Preventing Venous Thromboembolism in Stroke Patients & New Stroke VTE Safety Recommendations

International Stroke Conference
February 11, 2015
Our Panel

- **Mark Alberts, MD, FAHA**
  Clinical Vice-Chair for Department of Neurology and Neurotherapeutics
  University of Texas Southwestern Medical Center

- **Laurie Paletz, BSN, PHN RN-BC**
  Stroke Program Coordinator
  Cedars-Sinai Medical Center

- **Michael Wong, JD**
  Founder/Executive Director
  Physician-Patient Alliance for Health & Safety
Thanks for Lunch!

Medtronic & Covidien

Welcoming Covidien to Medtronic
Thanks Stroke Group!

Mark Alberts, MD, FAHA
(Clinical Vice-Chair for Department of Neurology and Neurotherapeutics, Southwestern Medical Center)

Louise Briggs
(AHP Therapy Consultant, St George’s Hospital London)

Martin Dennis, MD
(Bramwell Dott Building, University of Edinburgh, Western General Hospital)

Risha Gupta, MD
(Vascular Neurology, Wellstar)

Christine A. Holmstedt D.O.
Director, Acute Stroke Service
Medical University of South Carolina

Joseph Hormes, MD
(Neurologist, Marietta Neurology & Headache Center, Wellstar)

Irene Katzan, MD, MS
(Director, Neurological Institute Center for Outcomes Research and Evaluation, Cleveland Clinic)

Ahmad Khaldi, MD
(Neurological Surgery, Wellstar)

Loch Macdonald
(Scientist, Keenan Research Centre, Li Ka Shing Knowledge Institute, St. Michael's Hospital; Professor, Surgery/Neurosurgery, University of Toronto; Division Head, Neurosurgery & Keenan Endowed Chair, Surgery, St. Michael's Hospital)

Kathy Morrison, MSN, RN, CNRN, SCRN
(Stroke Program Manager, Penn State Hershey Medical Center)

Laurie Paletz, BSN, PHN RN-BC
(Stroke Program Coordinator Cedars-Sinai Medical Center)

Mark Reiter, MD, MBA
(CEO, Emergency Excellence Residency Director, The University of Tennessee at Murfreesboro; President, American Academy of Emergency Medicine)

Bruce Ritchie
(Professor of Medicine, Director Canadian BioSample Repository, Principal Investigator Blood Borne Pathogens Surveillance Project, Medical Director, Medical Outpatients, University Hospital Medical Director, Dr. John Akabutu Comprehensive Centre for Bleeding Disorders, Medical Director, Northern Alberta Comprehensive Centre for Rare Blood Disorders)

Robert H. Rosenwasser, MD, FAHA
(Professor and Chair of the Department of Neurological Surgery, Director, Division of Neurovascular Surgery and Endovascular Neurosurgery Jefferson University Hospitals)

Jeffrey L. Saver, MD, FAHA, FAAN, FANA
(Professor of Neurology Geffen School of Medicine at UCLA Director, UCLA Comprehensive Stroke Center)

Ashfaq Shuaib, MD, FRCP, FAHA
(Professor, Department of Medicine Director, Stroke Program University of Alberta)

Deborah Summers, MSN, RN, AHCNS-BC, CNRN, SCRN
(Stroke Program Coordinator/ Advanced Practice Nurse, St. Luke's Brain and Stroke Institute)

Richard D. Zorowitz, M.D.
(Associate Professor of Physical Medicine and Rehabilitation The Johns Hopkins University School of Medicine Chairman, Department of Physical Medicine and Rehabilitation, Johns Hopkins Bayview Medical Center)

Facilitators Physician-Patient Alliance for Health & Safety:
Michael Wong, JD (Executive Director) Lynn Razzano, RN, MSN, ONCC (Clinical Nurse Consultant)
**Goal:**
to advance key patient health and safety initiatives that significantly impact patient lives and to do so in a prescriptive and practical manner

**Board of Advisors:**

- Brian & Cindy Abbiehl (*A Promise to Amanda Foundation*)
- Lenore Alexander (*Leah’s Legacy*)
- Michèle G. Curtis, MD, MPH, MML (*CeeShell Consulting*, editor of “Glass’ Office Gynecology”)
- Maria Cvach, DNP, RN, CCRN (Assistant Director of Nursing, Clinical Standards, *The Johns Hopkins Hospital*)
- Melissa Langhan, MD (Assistant Professor of Pediatrics, Emergency Medicine, *Yale School of Medicine*)
- Jenifer Lightdale, MD (Director, Patient Safety and Quality, Division of GI/Nutrition, *Children’s Hospital Boston*)
- Harold Oglesby, RRT, Manager, Pulmonary Medicine, St. Joseph’s Hospital/Candler Health System
- Frank Overdyk, MSEE, MD (Executive Director for Research, *North American Partners in Anesthesiology*; Professor of Anesthesiology, *Hofstra North Shore-LIJ School of Medicine*)
- Gina Pugliese, RN, MS, FSHEA (Vice President, Premier Safety Institute)
- Kenneth P. Rothfield, M.D., M.B.A., Chairman, Department of Anesthesiology, Saint Agnes Hospital (Baltimore, MD)
Stroke - A Leading Cause of Death and Disability


