, NNH

ACCP 9th VTE Guidelines

CHEST Supplement

ANTITHROMBOTIC THERAPY AND PREVENTION OF THROMBOSIS, 9TH ED: ACCP GUIDELINES

Introduction to the Ninth Edition

Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

Gordon H. Guyatt, MD, FCCP; Elie A. Akl, MD, PhD, MPH; Mark Crowther, MD; Holger J. Schünemann, MD, PhD, FCCP; David D. Gutterman, MD, FCCP; and Sandra Zelman Lewis, PhD

CHEST 2012; 141(2)(Suppl):7S–47S

ACCP 9th VTE Guidelines

The Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines differs substantially from the prior versions both in process and in content. In this introduction, we describe some of the differences and the rationale for the changes.

CHEST 2012; 141(2)(Suppl):48S–52S

- Evidence downgraded across the board
- Recommendations for VTE prophylaxis scaled back
- Strength of recommendations scaled back

ACCP 9th VTE Guidelines

- Prior editions of the guidelines failed to recognize the implications of asymptomatic, screening-detected thrombosis, the use of which vastly over-estimates the clinical benefit of prophylaxis;
- Clinically evident VTE rather than asymptomatic VTE is now used for estimates of VTE incidence and calculations of prophylaxis benefit;
- Financial and intellectual conflicts of interest of leading experts and prior authors were highly problematic; their involvement was restricted.

ACCP 9th VTE Guidelines

- The lowest post-operative risk of VTE now felt to warrant chemo-prophylaxis in general surgical patients is 3%.
- Acceptable prophylaxis for orthopedic patients now includes ASA alone after total joint replacement.
- For hospitalized medical patients, the Padua Prediction Score is used to estimate risk; however, it remains poorly validated.
- Large randomized, placebo controlled trials in medical patients demonstrate little or no benefit with LMWH, yet elevated risk of hemorrhage, calling into question the utility and safety of liberal chemoprophylaxis.

- Very few patients with asymptomatic DVT develop clinical VTE.
- In the large meta-analysis of general surgical patients referenced in the 9th ACCP guideline (n=5400), the baseline risk of clinical VTE was 0.89% with placebo. The pooled risk of symptomatic DVT in another large meta-analysis of mixed surgical patients was 0.6%.
- In a retrospective cohort study used to validate a surgical risk scoring system (N=8216), the baseline risk was 0.28% for moderate risk and 0.9% for high-risk patients.
- In randomized studies of LMWH in more than 25,000 medical and stroke patients, the incidence of symptomatic DVT and pulmonary embolus with placebo are consistently below 1% each.
- These magnitudes of risk are ten to fifty times lower than the risks of asymptomatic DVT quoted in the Getting Started Kit

- In general surgical patients, the risk of hemorrhage from LMWH is significant.
- Meta-analysis of RCTs of 5400 general surgical patients given LMWH or placebo.
- Compared with placebo, LMWH reduced the absolute risk of clinical VTE by 0.68%.
- The NNT with LMWH to prevent one VTE was 147.

Harm from LMWH?

Total hemorrhages:	ARI 8.6%; NNH = 12
Major hemorrhage:	ARI 1.5%; NNH = 67
Wound hematoma:	ARI 4.9%; NNH = 20
Transfusions	ARI 3.8%; NNH = 26

ARR for clinical VTE was 0.68%: NNT = 147

For each VTE avoided, an additional:

12 total hemorrhages, 2 major hemorrhages,

7 wound hematomas, and 7 transfusions.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Low-Molecular-Weight Heparin and Mortality in Acutely Ill Medical Patients

Ajay K. Kakkar, M.B., B.S., Ph.D., Claudio Cimminiello, M.D., Samuel Z. Goldhaber, M.D., Rajiv Parakh, M.D., Chen Wang, M.D., Ph.D., and Jean-François Bergmann, M.D., for the LIFENOX Investigators*

N Engl J Med 2011;365:2463-72.

Supported by Sanofi.

