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Vital signs, their normal values and deviations

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Learning points

- Student will learn basic vital (life-sustaining) signs.
- Student will learn normal values of vital signs and their disorders.

Vital signs

- a) Consciousness
- b) Body temperature
- c) Heart rate or pulse
- d) Respiratory rate = RR
- e) Blood pressure = BP

Vary depending on age, gender, weight, general condition.

Measured values of vital signs in the physiological range = physiological functions

a) Consciousness

- orientation in one's own person, in time and space, in a situation
- a condition of being aware of oneself (self-awareness)
- perception of stimuli from the environment, appropriate response to them
- cooperation and communication with others

The most sensitive indicator of brain status / proper brain activity

a) Consciousness

1) Quantitative changes

- somnolence = lethargy
- sopor = stupor
- coma = unconsciousness

2) Qualitative changes

- confusion
- gloomy condition
- delirium

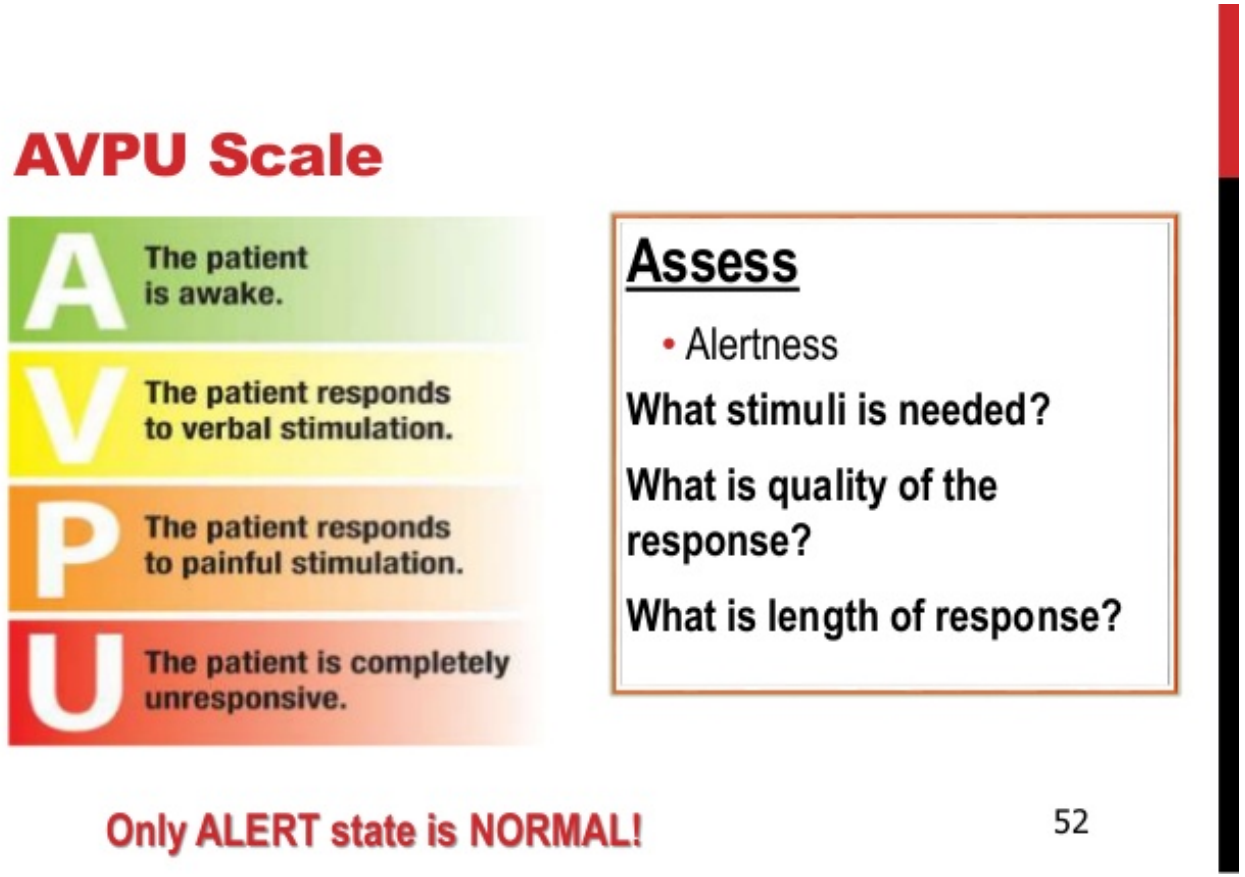
a) Consciousness

Assess level of consciousness

- through stimuli - verbal, tactile (touch, shaking), central stimulus (pinching)

- AVPU scale
- GCS = Glasgow coma scale (3 categories, 3-15 points)

a) Consciousness



https://images.app.goo.gl/ejN4S4pXbBdP7W328, Pediatric neurologic nurs

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b) Body temperature

- is a by-product of metabolism
- a healthy organism maintains a balance between production and heat loss

Human being is a warm-blooded animal with a constant body temperature.

b) Body temperature

is affected by:

- Basal metabolism
- Increased muscle activity
- Thyroid and adrenal hormones
- Mental processes
- Age
- Day time

b) Body temperature

Methods of measuring:

- in the armpit = axillary
- in the mouth = oral
- in the rectum
- in the vagina (so-called basal)
- in the ear
- on the skin

b) Body temperature

Values and rating:

- normal body temperature 36 ± 0.5 °C (= 96 to 98 °F)
- elevated temperature (above 38 °C) = fever
- temperature above 40 °C = hyperpyrexia - a life-threatening condition
- temperature depression (below 35 °C) = hypothermia

c) Heart rate or pulse

- is caused by the impact of blood flow on the wall of the artery during contraction of the heart (systole)