- over 800,000 cases per year
- one in every four being recurrent
Medical Complications After Stroke

Dr. Mark Alberts will discuss:
use of anticoagulants and mechanical prophylaxis

24-90% of stroke patients will have a medical complication

most common complication - DVT/PE:
• DVT 40%
• PE 15%

Kumar S. et al. “Medical complications after stroke”
Medical Complications After Stroke

Laurie Paletz will discuss decreasing door to treatment time

Strategies for Decreasing Door to Needle Time
Medical Complications After Stroke

Laurie Paletz will discuss decreasing door to treatment time

Strategies for Decreasing Door to Needle Time Treatment
The Face of Stroke Patients

Steven Spence (68-year-old man):
- admitted for stroke
- discharged after doctors believed blood clot in brain had “broken up”
- within hours after being sent home, suffered a second stroke.
- recurrent stroke has left him:
  - unable to speak
  - family members unsure if he can recognize them
  - increased potential for additional disability may occur as a result of the recurrent stroke.

The Face of Stroke Patients

Anna Frutiger
23-years old dental student
Undiagnosed DVT

Symptoms:
• Pain behind her knee and in her calf (which she attributed to half marathon training or a muscle pull)
• Short of breath whenever she ran
• Dental school friends noted that she limped, and Anna was aware of becoming.

Diagnosis & Discharge:
• Admitted for tests
• Orthopedic surgeon found no injury to suggest a muscle pull.
• Suspected a blood clot in her lower leg.
• Only known risk factor was that she was taking a third generation birth control pill.
• Ultrasound/Doppler results negative for DVT.
• At follow-up exam 3 weeks later, her leg was normal shape and size, and she no longer felt any leg pain.
• As a result, her doctor discharged her.

The Face of Stroke Patients

Anna Frutiger
23-years old dental student
Undiagnosed DVT

Post-Discharge:
• traveled quite a bit:
- flew for six hours over two consecutive weekends,
- then saw friends in New York City next two weekends involving 8 hour bus trips with one 10 minute stop
• complained of not being able to breathe easily when carrying groceries to her apartment right after last bus trip

PE & Death:
• next morning, called best friend to drive her to school because felt extremely weak and didn’t think she could walk
• collapsed on the lawn outside her apartment after walking downstairs, and blacked out for several seconds.
• upon arriving at ER, suffered cardiopulmonary arrest
• emergency surgery to dislodge huge blood clot causing PE.
• died 2 days after
• autopsy determined not predisposed to blood clots (birth control pill and concentrated travel were major clotting risks)

DVT and PE in Patients with Stroke

Mark J. Alberts, MD, FAHA
Vice-Chair, Neurology
UTSW Medical Center
Dallas, TX
DVT and PE Are Common Peri-Stroke Complications

- DVT can be found in 40-80% of stroke patients
- PEs present in 10-15% of all stroke patients
- PEs accounted for 13-25% of early deaths after a stroke
- More pervasive use of care guidelines have likely reduced some of these rates for DVT and PE

Kappelle, Preventing DVT after Stroke; Current Treatment Options in Neurology, 2011
Risk Factors for DVT in Stroke Patients

<table>
<thead>
<tr>
<th>Hx of prior DVT or PE</th>
<th>Prior disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hx of malignancy</td>
<td>Weakness in a limb</td>
</tr>
<tr>
<td>Hx of prothrombotic state</td>
<td>Advancing age</td>
</tr>
<tr>
<td>Hx of hormone use</td>
<td>Dehydration</td>
</tr>
<tr>
<td>Obesity</td>
<td>Genetic factors</td>
</tr>
</tbody>
</table>

Kappelle, Preventing DVT after Stroke; Current Treatment Options in Neurology, 2011
## Treatment Approaches to Prevent DVT in Stroke

