

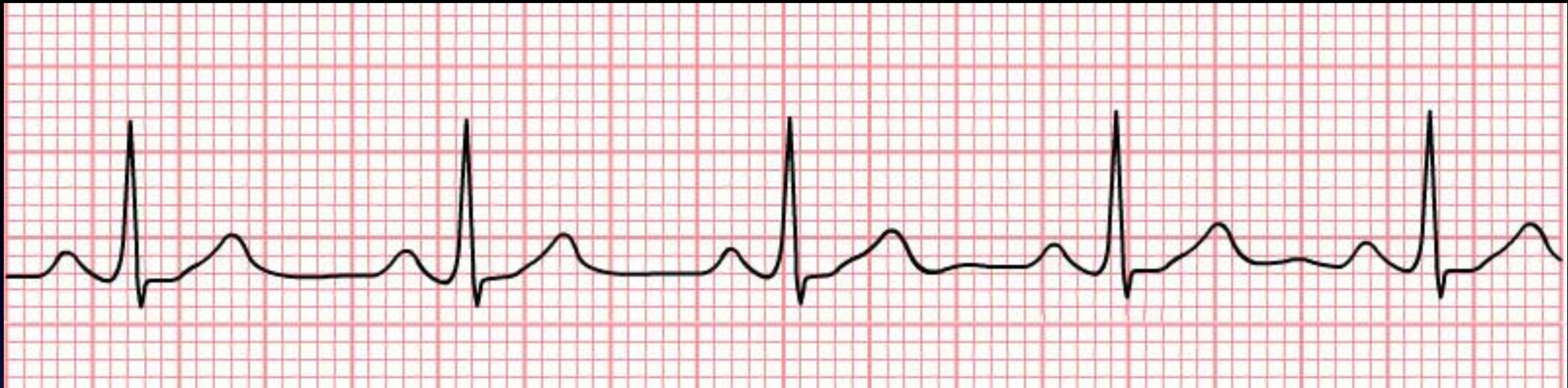
Post-Op A.Fib

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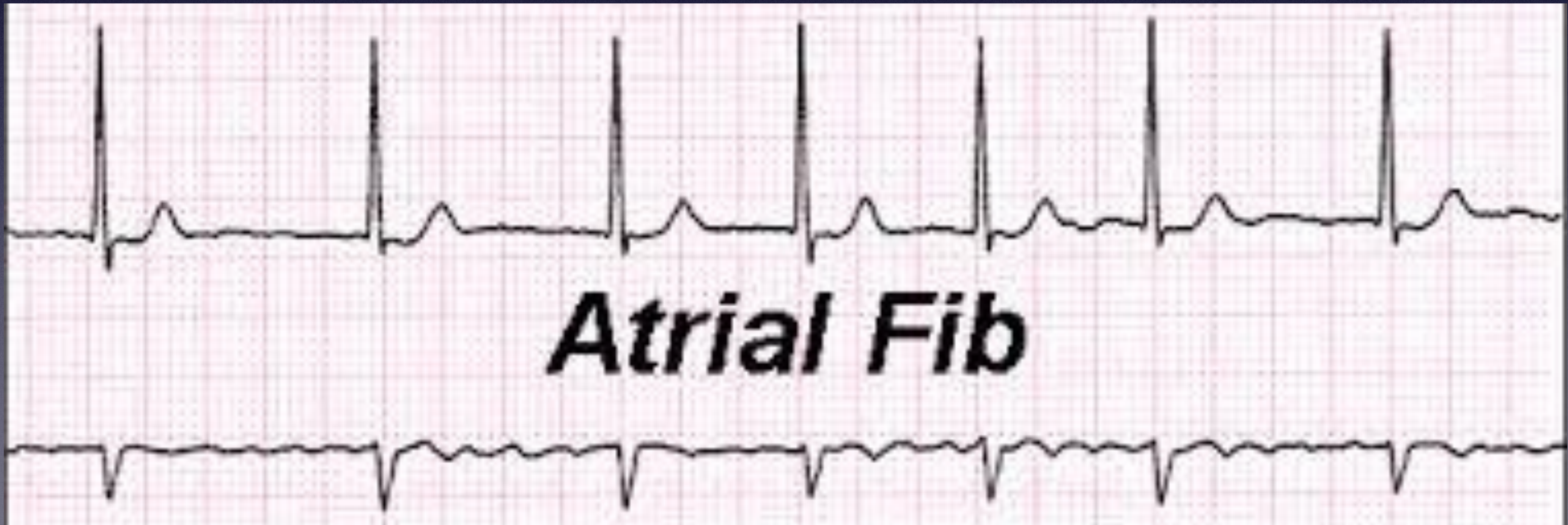
What is A.Fib

