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Overview of the basic techniques used to monitor the patient's condition by intensive care nurses - part one

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Admission

The purpose of conducting monitoring of vital functions is the early recognition of potential physiological imbalances and take urgent treatment. Supervision should be properly targeted and systematic, and the results must be reliable and accurate, because they are the basis for therapeutic intervention. The success of monitoring depends largely on the nursing staff. The nurse's role is enormous and requires a large resource of expertise and skills of its practical application, since it is the nursing staff spends the most time with the patient and the first notes any changes in the patient.

Summary

The work consists of three parts, which such issues were discussed on the functioning of the cardiovascular system, respiratory system and central nervous system. A nurse is a person who is directly involved in the conduct, measures and draws attention to possible complications, since it is she is the person who spends the most time at the bedside.

Development of medical science involves the construction of specialized medical equipment ever more perfect, more expensive, more complicated to build and operate, requiring more and more qualifications treatment team.

Cardiovascular monitoring

Monitoring of cardiovascular function is now standard in patients treated in the intensive care unit. It is based on constant monitoring of the electrical activity of the heart, blood pressure, heart rate and parameters of voltage, frequency, rhythms of, speed and filling.

Due to therapy and patient safety oversight function of the circulatory system is essential. Note, however, that the cardiovascular function and respiration are inextricably linked, because they cannot be clinically assessed separately.

ECG monitoring

Standard device used for surveillance and imaging variation of electric potential generated by the heart, in the intensive care unit is the ECG monitor. Its use allows simple and permanent control of the rhythm and heart rate and cardiac dysfunction: bradycardia, tachycardia, arrhythmias, conduction disorders, and myocardial ischemia including myocardial infarction.

We can track the impact of drugs and electrolyte abnormalities on the myocardium. In the event of cardiac arrest we can diversify its mechanism: asystole, ventricular fibrillation, or electromechanical dissociation [2,5].

Modern monitors are equipped with memory oscilloscopes in which the ECG is "stored during registration, allowing you to play changes over time. By using the "freeze" image of the ECG can pause and carefully analyzed. Oscilloscopes are often equipped with graphic recorders, incorporating a specified time or during an emergency. Devices are equipped with a complete system of acoustic and visual signaling of alarm and warning. The varied colors and messages displayed content allow you to quickly identify the rhythm and the cause of the alarm. The current monitors determine multi-parametric because they provide not only to

track recording the ECG, but also other parameters which will be discussed in the following work [2,5].

ECG monitoring electrodes assume epidermal disposable electrode filled with gel that sticks with rollers on properly prepared skin that should be shaved and grease. The place of attachment depends on the patient's condition and to control the ECG [2,6].

Keep in mind that while supervising cardiac function using ECG monitor may occur artifacts caused by various factors not related to the patient's condition, e.g..: influenced by other electrical appliances, electrodes placed badly, badly adjacent electrodes, or cable disconnection. To record, particularly the height of the QRS wave can affect the respiratory disorder mediastinal shift and changes in cardiac filling during the breathing cycle. Irregular power line occurs during the tremor or movement of the patient. Too low amplitude ECG may be caused by the bad attitude of its options in the monitor, as well as a constant alarm heart rate and ST interval [1,5].

To assess cardiac arrhythmias, e.g. Bradycardia, sinus tachycardia, atrial flutter, atrial fibrillation, ventricular extrasystoles, blocks atrio-ventricular rhythms nodal, or myocardial ischemia must be pre-determine what is the heart rate or heart rhythm is regular, P waves, if any, as the team looks QRS and, finally, whether arrhythmias are dangerous and require pharmacological treatment or other medical action [1,3].

Monitoring blood pressure

Blood pressure is an important indicator of blood flow to organs and its monitoring procedure is mandatory. It means the pressure exerted by the blood on the walls of arteries. Mean arterial pressure (MAP) depends on cardiac output (cardiac output-CO) and total peripheral resistance (TPR). Thus it is a simple rule: MAP = CO X TPR. Note, however, that the pressure may be correct when the peripheral resistance increases, but decreases cardiac output and the flow through the organs decreases. The systematic blood pressure measurements, however, are an important method for controlling operation of the cardiovascular system and infer the blood supply to other organs. Many authorities controls its movement in the wide range of pressure fluctuations. "The brain is a flow autoregulation in the range of 50-150 mmHg, but the values are increased in patients with chronic hypertension. Adjusting coronary occurs in the range of 60-180 mmHg, similar ranges takes place autoregulation of renal perfusion, although less than 70 mmHg is significantly weakened. Greater possibility of organ damage, mainly in the brain, heart and colon, threatens elderly people with vascular disease. Patients who have had a heart attack, symptoms of a reduced flow through the coronary

