Piecing together the new CHEST guidelines

Highlights of CHEST 2012

- Downgraded strength of recommendations
- Novel oral anticoagulants
- Aspirin for everyone
- Mechanical valve replacement and additional risk factors
- Extended interval monitoring
- Duration of anticoagulation therapy
- Orthopedic prophylaxis
- Perioperative bridging

To what extent have you adopted the CHEST 2012 guidelines?
1. All
2. Most
3. A few
4. None

Decrease in 1A recommendations
- Thrombosis experts excluded from final recommendations¹
  - Involved in discussions and review of evidence
  - Unconflicted methodologists took responsibility for each chapter
    - Not necessarily thrombosis experts
    - Minimized financial and intellectual conflict of interest

Defining recommendation grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Benefit vs. Risk</th>
<th>Strength of Supporting Evidence</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Benefit clearly outweighs risk</td>
<td>RCTs - consistent evidence without important limitations</td>
<td>Application to most patients in most circumstances</td>
</tr>
<tr>
<td>2A</td>
<td>Benefits closely balanced with risks</td>
<td>RCTs - consistent evidence without important limitations</td>
<td>Best action may differ depending on circumstances</td>
</tr>
<tr>
<td>2B</td>
<td>Benefits closely balanced with risks</td>
<td>Limitations with RCTs</td>
<td>Best action may differ depending on circumstances</td>
</tr>
</tbody>
</table>


Decrease in 1A recommendations
- New approach to determining strength of recommendation¹
  - 1A if treatment benefits all aspects of care
  - Surrogate vs. patient-important endpoints
  - Patient values and preferences considered²
    - Accessibility
    - Financial impact

Novel Oral Anticoagulants

<table>
<thead>
<tr>
<th>FDA indication</th>
<th>Daiogram®</th>
<th>Rivaroxaban®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce risk of stroke or systemic embolism in non-valvular AF</td>
<td>Reduce risk of stroke or systemic embolism in non-valvular AF</td>
<td></td>
</tr>
<tr>
<td>Mechanism of Action</td>
<td>Direct thrombin inhibitor</td>
<td>Factor Xa inhibitor</td>
</tr>
<tr>
<td>Afib Dose</td>
<td>150 mg BID</td>
<td>10mg daily</td>
</tr>
<tr>
<td>Renal Adjustment</td>
<td>CrCl 15-30 mL/min</td>
<td>CrCl 15-50 mL/min</td>
</tr>
<tr>
<td>Ortho Prophylaxis Dose</td>
<td>N/A in US</td>
<td>10mg daily</td>
</tr>
</tbody>
</table>

Aspirin for Primary Prevention

- **CHEST 2012 (2.1)**
  - “For persons aged 50 years or older without symptomatic cardiovascular disease, we suggest low-dose aspirin 75 to 100mg daily over no aspirin therapy” (2B)
- **CHEST 2008 (5.0-5.4.1)**
  - Moderate risk (10-year risk > 10%) (2A)

Mechanical Valves

- **CHEST 2012 (9.5)**
  - INR goal of 3.0 (2.5-3.5) with mechanical valves in the mitral AND aortic position
  - No additional benefit with higher INR goal in patients with additional risk factors
  - Aortic valve with additional risk factors: INR goal of 2.5

Piecing together the new CHEST guidelines

**Atrial Fibrillation**

Part 1: Shaunte Pohl PharmD, BCPS


The 2012 CHEST guidelines would recommend which of the following for MJ?

- **a. CHADS2 = 0; start aspirin**
- **b. CHADS2 = 1; start aspirin and clopidogrel**
- **c. CHADS2 = 1; start oral anticoagulation**
- **d. CHADS2 = 2; start oral anticoagulation**
Initiating therapy

CHEST 2012 2.1.8-2.1.10

<table>
<thead>
<tr>
<th>CHADS2</th>
<th>Medication Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk = 0</td>
<td>No therapy (2B)</td>
</tr>
<tr>
<td>Intermediate Risk = 1</td>
<td>Oral anticoagulation (1B)</td>
</tr>
<tr>
<td>High Risk = 2 or greater</td>
<td>Oral anticoagulation (1A)</td>
</tr>
</tbody>
</table>

The 2012 CHEST guidelines suggest which of the following medications for MJ?

a. Warfarin 5 mg daily
b. Aspirin 75 mg daily
c. Dabigatran 150 mg twice a day
d. Clopidogrel 75 mg daily