- Abnormal heart rhythm (arrhythmia) characterized by rapid and irregular beating of the atria
- Most common complication after cardiac surgery
 - 25 - 40% after CABG
 - 50 - 60% after valvular surgery
 - 62 - 70% after CABG + valvular surgery
- Lowest incidence of POAF seen in patients after heart transplant

- Predominantly occurs on post-op days 2 - 3
 - 70% of all episodes occur within first 4 post-op days
 - 60% of recurrences occur within 2 days of initial episode
- Main cause of hospital readmission after early discharge
- Considered transient or “benign”
 - CHF, 3-fold higher risk for post-op stroke, renal insufficiency
- Results in longer ICU and hospital stays by average of 4 days



Caption

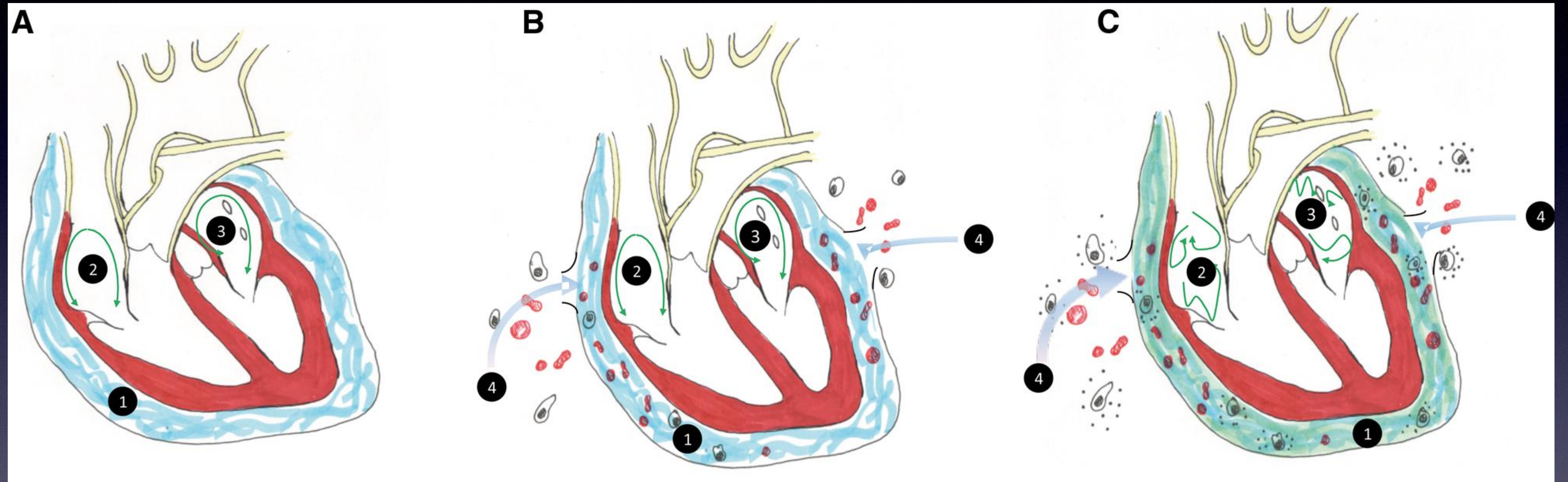


Caption

Pathophysiology

- Systemic Inflammation & Oxidative Stress
 - surgical trauma + ischemia from prolonged CPB + reperfusion → oxidative stress & pro-inflammatory molecules → endothelial & leukocyte activation + release of NADPH oxidase + NO production + reactive oxygen generation
 - decrease in POAF from anti-inflammatory prophylaxis using corticosteroids

