Vital Signs

Aaron J. Katz, AEMT-P, CIC
www.es26medic.net
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- Outward signs of what is occurring inside the body
- Also give valuable information about the patient’s condition
- They are taken on every patient that you assess!
What *are* the vital signs?

- Pulse
- Blood Pressure ("BP")
- Respirations
- Skin condition
- Pupillary response
- Capillary refill (old technique)
- Pulse Oximetry

Vital Signs – take them *when*?

- Initial set of vital signs are called **baseline vitals signs**
- Must be repeated periodically
  - Observe trends!
  - Every 5 minutes for unstable patients
  - Every 15 minutes for stable patients
  - **MORE IS BETTER!**
Pulse

- The “waves” felt as blood is pumped by the heart
- Measures the heart rate and “quality”
- Feel for the pulse at an artery near the skin surface over a bone
- Most often measured at the radial artery - it’s convenient
- Pulses can also be measured at the carotid or femoral artery

Pulse Rates

- Normal pulse rate
  - 60 - 100 beats per minute (bpm) **at rest**
  - >100 bpm → Tachycardia
  - <60 bpm → Bradycardia
- Regular Pulse
  - Measure over 15 seconds X 4
- Irregular Pulse
  - Measure for a full minute
Abnormal Pulses

- Tachycardia
  - “Temporary” tachycardia may result from:
    - Fear
    - Activity
    - Some medications
      - Sudafed, a common culprit!

Abnormal Pulses

- Bradycardia
  - Seasoned athletes may *normally* have pulses from 40–50 bpm
  - Some medications may depress pulse rate
    - “Beta blockers”, e.g. Lopressor
  - **Pulse consistently under 50 or greater than 120 → A Problem!**
Pulse Quality

- Normal/Full
- Weak/Thready
- Strong/Bounding
- Regular vs. Irregular
- Regularly irregular vs. irregularly irregular

Reporting Pulse

- A complete pulse measurement must include: Rate, strength, regularity
- For example:
  - Pulse rate of 120, thready and irregularly irregular
Respiratory Rate

- Often overlooked, yet it’s an early and EASY tipoff that the respiratory system is impaired!
- Normal respiratory rate in an adult
  - 12 - 20 breaths per minute
- One respiration cycle is one inhalation and one exhalation
- Can measure for 30 seconds \( \times 2 \)
- Best to measure for a full minute
- Some “tricks”

Respiratory Rate -- Terms

- Bradypnia: < 12 breaths per minute
- Tachypnia: > 20 breaths per minute
  - Both are age dependent
- Apnea: No breathing
- Hyperpnea: Deep respiration
- Hyperventilation:
  - Hyperpnea + Tachypnea
- Hypoxia: Inadequate Oxygenation
Quality of Respirations

- Deep
- Shallow
- Labored
- Normal

Ventilation

- At respiratory rates *generally below 8* or *over 24* or *overly shallow* “ventilatory support” may be needed if the patient is showing signs of hypoxia
- Ventilation:
  - Mouth to mouth
  - Pocket mask
  - Bag Valve Mask ("BVM")
Signs of Hypoxia

- Confusion
- Restlessness
- Other signs of Altered Mental Status ("AMS")
- Cyanosis?
  - \( \rightarrow \) A LATE SIGN.
  - Don’t wait for it
  - Rely on other clinical signs

Blood Pressure ("BP")

- Measures the force of blood against the walls of blood vessels
- Recorded as Systolic/Diastolic
  - E.g. 120/70
- **Systolic** measures pressure on arterial walls during contraction of the heart (called “Systole”)
- **Diastolic** measures pressure during relaxation of the heart (Called “Diastole”)
- Hypertension
- Hypotension
Hypo vs. Hypertension

- The EMT’s concern is Hypotension since EMTs can treat hypotension
- Hypertension is usually a long term problem (“chronic”) that in most cases is not an emergency
- Sudden onset (“acute”) hypertension is usually the result of other medical problems

Measuring BP

- Auscultation
  - Gives you the actual systolic reading
  - Uses a stethoscope
- Palpation
  - Gives you an estimate of the systolic BP
  - Use only in noisy environments
  - Routine use of palpation
  - Lazy EMT!
**Auscultation -- Technique**

- Inflate the cuff 1/3 up on upper arm
- Palpate the brachial artery
- Place the stethoscope over brachial artery
- Inflate to about 200 mm Hg
- **Slowly** release listening for the first sound
  - **Gauge reading at First Sound is Systolic**
- Continue releasing air until the last sound is heard
  - **Gauge reading at Last sound is Diastolic**

**Palpation -- Technique**

- Using your fingers over the radial pulse
  - inflate cuff until pulse dissappears
- Then slowly release the air
- The gauge reading when you once again begin to feel the pulse is the systolic reading
- **The palpation technique can not give a diastolic reading!**
Skin

- Assessment includes
  - Temperature
  - Moisture
  - Color

Temperature/Moisture

- Cool/Clammy
  - Shock
- Cold/Moist
  - Heat loss
- Cold/Dry
  - Hypothermia
- Hot/Dry
  - High Fever, Heat Exposure
- Hot/Moist
  - High Fever, Heat Exposure
Color

- Pink: Normal
- **Pale**: Shock
- **Cyanotic**: Late sign of hypoxia. A blue/grey color
- Flushed: CO poisoning, heat, emotional excitement
- Jaundice: Liver disease
- **Mottling**: “late” shock, allergic reaction

Pupillary Response

- Pupil
  - Black center of the eye
  - Reacts to light under normal circumstances
  - Can be
    - Normal
    - Dilated
    - Constricted
    - Somewhere in-between
Assessing Pupillary Response

- Use a “penlight”
  - A “mag-light” is not a penlight
  - Note the size prior to shining the light
  - Cover the other eye

Common Pupillary Responses

- Dilated
  - Fright, drugs, eye-drops, certain medical conditions
- Constricted
  - Drugs, eye drops
- Unequal
  - Stroke, head injury, eye injury, fake eye
- Non-reactive
  - Drugs, brain tissue hypoxia
- “PERL(A)”
Capillary Refill

- Not used anymore
- A measure of the quality of “peripheral” circulation
  - Only valid for children < 6yo
  - Use the nail bed or the skin on top of any bone
  - **Color should return to normal in under 2 seconds**
    - If capillary refill time > 2 seconds we call it “Delayed capillary refill”

Pulse Oximeter

- A photoelectric device that measures oxygen saturation of hemoglobin in the capillary beds.
- Can be a very effective tool
- Has limitations that you must be aware of!
- New to the BLS world