Therapy recommendations

- CHEST 2012 2.1.11
  - Recommends the use of dabigatran 150mg twice a day as first line oral anticoagulant therapy rather than dose adjusted VKA therapy. (2B)

Following patients are listed as exceptions to the above recommendation and adjusted dose VKA is recommended:

- AF and mitral stenosis
- AF and stable coronary artery disease
- AF and placement of an intracoronary stent
- AF and ACS with no intracoronary stent placement

MJ requests that she be started on warfarin due to the cost of dabigatran. Her physician agrees and sends her to your clinic. The 2012 CHEST guidelines would suggest which of the following doses?

a. Warfarin 2.5 mg for two days
b. Warfarin 5 mg for two days
c. Warfarin 7.5 mg for two days
d. Warfarin 10 mg for two days
Warfarin dosing

<table>
<thead>
<tr>
<th>CHEST 2008 2.1.1, 2.2.1</th>
<th>CHEST 2012 2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial dose of 5-10 mg for 1-2 days (1B)</td>
<td>Initial dose of 10 mg for 2 days (2C)</td>
</tr>
<tr>
<td>Initial dose &lt; 5 mg for (1C): Debilitated, Recent surgery, Elderly, Malnourished, CHF, Liver disease, Taking medications that may increase sensitivity to warfarin</td>
<td>No additional dosing recommendations made</td>
</tr>
</tbody>
</table>

Piecing together the new CHEST guidelines

Atrial Fibrillation (AF)
Part 2

Brooke Griffin, PharmD

Puzzle #1: SB

SB is a 92yo African American female with PMH of AF (diagnosed 2004), HTN, OA, PUD (ulcer 1960), CKD (CrCl~20ml/min) and history of breast cancer.

Current medications: warfarin 5mg (7.5mg Sun and 5mg rest of week), aspirin 81mg daily, furosemide 40 daily, esomeprazole 40mg daily, docusate 100mg daily prn, diltiazem 180 daily, calcium carbonate 500mg daily, vitamin D 1000units daily, metoprolol 50mg twice daily, anastrazole 40mg daily

Recent INR values (goal INR 2-3)

<table>
<thead>
<tr>
<th>Date</th>
<th>INR</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/27</td>
<td>2.4</td>
<td>Continue present management (CPM) (7.5mg Sun and 5mg rest of week)</td>
</tr>
<tr>
<td>7/30</td>
<td>2.2</td>
<td>CPM</td>
</tr>
<tr>
<td>7/2</td>
<td>2.4</td>
<td>CPM</td>
</tr>
<tr>
<td>5/5</td>
<td>2.2</td>
<td>CPM</td>
</tr>
<tr>
<td>5/28</td>
<td>2.1</td>
<td>CPM</td>
</tr>
<tr>
<td>5/7</td>
<td>2.7</td>
<td>CPM</td>
</tr>
<tr>
<td>4/16</td>
<td>1.9</td>
<td>CPM</td>
</tr>
<tr>
<td>4/2</td>
<td>2.3</td>
<td>CPM</td>
</tr>
</tbody>
</table>

What is “Extended Duration?”

CHEST 2012 (3.1)¹

- “For patients taking VKA therapy with consistently stable INRs, we suggest an INR testing frequency of up to 12 weeks rather than every 4 weeks” (2B)

CHEST 2008 (2.3.2)²

- “For patients taking a stable dose of oral anticoagulants, we suggest monitoring at an interval of no longer than every 4 weeks” (2C)

A pharmacy student asks you if this patient is a candidate for “extended duration” follow-up, per the new CHEST guidelines.

Your response:

A. No, because of her age
B. No, because she had one out of range INR in the last 6 months
C. No, because she is noncompliant with visits
D. Yes, she is a candidate

What is “Consistently Stable?”

One reference in CHEST 2012:

- One year, single center study (n=250, age ~70, mostly men, mostly AF)
  - Patients were on the same dose x 6 months
  - Patients were interviewed every 4 weeks
  - Results: 12 week follow-up is safe and noninferior to 4 week follow-up
  - No clinical outcomes

Considerations:

- Grade 2B recommendation
- May be useful in well educated, stable, compliant, young patients

Does SB need Vitamin K?