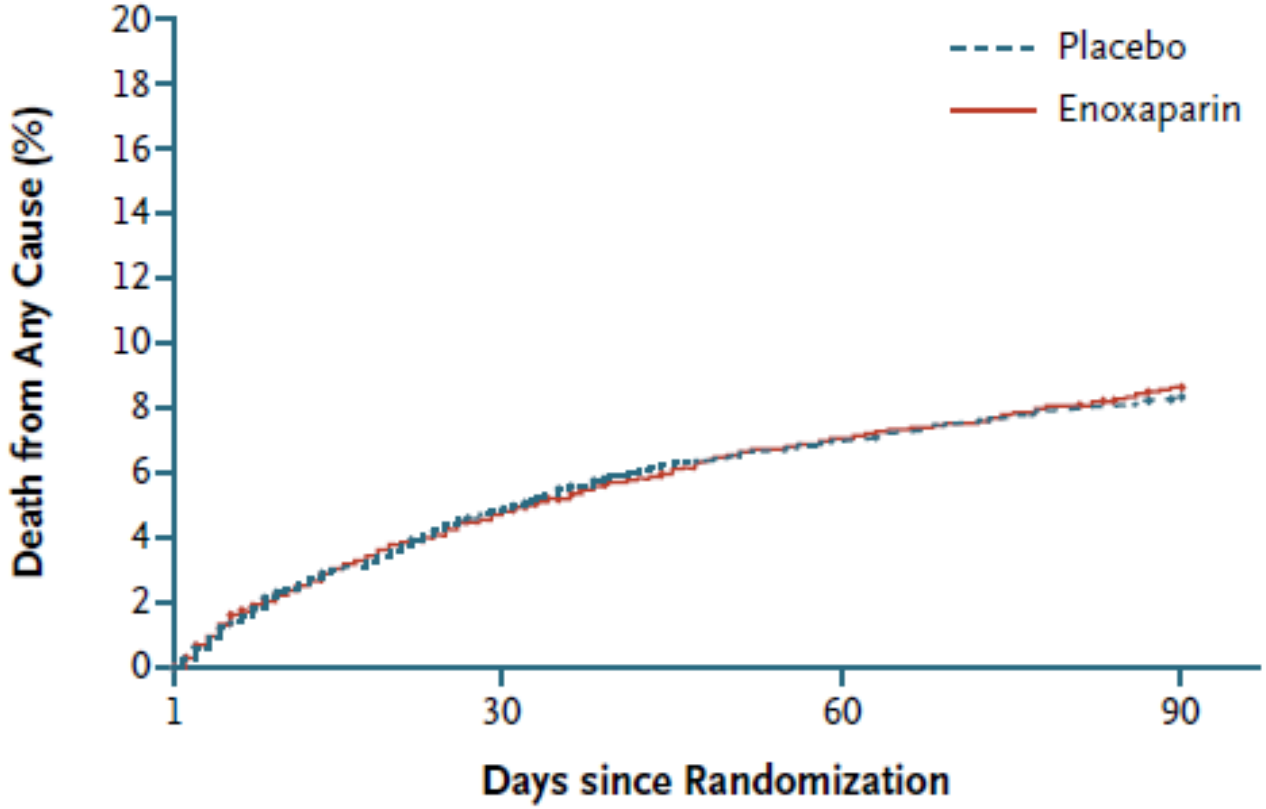
Dr. Kakkar reports receiving consulting fees, grant support through his institution, and lecture fees from Bayer Healthcare, Boehringer Ingelheim, Bristol-Myers Squibb, Daiichi Sankyo, Eisai, GlaxoSmithKline, Pfizer, and Sanofi; Dr. Cimminiello, receiving consulting fees from Sanofi; Dr. Goldhaber, receiving consulting fees from Boehringer Ingelheim, Bristol-Myers Squibb, Daiichi Sankyo, Eisai, EKOS, Medscape, Merck, Portola, and Sanofi and grant support through his institution from Boehringer Ingelheim, Bristol-Myers Squibb, Eisai, EKOS, Johnson &

METHODS

We conducted a double-blind, placebo-controlled, randomized trial to assess the effect of subcutaneous enoxaparin (40 mg daily) as compared with placebo — both administered for 10±4 days in patients who were wearing elastic stockings with graduated compression — on the rate of death from any cause among hospitalized, acutely ill medical patients at participating sites in China, India, Korea, Malaysia, Mexico, the Philippines, and Tunisia. Inclusion criteria were an age of at least 40 years and hospitalization for acute decompensated heart failure, severe systemic infection with at least one risk factor for venous thromboembolism, or active cancer. The primary efficacy outcome was the rate of death from any cause at 30 days after randomization. The primary safety outcome was the rate of major bleeding during and up to 48 hours after the treatment period.

CONCLUSIONS

The use of enoxaparin plus elastic stockings with graduated compression, as compared with elastic stockings with graduated compression alone, was not associated with a reduction in the rate of death from any cause among hospitalized, acutely ill medical patients. (Funded by Sanofi; LIFENOX ClinicalTrials.gov number, NCT00622648.)



No. of Deaths/ No. at Risk				
Placebo	1/4136	199/3922	291/3813	355/3745
Enoxaparin	2/4171	205/3950	292/3846	348/3785

Figure 2. Death from Any Cause.

The percentage of patients in the intention-to-treat population who died from any cause up to day 90 after randomization is shown.

Up to day 90, there was clinical suspicion of venous thromboembolism in 0.5% of the patients in the enoxaparin group (22 of 4072 patients) and in 0.7% of the patients in the placebo group (27 of 4044 patients). The diagnosis was confirmed by objective testing in 0.2% of the patients in the enoxaparin group and in 0.1% of the patients in the placebo group.

Table 3. Bleeding Outcomes during the Treatment Period.

