



Management of Acute Supraventricular Tachyarrhythmias

Peter Emilio Zambito MD
Arrhythmia Service
Montefiore Medical Center
September 25th, 2007



Introduction: Mechanisms

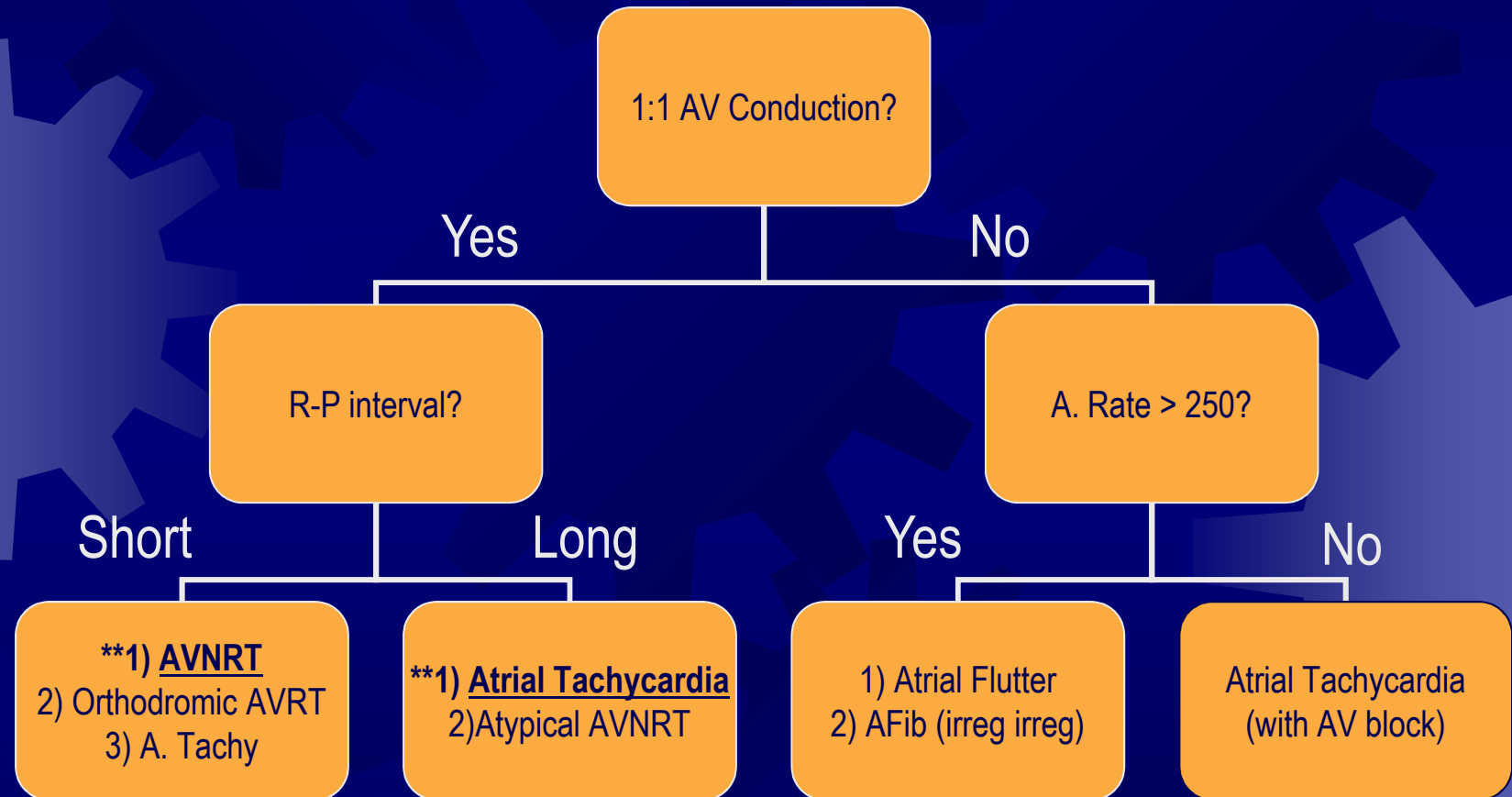
- ✦ Abnormal automaticity at a site other than the sinus node, overtakes the sinus node
- ✦ Reentry is a common theme in regular SVTs



Important Questions to Ask

- ✦ Is there 1:1 AV conduction (each p wave makes a QRS)?
- ✦ Is the R-P interval short or long?
- ✦ Is the atrial rate >250 ?
- ✦ Is it irregularly irregular?