CHEST 2012 (9.1)

- “For patients taking VKAs with INRs between 4.5 and 10 with no evidence of bleeding, we suggest against the routine use of vitamin K” (2B)
- “For patients taking VKAs with INRs ≥10.0 and with no evidence of bleeding, we suggest that oral vitamin K be administered” (2C)
  - There was no difference in thromboembolic events or bleeding episodes when vitamin K was administered compared to placebo (pooled analysis).2,5

SB asks you about a new drug she heard about on the news for AF, dabigatran. What is your response?

A. Dabigatran is not approved for AF
B. CHEST 2012 recommends warfarin over dabigatran for AF
C. SB is not a candidate
D. SB is a candidate

Can SB switch to dabigatran?

CHEST 2012 (2.1.11)

- “For patients with AF, including those with paroxysmal AF, for recommendations in favor of oral anticoagulation, we suggest dabigatran 150mg twice daily rather than adjusted-dose VKA therapy (target INR range, 2-3)” (2B)

Details about dabigatran

CHEST 2012

- Dabigatran is favored in patients with AF who are similar to patients in the RE-LY trial2
  - No valvular disease, younger patients, no liver disease, not pregnant, CrCl >30mL/min

- Dabigatran is the only new FDA-approved VKA therapy alternative for AF

**Dabigatran vs. Rivaroxaban for AF?**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dabigatran</th>
<th>Rivaroxaban</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Trial</strong></td>
<td>RE-DEF</td>
<td>ROCKET-AF</td>
</tr>
<tr>
<td>Patients in Trial</td>
<td>N=15,000; mean age 71; male 65%</td>
<td>N=14,000; median age 75; male 60%</td>
</tr>
<tr>
<td><strong>Efficacy Compared to Warfarin</strong></td>
<td>110mg twice daily: Non-inferior (not approved)</td>
<td>20mg once daily: Non-inferior</td>
</tr>
<tr>
<td>Renal Dosing</td>
<td>CrCl 15-30ml/min: 75mg twice daily, however, pts with CrCl&lt;30ml/min were excluded from RE-DEF</td>
<td>CrCl 15-50ml/min: 15mg daily</td>
</tr>
<tr>
<td>Safety Compared to Warfarin</td>
<td>Increased rate of GI bleed</td>
<td>Increased rate of GI bleed</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>References to be determined</td>
<td>References to be determined</td>
</tr>
</tbody>
</table>

**Drug Interactions**
- Avoid with rifampin
- Reduce dabigatran dose with dronedarone and ketocazole in patients with CrCl 30-50ml/min

**Clinical Pearls**
- Caution regarding bleeding risk in older patients
- Twice daily administration

**Issues for Both Drugs**
- No antidote
- No monitoring (VTA)
- No head-to-head comparison trial data

**References**

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**Piecing together the new CHEST guidelines: Venous Thromboembolism Updates**

Brian Cryder, PharmD, BCACP, CACP


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**Options vs Preference**

- **CHEST 2012 (2.1.1):**
  - “In patients undergoing THA or TKA, recommend... for a minimum of 10-14 days rather than no prophylaxis”
    - LMWH, fondaparinux, apixaban, dabigatran, rivaroxaban, LDUH, adjusted dose VKA, aspirin (1B) or IPDCD (3C) * from 2008
- **CHEST 2012 (2.3.1):**
  - “...we suggest the use of LMWH in preference to the other agents we recommended” (2B, except for 2C vs aspirin and adjusted dose VKA)
- **Both 2008 and 2012 consistent on duration**
  - Up to 35 days preferred over minimum of 10-14 days

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**American Academy of Orthopedic Surgeons: 2011 guidelines**

- “Current evidence is unclear about which prophylactic strategy (or strategies) is/are optimal or suboptimal. Therefore, we are unable to recommend for or against specific prophylactics in these patients.” (Grade of Recommendation: Inconclusive)
- “In the absence of reliable evidence about how long to employ these prophylactic strategies, it is the opinion of this work group that patients and physicians discuss the duration of prophylaxis.” (Grade of Recommendation: Consensus)

---

**Puzzle #1: Which thromboprophylaxis would you choose for a total knee replacement?**

1. Enoxaparin
2. Rivaroxaban
3. Fondaparinux
4. Warfarin
5. Aspirin
6. Other

---

6/4/2012
### Making the case for halting anticoagulants or continuing warfarin

**CHEST 2012 (3.1.4)**
- “In patients with unprovoked DVT of leg (distal or proximal), we recommend... at least 3 months over treatment of shorter duration. After 3 months... should be evaluated for the risk-benefit ratio of extended therapy” (1B)