arteries observed at medium pressure 65 mmHg. Intraoperative pressure drop of 3.1 for 10 minutes or longer tied to the possibility of post-operative cardiac complication "[2,4]. The increased pressure in the coronary artery disease is important because the demand of myocardial oxygen, is the product of heart rate and systolic blood pressure. similar ranges takes place autoregulation of renal perfusion, although less than 70 mmHg is significantly weakened. Greater possibility of organ damage, mainly in the brain, heart and colon, threatens elderly people with vascular disease. Patients who have had a heart attack, symptoms of a reduced flow through the coronary arteries observed at medium pressure 65 mmHg. Intraoperative pressure drop of 3.1 for 10 minutes or longer tied to the possibility of post-operative cardiac complication "[2,4]. The increased pressure in the coronary artery disease is important because the demand of myocardial oxygen, is the product of heart rate and systolic blood pressure. similar ranges takes place autoregulation of renal perfusion, although less than 70 mmHg is significantly weakened. Greater possibility of organ damage, mainly in the brain, heart and colon, threatens elderly people with vascular disease. Patients who have had a heart attack, symptoms of a reduced flow through the coronary arteries observed at medium pressure 65 mmHg. Intraoperative pressure drop of 3.1 for 10 minutes or longer tied to the possibility of post-operative cardiac complication "[2,4]. The increased pressure in the coronary artery disease is important because the demand of myocardial oxygen, is the product of heart rate and systolic blood pressure. threatening for older people with vascular disease. Patients who have had a heart attack, symptoms of a reduced flow through the coronary arteries observed at medium pressure 65 mmHg. Intraoperative pressure drop of 3.1 for 10 minutes or longer tied to the possibility of post-operative cardiac complication "[2,4]. The increased pressure in the coronary artery disease is important because the demand of myocardial oxygen, is the product of heart rate and systolic blood pressure. threatening for older people with vascular disease. Patients who have had a heart attack, symptoms of a reduced flow through the coronary arteries observed at medium pressure 65 mmHg. Intraoperative pressure drop of 3.1 for 10 minutes or longer tied to the possibility of post-operative cardiac complication "[2,4]. The increased pressure in the coronary artery disease is important because the demand of myocardial oxygen, is the product of heart rate and systolic blood pressure.

Blood pressure can be measured indirectly-invasive and non-invasively with the use of special equipment, in which are standard monitors in the intensive care unit. The unit used to measure pressure is mmHg. The system SI, the pressure is kilopascals (kPa), corresponding to 7.5 mmHg.

Using indirect measurement of arterial blood pressure is denoted by a variety of methods systolic and diastolic blood pressure. The obtained data can also calculate the mean pressure (MAP), which is the sum of diastolic blood pressure and 1/3 of the difference of systolic and diastolic blood pressure. For measuring pressure sfingomanometr use (mercury, spring or electronic), the cuff and often even a stethoscope. It is very important for the correct test is to use an appropriate width of the cuff, which should cover the 2/3 of the length of the arm or the thigh (Fig.2). Is too large can cause undercutting cuff pressure, while too narrow overestimation of [4,6]. Appropriate cuff sizes for adults is 12 - 14 cm, 11 cm children, small children 7 cm and 3.75 cm in the newborn.

Methods for measuring pressure include: a method sphygmomanometer, palpation, oscillatory, using ultrasound machine and [5]. Currently, due to technical progress, the first three, especially in the care unit is already used rarely. It should be noted that the sphygmomanometer method is based on the registration of the emergence and disappearance of tones thanks to stethoscope.

During the automatic measurement by this method tones are received by the microphone or electronic stethoscope and converted to electronic signals. Palpation method relies on feeling for the pulse of the radial artery during the release of air from the cuff. In this way, you can mark the systolic pressure and is lower than that measured by direct. The oscillating motion is based on the observation directions oscylometr during deflating cuff. Opening the artery signaled its oscillating movements, as the pulse moves to oscylometr. It is a moment in systolic blood pressure reading. If the pointer stops "flashing" save the diastolic pressure. This method is inaccurate and rarely used [4,6].

