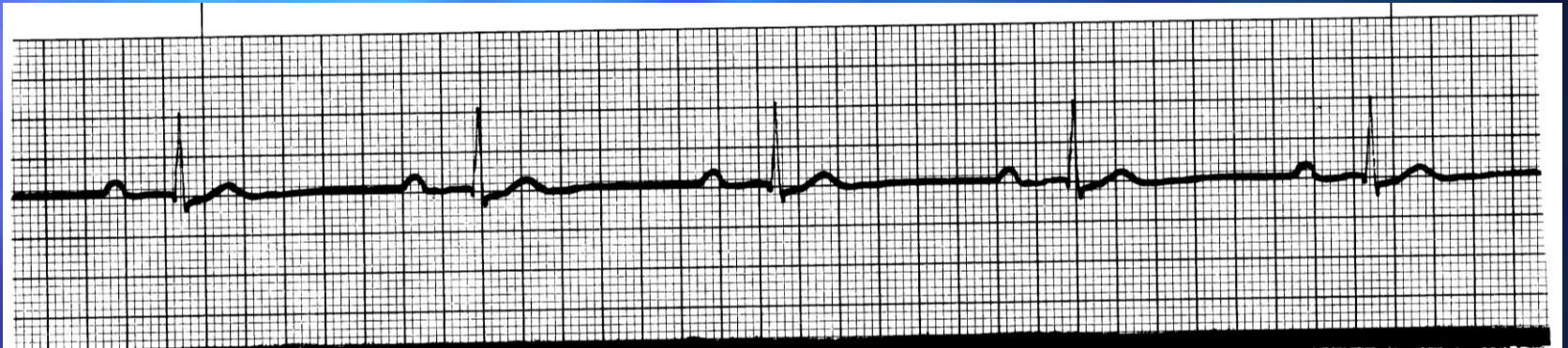


Блокады сердца. Электрокардиостимуляция

AV Blocks

- Disorders of conduction at AV Junction
- Categories
 - First degree (1° AV Block)
 - Second degree (2° AV Block)
 - Type I
 - Type II
 - Third degree (3° AV Block or Complete AV Block)

Analyze the Rhythm



AV Blocks

- First Degree

- Prolonged AV conduction time
- PR interval > 0.20 seconds
- Characteristics of that of any other rhythm with a SINGLE sinus or atrial pacemaker site
- Associated with an underlying sinus or atrial rhythm!!!

AV Blocks

- First Degree

- Causes

- AV node ischemia/hypoxia
 - Increased vagal or decreased sympathetic tone
 - Drug effects
 - Digitalis
 - Beta blockers
 - Calcium channel blockers
 - Quinidine
 - Pronestyl

AV Blocks

- First Degree

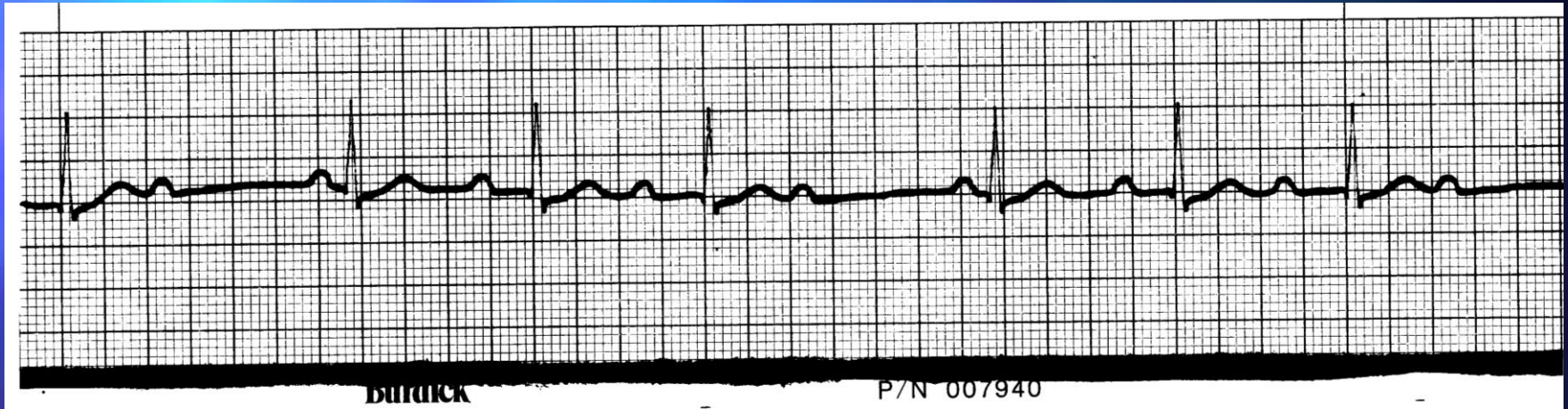
- Management

- Usually requires no specific treatment
 - Treat the patient!!!
 - Monitor for progression to higher degree block