Overview of Diagnosis

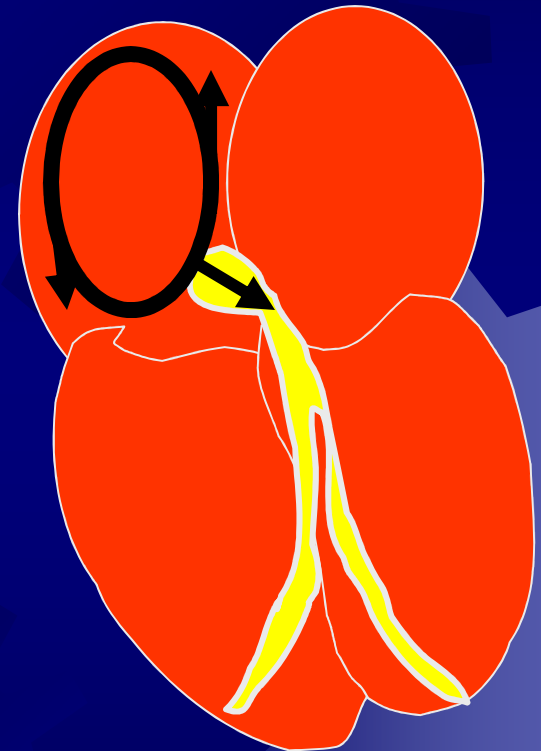


Tachycardias with AV Block

- ✦ In short, in regular tachycardias, if the atrial rate is:
 - ✦ >250 , it is probably atrial flutter
 - ✦ <250 , it is probably focal atrial tachycardia
- ✦ Irregularly irregular tachycardia would be A Fib

Atrial Flutter

- ✦ Loop in the right atrium
- ✦ Can be CCW or CW
 - Negative flutter waves in II/III/F and + in V1 (CCW)
 - Positive flutter waves in II/III/F and – in V1 (CW)

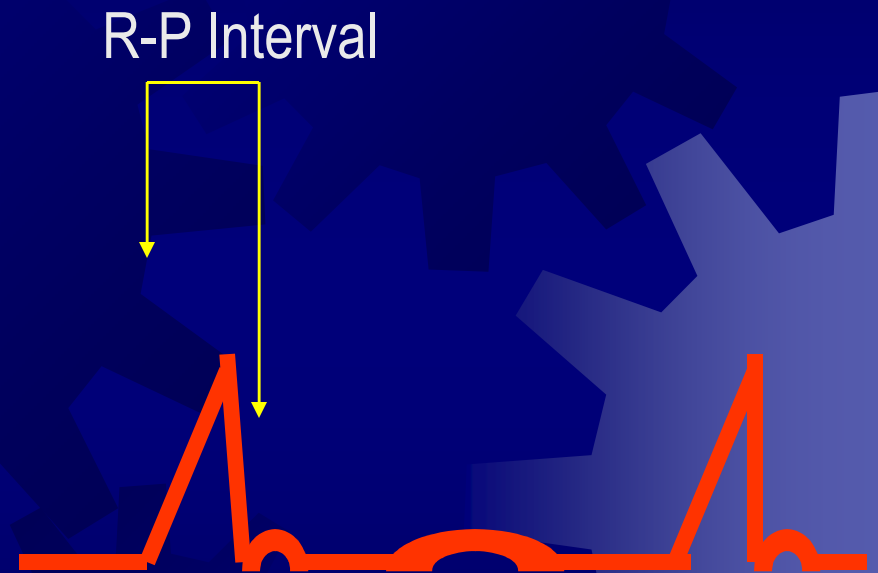


Tachycardias with 1:1 AV Conduction

- ★ If the R-P Interval (distance from QRS to the next P wave) is:
 - $< 1/2$ the R-R interval, it is a “short R-P tachycardia)
 - $> 1/2$ the R-R interval, it is a “long R-P tachycardia”
- ★ Most short R-P tachys are AVNRT
- ★ Most long R-P tachys are focal atrial tachycardia