<table>
<thead>
<tr>
<th>Mobilization/General Medical</th>
<th>Mechanical</th>
<th>Pharmacological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early mobilization</td>
<td>Compression stockings-knee</td>
<td>Heparin or heparinoids-SQ</td>
</tr>
<tr>
<td>Improve hydration status</td>
<td>Compression stockings-thigh</td>
<td>Antiplatelet agents</td>
</tr>
<tr>
<td></td>
<td>Intermittent pneumatic compression-knee</td>
<td>NOAC therapy</td>
</tr>
<tr>
<td></td>
<td>IPC—thigh high</td>
<td></td>
</tr>
</tbody>
</table>
Benefits of Compression Stockings

- Meta-analysis of 2615 patients
- Included knee-high and thigh-high stockings
- Overall no evidence of benefit
- Not currently recommended

Kappelle, Preventing DVT after Stroke; Current Treatment Options in Neurology, 2011
Advantages of Intermittent Compression Boots

1. Non-invasive approach
2. Generally well tolerated
3. Minimal side effects
4. Less costly than medications
5. Can be used in all types of stroke patients
Disadvantages of Intermittent Compression Boots

1. Patients may not always wear them
2. Nurses may not turn machine on
3. May be turned off or not worn when patients are off the ward or getting tested, rehabilitation therapy, etc.
4. Currently a high compliance rate with DVT prophylaxis using antithrombotic agents (> 90% in some studies)
Benefits of Intermittent Pneumatic Compression

- Several small studies suggested a benefit for IPC when used alone, but even more benefit when combined with medical therapy
- Overall RR of 60-80% depending on the study
- Largest study to test IPC in just stroke patients is CLOTS 3 trial

Kappelle, Preventing DVT after Stroke; Current Treatment Options in Neurology, 2011
Study involved nearly 3,000 stroke patients at over 100 hospitals across the United Kingdom

- Multi-centre parallel group randomized trial
- Enrolled patients from day 0 to day 3 of admission and allocated them via a central randomization system (ratio 1:1) to receive either IPC or no IPC
  - Technician was masked to treatment allocation
- Compression duplex ultrasound (CDU) of both legs performed at 7—10 days and, wherever practical, at 25—30 days after enrollment.
  - Caregivers and patients were not masked to treatment
- Patients were followed up for 6 months to determine survival and later symptomatic DVT
- The primary outcome was a DVT in the proximal veins detected on a screening CDU or any symptomatic DVT in the proximal veins, confirmed on imaging, within 30 days of randomization.

CLOTS Trial Collaboration, Lancet, August 2013
What type of IPC was used?

- Only thigh-length sleeves were tested in CLOTS 3.
- Many different types of IPC (calf or thigh-length, single or sequential, asymmetric or circumferential, fixed or variable frequency, rapid or slow inflation).

http://www.dcn.ed.ac.uk/clots/clots_results/IPCguidance_for_stroke_units_UK_V2.pdf
CLOT 3 Patient and Treatment Characteristics

- Groups were well matched for all baseline characteristics
- IPC duration was: Mean = 12.5 days  Median = 9 days
- Overall adherence to IPC therapy: Mean = 59%  Median = 65.4%

CLOTS Trial Collaboration, Lancet, August 2013
30-32% of patients in each group received some type of anticoagulant
CLOTS-3 Primary Results

Statistically Significant Reduction of DVT
Primary and Secondary Efficacy Results

- **PRIMARY OUTCOME** (any DVT on ultrasound or any Sx DVT within 30 days) 3.6% absolute risk reduction $p = 0.001$
- **ANY DVT or DEATH** 6.6% absolute risk reduction $p < 0.0001$
- **ANY DVT, PE, DEATH** 7% absolute risk reduction $p < 0.0001$

CLOTS Trial Collaboration, Lancet, August 2013
SECONDARY OUTCOMES
MORTALITY RISK REDUCTION

14.0%
Mortality Risk Reduction
p = .042

The rate of mortality during the first six months was 14% lower with the IPC Group compared to the non-IPC Group.
(Adjusted hazard ratio = .86; p = .042)

DVT EVENTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Non-IPC Group</th>
<th>IPC Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptomatic DVT at 30 days</td>
<td>6.3%</td>
<td>4.6%</td>
</tr>
<tr>
<td>(proximal or calf)</td>
<td>p = .045</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Any DVT at 30 days</td>
<td>21.1%</td>
<td>16.2%</td>
</tr>
<tr>
<td>(proximal or calf)</td>
<td>p = .001</td>
<td>p = .001</td>
</tr>
<tr>
<td>Any DVT at 6 months</td>
<td>21.7%</td>
<td>16.7%</td>
</tr>
<tr>
<td>(proximal or calf)</td>
<td>p = .001</td>
<td>p = .001</td>
</tr>
</tbody>
</table>
**Adverse Events Seen in Clot 3**

