2019 ACC/AHA Atrial Fibrillation Guideline Update

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Kelly Peddy, PharmD, MPA, BCACP

Clinical Pharmacy Specialist, Ambulatory Care

Memorial Hospital of South Bend

Speaker Disclosure

- The presenter has no real or perceived conflicts of interest related to this presentation.

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Learning Objectives

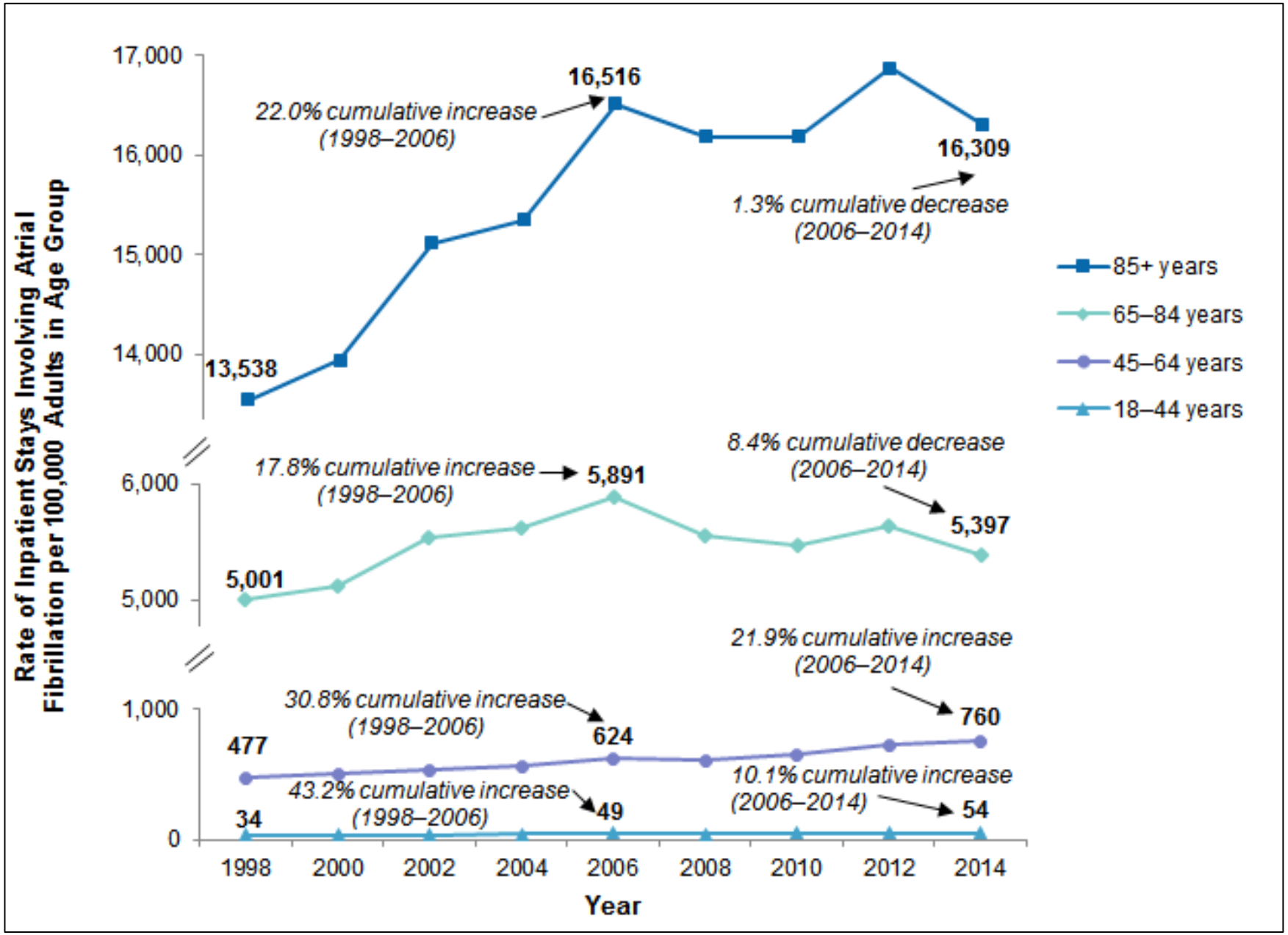
- Discuss how to calculate a CHA_2DS_2-VASc score.
- Review new recommendations on when anticoagulation is indicated in patients with atrial fibrillation (AF).
- Apply anticoagulation guideline updates to a patient case scenario.

Atrial Fibrillation (AF)

- Most common sustained arrhythmia diagnosed in clinical practice

- Epidemiology in the United States
  - Estimated 2.7 to 6.1 million diagnosed with atrial fibrillation
  - Lower incidence in African Americans than European descent
  - Increasing prevalence in United States
    - Aging population?

Sources: Atrial fibrillation fact sheet. Centers for Disease Control and Prevention website. Last reviewed August 22, 2019. Last accessed November 18, 2019.
January CT, Wann S, Alpert JS, et al. *Circulation.* 2014 December 2;64(21):2071-104.



Sources: Image obtained from https://www.hcup-us.ahrq.gov/reports/statbriefs/sb236-Atrial-Fibrillation-Hospital-Stays-Trends.jsp?utm_source=ahrq&utm_medium=en1&utm_term=&utm_content=1&utm_campaign=ahrq_en2_6_2018