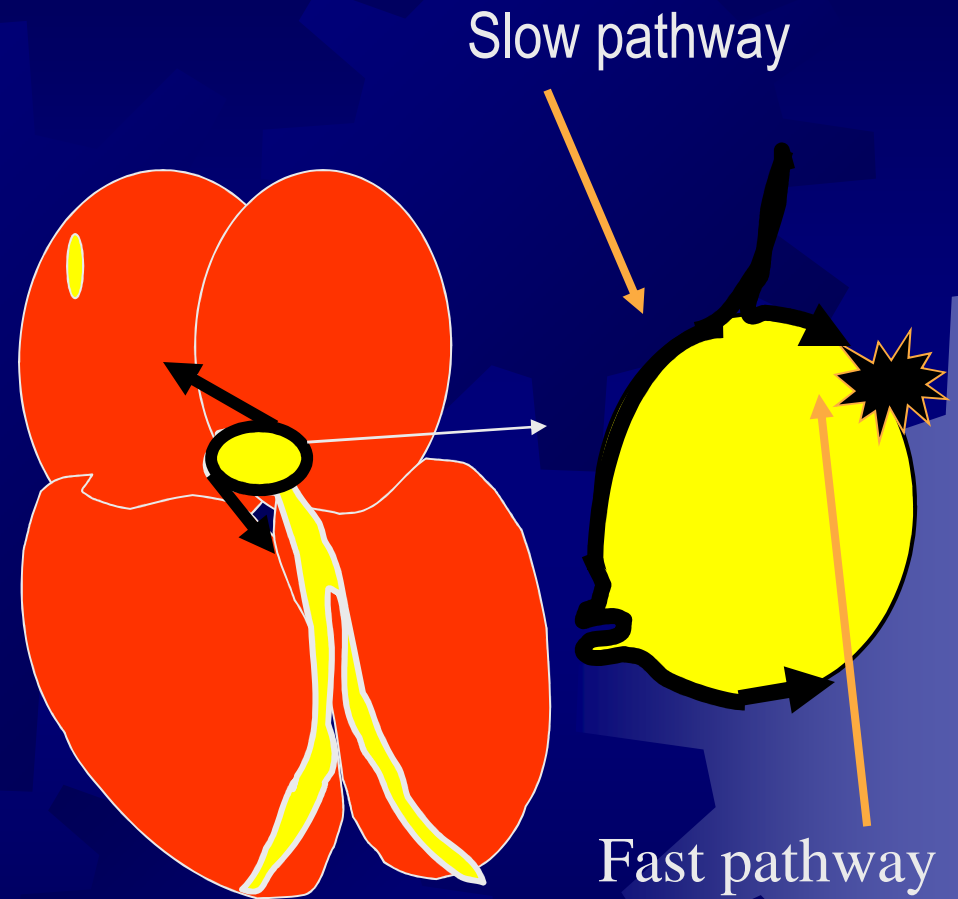
Short R-P Tachycardias

- ✦ Typical AVNRT
- ✦ Orthodromic AVRT
- ✦ Atrial tachycardia with a VERY long PR interval



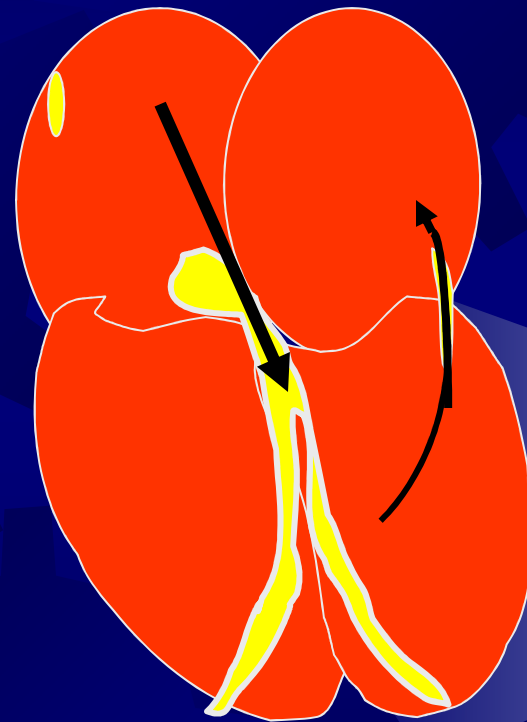
AVNRT

- ★ 2 pathways in the AV node
- ★ One becomes blocked
- ★ An endless loop is created
- ★ By far the most common Short RP tachys (85%)



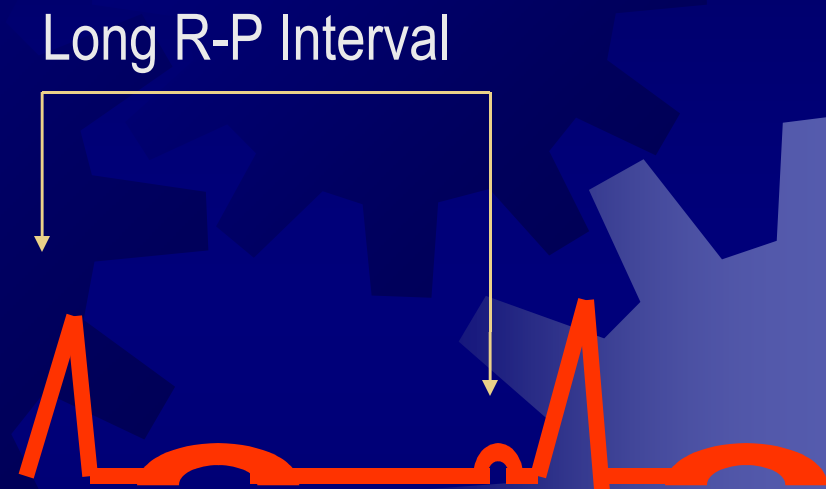
Orthodromic AVRT

- ★ Conduction down the AV node and back up an “accessory pathway” (an extra band of conducting tissue connecting ventricle to atrium)



