Chapter 28, Part 2 Cardiology

Part 2: Assessment and Management of the Cardiovascular Patient

Assessment of the Cardiovascular Patient

Scene Size-up and Initial Assessment

- Determine scene safety.
- Determine level of ________________
- Airway.
- Breathing:
  - Note ________________ sounds indicative of cardiovascular problems.
- Circulation:
  - Note color, temperature, turgor, moisture, mobility, ________________
- Treat life-threatening problems.

Focused History

Common Symptoms:

- Chest Pain
  - ________________ History of Pain
- Dyspnea
  - Onset
  - ________________ Provocation/palliation
  - Orthopnea
  - ________________

Other Signs/Symptoms

1

- Restlessness and anxiety
- Feeling of impending doom
- Nausea/vomiting
- ________________
- Palpitations

2

- Edema
- Headache
- ________________
  - Behavioral change
  - Anguished facial expression
  - Activity limitations
  - ________________

Acute Coronary Syndrome

3 General Categories

- Classic ________________
– Classic S/S of MI or coronary event
  ● ___________________________ Presentation
– Different S/S
  ● ___________________________ Equivalents
  – Considered for high risk patients

8 Atypical Presentation Examples
  ● Pain that is sharp or ___________________________
  ● Pain to teeth (toothache with no inflammation)
  ● Pain to neck, ____________________________ , arm or abdomen
  ● Mostly includes females, ____________________________ and the elderly
  ● Suspect cardiac event with these S/S

9 Anginal Equivalents
  ● Dyspnea
  ● ____________________________
  ● Syncope or near syncope
  ● Generalized weakness with no hx of GI bleed or fever
  ● ____________________________
  ● Often, the only S/S presented but may be ____________________________ in nature

10 Risk Factors for Anginal Equivalents
  ● ____________________________
  ● Hypertension
  ● Age
  ● Family history of CAD
  ● ____________________________
  ● Stress
  ● ____________________________ life style

11 Acute Coronary Syndrome (1 of 2)
  ● The key to forming accurate impression of cardiac event lies in clinical
    ____________________________ .
  ● Take into account the patient's physical presentation, risk factors, and assessment
    findings
  ● ____________________________ to the patient

12 Acute Coronary Syndrome (2 of 2)
  ● If anginal equivalents or atypical S/S are present, MONITOR
  ____________________________
  ● If presentation suggests possible coronary event, consider treatment just as with typical
    chest pain, even if chest pain is ____________________________

13 SAMPLE History
  ☐ Allergies
  ☐ ____________________________ 
  ☐ Nitroglycerin, propranolol, digitalis, diuretics, antihypertensives, antidysrhythmics,
lipid-lowering agents, ED meds
○ Nonprescription drugs
○ Cocaine
○ Antihistamines
○ ____________________________

14 SAMPLE History
Past Medical History:
● Cardiac history
● Heart problems
● Other medical problems
● ____________________________ cardiac history
● Modifiable risk factors for heart disease (______________________________, etc.)

15 SAMPLE History
Last Oral Intake
● Caffeinated beverages, alcohol, sports drinks, etc
Events Preceding the Incident
● ____________________________, strenuous or sexual activity

16 Physical Exam
Inspection of:
● Tracheal position
● Thorax
● ____________________________

17 Physical Exam
Auscultation:
○ ____________________________ Sounds
○ ____________________________ Sounds
○ Normal
○ Abnormal

18 Physical Exam
Palpation:
○ ____________________________
○ ____________________________
○ Crepitus
○ Chest Wall Tenderness
○ Epigastrum

19 Management of Cardiovascular Emergencies
Basic Life Support:
● ____________________________
● ____________________________
● Vital signs
Caution: Don’t get so wrapped up in your ALS skills and toys, that you forget the _________.

20 Management of Cardiovascular Emergencies
Advanced Life Support:
- ECG Monitoring
- Vagal Maneuvers
- Precordial ____________________________
- Pharmacological Management
- ________________________________
- Synchronized Cardioversion
- Transcutaneous Cardiac Pacing
- ____________________________ (12-Lead) ECG

21 Monitoring ECGs in The Field
2 main components:
- ECG ________________________________
  - May include 12 lead capabilities
- ________________________________
  - May include pacing capabilities

22 Components of an ECG Monitor
- Note: Monitors/Defibrillators are different. You should become very familiar with the unit you will be using
- Screen (__________________________ or LCD)
- Paper strip recorder
- Battery/Power source
- Patient __________________________ and electrodes
- Controls for monitoring
  - ____________________________ selection
  - ECG ____________________________

23 Using a Monitor
- ____________________________ monitor appropriately
- Turn on unit
- Prepare patients skin
  - Clean, dry, shave excess hair
- Attach 3 or 4 ____________________________
- Ask patient to lie still and print a strip
- ____________________________ strip
- Treat the patient NOT the monitor