<table>
<thead>
<tr>
<th>Event</th>
<th>IPC</th>
<th>No IPC</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin breaks</td>
<td>3.1%</td>
<td>1.4%</td>
<td>0.002</td>
</tr>
<tr>
<td>Skins breaks due to IPC</td>
<td>0.7%</td>
<td>0.0%</td>
<td>NS</td>
</tr>
<tr>
<td>Falls with injury within 30 days</td>
<td>2.3%</td>
<td>1.7%</td>
<td>0.22</td>
</tr>
<tr>
<td>Falls due to IPC within 30 days</td>
<td>0.1%</td>
<td>0.0%</td>
<td>NS</td>
</tr>
</tbody>
</table>

CLOTS Trial Collaboration, Lancet, August 2013
1. The use of SQ anticoagulation for DVT prevention is a class I, level A recommendation

2. The use of aspirin is a class IIa, level A recommendation

3. The use of external compression devices is a class IIa, level B recommendation (written before CLOTS 3 study)

4. The PREVAIL study showed that Enoxaparin 40 mg SQ qd was more effective than UFH 5000 U SQ bid*
   * This was not a specific guideline recommendation

Jauch et al, Guidelines for early management of acute ischemic stroke; Stroke, 2013
Conclusions

1. DVT is a common complication after an acute stroke
2. There are several treatment approaches for reducing DVT after a stroke
3. Intermittent pneumatic compression treatment is an important and well tolerated therapeutic option for the prevention of DVT and death after a stroke
Strategies for Decreasing Door to Treatment Time

Laurie Paletz, BSN PHN RN BC
Stroke Program Coordinator
Cedars-Sinai Medical Center
Disclosure

I have no actual or potential conflict of interest in relation to this program/presentation
Despite its effectiveness in improving neurological outcomes, many patients with ischemic stroke are not treated with t-PA, because they arrive late or because of delays in assessment or administration of IV t-PA.

Earlier administration of IV t-PA after the onset of stroke symptoms is associated with greater functional outcome.
Intravenous rt-PA is recommended for selected patients who may be treated within 3 hours of onset of ischemic stroke (Class I Recommendation, Level of Evidence A).

Delays in evaluation and initiation of therapy should be avoided, because the opportunity for improvement is greater with earlier treatment.

rt-PA should be administered to eligible patients who can be treated in the time period of 3 to 4.5 hours after stroke (Class I Recommendation, Level of Evidence B).

The sooner that t-PA is given to stroke patients, the greater the benefit, especially if started within 90 minutes of symptom onset.

• Emergency Departments must collaboratively establish standard operating procedures and protocols to triage stroke patients rapidly.

• Standard procedures and protocols should be established for times to quickly and safely evaluate and treat eligible stroke patients with t-PA.

• Target treatment time with t-PA should be within 1 hour of the patient’s arrival in the Emergency Department.

Comprehensive overview of nursing and interdisciplinary care of the acute ischemic stroke patient: a scientific statement from the American Heart Association. *Stroke* 2009;40;2911-2944
AHA Target Stroke

A national quality improvement initiative of the American Heart Association/American Stroke Association to improve the care of stroke

Primary Phase I Goal: Achieve Door-to-Needle Times within 60 minutes in 75% or more of acute ischemic stroke patients treated with IV tPA

- Secondary Phase II Goal: Achieve Door-to-Needle times within 45 minutes in 50% or more of acute ischemic stroke patients treated with IV tPA
1. **Advance Hospital Notification by EMS:** EMS providers should provide early notification to the receiving hospital when stroke is recognized in the field.

2. **Rapid Triage Protocol and Stroke Team Notification:** Acute triage protocols facilitate the timely recognition of stroke and reduce time to treatment.

3. **Acute Stroke Team Activation** enhance stroke care and should be activated as soon as the stroke patient is identified in the emergency department or after notification from pre-hospital personnel.

4. **Single Call Activation System:** A single call should activate the entire stroke team, which simultaneously pages the entire stroke team.
5. **Stroke tool kit** A Stroke toolkit containing clinical decision support, exclusion criteria any urgent medications and t-PA in a tackle box ready to go.

6. **Rapid Interpretation of Brain Imaging:** It is essential to initiate a CT scan (or MRI) within 25 minutes of arrival and complete interpretation of the CT scan within 45 minutes of arrival to exclude intracranial hemorrhage prior to administration of IV t-PA.

