THIS IS WHY with Dr. Busti

ATRIAL FIBRILLATION
COMMON RISK FACTORS

Modifiable Risk Factors	▪ HEAD: Heart failure, Exercise, Arterial hypertension, Diabetes ▪ TOES: Tobacco, Obesity, Ethanol, Sleep ▪ Other: CAD/ASCVD, CKD, Valvular heart disease
Non-Modifiable Risk Factors	▪ Age ▪ Genetics/family history ▪ Male sex
Contributors of Secondary AF	▪ Acute myocardial infarction (AMI) ▪ Cardiac surgery (during post-op) ▪ Myocarditis and/or pericarditis ▪ Pulmonary embolism (PE) ▪ Drug-induced hyperthyroidism

Anthony J. Busti, MD, PharmD, MSc, FNLA, FAHA

THIS IS WHY with Dr. Busti

ATRIAL FIBRILLATION
CLINICAL PRESENTATION

Irregularly irregular pulse	▪ Occurs from the multifocal action potentials within the atria resulting in dysfunctional processing of impulses arriving to the AV node.
Palpitations	▪ Same as the above but also due to PACs
Shortness of breath (SOB)	▪ Due to reduced forward blood flow secondary to a reduction in cardiac output that results in cardiopulmonary vascular congestion that pushes fluid into alveoli
Chest pain	▪ The multifocal areas of cardiac depolarizations and pulse can lead to increase oxygen demands. ▪ When this occurs in patients with ASCVD, this can result in decreased oxygen delivery.
Dizziness / lightheadedness	▪ Typically seen with higher pulses or in RVR ▪ Can also be a sign of hemodynamic instability due to reduced forward blood flow resulting in decreased cardiac output.
Fatigue or weakness	▪ This occurs from reductions in cardiac pump efficiency and effectiveness coupled with increase metabolic demands.
Decrease exercise tolerance	▪ Increases in cardiac and metabolic demands on a diseased heart with reduced forward flow and cardiopulmonary vascular congestion with reduced oxygenation and ventilation makes exercise difficult to maintain.

Anthony J. Busti, MD, PharmD, MSc, FNLA, FAHA

THIS IS WHY with Dr. Busti

ATRIAL FIBRILLATION

BASIC DIAGNOSTIC TESTS

Diagnostic Info	Test or Variable	Notes
Vital Signs	Baseline or Initial Info	
	Temp, pulse, RR, BP, O2 sat, weight	▪ Used to assess level of acuity or hemodynamic instability. ▪ Assessing for any presence of hemodynamic instability due to AF-associated poor stroke volume and cardiac output ▪ Also, used to align with HPI and clinical presentation for diagnosis. ▪ May also help align with signs and symptoms on presentation.
	Height Waist circumference BMI	▪ Used to calculate the BMI and stratify the patient's risk. ▪ Assess for other comorbidities that cause or worsen AF (e.g., obesity, metabolic syndrome) and treat modifiable risk factors.
	Long-Term/Intermittent Monitoring	
	Temp, pulse, RR, BP, O2 sat, weight	▪ Used to assess level of acuity or hemodynamic instability. ▪ Also, used to align with HPI and clinical presentation since AF occurs on a continuum and can be dynamic. ▪ Assess for possible new problems that either cause or develop from HF (e.g., atrial fibrillation with RVR, hypoxia from pulmonary edema, cardiogenic shock, etc.).
Labs	Baseline or Initial Info	
	CBC	▪ Used to rule out obvious infection or anemia which can be causes for high-output HF.
	BMP or Chem-7	▪ Allows for the evaluation of electrolyte status and renal function which can influence choice of treatments, some of which require renal dose adjustments.
	Magnesium	▪ Necessary for potassium maintenance for cardiac function ▪ Can be decreased by loop diuretics and cause hypokalemia.
	Thyroid stimulating hormone (TSH)	▪ Evaluate for secondary causes of low- and high-output HF.
	Brain natriuretic peptide (BNP) or NT-proBNP	▪ Consider evaluating this if the patient has SOB or concerns for or known HF. ▪ Can be falsely normal in obesity.
	Troponin T or I	▪ Especially if concerned for AMI (i.e., NSTEMI or STEMI) or PE that may be causing secondary AF
	Lipid panel (fasting at least 8 hrs)	▪ Assess for ASCVD, which is a common cause of conditions that contribute to the risk of AF.
	Long-Term/Intermittent Monitoring	
	CBC, BMP/CMP	▪ Ongoing for continuous assessment
	+/- Magnesium, TSH, lipid panel	▪ As needed based on patient's clinical scenario