Risk Factors for Atrial Fibrillation

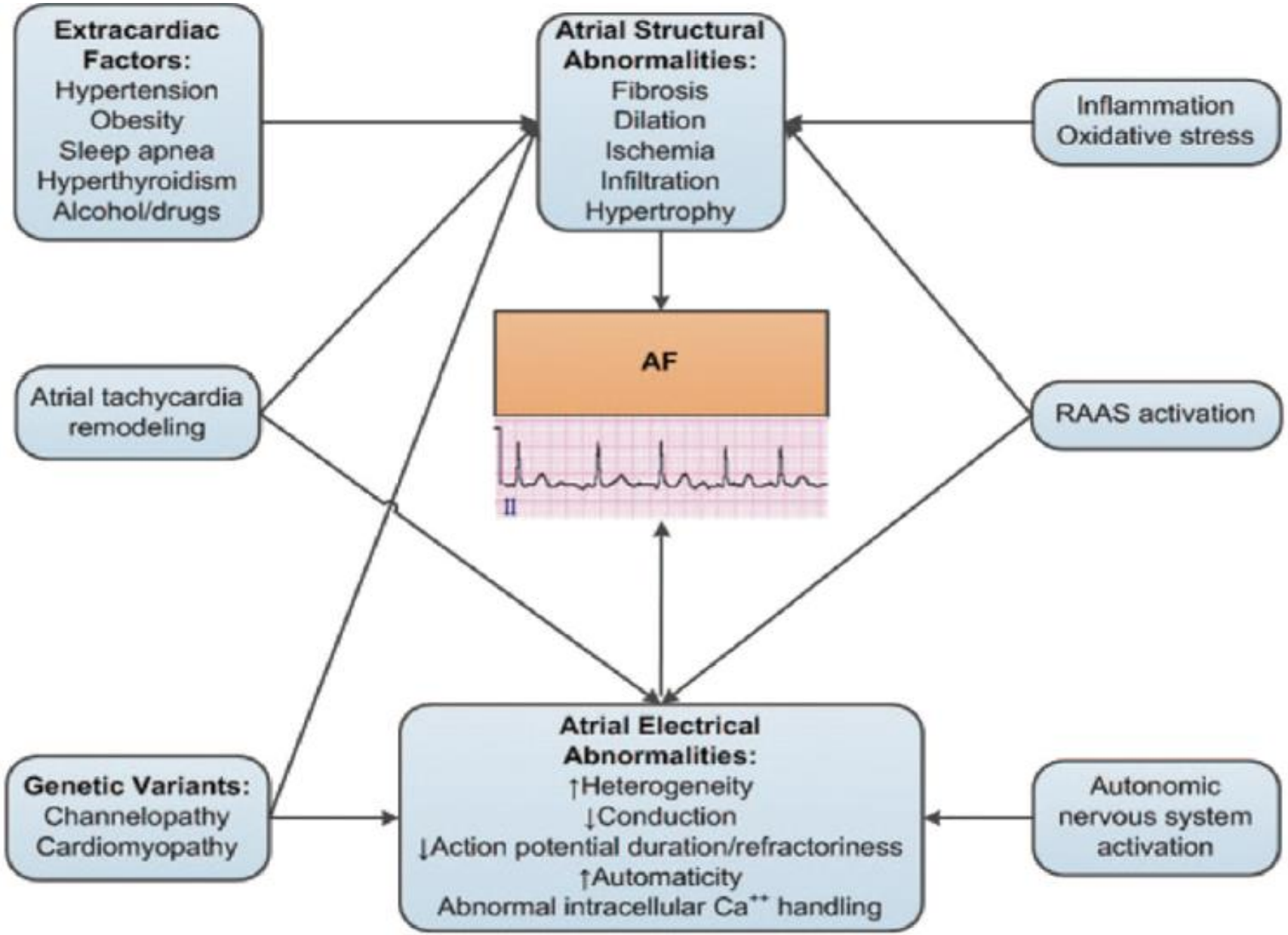
- Increasing age
- European ancestry
- Structural heart disease
- High blood pressure
- Hyperthyroidism
- Obesity
- Chronic kidney disease
- Heavy alcohol use

Source: January CT, Wann S, Alpert JS, et al. *Circulation*. 2014 December 2;64(21):2071-104.

Pathophysiology of Atrial Fibrillation

- Definition
  - Supraventricular tachyarrhythmia with uncoordinated atrial activation and consequently ineffective atrial contraction
- Mechanism of atrial fibrillation
  - Structural or electrophysiological (EP) abnormalities alter atrial tissue
  - Variety of abnormalities that can lead to atrial fibrillation
- "AF represents a final common phenotype for multiple disease pathways and mechanisms that are incompletely understood"

Source: January CT, Wann S, Alpert JS, et al. *Circulation*. 2014 December 2;64(21):2071-104.



Source: January CT, Wann S, Alpert JS, et al. *Circulation*. 2014 December 2;64(21):2071-104.