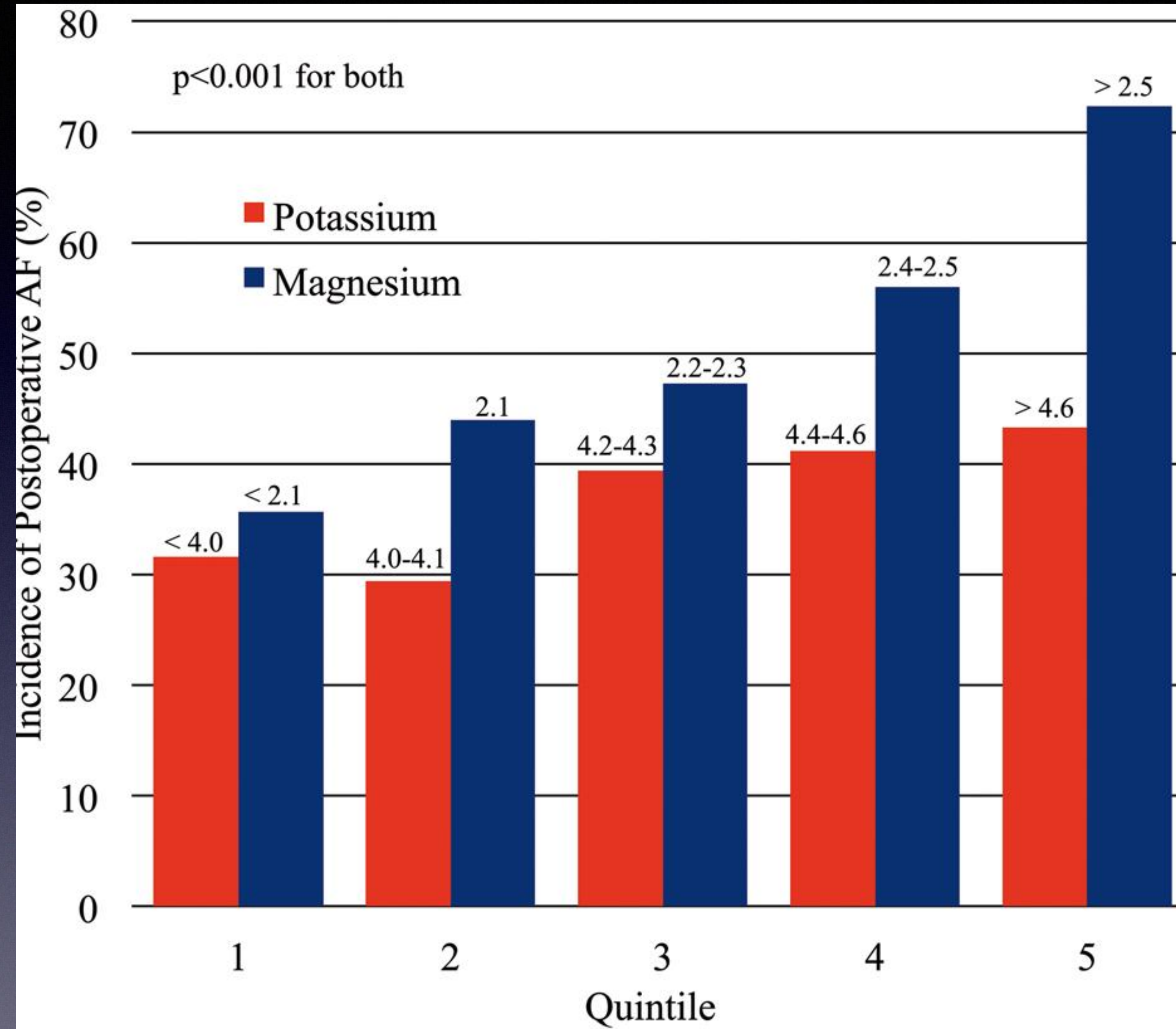
- Local Inflammation & Oxidative Stress
 - pericardial disruption causes local inflammation around heart and an increase in PCF volume
 - post-op PCF is highly oxidative and contains
 - blood + hemolyzed blood cells + Hgb + inflammatory markers
 - myocardium also produces pro-inflammatory molecules which further contribute to local inflammation and directly alter cardiac function
 - inflammation within pericardial space results in myocyte apoptosis and altered electrical activity