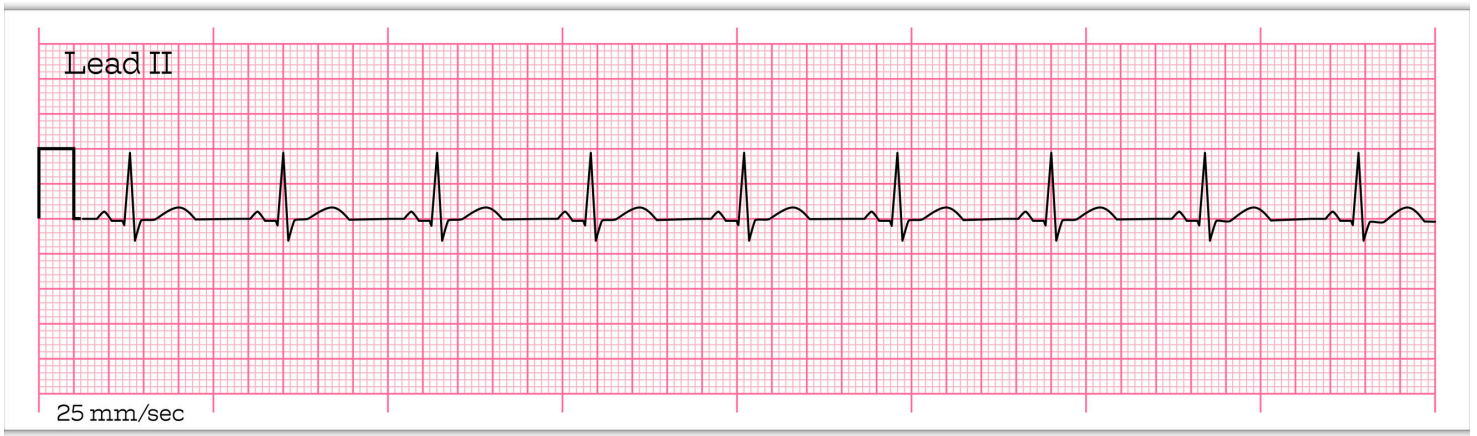
THIS IS WHY with Dr. Busti

ATRIAL FIBRILLATION
BASIC DIAGNOSTIC TESTS

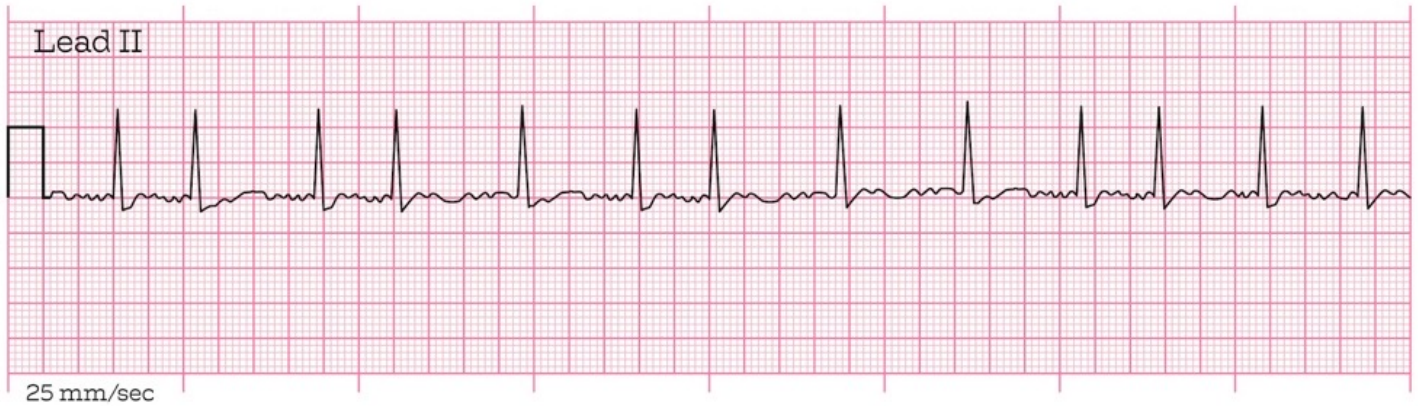
Diagnostic Info	Test or Variable	Notes
Imaging	Chest radiograph (i.e., x-ray)	▪ Easy to access and useful to assess for presence of cardiomegaly, pulmonary vascular congestion (Kerley B-lines), pleural effusions or edema ▪ Rules out other causes of SOB or dyspnea on exertion (e.g., hemothorax, mass, pneumothorax, pneumonia).
	Echocardiogram (ECHO)	▪ Left atrium (LA) and right atrium (RA) size (usually enlarged), left ventricle (LV) size and function, presence of LA thrombus (increases the risk for cardioembolic stroke), and/or presence of pericardial disease
	CTA Chest	▪ If there is a concern, this is used to rule out PE, which is a secondary cause of AF.
Misc	ECG (12-lead)	▪ Classic description of irregularly irregular rhythm without discernable P waves and irregular R-R intervals (i.e., ECG strip below, Image 1) ▪ Given the chance of confusion or presence of other comorbidities, consider also looking for evidence of left ventricular hypertrophy (LVH), Wolff-Parkinson-White (WPW) as manifested by a "delta wave," evidence of MI (i.e., ST segment or T-wave changes), and/or prolonged QT interval > 500 msec to characterize the dysrhythmia further.

Anthony J. Busti, MD, PharmD, MSc, FNLA, FAHA

Normal Sinus



Atrial Fibrillation



THIS IS WHY with Dr. Busti

ATRIAL FIBRILLATION
STAGING & EVOLUTION

Stage	1	2	3A	3B	3C	3D	4
	At Risk for AF	Pre-AF	Paroxysmal AF	Persistent AF	Long-Standing Persistent AF	Successful AF Ablation	Permanent