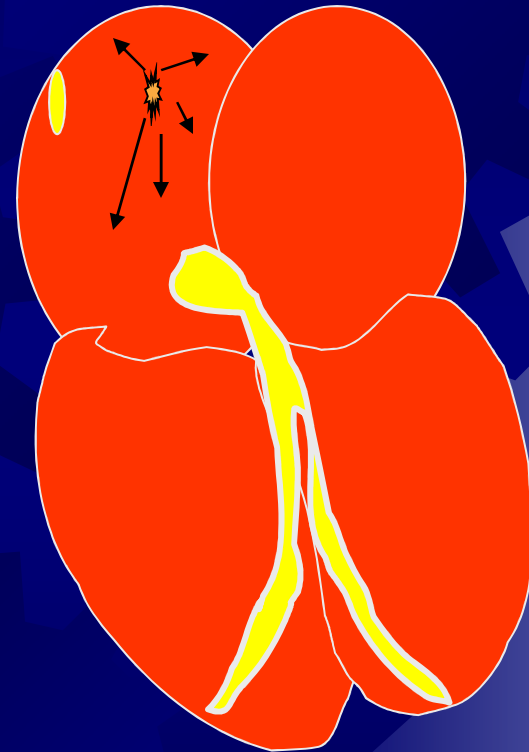
Long R-P Tachycardias

- ✦ Focal Atrial Tachycardia
- ✦ Sinus Tachycardia
- ✦ Atypical AVNRT

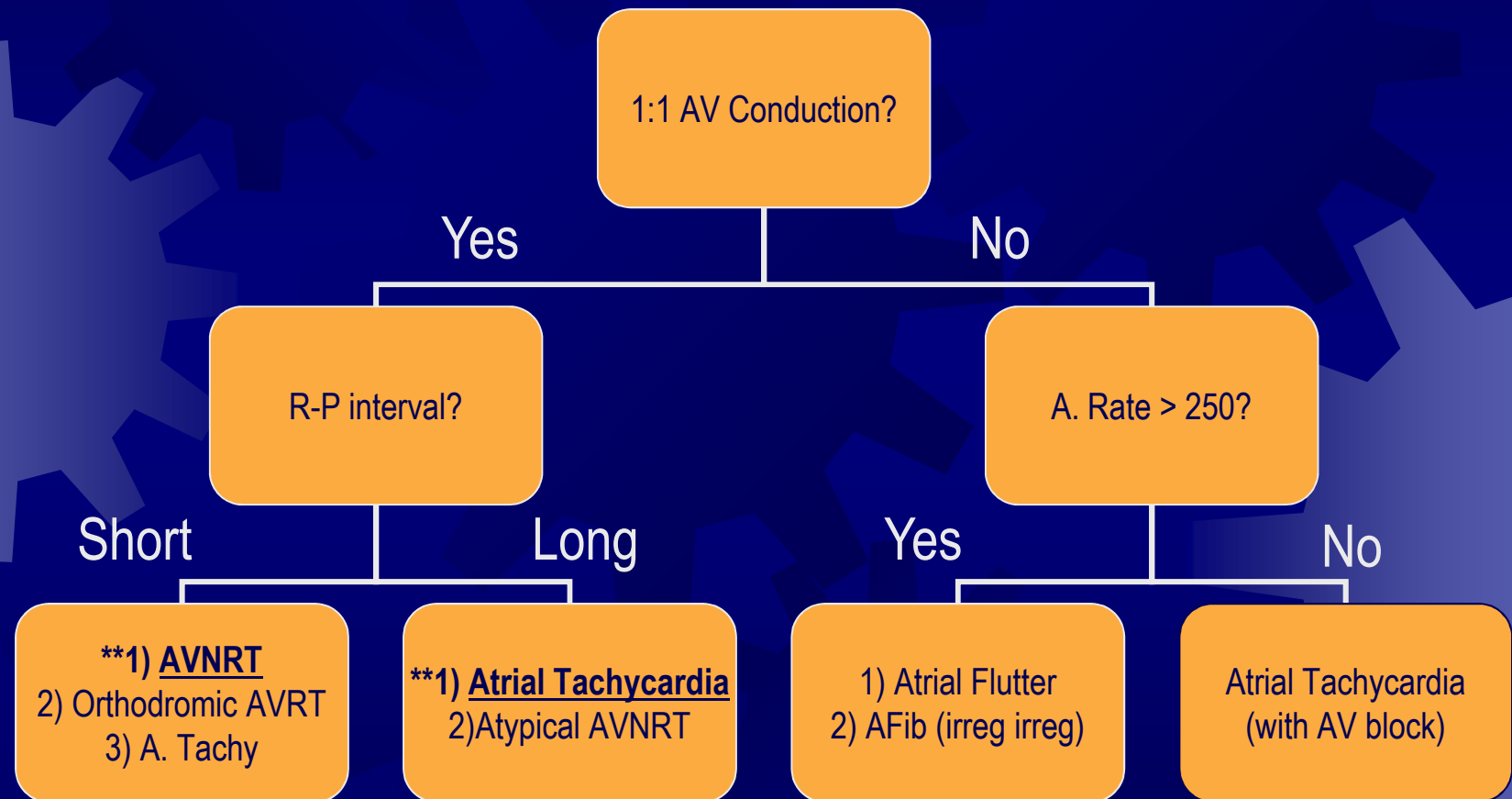


Focal Atrial Tachycardia

- ★ A single focus firing 150-250 bpm which suppresses the normal sinus node



Summary of Diagnosis





Management Question 1

- ✦ Is it stable or unstable?
 - ✦ Hypotension, CHF, angina, SOB...
- ✦ For unstable tachycardias, it is always correct to perform DC cardioversion (shocking)

Management of AVNRT/AVRT

- ★ These tachycardias are extremely sensitive to anything that blocks the AV node, since they all require the AV node in order to survive
 - ★ Vagal maneuvers
 - ★ Adenosine
 - ★ Beta blockers
 - ★ Calcium channel blockers
 - ★ (Definitive therapy is catheter ablation)