Diagnosis of Atrial Fibrillation

Signs

- Tachycardia
- Irregular pulse
- Hypotension

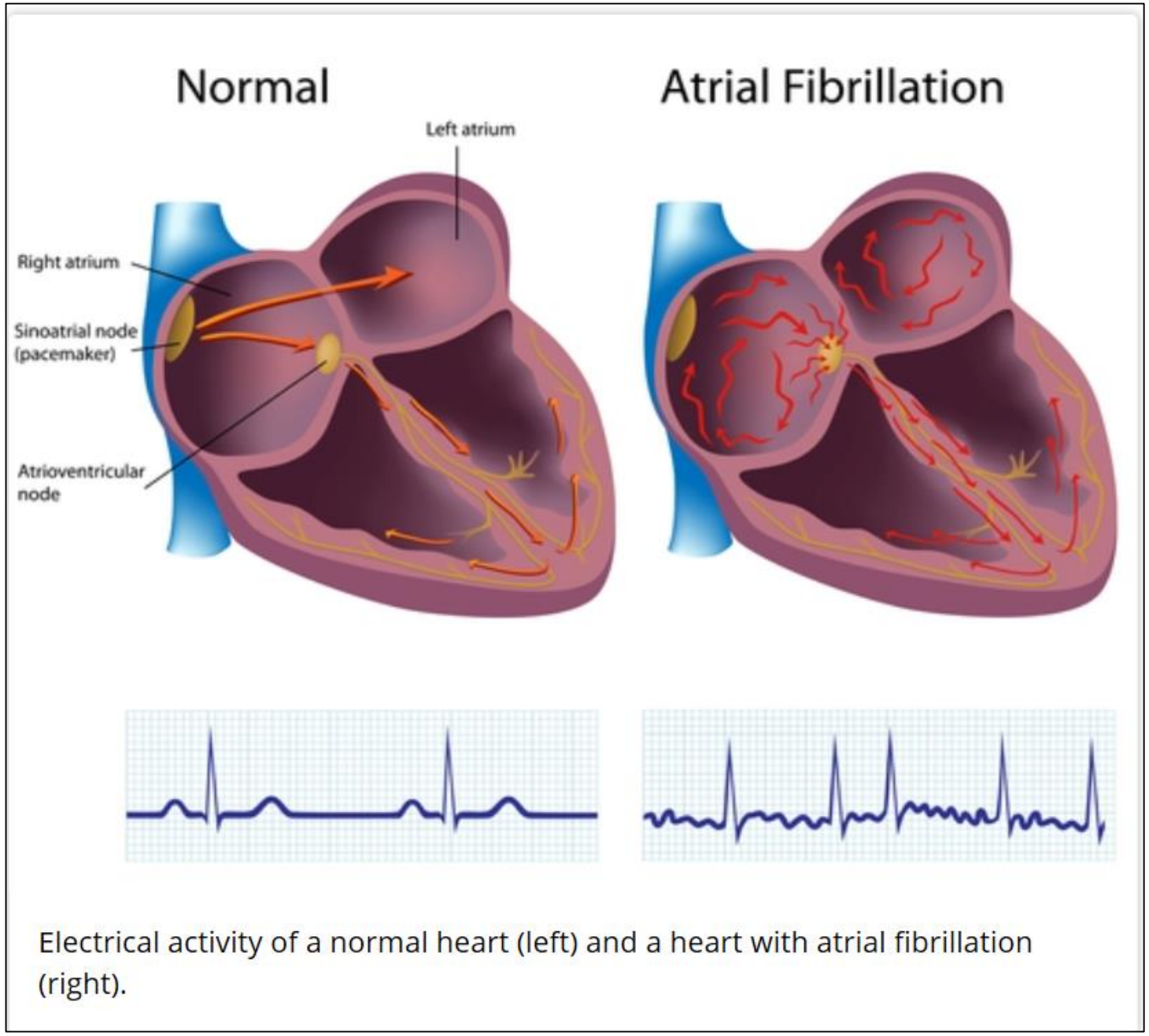
Symptoms

- Fatigue
- Palpitations
- Dizziness
- Syncope
- Dyspnea
- Orthopnea

Diagnostic Tests

- Electrocardiogram (ECG or EKG)
- Holter Monitor
- Event Monitor

Source: Gutierrez C and Blanchard DG. *Am Fam Physician.* 2016 Sep 15;94(6):442-452.



Electrical activity of a normal heart (left) and a heart with atrial fibrillation (right).

Source: Atrial fibrillation fact sheet. Centers for Disease Control and Prevention website. Last reviewed August 22, 2019. Last accessed November 18, 2019.

Classification of Atrial Fibrillation

Term	Definition
Paroxysmal Atrial Fibrillation	• Terminates spontaneously or with intervention within 7 days of onset • May recur with variable frequency
Persistent Atrial Fibrillation	• Continuous atrial fibrillation sustained > 7 days
Long-standing Atrial Fibrillation	• Continuous atrial fibrillation > 12 months in duration
Permanent Atrial Fibrillation	• Term used when patient and clinician make joint decision to stop further attempts to restore and/or maintain sinus rhythm • Represents a therapeutic attitude vs. pathophysiological description
Nonvalvular Atrial Fibrillation	• Absence of moderate-to-severe mitral stenosis or mechanical heart valve**

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

Complications of Atrial Fibrillation

- Ischemic Stroke
- Peripheral Thromboembolism
- Heart Failure
- Dementia
- Mortality

Source: Atrial fibrillation fact sheet. Centers for Disease Control and Prevention website. Last reviewed August 22, 2019. Last accessed November 18, 2019.

Pharmacologic Management of Atrial Fibrillation

- Prevention of thromboembolism
  - Decision between patient and provider
  - Risk stratification scoring systems provide assistance

- Risk stratification for bleeding and thromboembolism risk
  - Thromboembolism - CHA_2DS_2-VASc, $CHADS_2$
  - Bleeding - HAS-BLED, ATRIA

- Rhythm versus rate control
  - Will not plan to discuss during this webinar
  - Refer to 2014 ACC-AHA-HRS AF guidelines

$CHADS_2$ Score

$CHADS_2$ Components (possible points)	Point Totals	Adjusted Stroke Rate (% per year)
	0	1.9%
Congestive Heart Failure (1 point)	1	2.8%
Hypertension (1 point)	2	4.0%
Age ≥ 75 years (1 point)	3	5.9%
Diabetes mellitus (1 point)	4	8.5%
Stroke, Transient Ischemic Attack (TIA), or Thromboembolism (TE) (2 points)	5	12.5%
Maximum Score	6	18.2%

CHA_2DS_2-VASc Score

CHA_2DS_2-VASc Components (possible points)	Point Totals	Adjusted Stroke Rate (% per year)
Congestive Heart Failure (1 point)	1	1.3%
Hypertension (1 point)	2	2.2%
Age ≥ 75 years (2 point)	3	3.2%
Diabetes mellitus (1 point)	4	4.0%
Stroke, TIA, or TE (2 points)	5	6.7%
Vascular disease (1 point)	6	9.8%
Age 65 to 74 years (1 point)	7	9.6%
Sex category (female, 1 point)	8	6.7%
Maximum Score	9	15.20%

Source: January CT, Wann S, Alpert JS, et al. *Circulation*. 2014 December 2;64(21):2071-104.

CHA_2DS_2-VASc Score

- Developed in 2010 as update to $CHADS_2$ score
  - Improved at identifying "low risk" patients
- Clinical question- Is CHA_2DS_2-VASc the best stroke risk prediction tool?
  - Results from validation studies in different ethnicities vary
  - Debate about what score (0 vs. 1) is considered low risk
  - Is sex category a risk factor or risk modifier?
- 2014 ACC/AHA/HRS Guidelines
  - "Continued evolution of atrial fibrillation related thromboembolic risk evaluation is needed"