24 Causes of Poor Signals
- Excessive hair, loose or dislodged electrode
- Dried conductive gel, poor placement, ____________________________
- Patient movement or muscle tremor
- Broken patient cable or lead ____________________________
- Low ____________________________
- Faulty grounding
- Faulty monitor

25. Troubleshooting a Monitor/Defibrillator

<table>
<thead>
<tr>
<th>Problem</th>
<th>Check:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Power</td>
<td>Batteries/Power supply</td>
</tr>
<tr>
<td>Won’t shock</td>
<td>Cables or Synchronize button on</td>
</tr>
<tr>
<td>Movement of patient, 60 cycle interference, poor connection of electrodes</td>
<td></td>
</tr>
</tbody>
</table>

26. Troubleshooting a Monitor/Defibrillator

<table>
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<tr>
<th>Problem</th>
<th>Check:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Won’t Print</td>
<td>Paper, Paper jam</td>
</tr>
<tr>
<td>Strange looking rhythm</td>
<td>Lead ____________________________</td>
</tr>
<tr>
<td>ECG is very small</td>
<td>Increase lead ____________________________</td>
</tr>
</tbody>
</table>

27. Vagal Maneuvers

- Indication:
  - Stable patient with symptomatic ____________________________
- Maneuvers:
  - ____________________________ maneuvers
  - Coughing
- Carotid Sinus Massage
  - Avoid in patients with a history of cerebrovascular or carotid artery disease, or patients with carotid ____________________________.

28. Precordial Thump

- Indication:
  - ____________________________ patient who has a witnessed arrest.
  - Most effective when performed ____________________________ after onset of VF.
  - Not used in ____________________________ patients.

29. Antidysrhythmic Medications

- Control or suppress ____________________________
- Atropine Sulfate
- ____________________________
- Procainamide
- ____________________________
- ____________________________
- Verapamil

30. Procainamide (Pronestyl)

- Indications: Significant PVCs, ____________________________
- Contraindications:
  - Allergy
  - 2nd and 3rd Degree ____________________________ Block
• Dosage: 100mg over 5 minutes slow IV push until:
  – Suppression
  – Max of 500mg given
  – QRS complexes broaden by _______________________________%

31 Procainamide (Pronestyl)
• Adverse Reaction:
  – Fever, Seizures, Hypotension, ________________________________, V-Fib
• Note: Removed from sales in US

32 Cardizem (Diltiazem) (1 of 2)
• Antidysrhythmic __________________________ (channel blocker)
• Action: relaxation of vascular smooth muscle and slows conduction through the __________ node
• Indications: rapid response __________________________ and A-flutter and PSVT refractory to Adenosine for unstable patients
• Contraindications: hypotension, cardiogenic shock, wide complex tachycardia (__________________________), WPW

33 Cardizem (Diltiazem) (2 of 2)
• Dosage: ____________ mg/kg IVP over 2 minutes
  – Standard dose is ______________ mg
  – Followed by a maintenance drip at 5-15mg/hr (except for PSVTs)
• Adverse Reactions: N/V, headache, dizziness, bradycardia, heart block, hypotension, and asystole
• Should be ________________________________ or disposed of after 1 month at room temperature

34 Sympathomimetic Agents
  ☺ Similar to naturally occurring hormones
• Epinephrine
  • ________________________________
• Isoproterenol
  • ________________________________
• Dobutamine
  • ________________________________

35 Norepinephrine
• AKA: ________________________________
• Indication: Severe hypotension
• Contraindications: ________________________________, profound hypoxia
• Dosage: Initially _____ - ______ mcg/min IV drip with maintenance drip of 2-4mcg/min titrated to maintain BP
• Adverse Reactions: Headache, dizziness, bradycardia, hypotension, arrhythmias

36 Isoproterenol (Isuprel)
• Rarely used in prehospital setting
• Indications: Heart blocks, ________________________________ arrhythmias
● Contraindications: Bradyarrhythmias or heart blocks caused by Digitalis toxicity
● Dosage: 0.02-0.06mg IV with maintenance drip of 5mcg/minute
● Adverse Reactions: ________________________________, tachycardia, cardiac arrest, diaphoresis

37 Dopamine
● AKA: ________________________________
● Used regularly in prehospital setting
● Indication: Cardiogenic shock with ________________________________
● Contraindications: tachyarrhythmias, V-Fib
● Dosage: IV drip at ________-________mcg/kg/min to maintain BP
● Adverse Reactions: Ectopic beats, dyspnea, necrosis of skin with IV infiltration
● Over ________mcg/kg/min will shut off blood flow to kidneys and GI tract

38 Dobutamine (Dobutrex)
● Indications: Increases cardiac output in short-term treatment of cardiac decompensation such as ________________________________ shock
● Contraindications: ________________________________
● Dosage: 2-20mcg/kg/min IV drip titrated to ________________________________
● Adverse Reactions: Increased heart rate, hypertension, dyspnea

39 Drugs Used for Myocardial Ischemia
● Treat ischemia or manage pain
● Oxygen
● Nitrous Oxide
● ________________________________
● Morphine Sulfate
● ________________________________
● Fentanyl