AVNRT example

1301488

64 yrs

PR
QRSD 100
QT 266
QTc 447

--AXES--

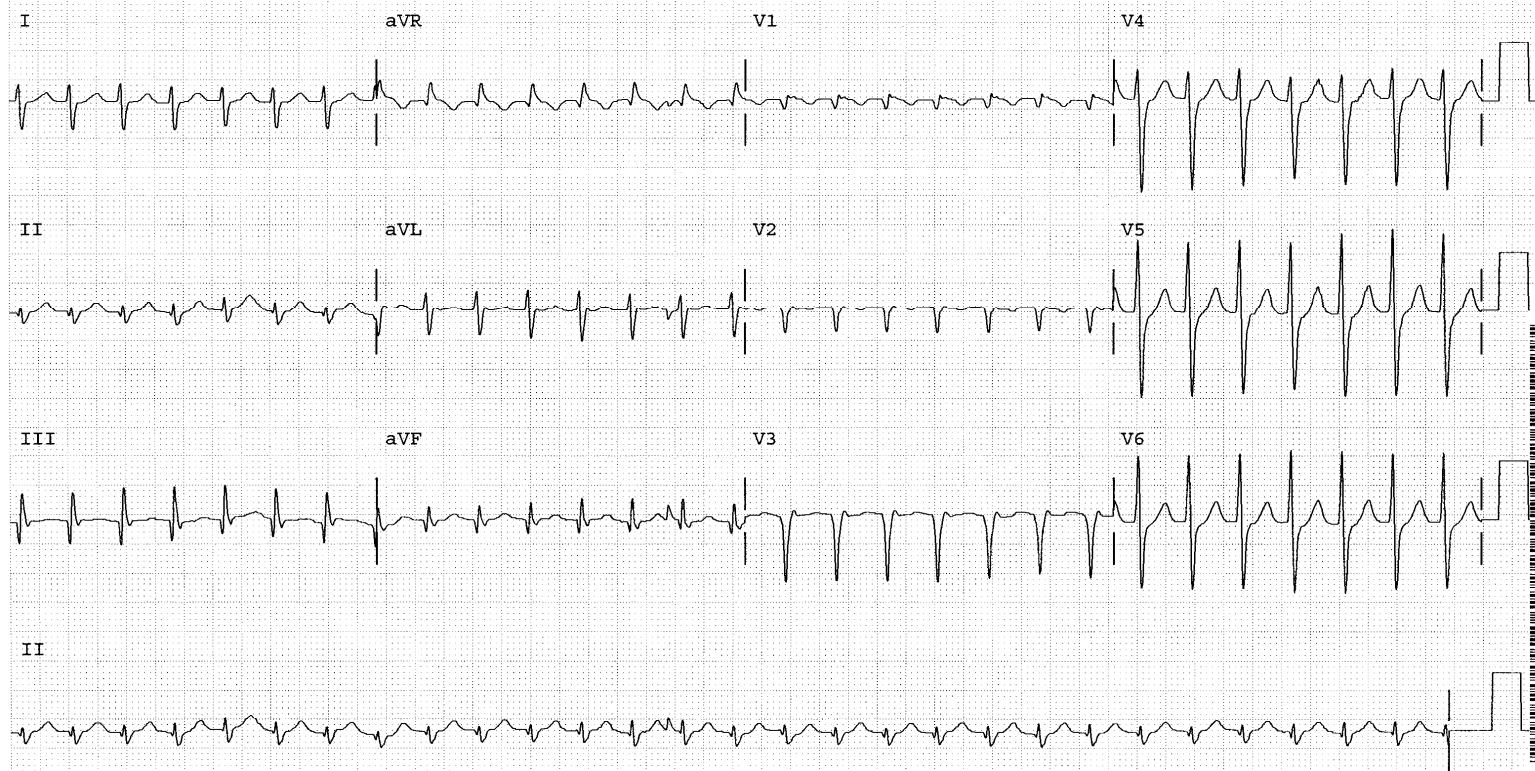
P
QRS 193
T 44

Requested by
BLUM
Tech BM

Edited C-HP708

PREVIOUS ECG: 12 MAY 2000 3:20:31PM, CONFIRMED BY WB - AB
DENVER HEALTH MEDICAL CENTER - EAST SIDE CLINIC

FREDERICK MASOUDI - 26 MAR 2001 4:36:18PM



Loc 10038

25 mm/sec 10.0 mm/mV

F ~ W 0.50-40

After adenosine...