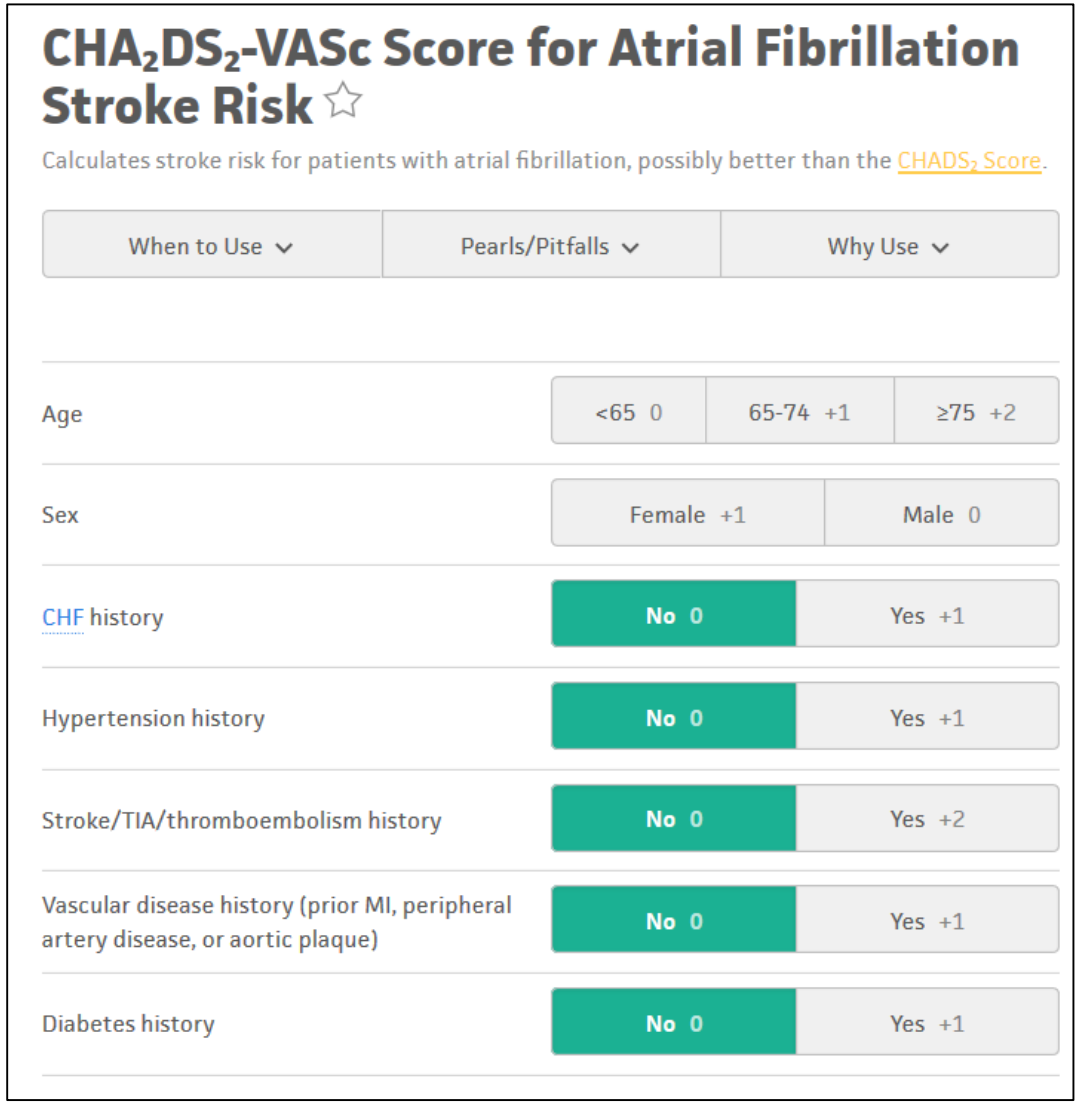
Source: Van Doorn S, Debray TP, Kaasenbrood F, et al. *J Thromb Haemost.* 2017 Jun;15(6):1065-1077.

HAS-BLED Score

HAS-BLED Components (possible points)	Point Totals	Risk of Major Bleeding
	0	0.9%
Hypertension (Systolic blood pressure > 160 mm Hg, 1 point)	1	3.4%
Abnormal renal/liver function (1 point)	2	4.1%
Stroke history (1 point)	3	5.8%
Bleeding history or predisposition (1 point)	4	8.9%
Labile INR (2 points)	5	9.1%
Elderly (age > 65 years, 1 point)	6	18.2%
Drugs predisposing bleeding (aspirin, clopidogrel, etc., 1 point)		
Alcohol usage (1 point)		

Source: January CT, Wann S, Alpert JS, et al. *Circulation*. 2014 December 2;64(21):2071-104.

MDCalc Website

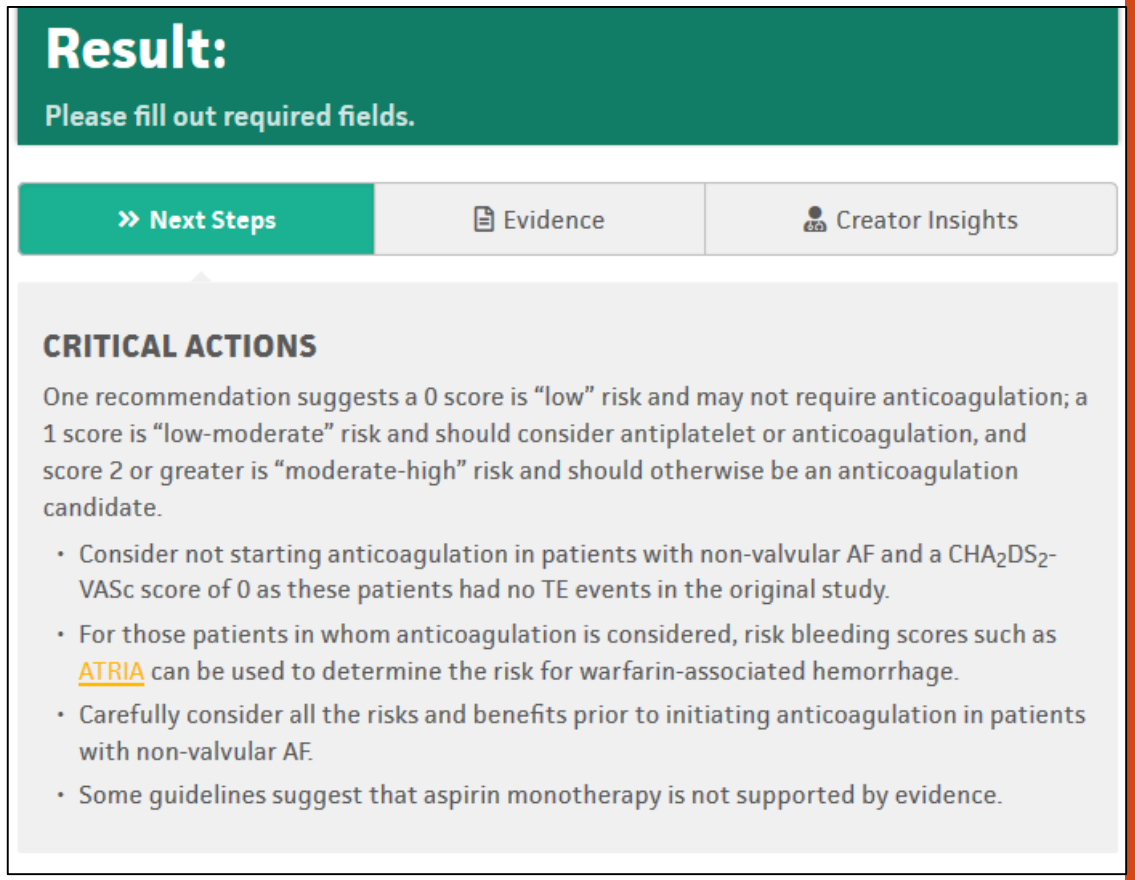


CHA_2DS_2-VASc Score for Atrial Fibrillation Stroke Risk ☆

Calculates stroke risk for patients with atrial fibrillation, possibly better than the $CHADS_2$ Score.