**CHEST 2012 (3.4)**
- “In patients with DVT of leg who receive extended therapy, we suggest treatment with the same anticoagulant chosen for the first 3 months” (2C)

### Making the case for transition to aspirin

**CHEST 2012**: no mention of aspirin as an option in this context

- **WARFASA study (2012)**
  - RCT of 402 unprovoked VTE patients after 6-18 months of VKA therapy
  - ASA 100mg daily vs placebo
  - ASA decreased DVT rate but no difference in PE

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### Making the case for transition to dabigatran

**CHEST 2012** (remarks on section 3.3)
- “Treatment of VTE with dabigatran or rivaroxaban, in addition to being less burdensome... may prove to be associated with better clinical outcomes”
- Postmarketing studies not available at time of guideline preparation

- **RE-MEDY**: dabigatran = warfarin in 6-36 month extension but ↑ MI rate with dabigatran
- **RE-SONATE**: dabigatran > placebo in 6 month extension, no difference in MI rate

---

### Making the case for re-evaluating objective testing

- **D-Dimer** — systematic review of 1st unprovoked VTE
  - Negative result: ~3.5% annual recurrence rate
  - Positive result: ~8.9% annual recurrence rate
  - *Chest* 2012 (64, 3): 199-207

- **Venous doppler** — mixed opinion
  - Prandoni, et al: (+) residual thrombus = ↑ risk
  - PROLONG: (+) residual thrombus = not a risk factor
  - *Chest* 2012 (64, 3): 199-207
  - Chest 2012: 19-22

- **Thrombophilia screening**
  - No evidence to support benefit of testing routinely

- **CHEST guidelines**: do not address topic for duration of therapy

---

### Puzzle #2A: patient has just completed 6 months of warfarin therapy after an unprovoked distal deep vein thrombosis. What is your long term anticoagulation recommendation?

1. D/c all anticoagulants
2. Continue warfarin
3. Switch to aspirin
4. Switch to dabigatran
5. Order other diagnostic tests
6. Other

---

### 2012 vs 2008: different answers?

**CHEST 2008**
- More generalized recommendations
  - 2.1.1 provoked (transient risk factor)
  - 2.1.2 unprovoked
  - 2.1.3 concurrent malignancy

**CHEST 2012**
- Much more specific for patient subgroups
  - 3.1.1: provoked proximal (surgery)
  - 3.1.2: provoked proximal (transient risk factor)
  - 3.1.3: any provoked distal
  - 3.1.4: (1-5): unprovoked (various)
  - 3.1.5: concurrent malignancy

---

Other Key Updates Related to VTE

- Medical Prophylaxis
  - Acutely ill hospitalized medical patients at ↑ VTE risk
    - LMWH, UFH, or fondaparinux (grade 1B)
  - Acutely ill hospitalized medical patients at ↓ VTE risk
    - Do not use pharmacologic or mechanical prophylaxis (grade 1B)
- Suspected VTE
  - High suspicion – use parenteral anticoagulant
  - Intermediate – use parenteral anticoagulant if results delayed > 4 hours
  - Low suspicion – no anticoagulant recommended (if results within 24 hours)

Puzzle #1- The random 1.5 INR

- Ji is a 58 year old WF who presents to the anticoagulation clinic for routine INR check. She has been on warfarin since her (mechanical) mitral valve replacement surgery in 2008. Her current warfarin dose is 5 mg daily.
  - No c/o bleeding or bruising. Ji typically eats a spinach salad 3x/week and is typically very consistent with greens. No recent medication changes, OTC meds, or herbal.
  - She missed a dose four days ago.
  - Other medications: lisinopril 10 mg daily, pravastatin 20 mg daily
- INR today is 1.5
- This is the lowest INR reported to date. Ji’s INR has been very stable in the past year in the 2.5-3.5 range. Four weeks ago, her INR was 3.3.

CHEST 2012 Recommendations

- CHEST 2012 (3.2):
  - “For patients with previously stable therapeutic INRs who present with a single out-of-range INR of 0.5 below or above therapeutic, we suggest continuing the current dose and testing the INR within 1-2 weeks” (2C)
- CHEST 2012 (3.3):
  - “For patients with stable therapeutic INRs presenting with a single subtherapeutic INR value, we suggest against routinely administering bridging with heparin” (2C).

What would you recommend for this patient?