Recorded as beats per minute (bpm):

AGE	*AVERAGE*	*RANGE*
– newborn	125	110 – 140
– 6 years	100	75 – 115
– 12 years old boy	85	65 – 105
– 12 years old girl	90	70 – 110
– adult man	70	60 – 80
– adult woman	75	65 – 85

(PHYSIOLOGICAL VALUES BY AGE AND GENDER)

c) Heart rate or pulse

Palpation of pulse - use 2 fingers to feel the artery, with light pressure on the inside of the wrist and count the number of beats per minute (for diastole below 40 mmHg the heartbeat cannot be felt on the periphery)

- palpable / diminished / none
- shallow / sharp
- regular / irregular
- fast / slow

https://images.app.goo.gl/SaAU362BTF2pcTmQ7, Definition of Pulse

d) Respiratory rate = RR

Breathing, or ventilation includes the active phase (=inspiration) and the passive phase (= expiration).

When checking breathing - listen for breaths and watch the chest movements.

- frequency / rate = number of breaths per minute
- regularity (rhythm)
- quality (depth, intensity) - hypoventilation / hyperventilation
- easy / difficult / painful
- breathing sounds – noisy or quiet

d) Respiratory rate = RR

Values and rating:

- normal rate in adults 12 –18 / min = eupnoe
- fast breathing above 20 / min = tachypnoe
- slow breathing below 10 / min = bradypnoe
- respiratory arrest = apnea
- shortness of breath = dyspnea - difficult breathing with a feeling of lack of air, especially in inspiration - the victim occupies a relief position (allowing the involvement of auxiliary respiratory muscles)

e) Blood pressure = BP

- pressure exerted by the flowing blood on the vessel wall
- the value of blood pressure is different in different parts of the bloodstream
- the term blood pressure is most often used to mean arterial blood pressure, which is the pressure of blood in the large arteries
- the common assessment of blood pressure has two components: systolic pressure and diastolic pressure
- for automatic measurement we can use the auscultation method and the oscillometric method

e) Blood pressure = BP

Evaluation of BP measurement:

- Normotension - 120/80 mmHg
- Mild hypertension - 140/90 mmHg
- Moderate hypertension - 160/100 mmHg
- Severe hypertension - 180/110 mmHg

- Hypotension - 85/60 mmHg

https://images.app.goo.gl/CyeBi224D3BxdqLA8, PERFORM A BLOOD PRESSURE CHECK

Demonstration of first aid - what should I do if ..