Outcome	Placebo (N=4136)	Enoxaparin (N=4171)	Risk Ratio for Enoxaparin vs. Placebo (95% CI)	P Value
	no. of patients (%)			
Any bleeding*	60 (1.5)	91 (2.2)	1.5 (1.1–2.1)	0.01
Adjudicated major bleeding	11 (0.3)	16 (0.4)	1.4 (0.7–3.1)	0.35
Resulting in death	0	2 (<0.1)		
Requiring transfusion of ≥2 units of red cells or whole blood	6 (0.1)	5 (0.1)		
Resulting in fall in hemoglobin of ≥20 g/liter	8 (0.2)	12 (0.3)		
Requiring surgical intervention	2 (<0.1)	1 (<0.1)		
Retroperitoneal, intracranial, or intraocular	1 (<0.1)	1 (<0.1)		
Other	2 (<0.1)	0		
Minor bleeding				
Any	47 (1.1)	73 (1.8)	1.5 (1.1–2.2)	0.02
Clinically relevant nonmajor	14 (0.3)	18 (0.4)	1.3 (0.6–2.6)	0.49
Unclassified bleeding	4 (0.1)	6 (0.1)	1.5 (0.4–5.3)	0.75

REVIEW | Annals of Internal Medicine

Venous Thromboembolism Prophylaxis in Hospitalized Medical Patients and Those With Stroke: A Background Review for an American College of Physicians Clinical Practice Guideline

Frank A. Lederle, MD; Dylan Zylla, MD; Roderick MacDonald, MS; and Timothy J. Wilt, MD, MPH

Conclusion: Heparin prophylaxis had no significant effect on mortality, may have reduced PE in medical patients and all patients combined, and led to more bleeding and major bleeding events, thus resulting in little or no net benefit. No differences in benefits or harms were found according to type of heparin used. Mechanical prophylaxis provided no benefit and resulted in clinically important harm to patients with stroke.

Primary Funding Source: American College of Physicians.

Ann Intern Med. 2011;155:602-615.

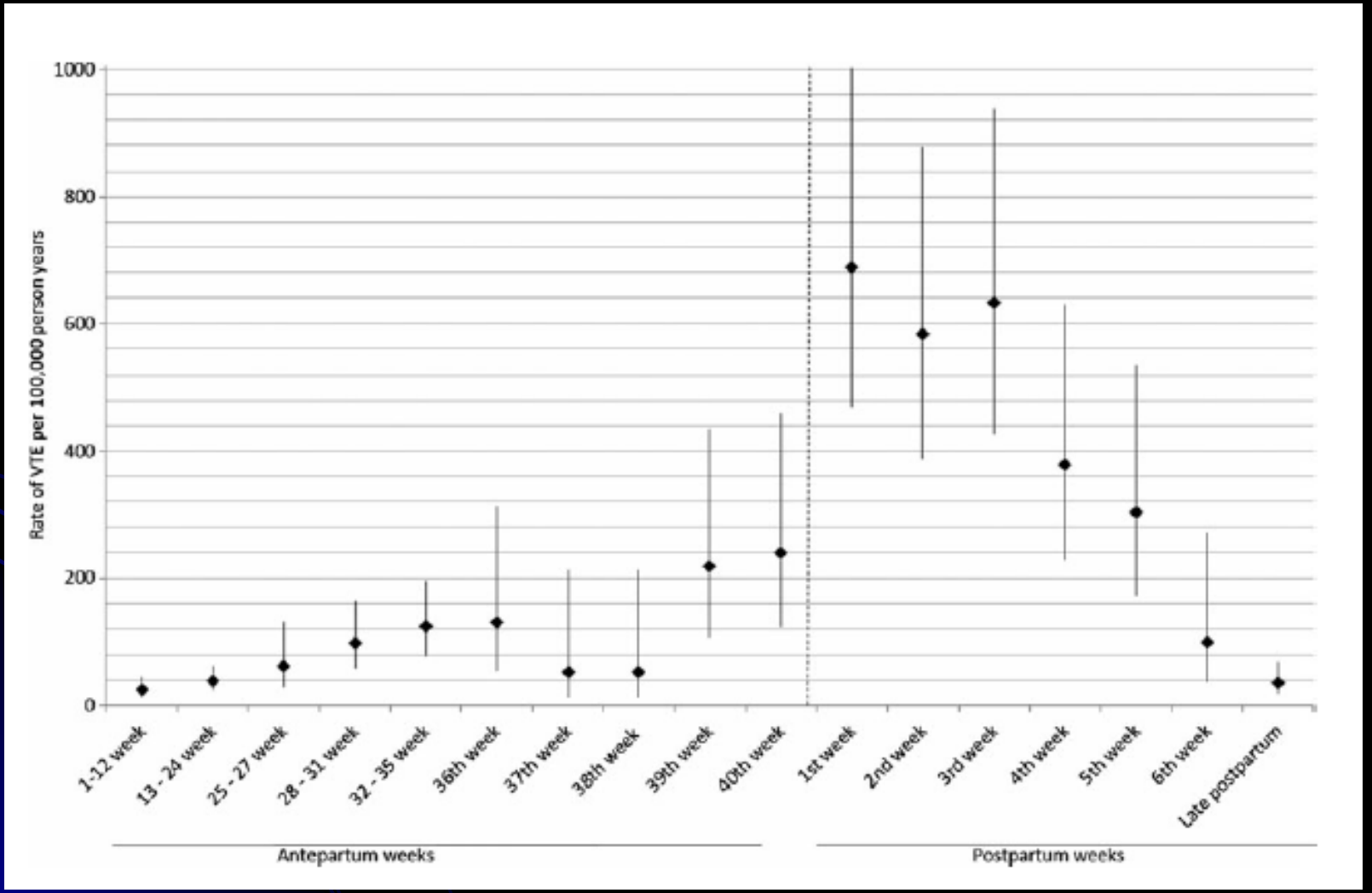
Table. Outcomes of Venous Thromboembolism Prophylaxis in Nonsurgical Patients