7. **Rapid Laboratory Testing:** For patients in whom coagulation parameters should be assessed because of suspicion of coagulopathy, INR/PTT results should be available as quickly as possible and no later than 45 minutes after ED arrival. If standard STAT laboratory turnaround times cannot meet this target, point of care INR testing in the Emergency Department can provide the data in the needed timeframe.
8. **Rapid Access to Intravenous rt-PA:** Once eligibility has been determined and intracranial hemorrhage has been excluded, IV rt-PA should be promptly mixed & administered. tPA should be readily available in the emergency department or CT scanner.

9. **Team-Based Approach:** A multidisciplinary team has proven to be effective in reducing time to treatment in stroke. An interdisciplinary collaborative team is also essential for successful stroke performance improvement efforts.

10. **Prompt Data Feedback:** Accurately measuring and tracking your hospital’s door-to-needle times equips the stroke team to identify areas for improvement and take appropriate action **Share insights, hurdles, experiences, and successes.**
Time Interval Goals

1. Perform an initial patient evaluation within 10 minutes of arrival in the emergency department

2. Notify the stroke team within 15 minutes of arrival

3. Initiate a CT scan within 25 minutes of arrival

4. Interpret the CT scan within 45 minutes of arrival

5. Ensure a door-to-needle time for IV rt-PA within 60 minutes from arrival.

Collaboration Efforts

ED physicians
ED nurse administrators and nursing staff
  ▪ Pre-hospital care coordinator and MICNs
  ▪ Tape runs with EMS
Radiology
Laboratory
Components of Successful Process

- Staff education and team building
- Stroke RN first responder triage
- Pre-hospital field Code Brain activation
- Placing Code Brain patients on portable monitors immediately upon arrival to ED
- POC istat blood work or clearly identify CODE BRAIN on labs and CT or any other orders to expedite
1. Organize stroke team with focused goal to improve Door to Treatment time. (DTN ≤ 60 minutes)

2. Have handy T-PA inclusion exclusion criteria

3. Meet frequently to discuss all acute stroke team activations

4. Track progress to goal using GWTG (or whatever means of data collection you use).

5. Incorporating LEAN methodology to eliminate waste, develop guidelines, actions, time durations, and collaboration across the hospital system is an effective means to decrease door to treatment time
Components of Successful Process

• Celebrate success with staff.
• Posters, newsletters with DTN times and who was part of that team

Just as the ED staff know the fastest STEMI time they should also know the fastest DTN time as well.
Components of Successful Process

• Set explicit goals and expectations

• Look at and identify gaps in processes

• Create a culture in which the focus is not on finding blame but rather focus on how the group can look for improvements collaboratively
CLOTS 3, a landmark trial, is the largest randomized, controlled study of its kind involving Intermittent Pneumatic Compression (IPC) in medical patients. IPC delivering sequential compression at a frequency determined by a patient’s venous refill time resulted in a statistically significant reduction (29.9%) of proximal DVTs in immobile stroke patients. Survival to six months was also statistically significant, with a 14% reduction in mortality risk. IPC is safe and effective in reducing the risk of DVT—and possibly improving survival in immobile stroke patients.
Don’t Stop There!!

Provision of Needed Prophylaxis is Sub-Optimal

Mechanical and Pharmacological Prophylaxis

Use Them!
References

• Clinical tools library: heart.org/stroke clinical tools.


• Target stroke resources. www.targetstroke.org. http://www.strokeassociation.org/STROKEORG/Professionals/Target-Stroke_UCM_314495_SubHomePage.jsp
  • Target: Stroke Learn More About The Challenge And How We Answer It. http://www.strokeassociation.org/STROKEORG/Professionals/TargetStroke/Target-Stroke-Learn-More-About-The-Challenge-And-How-We-Answer-It_UCM_432409_Article.jsp
  • Target: Stroke Clinical Resources and Tool Kit. http://www.strokeassociation.org/STROKEORG/Professionals/TargetStroke/Target-Stroke-Clinical-Resources-and-Tool-Kit_UCM_432411_Article.jsp
Cedars-Sinai ‘s Comprehensive Stroke Center Team
Overview of Stroke VTE Recommendations

**STROKE VTE SAFETY RECOMMENDATIONS: APPLIES TO ISCHEMIC AND HEMORRHAGIC STROKE**

**STEP 1 Admission/Transition of Care** (Risk Factor Assessment):

- Conduct stroke VTE risk factor assessment and document on all admitted patients with a stroke or rule out stroke diagnosis. Factors to consider, include:
  - Personal, family history, or diagnosis of VTE
  - Thrombophilia, history of hypercoagulopathy, or hypercoagulable state
  - Immobility/bedrest greater than 24 hours
  - Obesity BMI >30 kg/m²
  - Smoking
  - Active cancer (treatment ongoing, treatment within past 6 months, palliative)
  - Paralysis, paresis or recent plaster immobilization of the lower extremities
  - Major surgery within four weeks
  - Localized tenderness along the distribution of the deep venous system, entire leg swollen, calf swelling 3 cm > asymptomatic side (measured 10 cm below tibial tuberosity), pitting edema confined to the symptomatic leg, or collateral superficial veins (non-varicose)
  - Acute brain injury associated with trauma
  - Current infection and associated treatment
  - Pneumonia
  - Heart failure, recent MI, or mechanical heart valve
  - Lupus, autoimmune disease, inflammatory bowel disease
  - Long distance air travel (> 6 hours)
  - Current oral contraceptive or estrogen/testosterone supplement use