40 Nitrous Oxide (___________________________________)
● Nitrogen and ________________________________ mixture in a gas state. Medical Nitrous is a ____________-__________ mixture
● Indications: Pain management
● Contraindications: Pneumothorax, COPD, bowel obstruction
● Actions: Reduces the ________________________________ of pain
● Dosage: administration via hand held mask. Allow patient to hold mask to prevent over medication
● Nitrous leaves the system within ___________ minutes of d/c

41 Morphine Sulfate
● ________________________________ based narcotic analgesic. Dilates coronary arteries
● Indications: Pain management
● Contraindications: Hypovolemia, hypotension
● Dosage: _______-_______mg IV push repeated every 5-10 minutes as needed
● MS should be diluted 1:1 prior to administration
● Adverse Reactions: ___________________________ depression, sedation, hypotension, N/V
● MS can be reversed with ___________________________

42 Demerol
● __________________________ Narcotic Analgesic
● Indications: Pain management
● Contraindications: Hypovolemia, hypotension
● Dosage: ______ - ______ mg IV push repeated every 5-10 minutes as needed
● Adverse Reactions: ___________________________ depression, sedation, hypotension, N/V
● Demerol can be reversed with Narcan

43 Fentanyl (Sublimaze) (1 of 2)
● __________________________ Analgesic
● On a weight basis, 50 to 100 times more potent than MS
● Indication: pain management
● Contraindications: hemorrhage, shock, children < ____________ yoa
● Dosage ______ - ______ mcg slow IV push

44 Fentanyl (Sublimaze) (2 of 2)
● Adverse reactions: respiratory depression, muscle rigidity, ___________________________
● Fentanyl does not affect the ____________ to the extent of MS
● May be used on trauma victims where dropping of BP is a concern
● Does NOT ____________________________ the coronary arteries
● Can be reversed with Narcan

45 Thrombolytic Agents
○ Action: to break up blood clots blocking a blood vessel (clot busters)
○ __________________________
● Alteplase
● Relteplase
● Thrombolytics (other than asa) are not routinely given by EMS. However, many patients receiving them are transferred from one facility to another.
● Greatest concern is reperfusing ___________________________

46 Other Cardiac Medications

47 Furosemide (Lasix)
● Action: ___________________________ that inhibits the reabsorption of sodium in the kidneys. Also causes venous dilation and reduces cardiac preload
● Indications: CHF with pedal and/or __________________________ edema
● Contraindications: Hypovolemia, pregnancy, renal failure
● Dosage: ______ - ______ mg slow IV push
● Adverse reactions: volume depletion, muscle spasm

48 Diazepam (Valium)
• Actions: A benzodiazepine. Sedative-hypnotic, _________________.
• Used in EMS for sedation and anticonvulsant
• Indications: ______________________ for cardioversion and RSI. Seizures
• Contraindications: Coma

49  □  Diazepam (Valium)
• Dosage: ______-_______ mg IVP, repeated every 15 minutes to a max of 30mg. Can be given rectally as well.
• Adverse Reactions: Sedation, ______________________________ depression or arrest, bradycardia

50  □  Promethazine (Phenergan)
• Actions: Antiemetic, sedative, antihistamine, anticholinergic
• Indications: __________________ (for EMS) often needed after administration of narcotic analgesic
• Contraindications: Children <2yoa
• Dosage: ______-_______ mg IVP. Drug should be diluted 1:1 to avoid damage to vein. May be repeated as needed
• Adverse reactions: sedation, dry mouth

51  □  Zofran (Ondansetron) (1 of 2)
• Actions: _____________________________, serotonin 5-HT3 receptor blocker
• Does not cause the depressed ______________________________ status as does Phenergan
• Indications: nausea and/or vomiting
• Contraindications: children < ___________ yoa

52  □  Zofran (Ondansetron) (2 of 2)
• Adult Dosage: ___________mg IV push
• Pediatric Dosage: ___________mg/kg up to ____________mg
• Adverse Reactions: Rarely may cause chest pain, hypotension and tachycardia

53  □  Sodium Nitroprusside
• Actions: __________________________
• Indications: lowers BP and reduces preload and afterload
• Contraindications: hypovolemia, compensatory hypertension, head injuries
• Dosage: _____-_______ mcg/kg/min IV drip titrated to BP
• Adverse Reactions: Increased ____________, bradycardia, muscle tremors

54  □  Sodium Bicarbonate
• Actions: Reverses __________________________
• Indications: Acidosis due to cardiac/respiratory arrest, metabolic acidosis or _______________ Syndrome
• Contraindications: Alkalosis, renal failure
• Dosage: ______________ of 8.4% solution every 10 minutes as determined by ABGs
- Adverse reactions: metabolic alkalosis, hypokalemia
- Do not use in same IV tubing as ___________________________ drugs. Will cause formation of crystals

