Vital Signs and Oxygen Administration

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Patient Care and Management (202)
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Vital Signs and Oxygen Administration

- What are the vital signs?
- Why do we need to know them?
- How to measure them?
- How important is oxygen to the patient?
- What do we need to know?
Vital Signs and Oxygen Administration

• Why should a radiographer learn them?
  - To be prepared in emergency cases within the department.
  - To know what is normal so the abnormal can be treated.
  - To prevent or minimize serious situations from occurring.
  - To be confident about the different machines when doing portable x-ray.
Vital Signs

What are the vital signs?

1. Measurement of body temperature.


Measurement of Body Temperature

- **Body Temperature**: (Definition)
  - The physiologic balance between heat produced in body tissues and heat lost to the environment.
  - It’s controlled by the basal region of the diencephalon known as the hypothalamus.
  - Increase in body temperature above normal causing fever is known as …… *(Bonus).*
    - *Pyrexia.*
  - Decrease in body temperature below normal is known as …… *(Bonus).*
    - *Hypothermia.*
  - Increase above $41^\circ$ or below $34^\circ$ probably will lead to death.
Measurement of Body Temperature

- Hypothermia
- Pyrexia
- Hyperpyrexia

Normal: 37 °C

Maximum & Minimum Body Temperature: 44 °C, 25 °C
Measurement of Body Temperature

• **Ways to measure body temperature:**

1. **The oral site**
   - Measurement is taken under the tongue, averaging 37°C (O).

2. **The tympanic site**
   - Measurement is taken through the tympanic membrane of the ear, averaging 37°C (T).

3. **The rectal site**
   - Measurement is taken at the anal opening, averaging 37.5°C (R).

4. **The axillary site**
   - Measurement is taken in the axilla or armpit, averaging 36.4°C-36.7°C (Ax).
Measurement of Body Temperature

1. The oral site:

A- The electronic thermometer:

- Clean sheath is placed on the probe and then inserted under the tongue until the temperature is registered.
- The probe is removed and the reading is recorded.
- The sheath MUST be removed and hands washed.

B- The glass thermometer:

- Hands washed and a sterilized thermometer is used.
- The thermometer is shaken down to 35°C reading and placed under the tongue for 3-5 mins.
- Thermometer is removed and wiped temperature is recorded.
Measurement of Body Temperature

1. The oral site:
2. The tympanic site:

- The procedure is similar to the electronic oral thermometer but the probe is inserted into the external auditory canal.
Measurement of Body Temperature

3. **The rectal site:**
   - The most reliable measurement of body temperature since the site is with close proximity to the pelvic viscera or core body temperature.
   - Cloves, hands washed and thermometer with blunt tip.
   - Patient placed in Sims position and ensuring privacy.
   - Lubricate and insert 1-1 1/2 inches into the rectum for 2-3 mins.
   - Read and record the temperature.
   - Dispose the probe.
   - Ensure patient comfort and respect privacy.
Measurement of Body Temperature

3. The rectal site:

-- Sims Position:

- Lie down with your left side down. Bend knees slightly, the right leg a little deeper than the left.
Measurement of Body Temperature

4. The axillary site:
   - The safest method to measure body temperature.
   - Useful for infants, but not as accurate as others.
   - Glass thermometer is placed under a DRY armpit for 5 mins with patient arm down and over the chest.
   - Record the temperature and dispose the probe cover.
Measurement of Pulse Rate

- **Pulse Rate** *(60-90 adults, 120 infants, 90-100 adolescents beats/mins): (Definition)*
  - The pulsation of the pumped blood into the arteries as the heart beats.
  - It is a rapid and efficient means of assessing cardiovascular function.
  - The abnormally rapid pulse rate (over 100 beats/min) is known as ....... *(Bonus).*
    -- **Tachycardia.**

- The abnormally slow pulse rate (below 60 beats/min) is known as ....... *(Bonus).*
  -- **Bradycardia.**
Measurement of Pulse Rate

- **Detection sites for pulse rate:**

1. The apical - over the apex of the heart (Stethoscope).
2. The radial - over the radial artery of the wrist (Index & middle fingers).
3. The carotid - over the carotid artery.
4. The femoral - over the femoral artery.
5. The popliteal - posterior surface of the knee.
6. The temporal - over the temporal artery front of ear.
7. The dorsalis pedis - at the top of the feet.
8. The posterior tibial - inner side of the ankle.
9. The brachial - above the elbow between biceps and triceps muscles.
Measurement of Pulse Rate

- **Detection sites:**
  - Radial
  - Brachial
  - Carotid
  - Femoral
  - Posterior Tibial
  - Popliteal
  - Temporal
  - Dorsalis Pedis
Measurement of Pulse Rate

• **Detection Method:**

1. Wash hands and place index & middle fingers over the artery gently.
2. Count pulse when throbbing is felt for 1 min.
3. Do NOT use the thumb. **Why?**
4. This method is used for radial, femoral, carotid, popliteal, pedal and temporal pulses.
5. In some cases the pulse is not counted rather it is checked to assess weak, regular or irregular pulse.
6. Apical pulse is measured using a stethoscope, which requires in most cases a medical personnel.
Measurement of Respiration

