ACLS: Stroke, Acute Coronary Syndrome, Pharmacology and Rhythm Interpretation

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Types of Strokes

Ichemic Stroke

- 87% incidence
- Death rarely in first hr
- Thrombotic from atherosclerosis
- Embolic from carotids or left heart (don't forget right heart if AS defect)

Hemorrhagic Stroke

- 13% incidence
- Death more likely in first hour
- Intracerebral striate arteries from HTN
- Extracerebral from subarachnoid, aneurysm, AVM

Stroke Risk Factors

- HTN
- Smoking
- DM
- Tx for HIV
- Presence of bruits
- Previous TIA
- Protein C or S deficiency
- African-American
- A-fib
- Age
- Family Hx
- OCP
- Factor V Leiden

Stroke Considerations

- Extracerebral bleed
  - HA big time, LOC no-unless large, focal deficit unlikely initially
- Intracerebral bleed
  - No HA if small bleed, LOC maybe, focal deficit certain
- Ischemic
  - HA doubtful, LOC unlikely, focal deficit big time

ACLS Goals of Stroke Treatment

- Detection: goal is to get rtPA running in 3 hrs (4.5 hrs now)
- Dispatch – EMS
- Delivery – to ER
- Door – triage
- Data – non-contrast CT
- Decision
- Drug – goal is <60 minutes after arrival
- Disposition – admit to stroke unit

rtpa exclusion criteria

- Age >80 years
- Severe stroke
- Taking an oral anticoagulant
- Hx of both DM and prior TIA
- Cincinnati Pre-Hospital Stroke Scale
  - Facial droop
  - Arm drift
  - Slurred speach

ACLS: Acute Coronary Syndromes

For the patient presenting with chest pain of cardiac origin…

	ST elevation or new or presumably new LBBB; strongly suspicious for injury	ST depression or dynamic T-wave inversion; strongly suspicious for ischemia	Normal or non-diagnostic changes in ST segment or T wave
	ST-Elevation MI (STEMI)	High-Risk Unstable Angina/Non-ST Elevation MI (UA/NSTEMI)	Intermediadate/Low-Risk UA
Goals:	Reperfusion	Increase blood flow	Increase blood flow
Method:	Fibrinolytic/cath	Cath	Meds/cath

ACLS: Acute Coronary Syndromes

What needs to happen <u>in the first few minutes</u>

- Oxygen
- ASA (160-325 mg)
- Vitals
- IV
- SL NTG
- MS
- Remember MONA

- 12 lead
- Brief H&P
- Enzymes, coag, lab, mag
- Heparin (UFH or LMWH)
- Clopidogrel
- Eligible for thrombolytic (goal of 30 mins)?
- Headed for the cath lab (goal of 90 mins)?
- Beta-blocker
- ACE inhibitor/ARB with 24 hrs of symptom start
- Statin

ACLS: Pharmacology

- Know the drugs
- Know the indications
- Know the dosages
- Objective
  - Aid in resuscitation
  - Prevent or treat arrhythmias
  - Relieve pain and anxiety

Oxygen

- Indications
  - Chest pain or SOB for any reason
  - 10-15 l/min by non-rebreather mask
  - Don't mess with NC, not enough at 6 l/min max
  - Positive pressure in cardiopulmonary arrest
    - Bag-valve-mask
    - Laryngeal mask airway (LMA)
    - Endotrachial tube

Epinephrine

- Indications
  - V-fib, pulseless V-tach, PEA, asystole
- MOA – Increases:
  - systemic vascular resistance
  - arterial pressure
  - heart rate
  - contractility
  - myocardial oxygen demand
  - Automaticity
- Dose: 1 mg q 3-5 mins
  - No max dose
  - 10 ml of 1:10,000 soln = 1 mg IV/IO
  - 2.5 X IV dose down ET tube

Vasopressin

- Indications
  - V-fib, pulseless v-tach
  - Asystole/PEA
- MOA
  - Naturally occurring ADH
  - Strong vasoconstrictor
  - Long duration of action
  - Does not increase oxygen consumption
  - Does not cause bradycardia once circulation is restored
- Dose
  - 40 units IV/IO once