55 Labetalol
- AKA: ___________________________ , Trandate
- Action: Reduces peripheral vascular resistance
- Indications: Severe ___________________________
- Contraindications: Asthma, cardiac failure, cardiogenic shock, bradycardia
- Dosage: _____________ mg slow IV push repeated at 40-80mg every 10 minutes until hypertension relieved or a max of _____________ mg given
- Adverse Reactions: Ventricular arrhythmias, N/V, hypotension, bronchospasms

56 Digitalis
- AKA: ___________________________ ,
- Not normally given prehospital but presents challenges for EMS
- Used to treat SVTs, ___________________________ , A-Flutter, and heart blocks
- Digitalis Toxicity: characterized by arrhythmias and yellow-green _______ around visual images, and bradycardia
- Digitalis Toxicity may be life threatening and render some drugs

57 Giving Meds Via ETT
- During an emergency situation, certain drugs can be given down the ET tube.
  - IV push is always the route of choice over ETT
  - When giving drugs down an ETT, ___________________________ the amount of drug but do not give more than _________ cc at a time.
  - If more than _________ cc is required to double the dosage, ventilate the patient for a few seconds after first half and then give the second half

58 Giving Meds Via ETT
  The following drugs can be given via the ETT: LANE
  - ___________________________ 
  - ___________________________ 
  - ___________________________ 
  - ___________________________ 

59 Defibrillation
  - Chest Wall Resistance:
    - ___________________________ pressure, paddle–skin interface, paddle ___________________________ area, number of previous ___________________________ , and inspiratory vs. expiratory phase at time of shock

60 Defibrillation
- Defibrillation is the process of passing an electrical current through a
“_” heart to depolarize a critical mass of cardiac cells. This allows them to depolarize uniformly, resulting in an organized fashion.

- Uses __________________________ current (DC)
- Joules: the shock’s strength
  - Energy (Joules) = power (watts) X __________________________ (seconds)

61 Defibrillation
- All CPR, ventilations, treatment, and touching of patient must be stopped when analyzing the rhythm and while shocking
- Make sure no one is touching the patient and/or before shocking.
- Do not shock in water or in a wet environment
- If paddles are used, be sure to use appropriate defib

62 Defibrillators
- There must be enough “peak” current to reach the heart to defibrillate
- Too much “peak” current can damage the heart
- __________________________ Defibrillators:
  - Current flows in one direction only
  - Causes a sharp “peak”

63 Defibrillators
- Current flows in one direction in the first phase of the shock and then reverses for the second phase.
- Research shows biphasic to be more successful
- Creates a squared off “peak”
- Requires less __________________________: Some defibrillators automatically adjust joules so the 360J setting is still used

64 Defibrillators
  Biphasic Defibrillators (continued):
  - Biphasic wave forms adjust for __________________________ by varying the characteristics of their waveforms thus lowering joules setting
  - This tends to ensure that high impedance persons will have the same chance for survival as those who are of low impedance
  - Most, if not all, new defibrillators are __________________________

65 Monophasic v. Biphasic Defibrillation

66 Defibrillation
  Success of defibrillation depends on:
  - __________________________ since onset of VF
  - Condition of the __________________________
  - Heart size and body weight
Components of an Defibrillator

- Defibrillation Gel
- Defibrillation/Pacing (if hands free)
- Defibrillation Pads
- Defibrillation Controls (on paddles if equipped)
  - Energy setting
  - Discharge Button(s)
  - __________________________ button

- Battery or power supply

Using a Defibrillator

- Turn unit on
- If using paddles, apply defibrillation
- Apply defibrillation pads
  - Apex, ____________________________
- Charge unit to desired setting
- Say “CLEAR”
- _____________________________ that everyone is clear

Using a Defibrillator

- Discharge defibrillator
  - Push shock button on hands free
  - Push ____________________________ shock button simultaneously on paddles
- Deliver 1 shock at _________ J
- Do NOT check a __________________________ after defibrillation, but resume CPR for 2 minutes, unless patient regains consciousness

Using a Defibrillator

- After 2 minutes of CPR, check
- Do not check pulse unless there is a __________________________ change

Emergency Synchronized Cardioversion

Indications:
- Unstable, tachycardic patient
  - ____________________________ VT
  - ____________________________
  - Rapid atrial fibrillation
  - 2:1 atrial flutter

Emergency Synchronized Cardioversion

Procedure
Similar to defibrillation.
- Attempt to _________________ the patient whenever possible.
- Turn on the _________________ .
- _________________ discharge buttons until countershock administered.