A. 10 mg x 1, then CPM. Recheck 5d
B. 10 mg x 1, then CPM. Start LMWH until INR ≥ 2.5. Recheck 3d
C. Increase to 7.5 mg Sat/Tue; 5 mg other days. Recheck 10d
D. CPM. Recheck one week

Puzzle #2: Warfarin therapy interruption

- It is a few months later. You received a phone call today from Ji. She has been “back on track” for awhile, but now is inquiring about her upcoming colonoscopy. It is scheduled for October 1st at 9:00 AM.
  - She had a colonoscopy in 2006 and polyps were removed. The gastroenterologist wants her to hold warfarin prior to procedure.
  - She is wondering what she needs to do.
- Recent labs (done last month): CBC- WNL, CrCl=68 ml/min, current weight= 176 lb.
  - Last INR was 3.1 two weeks ago.

Piecing together the new CHEST Guidelines

Bridging Recommendations
Kathleen Vool, PharmD, CDE

What would you do for JJ?

- B. Hold warfarin from 9/26-9/30. Bridge with enoxaparin 80 mg daily.
- C. Hold warfarin from 9/28-9/30. Do not bridge.
- D. Cancel colonoscopy.

What would you do for JJ?

A. Hold warfarin 9/26–9/30. Bridge with enoxaparin 80 mg q12 hrs.
B. Hold warfarin from 9/26-9/30. Bridge with enoxaparin 80 mg daily.
C. Hold warfarin from 9/28-9/30. Do not bridge.
D. Cancel colonoscopy.

Risk Stratification for Determining the Need for Bridge Therapy

<table>
<thead>
<tr>
<th>Risk Stratum</th>
<th>Mechanical Heart Valve</th>
<th>Atrial Fibrillation</th>
<th>VTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Mitral or aortic valve prosthesis within 6 months or stroke or TIA</td>
<td>CHA4DS2 score 4 or 5</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Bileaflet aortic valve prosthesis and 3 or more of the following: AFib, prior stroke or TIA, HTN, DM, age ≥75 yrs</td>
<td>CHA4DS2 score 3 or 4</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Bileaflet aortic valve prosthesis without AFib and no other risk factors for stroke</td>
<td>CHA4DS2 score 0-2 (excluding no prior Ck or TIA)</td>
<td></td>
</tr>
</tbody>
</table>

Surgeries/procedures associated with increased bleeding risk

- Urologic surgery and procedures (transurethral prostate resection (TURP), bladder resection, nephrectomy, kidney biopsy)
- Pacemaker or implantable cardioverter defibrillator device implantation
- Colonic polyp resection
- Surgery in vascular organs (ex. kidney, liver, spleen)
- Bowel resection
- Major surgery with extensive tissue injury (cancer surgery, joint arthroplasty, reconstructive plastic surgery)
- Cardiac, intracranial, or spinal surgery

CHEST Guidance

- CHEST 2012 (2.1):
  
  “In patients who require temporary interruption of a VKA before surgery, we recommend stopping VKAs approximately 5 days prior to surgery instead of stopping VKAs a shorter time before surgery” [1C]

- CHEST 2012 (2.4):
  
  “In patients with a mechanical heart valve, AFib, or VTE at high risk for thromboembolism, we suggest bridging anticoagulation instead of no bridging during interruption of VKA therapy” [2C]

- CHEST 2012 (2.2):
  
  “In patients who require temporary interruption of a VKA before surgery, we recommend resuming VKAs approximately 12 to 24 h after surgery (evening or next morning) and when there is adequate hemostasis instead of later resumption of VKAs” [2C]
Key Pearls with Bridging

• See patients at least one week prior to the scheduled surgery date to plan appropriately
  – Balance risks of VTE vs. perioperative bleeding
  – Communicate with patient and involved providers
  – Factor in other issues such as cost/insurance coverage, ability to inject
• Make sure you have updated labs and weight (CrCl and CBC)

Key Pearls with Bridging

• Provide patients and providers with a calendar
• Patient and caregiver education on injection technique and calendar
• If possible, check INR on the date before surgery
• Assess post-op bleeding to help determine restart of anticoagulant medications
• Close follow up of INR following procedure/surgery

Remember SB?

• SB is a 92 y/o African American female with PMH of AF (diagnosed 2004), HTN, OA, PUD (ulcer 1960) and history of breast cancer.
• SB will be undergoing a spinal epidural in two weeks and is wondering what to do.
• She tells you that one of her friends had to take some sort of shots when off of warfarin and she is wondering if she needs to do this too?