When to Use | Pearls/Pitfalls | Why Use

Age	<65 0	65-74 +1	≥75 +2
Sex	Female +1	Male 0	
CHF history	**No 0**	Yes +1	
Hypertension history	**No 0**	Yes +1	
Stroke/TIA/thromboembolism history	**No 0**	Yes +2	
Vascular disease history (prior MI, peripheral artery disease, or aortic plaque)	**No 0**	Yes +1	
Diabetes history	**No 0**	Yes +1	



Result:

Please fill out required fields.

» Next Steps | Evidence | Creator Insights

CRITICAL ACTIONS

One recommendation suggests a 0 score is "low" risk and may not require anticoagulation; a 1 score is "low-moderate" risk and should consider antiplatelet or anticoagulation, and score 2 or greater is "moderate-high" risk and should otherwise be an anticoagulation candidate.

- Consider not starting anticoagulation in patients with non-valvular AF and a CHA_2DS_2-VASc score of 0 as these patients had no TE events in the original study.
- For those patients in whom anticoagulation is considered, risk bleeding scores such as ATRIA can be used to determine the risk for warfarin-associated hemorrhage.
- Carefully consider all the risks and benefits prior to initiating anticoagulation in patients with non-valvular AF.
- Some guidelines suggest that aspirin monotherapy is not supported by evidence.

Source: Images obtained at https://www.mdcalc.com/cha2ds2-vasc-score-atrial-fibrillation-stroke-risk

HAS-BLED Score for Major Bleeding Risk

Estimates risk of major bleeding for patients on anticoagulation to assess risk-benefit in atrial fibrillation care.

When to Use | Pearls/Pitfalls | Why Use

Hypertension Uncontrolled, >160 mmHg systolic	**No 0**	Yes +1
Renal disease Dialysis, transplant, Cr >2.26 mg/dL or >200 µmol/L	**No 0**	Yes +1
Liver disease Cirrhosis or bilirubin >2x normal with AST/ALT/AP >3x normal	**No 0**	Yes +1
Stroke history	**No 0**	Yes +1
Prior major bleeding or predisposition to bleeding	**No 0**	Yes +1
Labile INR Unstable/high INRs, time in therapeutic range <60%	**No 0**	Yes +1
Age >65	**No 0**	Yes +1
Medication usage predisposing to bleeding Aspirin, clopidogrel, NSAIDs	**No 0**	Yes +1
Alcohol use ≥8 drinks/week	**No 0**	Yes +1

4 points

Risk was 8.9% in one validation study (Lip 2011) and 8.70 bleeds per 100 patient-years in another validation study (Pisters 2010).

Alternatives to anticoagulation should be considered: Patient is at high risk for major bleeding.

Copy Results | Next Steps

Source: Images obtained at https://www.mdcalc.com/has-bled-score-major-bleeding-risk#evidence

Patient Case—Question 1

- **69-year-old Caucasian female is found to be in atrial fibrillation during an inpatient stay at your hospital. After reviewing her chart, you identify that her past medical history includes hypertension, diabetes, obesity and hyperlipidemia. What is her CHA_2DS_2-VASc score?**
  - **A. 2**
  - **B. 3**
  - **C. 4**
  - **D. 5**

Patient Case—Response 1

- 69-year-old Caucasian female is found to be in atrial fibrillation during an inpatient stay at your hospital. After reviewing her chart, you identify that her past medical history includes hypertension, diabetes, obesity and hyperlipidemia. What is her CHA_2DS_2-VASc score?
  - A. 2
  - B. 3
  - C. 4
  - D. 5

2019 ACC-AHA Atrial Fibrillation Guideline

- Purpose of the update
  - New evidence, medications and devices since 2014
- Guideline updates focused on anticoagulation
  - CHA_2DS_2-VASc score risk stratification changes
  - Anticoagulant choices in end-stage renal disease or hemodialysis
- Refer to 2014 Atrial Fibrillation Guidelines for unchanged recommendations

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

2019 AF Guidelines: Anticoagulant Therapy Recommendations

CHA_2DS_2-VASc score recommended to assess stroke risk

- Anticoagulant therapy based on thromboembolism risk

Mechanical heart valves: warfarin recommended anticoagulant

Anticoagulant therapy based on thromboembolism risk

- Regardless of classification as paroxysmal, persistent, or permanent atrial fibrillation

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

2014 AF Guidelines: Antithrombotic Therapy Recommendations

Nonvalvular Atrial Fibrillation		
CHA_2DS_2-VASc Score	**Other Criteria**	**Recommendation**
0	–	Reasonable to omit antithrombotic therapy
1	–	No antithrombotic therapy or Oral anticoagulant or Aspirin may be considered
Greater than or equal to 2	–	Oral anticoagulants recommended
Greater than or equal to 2	End stage kidney disease (CrCl < 15 mL/min) or on hemodialysis	Reasonable to prescribe warfarin for oral anticoagulation
-	Previous stroke or transient ischemic attack (TIA)	Oral anticoagulants recommended

Source: January CT, Wann S, Alpert JS, et al. *Circulation.* 2014 December 2;64(21):2071-104.