Transcutaneous Cardiac Pacing
Indications
- _________________, unstable patients who do not respond to pharmacological therapy
  - Symptomatic bradycardias with high-degree AV _________________.
  - Atrial fibrillation with a slow ventricular response.
  - Other significant bradycardias

External Cardiac Pacing
- **Must** have 3 or 4 limb _________________ applied
- _________________ if applicable
  - Versed or Diazepam
- Set _________________
  - Demand or Fixed
- Set _________________
- Set _________________

Pacing Bradyarrhythmias
- Set pacer in _________________ mode
- Set rate at _________________
- Set current at _________________ setting and increase in increments of __________mA until capture.
- Capture is confirmed by _________________ pulse
- Titrate rate to adequate perfusion

Carotid Sinus Massage
- Indications:
  - Paroxysmal supraventricular _________________ in a stable patient.
- Complications
  - Do not use in patients with a history of cerebrovascular or carotid artery disease.
  - Do not use in patients having carotid _________________.
  - Asystole, PVCs, VT, and VF may occur.
  - Patient may experience bradycardia, nausea, and vomiting.
- Only _________________ artery at a time

Managing Specific Cardiovascular Emergencies

General Cardiac Management
- Management of the cardiac patient changes significantly at the Paramedic level due to the increased knowledge and ability to manage dysrrythmias
Treatment priorities are always:
1. _____________________________________
2. _____________________________________
3. Blood ___________________________________

Angina Pectoris
Pathophysiology:
- Angina occurs when the heart’s demand for oxygen exceeds the blood’s supply.
- Commonly caused by artherosclerosis.
- May also result from ____________________________ of the coronary arteries (Prinzmetal’s angina).
- Stable vs. Unstable Angina
  o ____________________________ Progression

Angina Pectoris
Causes of Chest Pain:
- Cardiovascular, including acute coronary syndrome, ____________________________, or thoracic dissection of the aorta
- Respiratory, including pulmonary embolism, pneumothorax, pneumonia, and pleural irritation
- Gastrointestinal
  o ____________________________

Angina Pectoris
Field Assessment:
- Signs of inadequate perfusion
  - Chest Discomfort
    - Typically ____________________________ onset, which may radiate or be localized to the chest.
    - Patient often ____________________________ chest pain.
  - Duration
    - Episodes last ____________________________ minutes.
    - Pain relieved with ____________________________ and/or nitroglycerin.

Angina Pectoris
- Breathing
  - History of past episodes of angina:
    - Episodes of angina that are increasing in frequency, duration, or severity are ____________________________.
  - ECG
    - Do not ____________________________ scene time.
    - ____________________________ ECG preferred:
      - Angina typically causes nonspecific ST changes.

Angina Pectoris
Management:
Relieve ___________________________________:  
  – Place the patient in a position of physical and emotional comfort.

Administer ___________________________________.

Establish IV access, TKO

Monitor ECG.

Consider medication administration:
  – ___________________________________ tablets or spray
  – ___________________________________ sulfate

Angina Pectoris

Special Considerations:
  ● Patients with new-onset or _______________________________ angina often require hospitalization.
  ● Symptoms _______________________________ relieved by rest, nitroglycerin, and oxygen may indicate an overall worsening of the disease or the early stages of a myocardial infarction.
  ● Patients may _______________________________ transport after pain is relieved, even though the underlying problem is not addressed.

Myocardial Infarction

Pathophysiology:
  ○ Death and _______________________________ of heart muscle due to inadequate oxygen supply.
  – Causes may include occlusion, spasm, microemboli, acute volume overload, hypotension, acute respiratory failure, and trauma.
  ○ Location and size dependent on the _______________________________ involved.

Myocardial Infarction

Effects of a Myocardial Infarction:
  ● _______________________________
  ● Heart Failure
  ● Ventricular Aneurysm

Goals of Treatment:
  ● _______________________________ Relief
  ● _______________________________

Myocardial Infarction

Field Assessment:
  ○ Breathing
  ○ Signs of _______________________________
  ○ Chief Complaint
  – Typically related to chest pain.
  – Evaluate using _______________________________:
    ● Discomfort > 30 minutes.
    ● _______________________________ to arms, neck, back, or epigastric
region.
- Patients may ___________________________ symptoms.
- Feelings of “impending doom.”

89 Myocardial Infarction
- Other Symptoms
  - Nausea and vomiting
  - ___________________________________

Myocardial Infarctions & the ECG
- Diagnostic ECGs:
  - 12-lead ECGs
  - S-T ___________________________
  - Pathological ________ waves

90 Myocardial Infarction
- Myocardial Infarctions & the ECG
  - ___________________________________
  - Asystole, PEA, VF, VT.
  - ___________________________________ are the leading cause of death in MI.

91 Myocardial Infarction
- Reperfusion Screening for ___________________________ therapy
  - Time from onset to treatment < ____________ hours.
  - Reperfusion of ischemic/injured tissue.
  - Absence of history that would ___________________________ thrombolytics.
- Transport
  - Rapid ___________________________ indicated when acute MI suspected

92 Myocardial Infarction
- Management:
  - Assess while you ___________________________
  - Administer ____________ .
  - Establish IV access, TKO
  - Do NOT allow patient to ___________________________

93 Myocardial Infarction
- Consider medication administration:
  - Aspirin
  - ___________________________________ sulfate for pain if SBP>90-100
  - ___________________________________ or Zofran for nausea
  - ___________________________________ if SBP >90-100
  - Nitrous oxide
  - Nubain
  - ___________________________ medication as indicated

94 Myocardial Infarction
Management (Continued):

- Monitor ____________________________.
- Rapid transport as indicated.
- Avoid patient ____________________________ if possible.
- Identify candidates for ____________________________ therapy.