Group and Outcome	Studies, *n*	Intervention Group, *n/N (%)* — Heparin	Control Group, *n/N (%)* — No Heparin	Peto Odds Ratio (95% CI)*	Absolute Effect per 1000 Patients Treated (95% CI)
Heparin vs. no heparin					
Medical patients					
Mortality	10	679/10 466 (6.5)	679/10 251 (6.6)	0.94 (0.84 to 1.04)	−4 (−11 to 3)
Symptomatic DVT	5	25/3166 (0.79)	27/2791 (0.96)	0.78 (0.45 to 1.35)	−2 (−6 to 4)
PE	10	88/10 466 (0.84)	127/10 251 (1.2)	0.69 (0.52 to 0.90)	−4 (−6 to −1)
PE associated with death	6	50/10 157 (0.49)	53/9937 (0.53)	0.93 (0.63 to 1.38)	0 (−2 to 2)
Fatal PE	5	21/8927 (0.24)	26/8693 (0.30)	0.77 (0.43 to 1.37)	−1 (−2 to 1)
All bleeding events	8	216/4550 (4.7)	115/4194 (2.7)	1.34 (1.08 to 1.66)	9 (2 to 18)
Major bleeding events	9	41/10 331 (0.40)	25/10 116 (0.25)	1.49 (0.91 to 2.43)	1 (0 to 3)
Patients with stroke					
Mortality	8	496/5276 (9.4)	990/10 129 (9.8)	0.91 (0.70 to 1.18)	−9 (−29 to 18)
Symptomatic DVT	1	0/101	1/105 (0.95)	0.14 (0.00 to 7.09)	−9 (−10 to 57)
PE	5	39/5015 (0.78)	95/9847 (0.96)	0.72 (0.50 to 1.04)	−3 (−5 to 0)
PE associated with death	2	32/5004 (0.64)	72/9879 (0.73)	0.70 (0.46 to 1.05)	−2 (−4 to 0)
Fatal PE	2	25/4912 (0.51)	40/9769 (0.41)	1.25 (0.74 to 2.09)	1 (−1 to 4)
All bleeding events	6	24/272 (8.8)	25/250 (10)	0.95 (0.55 to 1.63)	−5 (−45 to 53)
Major bleeding events	8	79/5276 (1.5)	89/10 129 (0.88)	1.66 (1.20 to 2.28)	6 (2 to 12)
All patients combined					
Mortality	18	1175/15 742 (7.5)	1669/20 380 (8.2)	0.93 (0.86 to 1.00)	−6 (−11 to 0)
Symptomatic DVT	6	25/3267 (0.77)	28/2896 (0.97)	0.75 (0.43 to 1.30)	−2 (−6 to 3)
PE	15	127/15 481 (0.82)	222/20 098 (1.1)	0.70 (0.56 to 0.87)	−3 (−5 to −1)
PE associated with death	8	82/15 161 (0.54)	125/19 816 (0.63)	0.81 (0.61 to 1.08)	−1 (−2 to 0)
Fatal PE	7	46/13 839 (0.33)	66/18 462 (0.36)	1.01 (0.68 to 1.48)	0 (−1 to 2)
All bleeding events	14	240/4822 (5.0)	140/4444 (3.2)	1.28 (1.05 to 1.56)	9 (2 to 18)
Major bleeding events	17	120/15 607 (0.77)	114/20 245 (0.58)	1.61 (1.23 to 2.10)	4 (1 to 7)

Obstetrics VTE Guidelines: RCOG

See also Appendix I and Appendix II		
Pre-existing	Previous VTE	
	Thrombophilia	*Heritable* Antithrombin deficiency Protein C deficiency Protein S deficiency Factor V Leiden Prothrombin gene mutation
		Acquired Antiphospholipid antibodies Persistent lupus anticoagulant and/or persistent moderate/high titre anticardiolipin antibodies and/or β_2-glycoprotein 1 antibodies
	Medical comorbidities e.g. cancer; heart failure; active SLE, inflammatory polyarthropathy or IBD; nephrotic syndrome; type I diabetes mellitus with nephropathy; sickle cell disease;[49] current intravenous drug user	
	Age > 35 years	
	Obesity (BMI ≥ 30 kg/m^2) either prepregnancy or in early pregnancy	
	Parity ≥ 3 (a woman becomes para 3 after her third delivery)	
	Smoking	
	Gross varicose veins (symptomatic or above knee or with associated phlebitis, oedema/skin changes)	
	Paraplegia	
Obstetric risk factors	Multiple pregnancy Current pre-eclampsia	
	Caesarean section Prolonged labour (> 24 hours) Mid-cavity or rotational operative delivery Stillbirth Preterm birth Postpartum haemorrhage (> 1 litre/requiring transfusion)	