A (1) Pericardial fluid (blue) bathes the normal heart including the (2) right and (3) left atria. Green arrows represent atrial conduction. **B** Surgery disrupts the pericardium and blood and inflammatory cells enter the pericardial space (4). **C** (1) Pericardial fluid composition now includes inflammatory cells, cytokines, and highly oxidative proteins, causing atrial fibrillation (green arrows).

- Electrolytes
 - Hypomagnesemia
 - common after surgery
 - predictor of POAF
 - regulates Ca mobility + influences myocyte contractility + anti-inflammatory effects
 - high levels → prolong AV node conduction + prevent oxidative damage
 - low levels → increase SA node automaticity
 - recent studies state other wise


- Hypokalemia
 - leads to cellular hyperpolarity + higher resting potential + increased automaticity and excitability + vent. arrhythmias
 - recent studies show that low serum of K were not associated with increased risk of POAF and higher levels were not protective



Caption

Risk Factors

- Pre-Op

- increase in age; with each decade the incidence of POAF increases by 75%
- atrial dilation, fibrosis, lipid deposits  slower electrical conduction within the atria
- CV disease (CHF, CAD, HTN, LA enlargement, LV dysfunction)
- Non CV disease (males, hyperthyroidism, DM, CKD, obesity)

- Intra-Op

- long procedure times + aortic clamp times correlates with POAF
- inadequate atrial myocardium protection during aortic cross clamping results in ischemia triggering POAF
- valve surgery; results from structural and hemodynamically abnormalities
 - left atrial enlargement, pathological changes from rheumatic heart disease, increased left atrial pressure, surgical trauma

- Post-Op
 - prolonged ventilation
 - cardiac tamponade

Pre-Op Prophylaxis

- B-blockers (Class II AAD)
 - most widely used prophylactic drug
 - current guidelines recommend usage 24hrs prior surgery for those who have an EF > 30%
- Amiodarone (Class III AAD)
 - 600mg / 7days pre-op significantly decreased POAF, stroke, length of hospital stay
- Sotalol (Class III AAD)
 - 24 - 48 hrs significantly decreased POAF BUT carries higher rate of adverse side effects (bradycardia, ventricular arrhythmias)

Intra-Op Prophylaxis

- Post. pericardiotomy
 - incision made in post. pericardium from left pulmonary vein to the diaphragm parallel to left phrenic nerves
 - allows pericardial fluid to drain out the pericardial space thus decreasing pericardial effusion
 - simple procedures with dire adverse effects
 - compression of bypass grafts
 - cardiac herniation

Post-Op Prophylaxis

- B-blockers
 - oral metoprolol > iv esmolol
 - carvedilol more effective b/c of oxidative stress reducing properties
- Amiodarone
 - 400mg/bid for 7 days
- Sotalol
 - use is limited b/c of higher incidence of bradycardia, ventricular arrhythmias (torsades de pointes)
- Colchicine
 - potent anti-inflammatory properties
- Statins
 - reduce inflammation and oxidative stress

Management of POAF (Rate vs. Rhythm Control)

- Rate control focuses on slowing heart rate
 - recommended strategy for hemodynamically stable patients
 - new onset AF is self-limiting disease often resolves regardless of initial treatment
- Rhythm control focuses on converting the arrhythmia into SR
 - recommended strategy for hemodynamically unstable patients, symptomatic patients, persistent AF (>48hrs)

THANK YOU