1301488

pg 1 of 2

64 yrs

PR 164
QRSD 86
QT 316
QTc 387

--AXES--

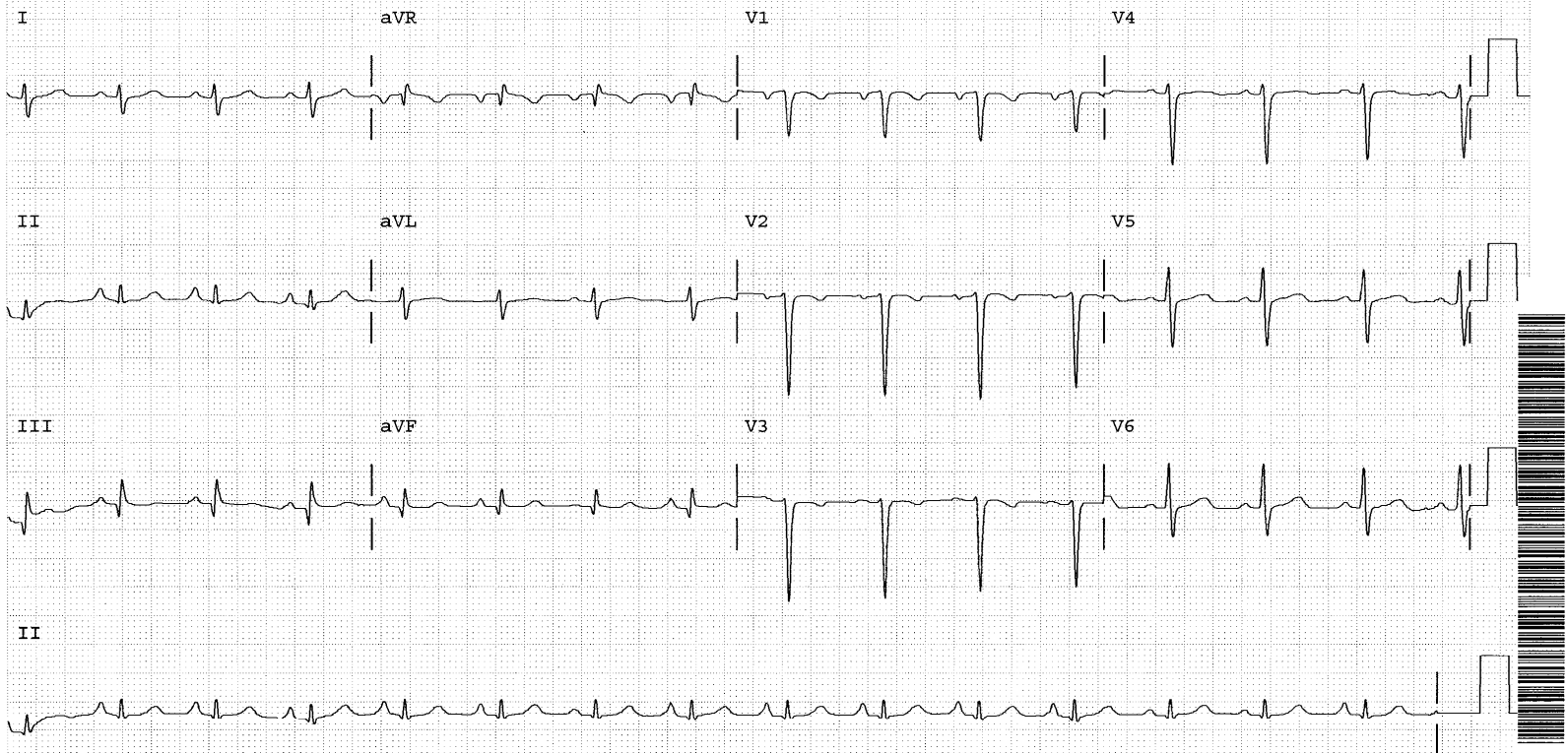
P 54
QRS 118
T 42

--CONTINUED ONTO NEXT SHEET--

Tech 1PB
Room CCU/5
Edited C-HP708

PREVIOUS ECG: 23 MAR 2001 5:43:20AM, CONFIRMED BY FM - AB
DENVER HEALTH MEDICAL CENTER - 9 CCU

WILLIAM BAKER - 25 MAR 2001 11:29:07AM



Loc 10092

25 mm/sec 10.0 mm/mV

F ~ W 0.50-40



Management of Atrial tachycardia, AFib and AFlutter

- ★ These tachycardias do not depend on the AV node to survive and exist within the atrium, therefore they are rarely responsive to adenosine or AV node blockers for conversion



RATE CONTROL of Stable Atrial Tach, Afib, AFlutter

✦ Initial Therapy is aimed at RATE CONTROL

- ✦ Beta blockers (propranolol, metoprolol)
- ✦ Calcium blockers (verapamil, cardizem)
- ✦ Digoxin
- ✦ Amiodarone