Postpartum VTE Risk



Postpartum VTE Prophylaxis

Kotaska

Table 1. Postpartum VTE incidence and NNT for clinical risk factors

Risk factor	VTE per 100 000 person-years	Incidence risk ratio	Risk during postpartum period (per 1000)	Risk during first postpartum week (per 1000)	NNT for 1 week of LMWH
None*	300	1.0	0.69	0.17	8400
Stillbirth	2444	6.24	5.62	1.35	1060
Preterm birth	854	2.69	1.96	0.47	3000
Obstetric haemorrhage	963	2.89	2.21	0.53	2700
Caesarean section	637	1.99	1.48	0.35	4000
BMI > 30 kg/m^2	926	3.75	2.13	0.51	2800
Para 3+	904	2.07	2.08	0.50	2900
Gestational diabetes	1013	1.97	2.33	0.56	2600

Data from Sultan et al.[42] (Blood 2015).
*No risk factors = nulliparous; age 25–34 years; spontaneous delivery; normal BMI.

Harm from LMWH (C/S)?

Wound complications ARI 3.8%; NNH = 26

Wound separation ARI 3.2%; NNH = 31

Re-hospitalisation ARI 1.3%; NNH = 77

All women had a BMI >30 and/or age >35, and 72% underwent CD in labour

ARR for clinical VTE was 0.17% (not significant): "NNT" = 600

For each VTE avoided, 20 women had a wound separation and 8 were re-admitted to hospital.

Harm from LMWH (C/S)?

- A conservative estimate of the extra postpartum risk of serious hemorrhage with LMWH is 0.2%
- This is substantially lower than the 1.5% increase found for non-obstetrical surgical patients.
- The corresponding NNH would be 500.
- For every VTE prevented, 10 women would experience a serious hemorrhage.

Critical Analysis of Guidelines

BJOG An International Journal of Obstetrics and Gynaecology

DOI: 10.1111/1471-0528.15150
www.bjog.org

Review article

Postpartum venous thromboembolism prophylaxis may cause more harm than benefit: a critical analysis of international guidelines through an evidence-based lens

A Kotaska[a,b,c,d]

[a] Territorial Clinical Lead, Women's & Children's Health, Northwest Territories Health and Social Services Association, Stanton Territorial Hospital, Yellowknife, NT, Canada [b] School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada [c] Department of Obstetrics and Gynaecology, University of Manitoba, Winnipeg, MB, Canada [d] Department of Obstetrics and Gynaecology, University of Toronto, Toronto, ON, Canada

Correspondence: A Kotaska, Territorial Clinical Lead, Women's & Children's Health, Northwest Territories Health and Social Services Association, Stanton Territorial Hospital, Yellowknife, NT Canada X1A 2N1. Email Andrew_kotaska@gov.nt.ca

Accepted 27 January 2018. Published Online 7 March 2018.

So what now?

Accreditation Canada ROP

- There is a written VTE prophylaxis policy or guideline.
- Clients at risk for VTE are identified and provided with appropriate evidence-informed VTE prophylaxis.
- Major orthopedic surgery clients who require post-discharge prophylaxis are identified and there is a process to provide them with appropriate post-discharge prophylaxis.

VTE

UWMC VTE RISK ASSESSMENT AND PROPHYLAXIS ORDER SET (page 1 of 2)

STEP 1: **PREDISPOSING RISK FACTORS: (Scores are Additive for this section)**

HYPERCOAGULABLE STATES (Thrombophilia) *Assign 3 points for each*		
	points	
○	3	Antiphosphosolipid syndrome (anticardiolipin antibody, lupus anticoagulant)
○	3	Antithrombin deficiency
○	3	Disorders of plasminogen or plasmin activation
○	3	Dysfibrinogenemia
○	3	Elevated factor VIII/normal CRP
○	3	Factor V Leiden/Activated Protein C resistance
○	3	Hyperhomocysteinemia
○	3	Hyperviscosity syndrome
○	3	Myeloproliferative disorders
○	3	Protein C or S deficiency
○	3	Prothrombin gene mutation

CLINICAL RISK FACTORS *(Assign 1 point each unless otherwise noted)*		
	points	
○	1	Abnormal pulmonary function (COPD)
○	1	Age 41 to 60 years
○	2	Age 60-74 years
○	3	Age 75 & above
○	1	Collagen vascular disease
○	1	Estrogen use (OC, HRT, tamoxifen)
○	3	Heparin-induced thrombocytopenia (< 3 months)
○	3	History of DVT/PE
○	1	History of recent surgery (<1 month)
○	1	History of unexplained stillborn infant or recurrent spontaneous abortion (>3 months),
○	1	Inflammatory Bowel Disease
○	3	Malignancy
○	1	Nephrotic syndrome
○	2	Obesity (BMI >25)
○	3	Pregnancy or post partum <1 month
○	1	Varicose Veins