95 ☐ Myocardial Infarction
   In-Hospital Management:
   - Diagnostic ECGs.
   - ____________________________ levels.
   - Risk assessment.
   - Treatment:
     - Cardiac ____________________________ and CABG.

96 ☐ Heart Failure
   Left Ventricular Failure:
   ☐ ____________________________: Results in increased back pressure into the pulmonary circulation.
   Signs/Symptoms
   ☐ Labored breathing/cyanosis, coughing, rales
   ☐ ____________________________
   ☐ Blood in sputum

97 ☐ Heart Failure

98 ☐ Heart Failure
   Right Ventricular Failure:
   ☐ Pathophysiology
     - Results in increased back pressure into the systemic venous circulation. Normally caused by left sided failure
   Signs/Symptoms:
     ☐ ____________________________
     ☐ ____________________________ neck veins
     ☐ ____________________________ edema

99 ☐ Heart Failure

100 ☐ Heart Failure
   Congestive Heart Failure:
   ☐ Pathophysiology
     - Reduction in the heart’s stroke volume causes fluid ____________________________ throughout the body’s other tissues.
   ☐ Manifestation
     ☐ Normally is a ____________________________ process
     ☐ Often caused by an old ____________________________

101 ☐ Congestive Heart Failure
   Field Assessment:
Edema:
- Cough with copious amounts of clear or pink-tinged sputum.
- Labored breathing, especially with ________________
- Abnormal breath sounds, including rales, rhonchi, and wheezes.

**Congestive Heart Failure**

- Paroxysmal Nocturnal __________________________ (PND)

- Medications:
  - ____________________________
  - Medications to ____________________________ cardiac contractile force, home oxygen.

**Mental Status**

- Mental status changes indicate impending ____________________________ failure.

**Breathing**

- Signs of labored breathing.
  - ____________________________ positioning.

**Skin**

- Color changes.
  - Peripheral and/or pedal ____________________________

**Management**

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- General management:
  - Avoid ____________________________ positioning.
  - Avoid ____________________________ such as standing or walking.

- Maintain the airway.

- Administer ____________________________

- Establish IV access.
  - Limit fluid administration. Use minidrip or __________

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- Monitor ECG

- Consider medication administration:
  - ____________________________
    - Morphine (does not have to have chest pain)
  - ____________________________
    - Dopamine/Dobutamine if hypotensive
    - Promethazine or Zofran if nauseated
    - Nitrous oxide
  - ____________________________ if breathing difficulty

- Avoid patient refusals if at all possible.

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**Cardiac Tamponade**

- Pathophysiology
Result of fluid accumulation between visceral __________ and parietal pericardium.

Increased intrapericardial pressure impairs diastolic filling.

Typically __________ progressively until corrected.

Epidemiology

_________________________ onset typically the result of trauma or MI.

Benign presentations may be caused by cancer, pericarditis, renal disease, and hypothyroidism.

Cardiac Tamponade

Field Assessment:

Patient History

- Determine precipitating causes.
- Patient relates a history of dyspnea and __________________________.

Exam

- Rapid, weak __________________________
- Decreasing systolic pressure, __________________________ pulse pressures
- Pulsus __________________________: drop in BP>10 torr during inspiration
- Faint, __________________________ heart sounds

Management:

- Maintain airway.
- Administer __________________________.
- Establish IV access.
- Consider medication administration:
  - __________________________ sulfate
  - Nitrous oxide
  - __________________________ if edema present
  - Dopamine/Dobutamine if hypotensive

Management (Continued):

- Rapid Transport

  - Pericardiocentesis is the definitive treatment.
  - Insertion of a cardiac needle and __________________________ of fluid from the pericardium.
  - Procedure should be performed __________________________ if allowed by local protocol.
  - Procedure should be performed only by personnel adequately trained in the procedure.

Hypertensive Emergencies

Causes:

- Typically occurs only in patients with a history of
Primary cause is ______________ with prescribed antihypertensive medications.

Also occurs with ______________ of pregnancy.

**Risk Factors:**

- ______________ -related factors
- Race-related factors

**Hypertensive Emergencies**

**Field Assessment:**

- **Initial Assessment**
  - ABCs and Alterations in mental state
- **Signs & Symptoms**
  - ______________ accompanied by N/V
  - Blurred vision
  - Shortness of breath
  - ______________
  - ______________
  - Tinnitus

**History:**

- Known history of hypertension
- Compliance with medications

**Exam:**

- BP > ______________
- Signs of left ventricular failure
- Strong, ______________ pulse
- Abnormal skin color, temperature, and condition
- Presence of ______________

**Management:**

- Maintain airway.
- Administer ______________.
- Establish _________ access.

