Example №3. 70-year-old man was hospitalized due to shortness of breath, which developed it 3 months ago for a few days.

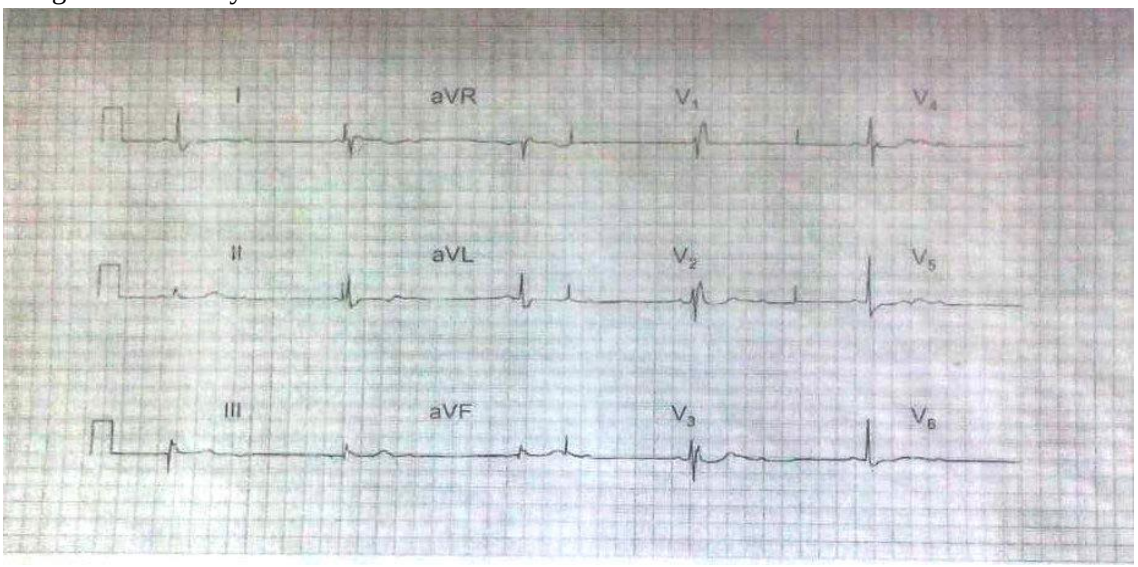

Figure 3. The ECG: sinus rhythm; AV blockade of II degree (2:1) (the most obvious in lead V_2); ventricular rate is 30 per min; normal PQ interval duration conducted complexes; EAoH normal; extended complexes QRS (160 ms); RSR is pattern in leads V_1-V_3 and a barb S in lead V_6; U tine noticeable in V_3-V_6 leads.

Results and discussion. 1) In the first example, the complete AV blockade there is no correlation between the barb P (here, their frequency – 70 / min) and complexes QRS. Against the background of a complete AV block appeared replacement ventricular rhythm with wide QRS complexes and T waves of abnormal shape. She needs constant pacing. If you cannot immediately implant a permanent pacemaker, should be before the surgery to carry out a temporary pacing.

2) In the second example there шы supraventricular tachycardia and since P waves are not detected, the tachycardia is likely from the AV compound (atrioventricular nodal tachycardia). Tachycardia seizures can be stopped by any of the vagal samples enhancing vagal activity – Valsalva`s test, carotid sinus massage or cold water irrigation of face. If vagal tests are unsuccessful, you should enter the adenosine intravenously as a bolus. With the ineffectiveness of adenosine, 5-10 mg of verapamil are required. If the failure a cardioversion is assigned.

3) In a third example, the patient has a AV blockade of II degree and His` right bundle branch block, indicating widespread lesion of conducting system. The cause of heart failure in this case is probably the heart rate and therefore needs a permanent implantation kardiostimulator. It is necessary to perform echocardiography. When there is evidence of left ventricular dysfunction receiving ACE blocker is prescribed.

Conclusions.

1. With the ECG, we can diagnose a variety of cardiovascular pathologies.
2. On the example of the above data, we can conclude:

a. at the 1st picture: AV complete blockade of III degree;
b. on the 2nd picture: AV nodal re-entry- tachycardia – AVRET;
c. on the 3rd picture: AV blockade of II degree and the blockade of His` right bundle branch block.