Description	Positive for modifiable* and non-modifiable^ risk factors	Predisposed to AF due to observed electrical or structural changes#	Intermittent & self terminates in ≤ 7 days (most end in < 24 hours)	Continuous & sustained for > 7 days and requires treatment	Continuous for > 12 months in duration	Freedom from AF after intervention to eliminate AF	Cardioversion fails or no additional attempts at rhythm control
		Heightened Monitoring	Patients can transition among the substages of AF.				
Patho Changes			Observe for atrial enlargement, atrial flutter, bursts of atrial tachycardia, frequent atrial ectopy, HF, valve disease, thyroid disease, neuromuscular disorders, hypertrophic cardiomyopathy, and coronary artery disease.				

THE PILLARS OF AF MANAGEMENT

4A's: Access to All Aspects of Care for All

SOS: Using Shared Decision Making, Treatment of Risk Factors, and Enactment of Behavioral Changes

Stroke Assessment			Assess and treat if appropriate.
Optimize All Modifiable Risk Factors	HEAD: Heart failure, Exercise, Arterial Hypertension, Diabetes TOES: Tobacco, Obesity, Ethanol, Sleep Enact Behavioral Changes		
Symptom Management			Treat AF Burden with rhythm and/or rate control. Note: AF Burden refers to the frequency and duration or "amount" of AF that a patient has.

Anthony J. Busti, MD, PharmD, MSc, FNLA, FAHA

ATRIAL FIBRILLATION
POTENTIAL COMPLICATIONS

Adverse Outcome	Increase in Risk if Diagnosed with AF
Heart failure	5-fold
Stroke (cardioembolic)	2.4-fold
Sudden cardiac death	2-fold
Death	1.5- to 2-fold
Chronic kidney disease	1.6-fold
Myocardial infarction	1.5-fold
Cognitive impairment	1.5-fold
Peripheral artery disease	1.3-fold

The table represents the editor's best effort to summarize the intent of the clinical data, based on data from various reputable sources. Any use is meant to be for educational purposes only and is not intended to replace medical decision-making or clinical judgment.

Anthony J. Busti, MD, PharmD, MSc, FNLA, FAHA

THISISWHY.HEALTH