AV Blocks

- Second Degree
 - Types
 - Type I
 - Variable
 - Wenckebach phenomenon
 - Type II
 - Fixed
 - Classical

Analyze the Rhythm



AV Blocks

- Second Degree

- Type I

- Definition

- PR interval lengthens
 - Beat drops

- Pathophysiology

- Usually physiologic
 - Increased vagal tone (Acute inferior MI, RVI)
 - Drug effects (digitalis, beta blockers, CCBs)
 - Frequently aborted

AV Blocks

- Second Degree

- Type I

- Good prognosis
 - Specific therapy usually not necessary
 - therapy, if indicated, most likely targeted towards bradycardia
 - Treat the patient!!!

Analyze the Rhythm



AV Blocks

- Second Degree

- Type II

- Definition

- P waves fail to conduct
 - PR interval does not lengthen

- Characteristics

- Atrial rate > Ventricular rate
 - QRS usually longer than 0.12 sec
 - Usually 4:3 or 3:2 conduction ratio (P:QRS ratio)

AV Blocks

- Second Degree

- Type II

- Pathophysiology

- Organic lesions in bundle branches

- Usually occurs below bundle of His in the bundle branches (infranodal AV block)

- Intermittent block of conduction through one bundle and complete block in other

- Usually caused by Acute anterior or anteroseptal MI

AV Blocks

- Second Degree

- Type II

- Outlook

- Not good

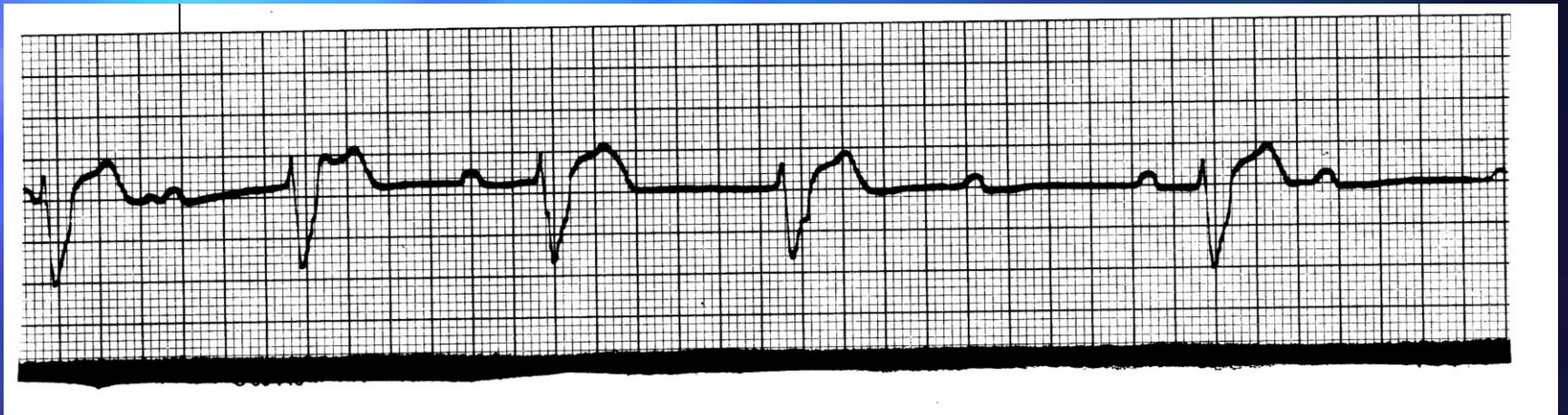
- Usually associated with anterior or anteroseptal MI

- Frequent progression to complete AV block

- Requires pacemaker

- Worsened by digitalis, procainamide, lidocaine, propranolol, TCAs

Analyze the Rhythm



AV Blocks

- Complete

- Definition

- No conduction through AV node
 - Independent atrial and ventricular rhythms
 - Ventricular depolarization dependent on automaticity of ventricular pacemaker sites

- Pathophysiology

- AV node hypoxia/ischemia
 - Myocardial infarction
 - Increased vagal or decreased sympathetic tone

AV Blocks

- Complete

- Characteristics

- Atrioventricular dissociation
 - Regular P-P and R-R but without association between the two
 - Atrial rate > Ventricular rate
 - QRS > 0.12 sec

AV Blocks

- Complete
 - Outlook
 - Junctional escape rhythm: good
 - Ventricular escape rhythm: bad
 - Warning
 - Do NOT give lidocaine or other ventricular antidysrhythmics!!!