TOXICOLOGICAL EFFECTS AFTER REPEATED ADMINISTRATION OF MEDICINES, THE CALCULATION OF REPEATED DOSES

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Introduction. Modern high-performance drugs provide significant assistance to a person in the process of treatment and recovery. However, we must remember that all medicines have their dosage on

which they depend for their further properties. To avoid the negative effects of toxic substances (drugs) will pharmacokinetics. Pharmacokinetic model describes the kinetics of the distribution of drugs introduced into the body. The therapeutic effect of the drug depends on its concentration in the body at an optimal drug concentration. The object of the doctor is to select dosage, mode and frequency of drug administration, providing a maximum therapeutic effect with minimal UE full-time phenomena. The purpose of creating a pharmacokinetic model – help in solving this model allows tasks. Farmakokinetic one within certain assumptions to find changes in the concentration of the drug over time for different methods of its introduction into the body, to calculate the optimal ratio between the input and output parameters of the drug to provide the desired therapeutic effect.

Aim. To build mathematical model of a three-factor distribution of the drug in the body during repeated administration.

Materials and methods. In the course of my work I used the Graph program. Graph- is a tool for creating graphs of mathematical and trigonometric functions. The program allows you not only to set the function of which is automatically plotted, but also to add additional elements, such as rows of points, tangents or normals, approaching curves mark. For the mathematical description of the kinetics of absorption and excretion can be to use the model of the system with a subsystem or a camera with sub-chamber, providing an exponential delivery of substances in sub-chamber where the chamber are blood and tissue, which penetrates the substance of except the place of administration. The system of differential equations model given in [2], as follows:

$$\begin{cases} \frac{dM_0}{dt} = -k_{in}M_0, \\ \frac{dM_1}{dt} = k_{in}M_0 - k_{el}M_1, \\ \frac{dM_2}{dt} = k_{el}M_1 \end{cases} \quad (1)$$

Where; $M_0(t)$ – amount of substance in the sub-chamber, $M_1(t)$ – amount of substance in the chamber, $M_2(t)$- the amount of substances in the environment, Integration of the system of equations under the conditions:

$$M_0(t=0) = M_{0,}^0 \quad M_0(t \longrightarrow \infty) = 0;$$
$$M_1(t=0) = 0, \qquad M_1(t \longrightarrow \infty) = 0;$$
$$M_2(t=0) = 0, \qquad M_2(t \longrightarrow \infty) = M_0.$$

It leads to the following kinetic equation:

$$M_1(t) = \frac{M_0^0 k_{in}}{k_{in} - k_{el}}(k_{in}e^{-k_{el}t} - k_{el}e^{-k_{in}t}), \quad (2)$$

which defines the amount of substance in the cell or organism in any moment of time. And the equation:

$$M_2(t) = M_0^0\left[1 - \frac{1}{k_{in} - k_{el}}(k_{in}e^{-k_{el}t} - k_{el}e^{-k_{in}t})\right] \quad (3)$$

It shows the amount of the substance extracted from the body. In this case, the law of conservation of mass:

$$M_0(t) + M_1(t) + M_2(t) = M_0^0 \quad (4)$$

By taking the logarithm of the main pharmacokinetic equations with $k_{in} = k_{el}$, we get: ***x * e ^ -x.***

The equations for plotting with repeated administration are as follows:

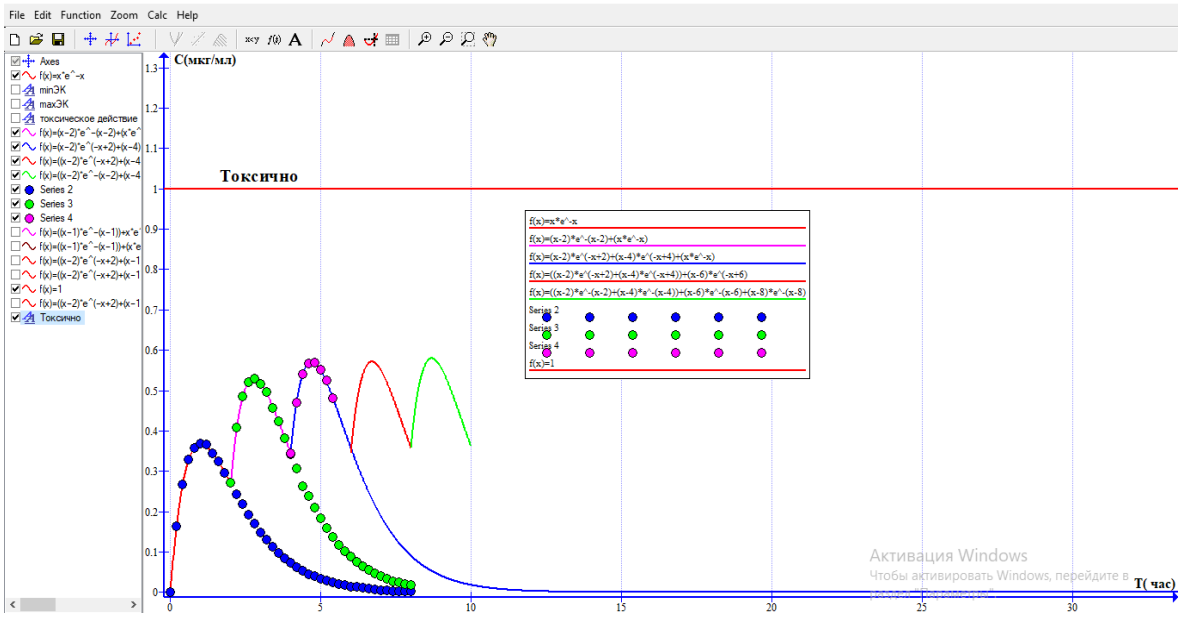
f (x) = ((x-2) * e ^ – (x-2)) + x * e ^ -x

f (x) = ((x-2) * e ^ – (x-2)) + (x * e ^ -x) + ((x-4) * e ^ – (x-4))

f (x) = ((x-2) * e ^ (- x + 2) + (x-4) * e ^ (- x + 4)) + (x-6) * e ^ (- x + 6) + x * e ^ -x

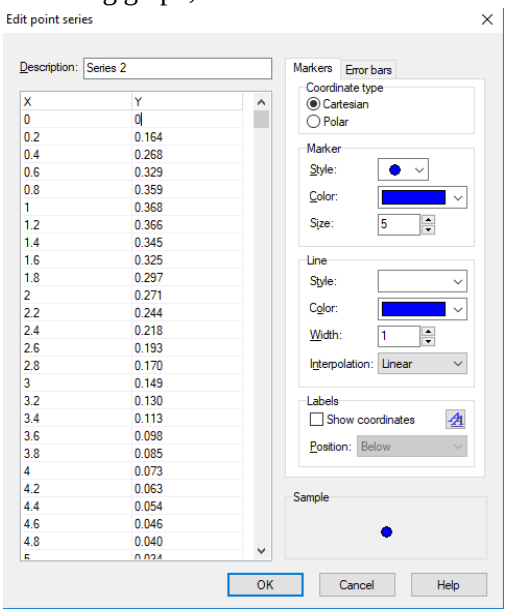
f (x) = ((x-2) * e ^ (- x + 2) + (x-4) * e ^ (- x + 4)) + (x-6) * e ^ (- x + 6) + x * e ^ -x + (x-8) * e ^ – (x-8)

Results and discussion.



We got pharmacokinetic curves. The graph shows that after the first three injections of drug stability observed.

To verify the accuracy of the resulting graph, we inserted a dot different values of *x* in the equation:



X	Y
0	0
0.2	0.164
0.4	0.268
0.6	0.329
0.8	0.359
1	0.368
1.2	0.366
1.4	0.345
1.6	0.325
1.8	0.297
2	0.271
2.2	0.244
2.4	0.218
2.6	0.193
2.8	0.170
3	0.149
3.2	0.130
3.4	0.113
3.6	0.098
3.8	0.085
4	0.073
4.2	0.063
4.4	0.054
4.6	0.046
4.8	0.040

Conclusions. 1) We created the kinetic three-factor model of the distribution of the drug in the human body to determine the time between re-introduction and concentration, so as not to privysit toxicological border. **2)** The magnitude and duration of the pharmacological effect is largely determined by the concentration of LP in the organs or tissues, where it exerts its effect. It is therefore very important to maintain a certain (therapeutic) concentration of drug.