- **Respiration** *(10-20 adults, 30-60 infants breaths/min)*: *(Definition)*:
  - The exchange of oxygen and carbon dioxide between the external environment and blood circulating in the body.
  - Difficulty breathing could cause cyanosis, change in level of consciousness, restlessness and apprehension.
  - Dyspnea is the condition describing difficulty in breath taking by the patient.
  - Medication, illness, exercise, and age may increase or decrease respiration rate.
Measurement of Respiration

- **Assessment of Respiration:**

  1. Rate, depth, quality and pattern should be observed when assessing respiration.
  2. Patient should NOT be aware of the assessment so his/her respiration rate will not be affected.
  3. The symmetry of the chest wall movement should be observed indicating an even rise and fall of the chest.
  4. Skin color should be observed to check for cyanosis.
  5. Counting the number of the patient’s chest rises and falls in 1 min should be recorded to check for normal/abnormal respiration.
Measurement of Respiration

- Hitler Style
Measurement of Blood Pressure

- **Blood Pressure** *(110-140 systolic/60-80 diastolic in adults)*: *(Definition):*
  - The amount of blood flow ejected from the left ventricle of the heart during systole and the amount of resistance the blood meets due to systematic vascular resistance.
  - Systolic: the highest point reached during contraction of the left ventricle as it pumps blood into the aorta.
  - Diastolic: the lowest point reached when during relaxation of the ventricles indicating the minimal pressure against the arterial walls.
  - Systolic and diastolic are read in millimeters of mercury (mm Hg) using a sphyg-momano-meter.
  - Hypertension= >140/90 mm Hg, Hypotension= <90 mm Hg.
# Measurement of Blood Pressure

## Grades of Hypertension

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
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<tr>
<td>Normal</td>
<td>120-129</td>
<td>81-84</td>
<td>Prehypertension</td>
<td>120-139</td>
<td>80-89</td>
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<tr>
<td>High normal</td>
<td>130-139</td>
<td>85-89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 1 HT (mild)</td>
<td>140-159</td>
<td>90-99</td>
<td>Stage 1 HT</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Grade 2 HT (moderate)</td>
<td>160-179</td>
<td>100-109</td>
<td>Stage 2 HT</td>
<td>e&quot;160</td>
<td>e&quot;100</td>
</tr>
<tr>
<td>Grade 3 HT (severe)</td>
<td>e&quot;180</td>
<td>e&quot;110</td>
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</tbody>
</table>

*HT=hypertension
Measurement of Blood Pressure

• **Measuring Blood Pressure:**

1. Brachial artery must be free to place a deflated sphygmomanometer cuff around it.

2. The stethoscope should be placed over the brachial artery to tighten the cuff until the dial reads 180 mm Hg.

3. The valve should be released slowly until the first audible (systolic) pulse is reached followed by the second audible (diastolic) pulse is reached.

4. Blood pressure measurement for infants and small children should be handled by a registered nurse when possible.
Oxygen Administration

• **How important is oxygen to the body?**
  - Oxygen cannot be stored in the body so constant supply must be available especially since the brain dies after lacking oxygen for 4-5 mins.
  - The lung’s ability to exchange oxygen and carbon dioxide efficiently is known as **Pulmonary Function**.
  - If pulmonary function is disturbed, the level of oxygen in the arterial blood becomes inadequate and this is referred to as **hypoxia**.
  - Some patients need constant invigilation when they are presented to the x-ray department and it is the **RESPONSIBILITY** of the radiographer to ensure they get enough oxygen supply.
Oxygen Administration

• **Remember:** Oxygen is a medication and MUST be prescribed by the doctor in order to supply the appropriate rate/dose.

  - Oxygen may produce toxic effects on the lungs and central nervous system, resulting in mild to serious conditions that could lead to death.

  - Special care must be paid to patients with chronic lung disease since excessive oxygen supply may depress the respiratory drive leading the patient to stop breathing.

  - Oxygen supply equipments MUST be infection-free and this is the radiographer job to ensure. Mask, tubing, and cannulae used to deliver oxygen must be discarded after using them for one patient.

  - Smoking MUST be prohibited in rooms where oxygen is supplied.
Oxygen Administration

• **Oxygen Delivery System:**
- Oxygen in hospitals is usually delivered from a wall oxygen outlet or an oxygen tank. Both require special attention when used to prevent serious consequences from happening.
Oxygen Administration

- **Oxygen Delivery System:**

1. **Nasal Cannula:** Disposable plastic tube with 2 hallows that deliver oxygen into the nostrils (openings of the nose).

- The concentration of oxygen ranges from 21%-60% and it’s used to deliver oxygen for patients with normal breathing rate.
Oxygen Administration

2. **Nasal Catheter**: A catheter is inserted into the nose until it reaches the oral pharynx to deliver moderate to high concentration of oxygen.

- If misdirected, it could go into the stomach causing gastric distention and sore throat.
Oxygen Administration

3. **Face Mask:** A mask is placed over the nose and mouth to deliver oxygen.

- Face masks should only be used for short periods of time since its delivery percentage of oxygen could vary.
4. **Oxygen Tent:** Used when there’s a need for humidity and oxygen concentration higher than normal.

- Mainly used for children and pediatrics so special care should be taken when radiographing in such cases.
What do we need to know???

• The vital signs?
• Methods to measure body temperature?
• Detection sites for pulse rate?
• Detection methods for pulse rate?
• Assessment of respiration?
• Measuring blood pressure?
• Oxygen administration and its importance to the body?
• Oxygen delivery system?
Thank you and please don’t fool around with vital signs!!!

Come on, everybody... Organ fight!