AV Blocks

■ Management

- Most common complication = Bradycardia
 - IV/O₂/ECG Monitor/12 lead ECG
 - Atropine (not useful in 2° Type II or 3° AV Block)
 - TCP (bridge to transvenous pacer)
 - Catecholamine drip
- Prophylactic pacer application (standby)
 - 2° Type II AV block
 - 3° AV Block

Analyze the Rhythm



Cardiac Pacemakers

■ Definition

- Delivers artificial stimulus to heart
- Causes depolarization and contraction

■ Uses

- Bradyarrhythmias
- Asystole
- Tachyarrhythmias (overdrive pacing)

Cardiac Pacemakers

■ Types

– Fixed

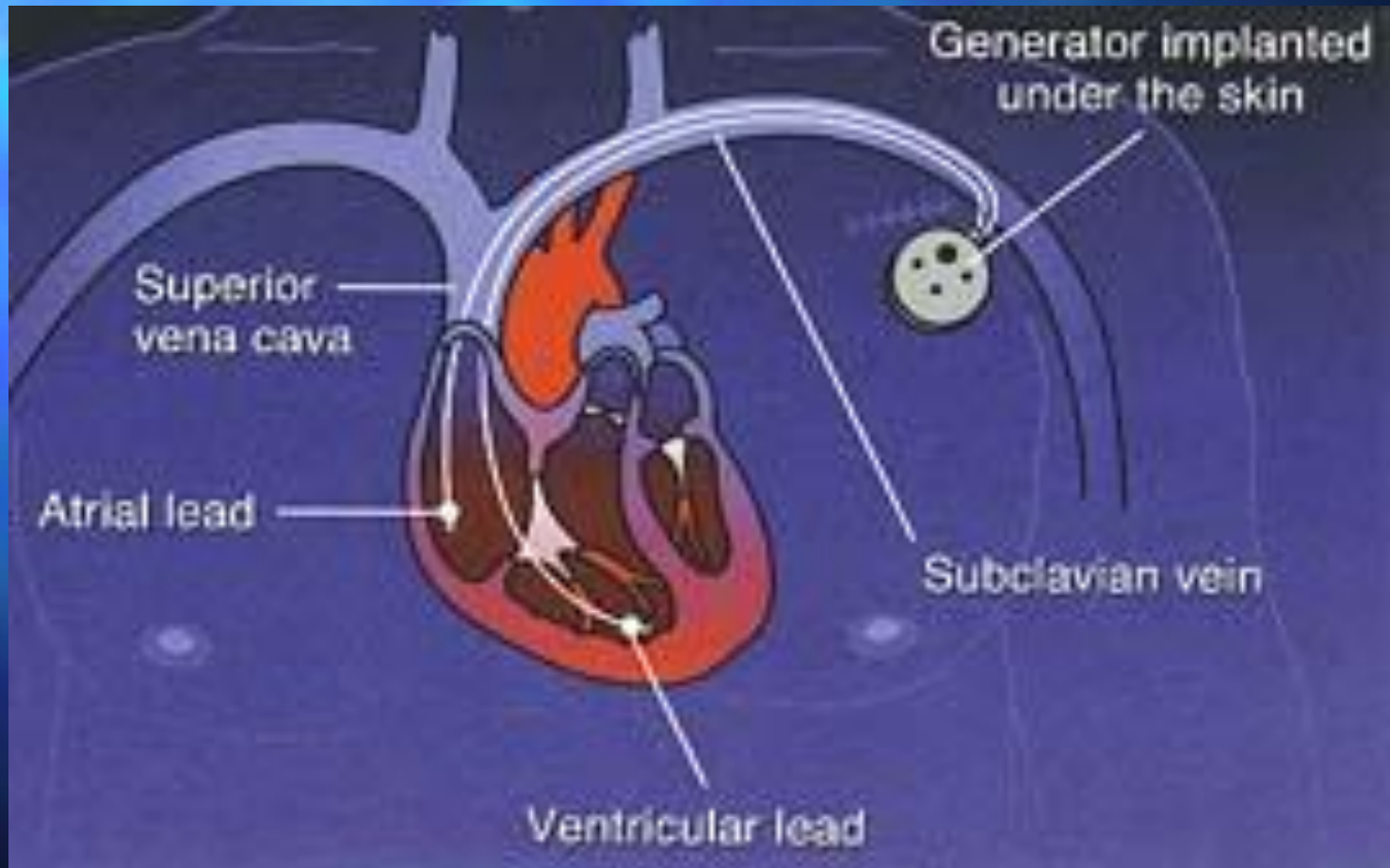
- Fires at constant rate
- Can discharge on T-wave
- Very rare

– Demand

- Senses patient's rhythm
- Fires only if no activity sensed after preset interval (escape interval)