Note: Caution must be used when lowering the BP of a chronically hypertensive patient. Over time, the patient adjusts ______________ perfusion to the hypertensive BP. If lowered, cerebral perfusion could be decreased and the brain become ischemic. Always consult local protocols or medical direction before lowering a BP with medications.

- If indicated, consider medication administration:
  - ______________ sulfate
  - ______________
  - Nitroglycerin
Sodium nitroprusside

Cardiogenic Shock
Pathophysiology:
General
- Inability of the heart to meet the body’s ______________ needs.
- Often remains after ______________ of other problems.
- Severe form of pump failure.
- High ______________ rate.

Causes
- Tension pneumothorax and cardiac ______________.
- Impaired ______________ emptying.
- Impaired myocardial ______________.
- Trauma.

Field Assessment:
Primary Assessment
Chief Complaint
- Chief complaint is typically chest pain, shortness of breath, unconsciousness, or altered ______________ state.
- Onset may be acute or ______________.

History
- History of recent ______________ or chest pain episode.
- Presence of shock in the absence of trauma.

Mental Status
- Restlessness progressing to ______________

Airway and Breathing
- Dyspnea, labored breathing, and cough
- PND, tripod position, accessory muscle retraction, and adventitious lung sounds

ECG
- ______________ and ______________ dysrhythmias

Circulation
- ______________, Cool, clammy skin

Management:
Maintain airway.
Administer ______________
Identify and treat underlying problem.
Establish IV access, consider fluid challenges if no pulmonary edema.
Consider medication administration:
- Vasopressors (__________________________)
- Other meds or __________________________ Challenge

Cardiac Arrest
Causes:
- __________________________ or acid–base imbalances
- Electrocuition
- Drug intoxication
- __________________________
- Hypothermia
- Pulmonary embolism
- __________________________
- Drowning
- Trauma
- End-stage renal disease and hyperkalemia

Field Assessment:
Initial Assessment
- Unresponsive, apneic, pulseless patient
ECG
- ___________________________________
History
- __________________________ events
  - Bystander CPR
  - “________________________ time”

Management:
- __________________________ aggressively unless contraindicated
General Guidelines
- CPR.
  - Manage specific dysrhythmias.
  - Establish IV access
  - Advanced __________________________ management.
  - CPR takes priority over __________________________
    - Avoid interruptions of CPR

Postresuscitation Management:
- Manage __________________________ and problems as presented.
- Be alert for ______________________.
- Manage BP
- Transport rapidly:
– Take care to protect ___________________________ and IV access.

124 Cardiac Arrest

○ Withholding Resuscitation
  – Rigor mortis
  – Dependent ___________________________
  – Decapitation, decomposition, incineration
  – Valid ___________________________

125 Cardiac Arrest

Indications for termination of resuscitation:

● Patient over ___________ years old.
● Cause is presumed ___________________________ in origin.
● Successful ___________________________ intubation.
● ___________________________ standards applied throughout the arrest.
● On-scene effort > ________________ minutes, or four rounds of drug therapy and ECG remains ___________________________ or agonal.
● Blunt trauma victims presenting with or developing asystole.

126 Cardiac Arrest

Contraindications to termination of resuscitation:

● Patient under 18 years old.
● Arrest is of a treatable cause.
● Present or recurring ___________/__________.
● ___________________________ return of a pulse.
● Signs of neurological viability.
● ___________________________ arrest.
● Family or others ___________________________ to termination of resuscitation.
● Suspected criminal activity

127 Cardiac Arrest

Terminating CPR:

● Always follow local protocols related to termination of resuscitation.
● Support the ___________________________ or others after termination of resuscitation.
● Coordinate with law ___________________________ as required
● When in doubt, ___________________________ resuscitation

128 Peripheral Vascular and Other Cardiovascular Emergencies

129 Atherosclerosis

Pathophysiology:

● Progressive degenerative disease of the medium-sized and large ___________________________.
● Results from the buildup of ___________________________ on the interior of the artery.
● Fatty buildup results in plaques and eventual ___________________________
Aneurysm

Pathophysiology:
- Weakness or defect in the wall of an arterial wall, usually the aorta, that results from a weakness or defect in the wall

Types:
- Atherosclerotic
- Infectious
- Traumatic

Abdominal Aortic Aneurysm

- Often the result of atherosclerosis

Signs and symptoms:
- Abdominal pain
- Pain
- Hypotension
- Urge to
- Pulsating mass

Dissecting Aortic Aneurysm

- Caused by degenerative changes in the smooth muscle and elastic tissue.
- Blood gets between and the wall of the aorta.
- Can extend throughout the aorta and into associated .

Acute Pulmonary Embolism

Pathophysiology:
- Blockage of a pulmonary artery by a blood or other particle.
- The area served by the pulmonary artery fails.

Signs and Symptoms:
- Dependent upon size and location of the blockage.
- Onset of severe, unexplained .
- History of recent lengthy .