Amiodarone

- Indications
  - V-fib, pulseless v-tach
  - Wide complex v-tach
  - SVT due to WPW
- MOA
  - Suppresses ectopy
  - Increases atrial, AV and ventricular refractory periods
  - Antianginal effect
  - Slows sinus rate
  - Prolongs QRS and QT intervals
- Dose
  - 300 mg IV/IO, may rebolus 150 mg in v-fib/pulseless v-tach, PSVT
  - 150 mg over 10 min, may repeat to 2.2 gm/24 hrs
  - Drip rate 0.2-2 mg/min

Atropine

- Indications
  - Bradycardia
- MOA
  - Parasympatholytic
  - Accelerates rate of SA discharge
  - Improves AV conduction
- 0.5 mg IV q 3-5 min prn
  - Max dose 3 mg

Note: atropine increases rate, but does little for pressure. If correction of hypotension is needed, add 1-2 liters IV normal saline or LR

Drip rates in bradycardia

- Dopamine
  - 5-10 mcg/kg/min
- Epinephrine
  - 2-10 mcg/min
- Norepinephrine
  - 0.1-0.5 mcg/kg/min – for post-cardiac arrest

Adenosine

- Indications
  - SVT
  - Diagnostic tool
- MOA
  - Slows AV conduction
  - Interrupts AV nodal re-entry pathway
  - May worsen SVT due to WPW
  - Half-life is less than 10 seconds
- Dose
  - 6 mg IV push followed by 20 cc saline flush
  - May repeat at 12 mg IV in 1-2 minutes
  - Sinus pause if effective

Diltiazem (Cardizem)

- Indications
  - SVT
  - Do not use in WPW, AV block, with IV beta-blockers
- MOA
  - Calcium channel blocker
  - Prolongs AV nodal conduction
  - Decreases systemic vascular resistance

Magnessium

- Indications
  - Torsades de pointes
  - Post-MI
- MOA
  - NA and K channel blocker
  - Blocks neuromuscular transmission
  - magic
- Dose
  - 1-2 gm IV over 5-50 min in torsades
  - 0.5-1.0 gm/hr infusion in post-MI

Nitroglycerin

- Indications
  - Angina
  - MI
- MOA
  - Dilates coronary arteries – and others
  - Decreases ventricular work/volume/venous return
- Dose
  - 0.4 mg q 5 mins SL X 3, tabs or spray
  - May apply 1 inch nitropaste
  - IV rate 10-20 mcg/min, may increase by 5
  - Watch for hypotension with all

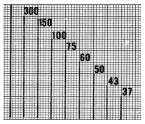
Morphine

- Indications
  - Acute MI
  - Acute pulmonary edema
- MOA
  - Vasodilator
  - Opioid analgesic
- Dose
  - 2-5 mg IV titrated to desired analgesic or hemodynamic effect

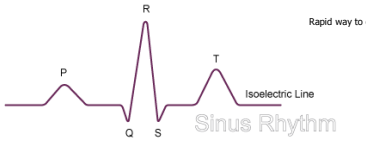
Dopamine/Dobutamine

- Indications
  - Bradycardia
  - Hypotension/cardiogenic shock
  - CHF – with other drugs
- MOA
  - Precursor of epi
  - Alpha- and beta-adrenergic agonist
  - Arterial and venous constriction
  - Dopamine increases myocardial oxygen demand, dobutamine does not
- Dose
  - 5-20 mcg/kg/min
  - Adjust to desired BP, urine output and clinical response

Rhythm interpretation

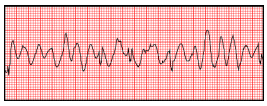


Rapid way to calculate rate

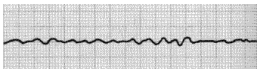


R to R interval is even
Every QRS is preceded by a P wave
The QRS width is less than .12 sec