ADD POINTS FOR PREDISPOSING RISK FACTOR SCORE_____ (Score A; range= 0 to 58)

STEP 2: **EXPOSING RISK FACTORS: Choose highest risk category that describes the patient 's status in order to determine the baseline risk factor score.)**

Assign 5 Points	Assign 2 Points	Assign 1 Point
○ Acute spinal cord injury (< 1 mo)	○ Central venous access	○ Acute myocardial infarction
○ Elective hip/knee arthroplasty	○ Immobilizing plaster cast (<1 month)	○ Acute CHF exacerbation
○ Hip, pelvis, or leg fracture (<1 month)	○ Laparoscopic surgery (>45 min)	○ Acute respiratory failure
○ Multiple trauma (< 1 month)	○ Major Surgery (>45 min)	○ Infection,serious
○ Stroke (<1 month)	○ Patient confined to bed >72 hrs	○ Medical pt at bed rest (<72 hrs)
		○ Minor Surgery (< 45 min)
Total score for any checked risk factors = 5	Total score for any checked risk factors =2	Total score for any checked risk factors =1

SELECT POINTS FOR EXPOSING RISK FACTOR SCORE: _____(Score B; options = 5, 2, or 1)

STEP 3: **TOTAL RISK FACTOR SCORE:**

PREDISPOSING: (Score A) _____ + EXPOSING: (Score B)_____ Total Score

PHYSI

VTE

UWMC VTE RISK ASSESSMENT AND PROPHYLAXIS ORDER SET (page 2 of

STEP 4: **PROPHYLAXIS SAFETY CONSIDERATIONS: Check if any of the following contraindications to heparin or enoxap are present**

○	active bleeding within 48-72 hours
○	hypertensive crisis
○	coagulopathy / severe liver disease
○	heparin induced thrombocytopenia
○	thrombocytopenia (< 20,000 if no coagulopathy; < 50,000 if coagulopathy present)
○	Recent intraocular, spinal or intracranial surgery
○	Use of TPA for stroke within 24 hours
○	Head trauma or CNS hemorrhage
○	Multiple trauma with high bleeding risk
○	Proven or suspected peri-spinal hematoma
○	Other high risk for bleeding or active bleeding conditions based on clinical judgment

If any of the above boxes are checked, the patient *is not* a candidate for anticoagulant therapy. Mechanical prophylaxis [elastic stockings (ES) or intermittent pneumatic compression (IPC)] should be used.

STEP 5: **NEURAXIAL ANESTHESIA CONSIDERATIONS:**

○	Recent LP, spinal injection, or removal of epidural catheter: (< 12 hours)
○	Indwelling epidural catheter; indwelling or removal intrathecal catheter

If either of these boxes is checked, special precautions for use and timing of prophylactic anticoagulation are required to prevent spinal hematoma. See *Guidelines for Neuraxial Anesthesia in the Anticoagulated Patient.*

STEP 6: **RECOMMENDED PROPHYLACTIC REGIMENS FOR EACH RISK GROUP:**

LOW RISK (Total = 1Point)	MODERATE RISK (Total = 2 Points)	HIGH RISK (Total = 3-4 Points)	VERY HIGH RISK (Total = 5 or more Points)
○ Early Ambulation (< 72 hours)	○ Heparin 5,000 units SC q12H ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min,use 30mg SC once daily* ○ *If BMI > 50, use 40mg SC bid* ○ Elastic Stockig ○ SCD	○ Heparin 5,000 units SC q8H ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min, use 30mg SC once daily* ○ *if BMI > 50, use 40mg SC bid* ○ Elastic Stocking & SCD	○ Enoxaparin 30mg sc q12H (reserved for TKR, THR & hip fracture; SCI; & trauma patients only) ○ Enoxaparin 40mg SC once daily ○ *If CrCl < 30ml/min, use 30mg SC once daily* ○ *if BMI > 50, use 40mg SC bid* ○ Elastic Stocking & SCD

calgary health region

October, 2006

venous thromboembolism

VTE Prevention

VTE Prophylaxis
A Mini-Guide for Medical Conditions and General Surgery

Reference:
Adapted from: Geerts WH, Pineo GF, et al., Prevention of Venous Thromboembolism, Chest, 2004; 126: 338S-400S and the work of the Anticoagulation Order Set Content Development Team, Chaired by Dr. G. Pineo, Calgary Health Region, 2005.