2019 AF Guidelines: Antithrombotic Therapy Recommendations

Nonvalvular Atrial Fibrillation in Men		
CHA_2DS_2-VASc Score	**Other Criteria**	**Recommendation**
0	–	Reasonable to omit antithrombotic therapy
1	–	May consider oral anticoagulation
Greater than or equal to 2	–	Oral anticoagulants recommended (warfarin, dabigatran, apixaban, rivaroxaban, edoxaban)
Greater than or equal to 2	End stage kidney disease (CrCl < 15 mL/min) or on hemodialysis	Reasonable to prescribe warfarin or apixaban for oral anticoagulation

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

2019 AF Guidelines: Antithrombotic Therapy Recommendations

Nonvalvular Atrial Fibrillation in Women		
CHA_2DS_2-VASc Score	**Other Criteria**	**Recommendation**
1	–	Reasonable to omit antithrombotic therapy
2	–	May consider oral anticoagulation
Greater than or equal to 3	–	Oral anticoagulants recommended (warfarin, dabigatran, apixaban, rivaroxaban, edoxaban)
Greater than or equal to 3	End stage kidney disease (CrCl < 15 mL/min) or on hemodialysis	Reasonable to prescribe warfarin or apixaban for oral anticoagulation

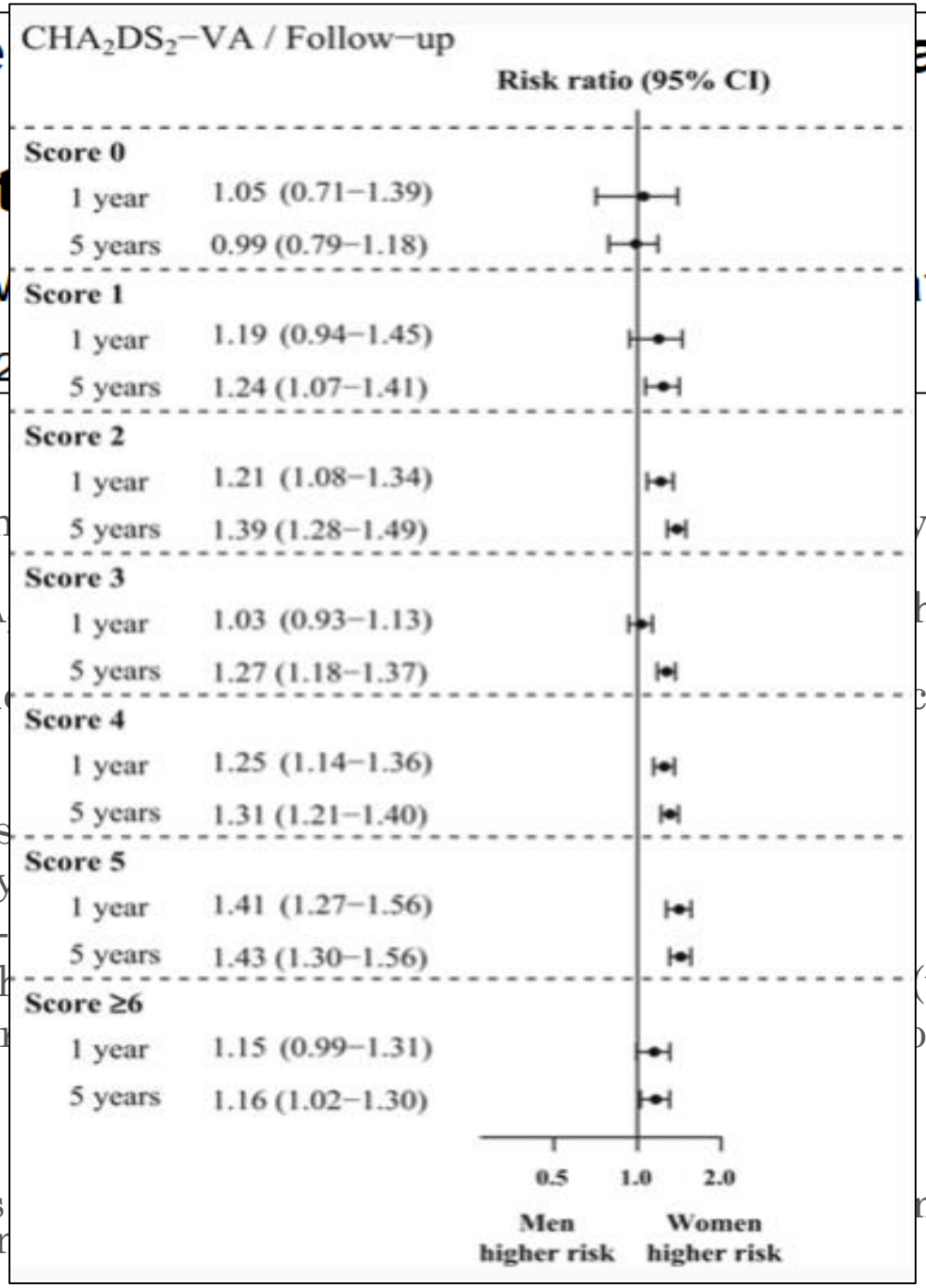
Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

CHA_2DS_2-VASc Scoring and Anticoagulation in Women

- Evidence supports female sex as risk factor for stroke in atrial fibrillation
  - 1.31-fold elevated risk of stroke in females with atrial fibrillation
  - Greatest risk in females aged ≥ 75 years
- What about female sex in absence of other risk factors?
- Sex category as a risk modifier vs. risk factor for stroke
  - Discussion surrounding how to risk stratify women
  - "Adding female sex to the CHA2DS2-VASc score matters for age > 65 years or ≥ 2 non-sex related stroke risk factors"