Acute Arterial Occlusion

Pathophysiology:
- Sudden of arterial blood flow due to trauma, thrombosis, tumor, embolus, or idiopathic means.
- Frequently involves the or extremities.

Noncritical Peripheral Vascular Conditions

Peripheral Arterial Atherosclerotic Disease:
- Can be or chronic.
- Often associated with diabetes.
• Extremities exhibit coldness, numbness, and pallor.

136 Noncritical Peripheral Vascular Conditions
   Deep Venous Blood clot in a vein.
   • Typically occurs in the veins of the thigh and calf.
   • Dilated superficial veins, common with pregnancy and obesity.

137 Wolff-Parkinson-White Syndrome
   • WPW is a syndrome of pre-atrial contraction of the ventricles due to an accessory pathway called the Bundle of Kent which is an abnormal pathway from the atria to the ventricles.
   • Effects 0.15 to 0.2% of the population
   • Normally

138 Wolff-Parkinson-White Syndrome
   • Risk of sudden death due to (rare)
   • Produces a delta wave
     – Slurred upstroke in the QRS complex with a short PRI
     – Type I WPW produces positive waves
     – Type II WPW produces negative delta waves
   • Commonly causes and/or palpitations

139 WPW
140 WPW
141 WPW

142 Wolff-Parkinson-White Syndrome
   • If patient experiences episodes of A-Fib, the ECG will show a rapid polymorphic wide-complex and is very dangerous.
   • In this case, many antiarrhythmic drugs are contraindicated.
   ____________ is the treatment of choice for unstable patients

143 Management of WPW
   • If unstable tachydysrhythmia, cardioversion is indicated
   • If more stable, consider or Adenosine
     – Always consult Direction prior to administering any medications for WPW

144 General Assessment and Management of Vascular Disorders
   Assessment:
   • Initial Assessment
Circulatory Assessment
- ____________________________
  - Pain
  - ____________________________
  - Paralysis
  - Paresthesia

General Assessment and Management of Vascular Disorders
Assessment (Continued):
- Chief Complaint
  - OPQRST
- Physical Exam
  - Prior history of ____________________________ problems
  - Differences in ____________________________ or blood pressures

General Assessment and Management of Vascular Disorders
Management:
- Maintain the airway.
- Administer ____________________________ if respiratory distress or signs of hypoperfusion present.
- Consider administration of ____________________________ .
  - ____________________________ rapidly if signs of hypoperfusion present.

12 Lead ECG
- Provides much better analysis of ECG
- Most 12 Lead machines have ____________________________ software: Do not rely solely on computer
- Patient must be ____________________________
- Do NOT delay ____________________________ or transport to obtain 12 lead
  - Normally a left sided ECG, but a right sided ECG can also be performed

12 Lead ECG
10 Leads:
- Conventional 4 ____________________________ Leads
  - Right Arm
  - Left Arm
  - Right Leg
  - Left Leg
- 6 ____________________________ Leads
  - V1: 4th Intercostal space just to right of sternum

12 Lead ECG
6 V Leads (Continued)
- V2: 4th intercostal space just to left of ____________________________
- V3: In line midway between V2 and V4
- V4: Midclavicular line in _______th intercostal space
- V5: Anterior axillary line at same level as V4
- V6: ____________________________ line at same level as V4

150 12 Lead Lead Placement
151 Prehospital ECG Monitoring
152 Prehospital ECG Monitoring
153 Prehospital ECG Monitoring
154 Prehospital ECG Monitoring
155 Prehospital ECG Monitoring
156 Prehospital ECG Monitoring
157 Prehospital ECG Monitoring
158 Right Sided 12 Lead
    - To perform a right sided ECG, simply ____________________________ all v-leads to the right side.
    - Use the same locations, just on the ____________________________ sided instead of the left.
    - CANNOT use the monitor’s ____________________________
**LEFT SIDED V-LEAD PLACEMENT**

**V₁**: Right 4<sup>th</sup> intercostal space

**V₂**: Left 4<sup>th</sup> intercostal space

**V₃**: Halfway between V₂ and V₄

**V₄**: Left 5<sup>th</sup> intercostal space, mid-clavicular line

**V₅**: Horizontal to V₄, anterior axillary line

**V₆**: Horizontal to V₅, mid-axillary line

In an emergent situation and time does not permit a complete right sided EKG, move V₄ to the V₄R position to confirm a right ventricular infarct.
RIGHT SIDED V-LEAD PLACEMENT

$V_1R$: Left 4$^{th}$ intercostal space

$V_2R$: Right 4$^{th}$ intercostal space

$V_3R$: Halfway between $V_2$ and $V_4$

$V_4R$: Right 5$^{th}$ intercostal space, mid-clavicular line

$V_5R$: Horizontal to $V_4$, anterior axillary line

$V_6R$: Horizontal to $V_5$, mid-axillary line

In an emergent situation and time does not permit a complete right sided EKG, move $V_4$ to the $V_4R$ position to confirm a right ventricular infarct.