Major Risk Factors
(1 Major RF = Prophylaxis)

- Major Surgery
- Trauma
- Ischemic stroke or paralysis
- Spinal cord injury
- Previous VTE
- Congenital and/or acquired thrombophilia states
- Mechanical ventilation
- Active cancer and its treatment

Minor Risk Factors
(2 or more Minor RF = Prophylaxis)

- Age > 40 years
- Estrogen therapy
- Nephrotic Syndrome
- Pregnancy/post-partum
- Prolonged immobility > 24hours
- General anesthesia > 1 hour
- Severe respiratory disease
- Collagen vascular disease
- Inflammatory bowel disease
- Congestive heart failure
- Obesity
- Sepsis
- Varicose veins

Contraindications (If Contraindications then S.C. Device or G.C.Stockings)

- Uncontrolled Hypertension
- Avoid LMWH if CrCl < 20 mL/min
- Bleeding Disorders (platelets < 50)
- Recent intracranial or intraocular hemorrhage
- Lumbar puncture within 24hrs
- Active Bleeding
- HIT(T)

For patients on UFH or LMWH, bleeding tendency with: aspirin (ASA), NSAIDS (particularly ketorolac, Toradol), clopidogrel or ticlopidine. For patients with intrathecal catheters for analgesia UFH or LMWH must NOT be used in conjunction with antiplatelet agents.

VTE Prophylaxis Guidelines for Medical Conditions

Risk Level	Indicator	Prophylaxis
Low Risk	No risk factors	• No medical prophylaxis required; early ambulation only
Moderate Risk	1 or 2 minor risk factors	• Heparin, 5000 units, sc, q8h • Heparin, 5000 units, sc, q12h
High Risk	1 major risk factor, or 3-4 minor risk factors	• Heparin, 5000 units, sc, q8h • Enoxaparin, 40 mg, sc, daily* • Dalteparin, 5000 units, sc, daily
Highest Risk	Trauma, > 1 Major risk factor +/- multiple minor risk factors	• Enoxaparin, 30 mg, sc, q12h** • Dalteparin, 5000 units, sc, daily

*If CrCl< 20 mL/min or SCr> 175 umol/L, then Enoxaparin, 20 mg, sc, daily
**If CrCl< 20 mL/min or SCr> 175 umol/L, then Enoxaparin, 30 mg, sc, daily

VTE Prophylaxis Guidelines for General Surgery

Risk Level	Indicator	Prophylaxis
Low Risk	Non-major surgery in pts <40yrs w/ no risk factors	• No medical prophylaxis required; early ambulation only
Moderate Risk	Non-major surgery with additional risk factors or age 40-60	• Heparin, 5000 units, sc, q12h • Dalteparin, 2500 units, sc, daily
High Risk	Age > 60 years, or age 40-60 years with additional major risk factors	• Heparin, 5000 units, sc, q8h • Enoxaparin, 40 mg, sc, daily • Dalteparin, 5000 units, sc, daily
Highest Risk	Trauma, > 1 Major risk factor +/- multiple minor risk factors	• Enoxaparin, 30 mg, sc, q12h* • Warfarin po, daily at 1700, adjust to INR of 2.0-3.0 • Dalteparin, 5000 units, sc, daily

*If CrCl < 20 mL/min or SCr >175 umol/L then Enoxaparin, 30 mg, sc, daily

STANTON TERRITORIAL HEALTH AUTHORITY

VENOUS THROMBOEMBOLISM PROPHYLAXIS RISK ASSESSMENT GUIDELINES FOR ADULT MEDICAL & SURGICAL INPATIENTS

(PATIENT ID LABEL)

CONTRADICTIONS TO MEDICAL PROPHYLAXIS

If present, use Sequential Compression Device (SCD) or Graduated Compression Stockings:

- Uncontrolled hypertension
- Recent intracranial or intraocular hemorrhage
- Avoid LMWH* if CrCl is less than 20 mL per minute
- Lumbar puncture within 24 hours
- Bleeding disorders (platelets less than 50)
- Active bleeding
- HIT (T)***

For patients on UFH or LMWH, increased bleeding risk with: aspirin (ASA), NSAIDs (particulary ketorolac), clopidogrel or ticlodipine – SUGGEST PHARMACY CONSULT.**

For patients with intrathecal catheters for analgesia, CONSULT ANAESTHETIST ON CALL before initiating thromboprophylaxis.

*LMWH: Low molecular weight heparin; **UFH: Unfractioned Heparin ***HIT(T): Heparin Induced Thrombocytopenia (Thrombosis)

Major Risk Factors	Minor Risk Factors
(1 major risk factor = prophylaxis)	(2 or more minor risk factors = prophylaxis)
- Major surgery - Trauma - Ischemic stroke or paralysis - Spinal cord injury - Congenital and/or acquired thrombophilia states - Mechanical ventilation - Active cancer and its treatment	- Age greater than 40 - Obesity - Estrogen therapy - Sepsis - Nephrotic syndrome - Varicose veins - Pregnancy/post-partum - Prolonged immobility (greater than 24 hours) - General anesthesia (greater than 1 hour) - Severe respiratory disease - Collagen vascular disease - Inflammatory bowel disease - Congestive heart failure