Reliable method determined arterial blood pressure is its ultrasonic measurement. The cuff is equipped with a probe of the transmitter sending ultrasound waves and a receiver. The moving parts of the blood reflect the waves and change their frequency and the receiver registers and converts it to a sound signal. Due to the high sensitivity of the measuring apparatus method of ultrasonic measurement is useful in patients in shock condition, or small children.

In the intensive care unit are now being automated non-invasive blood pressure measurement. Machunws measure systolic, diastolic, mean values shall also, remember measurements, which allows you to browse the history of trends and insightful analysis. ECG monitors have the ability to perform automatic measurement at specified intervals, large-scale alarm settings, which greatly facilitates supervision.

Currently, in the intensive care unit for continuous, accurate recording of blood pressure measurement is used directly. It provides the ability to rapidly identify hemodynamic disturbances assess cardiac contractility and stroke volume on the basis of the pressure curve or even observation of heart rate. In order to perform such a measurement is made of the selected artery cannulation: radius, ulna, humerus, femur or dorsal foot. Usually use short cannula plastic 20G (18G) for adults and 20, 22, 24G in children [4]. The equipment used to measure pressure by the direct method includes: a pressure transducer, an amplifier, a set of washing, the bag pressure, 500 ml of an electrolyte solution, supply line, valve trigeminal.

Currently, the ICU has a disposable, prepared for such measurement sets. In the course of the proceedings preparing kit for measuring bleed liquid electrolyte, and a pressure bag to inflate the value of 300 mmHg. Prepared from the transmitter three-way valves connect the amplifier and set to a rinsing catheter derived from the artery. The pressure transducer fastened at the level of the reference point. Performing the measurement requires so. zeroing pressure transducer and its calibration.

ECG monitors ICU represent pressure values in digital form and a curve on the monitor screen.

During measurement, there may be some disorders due to many factors:

- too long cable connecting the device with the cannula triggering "Curve bouncing"
- air bubbles or blood clots in a flatter curve
- bending the cable causes the descent of the curve
- reset or bad placement of the transducer for high underestimate the pressure
- mounting the transmitter for the measurement of low inflate [2,6].

Very important is the care intraarterial cannula. Establishment and its behavior when operating the valves and connections, or blood sampling should be performed using aseptic technique. Be prevented and clogging clots by frequent flushing of the system, and the blood backflow by the formation of a sufficiently high pressure in the pressure bag and brought to operating triple valves and drains.

Of pulse rate

Pulse, pulse - undulating movement of the arterial-dependent heart rate and the elasticity of the artery walls. Studies made on the superficial arteries, most commonly at the radial artery, external carotid artery, brachial artery, femoral artery, popliteal artery, temporal artery and a dorsal pedal artery. Examination technique amounts to compressing the artery in a place

where is situated directly under the skin, the tips of two fingers. To test the pulse of thumb does not apply, because in this way be confused with its own pulse tested.

During heart rate measurement attention is paid to the 6 characteristics:

- frequency (the number of sensed beats per minute), the values of which depend mainly on the correct age. During the test you should have in mind that you should not study the heart rate after exercise (after strenuous exercise frequency can even exceed 200 beats / min.) Or in a state of emotional experiences. Heart rate can be frequent or rare. Average pulse rate varies depending on age and is approximately:
  - fetus: 110-150 / min
  - in infants: 130 / min
  - children: 100 / min
  - in adolescents: 85 / min
  - in adults 70 / min
  - in the elderly: 60 / min
- cadence - heart rate is steady if all have the same impact strength, and the intervals between them are the same, otherwise we talk about heart rate irregular
- filling wave height of the pulse is determined depending on filling the arterial blood, which in turn depends on cardiac output. Heart rate can be high, threadlike, equal, unequal and bizarre
- voltage - pulse which is characteristic of expression of blood pressure. Heart rate can be hard, soft or dicrotal
- speed - it depends on the speed of the fulfillment of the artery and the collapse of its lights during one cardiac cycle. It depends on the velocity of blood flow and compliance walls of the arteries. Heart rate can be supple or lazy
- symmetry - a physiologically should be the same on the left and on the right (e.g. the left hand t. the radius and on the right) [2,6].

The next section will be shown and discussed techniques to monitor respiratory and central nervous system.

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