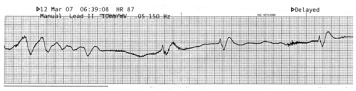
Asystole



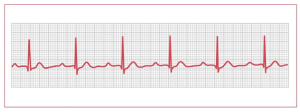
Course vfib



Fine vfib



Agonal (idioventricular)

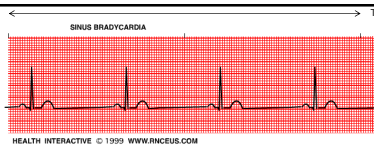


First degree – prolonged PR

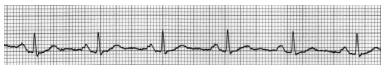
2nd degree, Mobitz type 1 – short, longer, longest, drop

2nd degree, Mobitz type 2 – all QRS preceded by P, but not all P's have QRS following

3rd degree – R to R same, P to P same, just not together

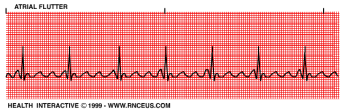


Sinus bradycardia

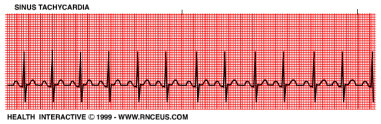


If no pulse… Pulseless Electrical Activity

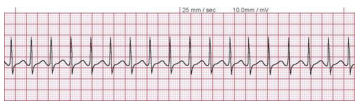
Afib – absence of P waves, irregularly irregular



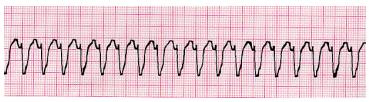
Aflutter – sawtooth or picket fence waves



Sinus tach – narrow complex QRS, all preceded by a P wave



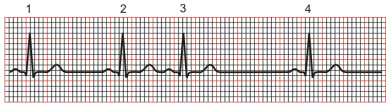
Supraventricular tachycardia – narrow complex QRS, no P wave



Wide complex ventricular tachycardia – can be pulseless, stable or unstable

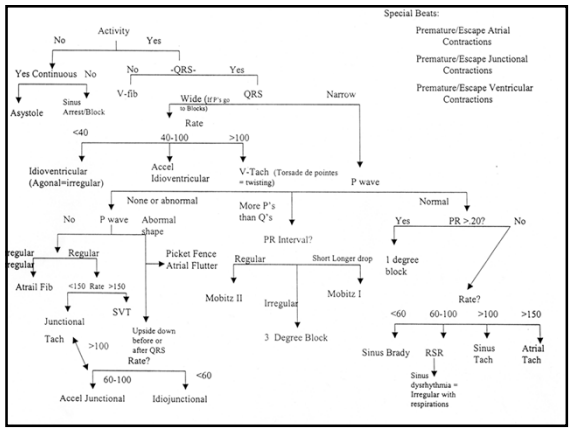
Junctional rhythm

Multifocal PVCs



Premature atrial contraction

Torsades de pointes – assoc with long QT, drugs


Special Beats:
Premature/Escape Atrial Contractions
Premature/Escape Junctional Contractions
Premature/Escape Ventricular Contractions
Activity
No
Yes
Yes Continuous
No
Asystole
Sinus Arrest/Block
No
-QRS-
Yes
V-fib
QRS
Narrow
Wide (if P's go to Blocks)
Rate
<40
40-100
>100
Idioventricular (Agonal=irregular)
Accel Idioventricular
V-Tach (Torsade de pointes = twisting)
P wave
None or abnormal
More P's than Q's
Normal
No
P wave
Abormal shape
PR Interval?
Yes
PR > .20?
No
Regular
Picket Fence Atrial Flutter
Regular
Short Longer drop
1 degree block
Atrail Fib
<150 Rate >150
Mobitz II
Irregular
Mobitz I
Rate?
SVT
<60
60-100
>100
>150
Junctional Tach
>100
Upside down before or after QRS
3 Degree Block
Sinus Brady
RSR
Sinus Tach
Atrial Tach
Rate?
Sinus dysrhythmia = Irregular with respirations
60-100
<60
Accel Junctional
Idiojunctional