Documented VTE then consider:
- Consult hematologist for any potential anticoagulation addition or adjustment,
- Consult vascular surgeon or interventional radiologist for inferior vena cava placement or evaluation.

*These recommendations are intended as a list of recommended steps to maximize VTE prevention, promote patient safety and health outcomes. Nothing contained in these recommendations may replace or be a substitute for the medical advice of the attending clinician.*

February 2015
Overview of Stroke VTE Recommendations

**Recommended VTE Prophylaxis**

For Stroke Core Measures: mechanical and pharmacological therapy is required, unless documented contraindication

- Ambulation progression, as prescribed by health provider
- Mechanical prophylaxis initiated:
  - Intermittent pneumatic compression (IPC) device (thigh length, not knee length)
  - Other compression devices considered:
    - anti-embolism stockings;
    - venous foot pump (VFP)

- Mechanical prophylaxis ongoing:
  - Wound care team advised of patient’s use
  - Ensure on patient
  - Ensure properly measured, fitted, worn, and machine is on
    - Minimally 18-20 hours per day (removed for 30 minutes maximum)
  - Skin inspection minimally every 8 hrs
  - IPC/VFP removed for ambulation
  - Patient provided with information on proper use wearing, and able to verbalize understanding.

**Contra-indications to VFP/IPC**

- Dermatitis
- Leg ulcers
- Severe edema
- Severe peripheral vascular disease
- Congestive heart failure

**Bleeding Risk contraindications**

A patient at higher bleeding risk is assessed by having 3 or more of the following risk factors:
- Age > 65 years.
- Previous history bleed or predisposition to bleeding (e.g. diverticulitis).
- Uncontrolled hypertension.
- Severe renal impairment (i.e. serum creatinine > 200 umol/L, GFR < 30 ml/min/1.73 m² or on dialysis).
- Acute hepatic impairment (e.g. bilirubin > 3 x ULN + LFTs > 3 x ULN), chronic liver disease (e.g. cirrhosis).
- Low platelet count < 80 x 10⁹/L, or a thrombocytoopenia or anaemia of undiagnosed cause.
- On concomitant drugs associated with an increased bleeding risk e.g. SSRIs, oral steroids, NSAIDS, methotrexate or other immune-suppressant agents.

**Absolute contraindications**

- Known large oesophageal varices.
- Significant thrombocytopenia (platelet count < 50 x 10⁹/L) - refer to haematologist.
- Within 72 hours of major surgery w/ risk of severe bleeding - defer & reassess risk postoperatively.
- Previously documented hypersensitivity to either the drug or excipients – consider cardiology opinion.
- Acute clinically significant bleed - defer & re-assess stroke versus bleeding risk within 3 months.
- Decompensated liver disease or deranged baseline clotting screen (INR > 1.5) - refer to Gastroenterology / Hepatology. Contraindication applies to oral anticoagulants only.
- Pregnancy or within 48 hours post partum - seek urgent haematological advice. Contraindication applies to oral anticoagulants only.
- Severe renal impairment (GFR < 30 ml/min/1.73 m² or on dialysis). Contraindication applies to dabigitran only.

**Relative contraindications**

- Previous history intracranial haemorrhage - as some AF patients especially those considered at higher stroke risk (i.e. CHA2DS2 score ≥ 3) may benefit from anti-thrombotic therapy, seek the opinion of a stroke specialist.
- Recent major extracranial bleed within the last 6 months where the cause has not been identified or treated – decision for oral anti-thrombotic therapy should be deferred.
- Recent documented peptic ulcer (PU) within last 3 months – decision for oral anti-thrombotic therapy should be deferred until treatment for PU completed. In all cases with history PU give PPI cover whilst on anti-thrombotic.
- Recent history recurrent iatrogenic falls in patient at higher bleeding risk.

A risk of falls is not a contraindication to initiating oral anticoagulation (e.g. a patient with an annual stroke risk of 5% (CHA2DS2 score 2-3) would need to fall 295 times for fall risk to outweigh stroke reduction benefit of warfarin).
- Dementia or marked cognitive impairment with poor medicines compliance and no access to carer support.
- Chronic alcohol abuse – especially if associated with binge drinking.