– Transcutaneous vs Transvenous vs Implanted

Cardiac Pacemakers



Cardiac Pacemakers

- Demand Pacemaker Types
 - Ventricular
 - Fires ventricles
 - Atrial
 - Fires atria
 - Atria fire ventricles
 - Requires intact AV conduction

Cardiac Pacemakers

- Demand Pacemaker Types
 - Atrial Synchronous
 - Senses atria
 - Fires ventricles
 - AV Sequential
 - Two electrodes
 - Fires atria/ventricles in sequence

Cardiac Pacemakers

■ Problems

– Failure to capture

- No response to pacemaker artifact
- Bradycardia may result
- Cause: high “threshold”
- Management
 - Increase amps on temporary pacemaker
 - Treat as symptomatic bradycardia

Cardiac Pacemakers

■ Problems

– Failure to sense

- Spike follows QRS within escape interval

- May cause R-on-T phenomenon

- Management

 - Increase sensitivity

 - Attempt to override permanent pacer with temporary

 - Be prepared to manage VF

Cardiac Pacemakers

■ Problems

- Inappropriate absence of pacer artifact

■ Causes

- Depleted battery
- Circuit malfunction
- Oversense

■ Management

- Decrease sensitivity
- Treat bradycardia
- Replace pacemaker

Cardiac Pacemakers

■ Problems

– Runaway pacemaker

- Rates of up to 400/minute
- Increasing rate = Emergency

■ Causes

- Component failure
- Battery depletion

■ Management

- Transport
- Enter site surgically, cut lead

Cardiac Pacemakers

- Special Considerations

- Pacemaker does NOT affect treatment of cardiac arrest
- Do NOT fire defibrillator directly over pacemaker generator

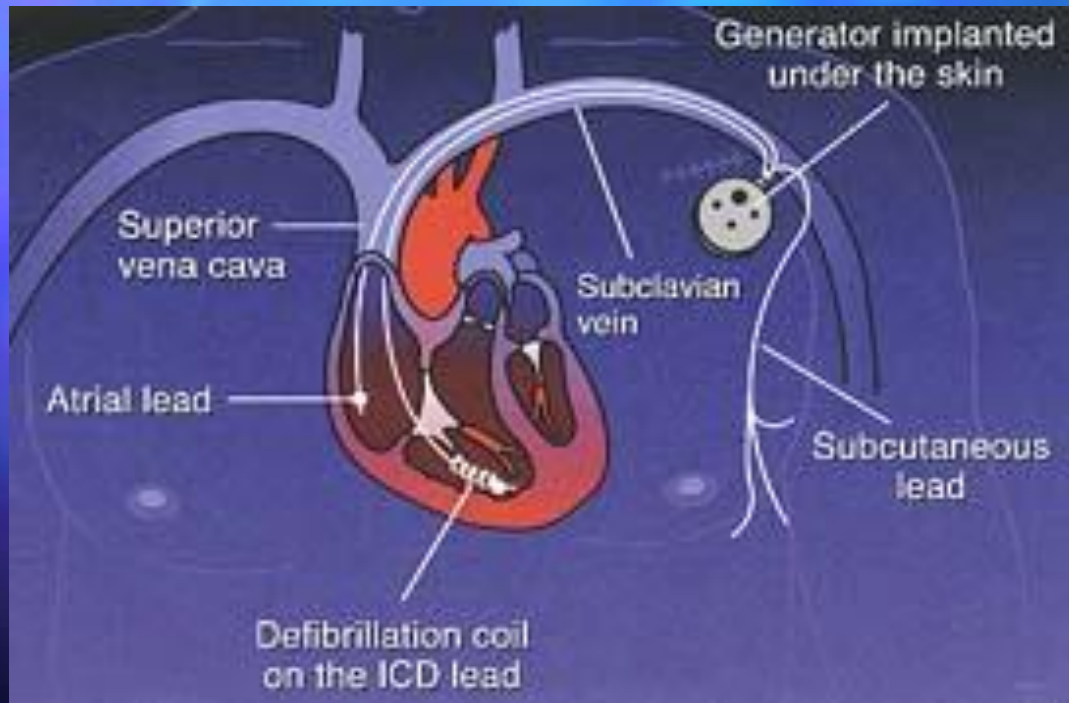
Cardiac Pacemakers

- **Transcutaneous Pacing Realizations**

You can't create mechanical capture in **dead** muscle!

It is much easier to increase the electrical rate of depolarization than it is to increase the mechanical rate of contraction!

Implanted Defibrillators



■ AICD

- Automated Implanted Cardio-Defibrillator

■ Uses

- Tachyarrhythmias
- Malignant arrhythmias
 - VT
 - VF