VTE Prophylaxis Guidelines for MEDICAL Conditions		
Risk Level	**Indicator**	**Prophylaxis Suggestions**
Low Risk	No or 1 minor risk factor	No medical prophylaxis required; early ambulation only.
Moderate Risk	2 minor risk factors	Heparin 5000 units subcut q8h *or* Heparin 5000 units subcut q12h
High Risk	1 major risk factor, or 3-4 minor risk factors	Heparin 5000 units sub cut q8h *or* Enoxaparin 40 mg subcut daily
Highest Risk	Trauma or more than 1 risk factor +/- multiple minor risk factors	Enoxaparin 30 mg subcut q12h* (preferred) *or* Heparin 5000 units sub cut q8h* Elastic stockings/SCD
VTE Prophylaxis Guidelines for SURGICAL Conditions		
Risk Level	**Indicator**	**Prophylaxis Suggestions**
Low Risk	Non-major surgery in patients less than 40 years with no risk factors	No medical prophylaxis required; early ambulation only
Moderate Risk	Non-major surgery with additional risk factors of age 40-60	Heparin 5000 units subcut q12h
High Risk	Age greater than 60 years or age 40-60 with additional risk factors	Heparin 5000 units subcut q8h *or* Enoxaparin 40 mg subcut daily
Highest Risk	Trauma or more than 1 major risk factor	Enoxaparin 30 mg subcut q12h* (preferred) *or* Heparin 5000 units subcut q8h* *or* Warfarin p.o daily (target INR 2-3) Elastic stockings/SCD

*If BMI greater than 50 kg per m^2, then Enoxaparin 40 mg subcut q12h or Heparin 7500 units subcut q8h.

Note: For most patients (possible exceptions include, but are not limited to some "extreme risk" patients and patients with malignancy, UFH is less expensive and medically equivalent to LMWH for thromboprophylaxis.

Who really needs VTE prophylaxis?

Good evidence for patients with:

- A personal history of VTE
- A known potent thrombophilia
- Active cancer
- A hip fracture or joint arthroplasty
- Major abdominal or pelvic surgery (maybe)

Who really needs VTE prophylaxis?

No good evidence for patients with multiple other risk factors: Eg.

- Morbid obesity
- Prolonged complicated surgery
- Hormone treatment
- Prolonged immobility
- Central venous catheters

But clinical judgement still allowed

Stanton VTE prophylaxis

STANTON TERRITORIAL HOSPITAL

VENOUS THROMBOEMBOLISM RISK ASSESSMENT

(Patient ID)

ADMISSION RISK ASSESSMENT

☐ Yes ☐ No: History of VTE or known thrombophilia

☐ Yes ☐ No: Planned hip or knee arthroplasty

☐ Yes ☐ No: Current hip fracture → Suggest unfractionated heparin 5000 units subcutaneous bid in anticipation of spinal anesthetic.

☐ Yes ☐ No: Active malignancy

☐ Yes ☐ No: Planned major abdominal/pelvic surgery (evaluate case by case)

☐ Yes ☐ No: Consider other risk factors: ☐Morbid obesity ☐Bed rest > 3 days
☐First degree relative with unprovoked VTE
☐Other: _____

☐ Yes ☐ No: Active bleeding or risk factors: _____

In-Hospital Prophylaxis ordered (See Physician Orders)

☐ Mechanical ☐ Pharmacologic ☐ None

What constitutes “identifying” patients at risk for VTE?

Patients with:

- A personal history of VTE
- A known potent thrombophilia
- Active cancer
- A hip fracture or joint arthroplasty
- Major abdominal or pelvic surgery (maybe)

CMPA Case – A 26-year-old woman with a Hx of diabetes and previous DVT presented to the ED with right lower quadrant pain, nausea and vomiting. Abdominal U/S revealed acute appendicitis and urgent laparotomy was performed for a ruptured appendix. On POD #2, the patient's lower extremities were edematous and compression stockings were applied.

The patient was discharged on POD #4. Four days later, she arrived by ambulance with acute SOB and loss of consciousness. Cardiac arrest ensued with successful resuscitation. Investigations confirmed massive PE. Anoxic brain injury complicating the PE left the patient with marked cognitive impairment and spastic quadriparesis. The family commenced a legal action alleging failure to obtain an adequate medical history and failure to prescribe thromboprophylaxis postoperatively.

Legal outcome - Peer experts were of the opinion that the general surgeon should have been aware of the patient's history of DVT, and the fact that he did not review the information contained in the medical records fell below the standard of care. The experts also maintained that a person at risk for VTE, as this patient was, should have received antithrombotic prophylaxis peri-operatively. The CMPA paid a settlement to the patient on the member's behalf.

What constitutes “identifying” patients at risk for VTE?

What constitutes “identifying” patients at risk for VTE?

Ask every admitted patient and every patient undergoing surgery:

“Do you have a history of blood clots in your lungs or your legs?”

Who really needs VTE prophylaxis?

- The widespread treatment of average-risk hospitalized patients with LMWH constitutes a massive experiment:
  - without a power calculation,
  - without ethics review,
  - without careful measurement of benefits and harms,
  - and without patient consent.
- Until and unless RCTs in hospitalized patients show net benefit, guidelines advising widespread LMWH prophylaxis, including the Getting Started Kit, need to be withdrawn.


KEEP CALM
AND
DON'T
DRINK THE
KOOL AID