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

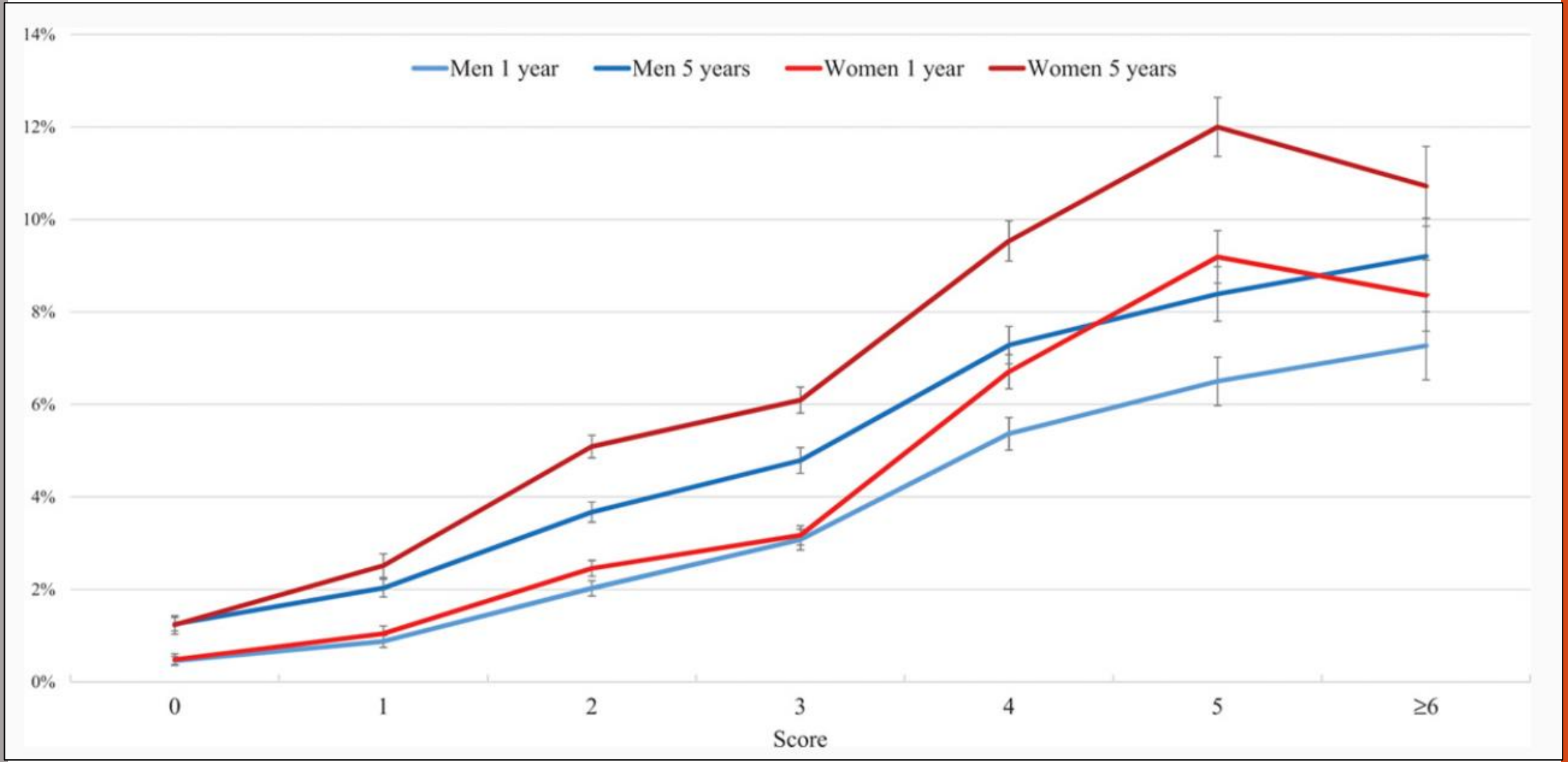
Female … Than a … Fibrillat… Should W… CHA_2DS_2… …ather … Atrial … …ther Than …



- Methods
  - Identified patien… …y 1, 1997 to December 31, 2015
  - Calculated CHA… …h Danish National Patient Registry
  - Primary outcom… …c embolism
- Results
  - 239,671 patients…
  - Mean age: 76.6 y…
  - Mean CHA_2DS_2-…
  - Overall 1-year th… …(women) and 5.7 (men)
  - 1-year absolute r… …omen with CHA_2DS_2-VA score of 0
- Conclusions
  - Female patients… …mbolic risk in comparison with male patien…

Source: Nielsen PB, Skjoth F, Overvad TF, Larsen, TB and Lip GY. *Circulation*. 2018;137:832-840.

Female Sex Is a Risk Modifier Rather Than a Risk Factor for Stroke in Atrial Fibrillation



Source: Nielsen PB, Skjoth F, Overvad TF, Larsen TB and Lip GY. *Circulation*. 2018;137:832-840.

Patient Case *(continued)*—Question 2

- 69-year-old Caucasian female is found to be in atrial fibrillation during an inpatient stay at your hospital. After reviewing her chart, you identify that her past medical history includes obesity and hyperlipidemia. You calculated her CHA_2DS_2-VASc score to be 2.
- The medical resident asks for your recommendation regarding thromboembolism prevention. What do you tell the physician?

  - A. Recommend no oral anticoagulant
  - B. Recommend aspirin 81mg po daily
  - C. Recommend clopidogrel 75mg po daily
  - D. Recommend rivaroxaban 20mg po daily

Patient Case *(continued)*—Response 2

- 69-year-old Caucasian female is found to be in atrial fibrillation during an inpatient stay at your hospital. After reviewing her chart, you identify that her past medical history includes obesity and hyperlipidemia. You calculated her CHA_2DS_2-VASc score to be 2.
- The medical resident asks for your recommendation regarding thromboembolism prevention. What do you tell the physician?

  - A. **Recommend no oral anticoagulant**
  - B. Recommend aspirin 81mg po daily
  - C. Recommend clopidogrel 75mg po daily
  - D. **Recommend rivaroxaban 20mg po daily**

2019 ACC-AHA Atrial Fibrillation Guideline Update

Non-vitamin K oral anticoagulants (NOACs) recommended over warfarin in NOAC-eligible patients with atrial fibrillation

- Examples- dabigatran, rivaroxaban, apixaban, edoxaban
- Exclusion criteria- moderate-to-severe mitral stenosis or mechanical heart valve

Consistent evidence of non-inferiority of NOACs vs. warfarin

Recommendation consistent with 2018 CHEST and European Society of Cardiology Atrial Fibrillation Guidelines

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

Edoxaban (Savaysa®)

- Approved for use in atrial fibrillation in January 2015
  - ENGAGE-TIMI trial
  - Edoxaban 60mg po daily noninferior to warfarin
  - Lower rates of major bleeding versus warfarin
- Mechanism of action
  - Factor Xa inhibitor
- Dosing
  - Not to be used in 15 mL/min < CrCl > 95 mL/min
  - CrCl 51-95 mL/min: 60mg PO daily
  - CrCl 15-50 mL/min: 30 mg PO daily
- Adverse effects
  - Similar to other oral anticoagulants

Source: Edoxaban: drug information. Lexi-Comp website. Last accessed November 18, 2019.