SB- to bridge or not to bridge?

• Bridge and hold warfarin x 5-7 days prior
• Not bridge and hold warfarin x 5-7 days prior

SB - to bridge or not to bridge?

A. Bridge and hold warfarin x 5-7 days prior
B. Do not bridge and hold warfarin x 5-7 days prior
Considerations for SB

• Bleeding risk
  – Age
  – Spinal procedure- risk of bleeding is high
• Thrombosis risk
  – CHADS2 score of 2: HTN and age >75 y/o
• Low risk- do not bridge.
  – Lots of discussion needed in these scenarios between patient, anticoagulation provider, PCP and other physicians involved!

Thank you for participating!

• Acknowledgements:
  – Julie Fusco, PharmD, BCPS, CGP
  – Lea DelaPena, PharmD, BCPS

Post Test Questions

1. Which of the following is false regarding dabigatran?
   a. It is approved for use in atrial fibrillation
   b. In the RE-LY trial, dabigatran users experienced a higher rate of GI bleed compared with warfarin users
   c. Dabigatran is dosed once daily
   d. There is no antidote for dabigatran

2. GM is a 66yo male who has atrial fibrillation and renal insufficiency (CrCl 25ml/min) He brings a prescription to your pharmacy for rivaroxaban. Which of the following is a true statement?
   a. GM should not use rivaroxaban because it is contraindicated in patients with CrCl <30ml/min
   b. GM can use rivaroxaban 20mg daily
   c. GM can use rivaroxaban 15mg daily
   d. GM can use rivaroxaban 10mg daily

3. The generic names of the two newly available oral anticoagulants are:
   a. Warfarin and dabigatran
   b. Dabigatran and rivaroxaban
   c. Dabigatran and argatroban
   d. Rivaroxaban and argatroban

Piecing together the new CHEST guidelines

Erika Hellenbart, PharmD, BCPS
Shaunte Pohl, PharmD, BCPS
Brooke Griffin, PharmD
Brian Cryder, PharmD, BCACP, CACP
Kathleen Vest, PharmD, CDE

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   d. Rivaroxaban and argatroban

Acknowledgements:

– Julie Fusco, PharmD, BCPS, CGP
– Lea DelaPena, PharmD, BCPS
4. The standard dose of dabigatran for the risk reduction of stroke in patients with non-valvular atrial fibrillation is:
   a. 150mg BID
   b. 110mg BID
   c. 50mg BID
   d. 40mg BID

5. Per CHEST 2012, which of the following drug classes is preferred for use in total knee arthroscopy thromboprophylaxis in the absence of contraindications?
   a. Direct thrombin inhibitors (e.g. dabigatran)
   b. Low molecular weight heparin (e.g. enoxaparin)
   c. Vitamin K antagonist (e.g. warfarin)
   d. Factor Xa inhibitor (e.g. rivaroxaban)

6. JP is a 60 year old male patient who has been treated with warfarin for the past 6 months following an unprovoked deep vein thrombosis of the right lower extremity. His primary care physician would like to halt warfarin therapy and initiate aspirin 325mg daily. Does CHEST 2012 support this decision?
   a. Yes - it is included as a 1B recommendation for all unprovoked DVT patients
   b. Yes - it is included as an alternative for patients who are not candidates for transition to dabigatran
   c. No - CHEST 2012 states that aspirin use has no benefit following warfarin treatment for DVT prevention
   d. No - CHEST 2012 does not recommend for or against aspirin use after warfarin, but one clinical study supports this option

7. SG is a 47 year old patient with a mechanical heart valve in the aortic position. This patient does not have any other cardiovascular risk factors. According to CHEST 2012, what is the recommended INR goal?
   a. 1.8-3.2
   b. 2.0-3.0
   c. 2.5-3.5
   d. 3.0-4.0

8. Which of the following patients would be considered high risk for VTE?
   a. 39 year old male with AFib, HTN and diabetes.
   b. 79 year old female with HTN, diabetes, AFib, and a history of TIs.
   c. 45 year old patient with a history of PE five months ago.
   d. 76 year old male with a history of an aortic valve replacement and diabetes.

9. Which of the following procedures is associated with a high bleeding risk according to CHEST 2012?
   a. Root canal
   b. Transurethral prostate resection (TURP)
   c. Cataract surgery
   d. Dermatologic surgery