Beta blockers and Calcium Blockers

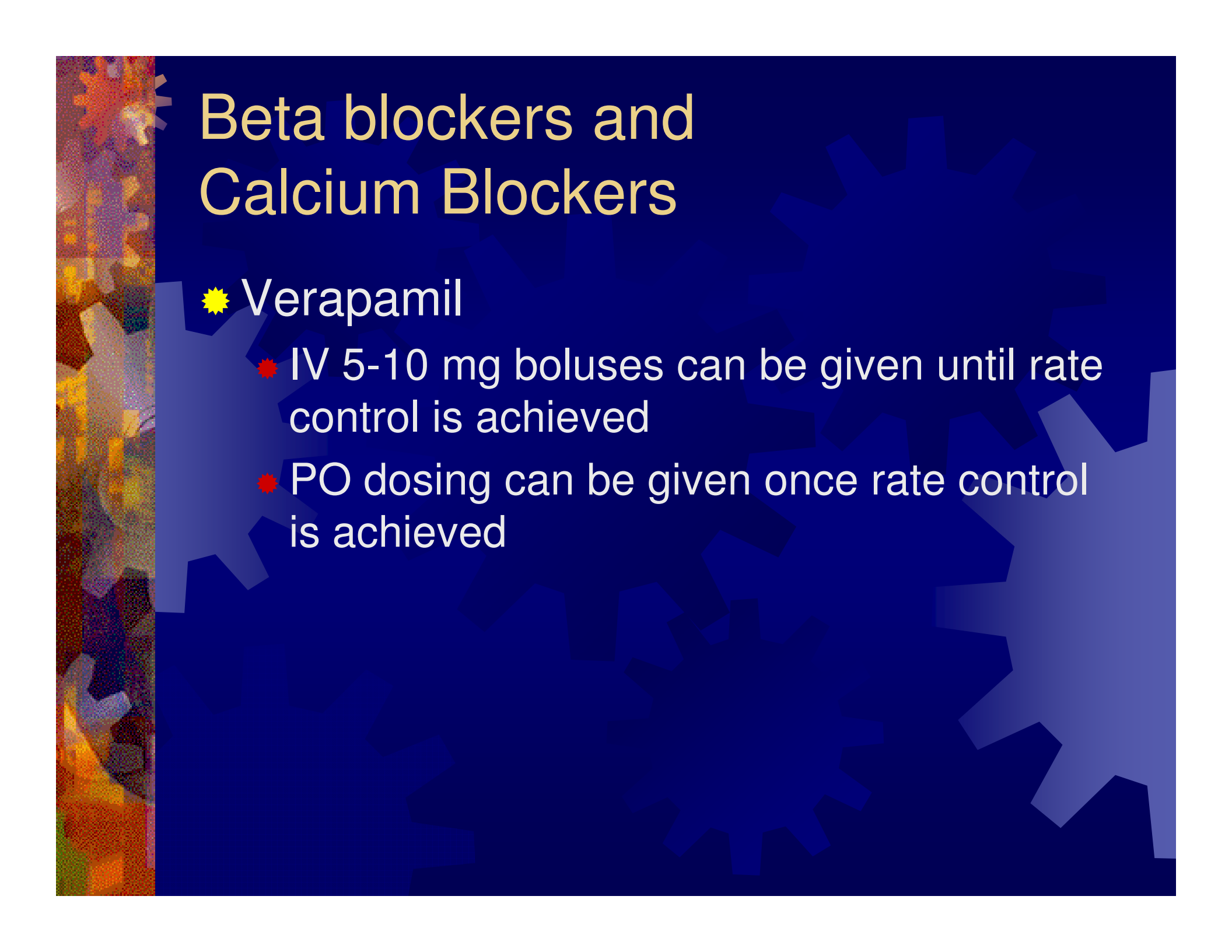
★ Beta blockers

- ★ IV metoprolol can be given in 2.5-10mg or propranolol 1-5mg increments every 5 minutes until rate control is achieved
- ★ Thereafter, a PO dose can be calculated and started immediately after rate control is achieved

Beta blockers and Calcium Blockers

★ Cardizem

- IV 0.25mg/kg as an initial bolus
- Can be repeated in 5 minutes at 0.35mg/kg until rate control is achieved
- Can be given continuous infusion 5-20mg/hr short term (usually <24h)
- Can be converted to PO once rate control is achieved



Beta blockers and Calcium Blockers

☀ Verapamil

- ☀ IV 5-10 mg boluses can be given until rate control is achieved
- ☀ PO dosing can be given once rate control is achieved

Digoxin

- ✦ In general, it is a decent adjunct therapy, but should not be given alone as it may worsen tachyarrhythmias or make them harder to control (has + inotropic and chronotropic effects in addition to blocking the AV node)

Amiodarone

- ✦ Can be given as a 150mg bolus over 10 minutes, and repeated up to 2 times
- ✦ Is good for RATE CONTROL, but also has up to 66% chance of CONVERSION to sinus rhythm
- ✦ If rate control is achieved, can change to 1mg/min maintenance for 6hrs, 0.5mg/min for 18hrs, and then 400mg PO TID
- ✦ Can be used in patients with CHF safely, including decompensated CHF
- ✦ Total loading dose is 8-10 grams over a few weeks

Cautions

- ✦ Beta blockers in the setting of decompensated CHF
- ✦ Calcium blockers long term in the setting of chronic CHF (ok acutely)