**These recommendations are intended as a list of recommended steps to maximize VTE prevention, promote patient safety and health outcomes. Nothing contained in these recommendations may replace or be a substitute for the medical advice of the attending clinician.**
### Recommended VTE Prophylaxis

**For Stroke Core Measures:** mechanical and pharmacological therapy is required, unless documented contraindication.

#### Structured Clinical Questions

- **Population:** Hospitalized acutely ill medical patients, Fondaparinux sodium, Low molecular weight heparin (LMWH), Low-dose unfractionated heparin (UFH) (for patients with renal failure), Other anticoagulant agent (specify ____________).

- **Intervention(s):** Symptomatic DVT and PE, death, major bleeding events, mechanical complications.

- **Comparator:** No treatment, placebo, mechanical prophylaxis, pharmacological prophylaxis.

- **Outcome:** RCTs and observational studies.

- **Methodology:**
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.

#### Patients with Cancer

- **Intervention(s):** Symptomatic DVT and PE, death, major bleeding events, mechanical complications.

- **Comparator:** No treatment, placebo, mechanical prophylaxis, pharmacological prophylaxis.

- **Outcome:** RCTs and observational studies.

- **Methodology:**
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.
  - Symptomatic DVT, PE, death, major bleeding events, mechanical complications.

#### Discharge Planning:

- **Discuss with patient/family**
- **Collaboration and recommendations with patient’s case manager and/or transition care specialist (discharge coach) for rehabilitation transition potential and patient mobility/functional goals**
- **Discussion with physical therapist for current and future mobility/functional goals**
- **Anticipated discharge date determined**
- **Evaluate patient for mechanical prophylaxis for home use**
- **Order continued home mechanical prophylaxis use at time of discharge**
- **Continue home use post discharge unless specified differently by the clinician**

---

**Overview of Stroke VTE Recommendations**

---

**February 2015**

---

**Step 2 Cont’d**

---

**Stroke VTE Safety Recommendations:** Applies to Ischemic and Hemorrhagic Stroke

---

**These recommendations are intended as a list of recommended steps to maximize VTE prevention, promote patient safety and health outcomes. Nothing contained in these recommendations may replace or be a substitute for the medical advice of the attending clinician.**
Overview of Stroke VTE Recommendations

**STEP 3: Patient VTE Risk Factor Reassessment**
- Risk factors reassessment conducted and documented:
  - Prior to any surgical or procedural intervention
  - Change in patient’s condition
  - Minimally once every 24 hours
- Mechanical prophylaxis ongoing:
  - Skin examination (wound care team consulted, if necessary), inspection care plan and treatment recommendations
  - Ensure on patient
  - Ensure properly measured, fitted and worn:
    - Minimally 18-20 hours per day (removed for 30 minutes maximum)
    - Skin inspection per wound care team protocol or inspected minimally every 8 hrs
  - IPC/VFP removed for ambulation
  - Patient provided with information on proper use and wearing of all mechanical devices and able to read back to caregiver
- Pharmacological prophylaxis continued as prescribed
- Ambulation progression, as prescribed by health provider
- Discharge planning:
  - Discussed with patient/family
  - Collaboration & recommendations with patient’s case manager and/or transition care specialist (discharge coach) for rehabilitation transition potential and patient mobility/functional goals
  - Discussion with physical therapist for current and future mobility/functional goals
  - Anticipated discharge date determined
  - Evaluate patient for mechanical prophylaxis for home use
  - Order home mechanical prophylaxis if discharge occurs
  - Continue home use post discharge unless specified differently by the clinician

**STEP 4: Patient Discharge or Transition to Rehab**
To reduce readmissions and increase better health outcomes, the discharge or transfer to rehabilitation of all stroke patients should be planned. Health professionals should ensure patients understand the role of ordering physician-prescribed pharmacological prophylaxis and of wearing thigh-length compression IPC and stockings to prevent further stroke/VTE incidents are essential.