Name of Medication	Clinical Trial Comparing to Warfarin	Study Information	Efficacy Results	Safety Results
Dabigatran (Pradaxa®)	RE-LY trial	Subject number= 18,113 Mean TTR= 64% Mean $CHADS_2$= 2.1 Primary outcome= stroke and systemic embolism	• Dabigatran 150mg PO BID superior to warfarin	• Significantly lower risk of hemorrhagic stroke for dabigatran group • GI bleeding higher in dabigatran 150mg BID group
Rivaroxaban (Xarelto®)	ROCKET-AF trial	Subject number= 14,264 Mean TTR= 55% Mean $CHADS_2$= 3.47 Primary outcome= stroke and systemic embolism	• Rivaroxaban 20mg po daily non-inferior to warfarin • Superiority not achieved	• Less fatal bleeding and intracranial hemorrhage for rivaroxaban group
Apixaban (Eliquis®)	ARISTOTLE-AF trial	Subject number= 18,201 Mean TTR= 62% Mean $CHADS_2$= 2.1 Primary outcome= stroke and systemic embolism	• Apixaban significantly better with fewer strokes versus warfarin	• Significantly fewer intracranial bleeds in apixaban group • Similar GI bleeding between treatment groups
Edoxaban (Savaysa®)	ENGAGE-TIMI trial	Subject number= 21,105 Mean TTR= 68.4% $CHADS_2$= 78% (≤3), 22% (4-6) Primary outcome= stroke and systemic embolism	• Edoxaban non-inferior to warfarin	• Lower rate of major bleeding in edoxaban group

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

Name of Medication	Mechanism of Action	Dosing for Nonvalvular AF	Renal Dose Adjustment
Dabigatran (Pradaxa®)	Direct thrombin inhibitor	150mg PO BID	• CrCl 30-50 mL/min and receiving dronedarone or ketoconazole: 75mg PO BID • CrCl 15-30 mL/min: 75mg PO BID ○ If on PGP inhibitor: avoid concurrent use • CrCl < 15 mL/min: no dosage adjustment in manufacturer's labeling • Hemodialysis: no dosage adjustment in package insert
Rivaroxaban (Xarelto®)	Factor Xa inhibitor	20mg PO daily with food	• CrCl 15-50 mL/min: 15mg PO daily with food • CrCl < 15 mL/min: experts recommend avoiding use
Apixaban (Eliquis®)	Factor Xa inhibitor	5mg PO BID	• Serum creatinine (SCr) < 1.5 mg/dL: no dosage adjustment unless ≥ 80 years old AND body weight ≤ 60 kg: 2.5mg PO BID • SCr ≥ 1.5 mg/dL and ≥ 80 years old or body weight ≤ 60 kg: 2.5mg PO BID • Other clinical situations- see upcoming slides
Edoxaban (Savaysa®)	Factor Xa inhibitor	60mg PO daily	See previous slide on Edoxaban

Sources: Dabigatran:drug information. Lexi-Comp website. Last accessed November 18, 2019. Edoxaban: drug information. Lexi-Comp website. Last accessed November 18, 2019. Rivaroxaban: drug information. Lexi-Comp website. Last accessed November 18, 2019. Apixaban: drug information. Lexi-Comp website. Last accessed November 18, 2019.

2019 ACC-AHA Atrial Fibrillation Guideline Update

For AF and moderate-to-severe chronic kidney disease (CKD) with elevated CHA_2DS_2-VASc score, consider treatment with reduced doses of direct thrombin or factor Xa inhibitors

- Examples: apixaban, dabigatran, rivaroxaban, edoxaban

For AF and CHA_2DS_2-VASc score ≥ 2 (men) or ≥ 3 (women) with end-stage chronic kidney disease (CrCl < 15 mL/min) or on hemodialysis, reasonable to prescribe warfarin or apixaban for oral anticoagulants

For patients with AF and end-stage chronic kidney disease or on hemodialysis, dabigatran, edoxaban, and rivaroxaban are NOT recommended

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

Apixaban in Severe Chronic Kidney Disease or Hemodialysis

- Not dialyzable to minimally dialyzable

- Single-dose pharmacokinetic and pharmacodynamic study in 8 patients with end-stage kidney disease on hemodialysis
  - Manufacturer recommendation: no dosage adjustment recommended unless either ≥80 years of age or body weight ≤60 kg, then reduce to 2.5 mg twice daily.

- Cohort study of patients with end-stage kidney disease requiring hemodialysis
  - Apixaban 5mg PO BID resulted in fewer thromboembolic and bleeding events vs. warfarin
  - Apixaban 2.5mg PO BID resulted in fewer bleeding events vs. warfarin

- Only one retrospective study completed to assess clinical efficacy and safety
  - Summary: use with caution

Sources: Siontis KC, Zhang X, Eckard A, et al. *Circulation*. 2018;138(15):1519-1529.
Wang X, Tirucherai G, Marbury TC, et al. *J Clin Pharmacol*. 2016;56(5):628-636.

Question 3—Which of the following oral anticoagulants may be used in a patient with AF and end-stage chronic kidney disease on hemodialysis? Select all that apply.

- A. Rivaroxaban
- B. Edoxaban
- C. Dabigatran
- D. Apixaban
- E. Warfarin

Response 3—Which of the following oral anticoagulants may be used in a patient with AF and end-stage chronic kidney disease on hemodialysis? Select all that apply.

- A. Rivaroxaban
- B. Edoxaban
- C. Dabigatran
- D. Apixaban
- E. Warfarin

2019 ACC-AHA Atrial Fibrillation Guideline Update

For patients with AF for > 48 hours or unknown duration, warfarin or a NOAC is recommended 3 weeks before and 4 weeks after cardioversion

- Regardless of CHA_2DS_2-VASc score or cardioversion method

If immediate cardioversion required due to hemodynamic instability, anticoagulation initiated as soon as possible and continued ≥ 4 weeks after cardioversion unless contraindicated

After cardioversion, long-term anticoagulation decision based on thromboembolic versus bleeding risk

Source: January CT, Wann LS, Chen LY, et al. *Circulation.* 2019 Jul 9;140(2):e125-e151.

Conclusion

- CHA_2DS_2-VASc risk stratification
  - Still reigns as risk predictor tool
  - Updates on “high risk” scores for males and females
- Anticoagulants approved for atrial fibrillation
  - Edoxaban approved in 2015
- End-stage kidney disease or hemodialysis
  - Can consider apixaban at your own liability
  - No other NOACs mentioned for use in end stage chronic kidney disease or patients on hemodialysis

References

- Atrial fibrillation fact sheet. Centers for Disease Control and Prevention website. https://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_atrial_fibrillation.htm. Last reviewed August 22, 2019. Last accessed November 18, 2019.
- Edoxaban: drug information. Lexi-Comp website. https://www.uptodate.com/contents/edoxaban-drug-information?search=savaysa&source=panel_search_result&selectedTitle=1~103&usage_type=panel&kp_tab=drug_general&display_rank=1. Last accessed November 18, 2019.
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Thank you!

Kelly Peddy, PharmD, MPA, BCACP

Clinical Pharmacy Specialist, Ambulatory Care

Memorial Hospital of South Bend

kpeddy@beaconhealthsystem.org