Example:

- casualty found in the early morning, lying in the grass on his side
- he has a bloody scar on his head and can smell alcohol

Example (hypothermia, bradypnea, bradycardia, hypotension)

S = Safety - check if there is no danger

S = Stimulate - examine and find out if he has a disorder of consciousness (AVPU scale) – he probably suffered an injury, he communicates in one word and with a delay, he is confused

S = Shout for the help - of a passer-by, then I dial 155 and describe what, where, how ..

(C) - I do not observe massive external bleeding with a quick glance at the casualty

A - he speaks, his airways are open and clear

B - I can smell alcohol from his breath, his chest rises regularly, I count 10 breaths per min

C - I palpate the pulse on the radial artery - it is shallow but regular, looks slow, around 50 per min; the skin feels cold to the touch, the victim's clothing is damp and uncomfortably cool

Example (hypothermia, bradypnea, bradycardia, hypotension)

- the ambulance is already on its way, but it can take up to 20 minutes

There is a risk of deterioration of the affected person, therefore:

- I will leave the victim in a sideways position as he is lying down
- I try to prevent further heat loss - alternation of breathable thermal insulation layers with impermeable waterproof layers (plastic / isothermal foil) - the main attention must be paid to heat loss by conduction to the ground (insulation pad) and radiation from the head (cover well)
- I monitor vital signs and maintain a clear airway

Upon the arrival of the rescuers, I will refer to what I have found out and done - I will hand over the victim to their professional care.

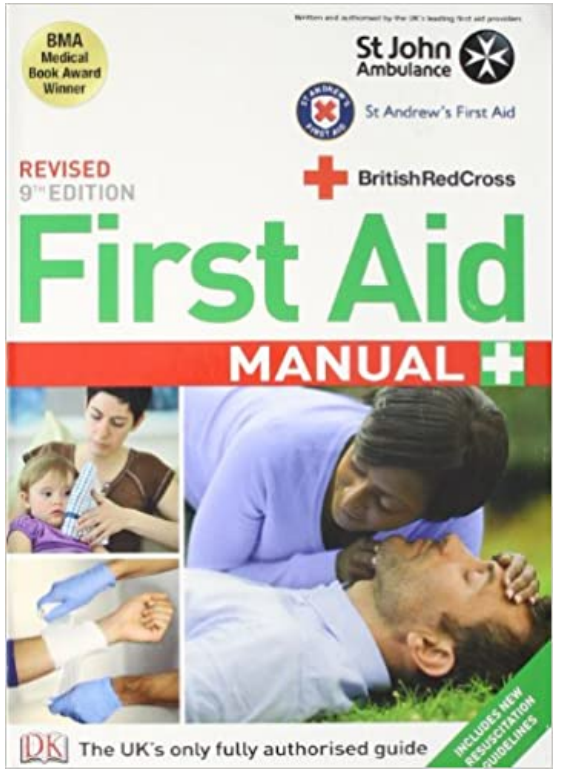
What to remember ..

- Vital functions include consciousness and body temperature.
- Take care of your safety.
- Call for help / 155 - they will advise you there!
- Repeatedly educate yourself in first aid and train individual procedures.
- Be calm, it's just about life ☺

Learning outcomes:

- Student is able to list the basic life functions and their normal values.
- Student is familiar with the basic deviations from the normal values of vital functions.

Sources and references



- First Aid Manual: The Authorised Manual of St. John Ambulance, St. Andrew's Ambulance Association and the British Red Cross

- Vital Signs (Body Temperature, Pulse Rate, Respiration Rate, Blood Pressure), https://www.hopkinsmedicine.org

- https://en.wikipedia.org/wiki/Consciousness#Medical_aspects

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