- Discharge instructions include:
  - Healthcare provider contact information
  - Signs and symptoms of DVT and PE
  - Evaluate patient for home use of:
    - Intermittent pneumatic compression (IPC) thigh length
    - Anti-embolism stockings
    - Venous foot pump
- Discharge instructions:
  - Reviewed with patient and read back
  - Received by patient
- Patient understands DVT/PE risk factors and how to prevent at home
  - Follow up appointment made
  - If immobility or bedrest required:
    - Health care provider orders completed, including:
      - Evaluated patient for home use of:
        - Mechanical prophylaxis
        - Length of mechanical prophylaxis treatment
        - Durable medical equipment unit notified of start date of IPC/VFP treatment
  - Patient provided with information on:
    - Purpose of mechanical prophylaxis
    - Proper use and wearing
    - Importance on maintaining use at home until MD discontinues
    - Removed for ambulation and skin inspections (every 8 hrs)
    - Worn minimally 18-20 hours per day (removed for 30 minutes maximum)

**Note:** These recommendations are intended as a list of recommended steps to maximize VTE prevention, promote patient safety and health outcomes. Nothing contained in these recommendations may replace or be a substitute for the medical advice of the attending clinician. February 2015
Overview of Stroke VTE Recommendations

Currently available in pdf form at:
https://ppahs.files.wordpress.com/2015/02/2015_strokevte_safety_recommendations.pdf
http://bit.ly/1C76ZqK

Questions:
• Would you prefer the Recommendations be in current pdf form or web-enabled application?
• Would you be interested in seeing Practical Clinical Tips for preventing VTE in stroke patients?
  - articles
  - podcasts
  - webinars
Thanks Stroke Group!

Mark Alberts, MD, FAHA
(Clinical Vice-Chair for Department of Neurology and Neurotherapeutics, Southwestern Medical Center)

Louise Briggs
(AHP Therapy Consultant, St George's Hospital London)

Martin Dennis, MD
(Bramwell Dott Building, University of Edinburgh, Western General Hospital)

Risha Gupta, MD
(Vascular Neurology, Wellstar)

Christine A. Holmstedt D.O.
Director, Acute Stroke Service
Medical University of South Carolina

Joseph Hormes, MD
(Neurologist, Marietta Neurology & Headache Center, Wellstar)

Irene Katzan, MD, MS
(Director, Neurological Institute Center for Outcomes Research and Evaluation, Cleveland Clinic)

Ahmad Khalidi, MD
(Neurological Surgery, Wellstar)

Loch Macdonald
(Scientist, Keenan Research Centre, Li Ka Shing Knowledge Institute, St. Michael's Hospital; Professor, Surgery/Neurosurgery, University of Toronto; Division Head, Neurosurgery & Keenan Endowed Chair, Surgery, St. Michael's Hospital)

Kathy Morrison, MSN, RN, CNRN, SCRN
(Stroke Program Manager, Penn State Hershey Medical Center)

Laurie Paletz, BSN, PHN RN-BC
(Stroke Program Coordinator
Cedars-Sinai Medical Center)

Mark Reiter, MD, MBA
(CEO, Emergency Excellence
Residency Director, The University of Tennessee at Murfreesboro; President, American Academy of Emergency Medicine)

Bruce Ritchie
(Professor of Medicine, Director Canadian BioSample Repository, Principal Investigator Blood Borne Pathogens Surveillance Project, Medical Director, Medical Outpatients, University Hospital
Medical Director, Dr. John Akabutu Comprehensive Centre for Bleeding Disorders, Medical Director, Northern Alberta Comprehensive Centre for Rare Blood Disorders)

Robert H. Rosenwasser, MD, FAHA
(Professor and Chair of the Department of Neurological Surgery, Director, Division of Neurovascular Surgery and Endovascular Neurosurgery
Jefferson University Hospitals)

Lee Schwamm, MD, FAHA
(Vice Chair of Neurology, Professor of Neurology, Harvard Medical School; Chair, American Heart Association GWTG Steering Committee; Director, Stroke Program/Telemedicine, Massachusetts General Hospital)

Jeffrey L. Saver, MD, FAHA, FAAN, FANA
(Professor of Neurology
Geffen School of Medicine at UCLA
Director, UCLA Comprehensive Stroke Center)

Ashfaq Shuaib, MD, FRCP, FAHA
(Professor, Department of Medicine
Director, Stroke Program
University of Alberta)

Deborah Summers, MSN, RN, AHCNS-BC, CNRN, SCRN
(Stroke Outcomes APN, Saint Luke’s Health System’s Marion Bloch Neuroscience Institute)

Susan Zimmermann, BSN,CNRN
Program Manager Neurosciences
WellStar Kennestone Hospital

Richard D. Zorowitz, M.D.
(Associate Professor of Physical Medicine and Rehabilitation
The Johns Hopkins University School of Medicine
Chairman, Department of Physical Medicine and Rehabilitation, Johns Hopkins Bayview Medical Center)

Facilitators Physician-Patient Alliance for Health & Safety:
Michael Wong, JD (Executive Director)
Lynn Razzano, RN, MSN, ONCC (Clinical Nurse Consultant)
Questions?