Vital Signs

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2013

Vital Signs

- 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 X 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?
  - → 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 **Hypo**tension 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