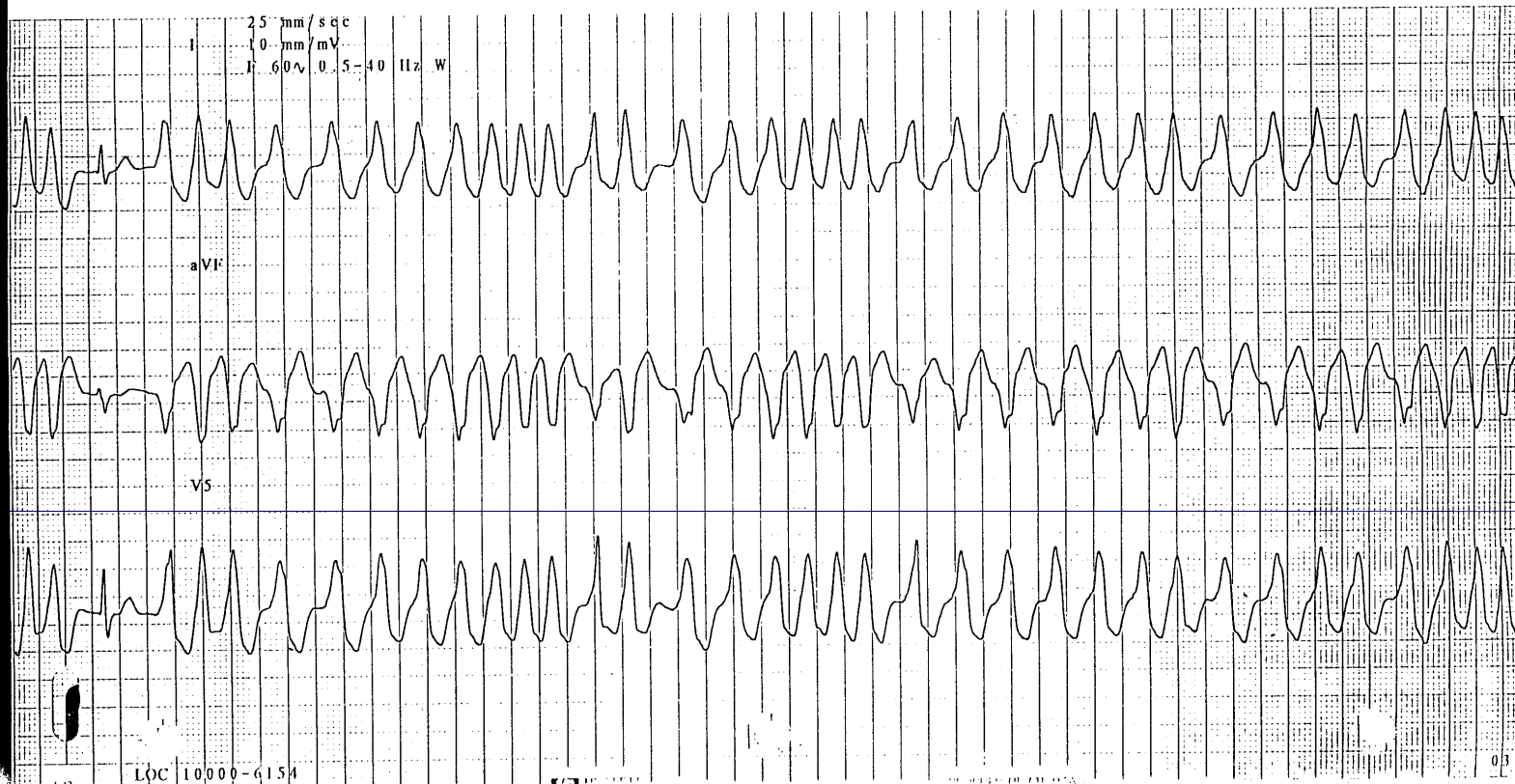
A Special Situation

- ★ AV node blockers should NEVER be used alone (adenosine, BB, CCBs, digoxin) in the setting of Atrial Fibrillation with WPW syndrome...
- ★ This can lead to increased conduction down the accessory pathway and a faster ventricular rate, even 1:1 conduction

Afib with WPW syndrome

01

DENVER GENERAL HOSPITAL
Dept: 10
Room: ED-1
Oper: 2 GW





CONVERSION of Atrial tach, A Fib, A Flutter

★ Who to convert?

- ★ Recent onset Afib, AFL, AT (<48hrs)
- ★ Those on chronic anticoagulation
- ★ Unstable (DCCV only)

★ PLEASE NOTE:

- ★ About 50% of patients with new onset AFib convert spontaneously within 24 hours!!!



CONVERSION of Atrial Tach, A Fib, A Flutter

★ Common drugs to convert:

- ★ Amiodarone
- ★ Ibutilide
- ★ Procainamide
- ★ Dofetilide

Amiodarone

- ★ Decent drug for conversion (50-66% with high doses), but it really excels due to also good rate control
- ★ Dosage was stated before
- ★ Can be used in CHF, including decompensated
- ★ Digoxin and Amio a nice combination, but watch the dig level as amio will double it

Ibutilide

- ✦ An excellent drug for acute conversion of Afib or Aflutter
- ✦ 1mg IV over 10 minutes, then can be repeated
- ✦ Needs 4 hours of continuous EKG monitoring for VT as a side effect
- ✦ VT is more common if HR is slow, women, and long QT interval
- ✦ Should NOT be used in patients with CHF or prior MI

Procainamide

- ✦ A good choice for Afib with WPW syndrome
- ✦ For anything else it is ok, but more difficult to give than amio or ibutilide
- ✦ Also can't be given with CHF or prior MI
- ✦ Given as infusion 20-30mcg/min, until hypotension, QRS>120ms, prolonged QT, or conversion occurs

Dofetilide

- ✦ Excellent choice for patients with prior MI or CHF
- ✦ Should not use with renal insufficiency
- ✦ Has no significant side effects when compared to amio (thyroid, liver, lungs)
- ✦ Given as 250-500mcg PO BID depending on the baseline QT interval
- ✦ A 4 hour QT interval helps to determine the ultimate dose (decrease by $\frac{1}{2}$ if the QT $>$ 500 or widens by $>25\%$)
- ✦ Need to be admitted to a telemetry unit while titrating the dose

Some final notes

- ✦ Atrial flutter is very hard to rate control, as the rates will change only as multiples of the atrial rate (i.e. if the atrial rate is 300, the v rate will either be 150, 75 or 60)
- ✦ AT, AFib and AFL should all be anticoagulated at least temporarily, in case a decision is made later about DCCV electively



Thank you for listening...

- ✦ Questions and feedback are encouraged!