INTRODUCTION

Violation of the heart rhythm (VHR) is a violation of the frequency, rhythm and sequence of excitation and contraction of the heart. They are the most common complications from the cardiovascular system that occur during the gestational period and occur in 50% of pregnant women [1, 2]. VHR can contribute to the development of other complications of pregnancy (malignant gestosis, miscarriage and fetal hypotrophy), complications of labor (violations of contractile activity of the uterus, bleeding) and perinatal pathology [3]. Many types of arrhythmias occur in women without structural damage to the cardiovascular system. The presence of VHR can contribute to an increase in maternal mortality. In addition, the spread of VHR significantly increases during pregnancy in healthy women, as well as with diseases of the cardiovascular system, compared with non-pregnant women [4]. According to some authors [3], arrhythmias are detected in 15.7% of pregnant women. It should be noted that 43% of them are functional arrhythmias that occur without organic damage of the heart. In addition, the occurrence of malignant gestosis, fetal hypotrophy is much more common in pregnant women with arrhythmias, even under the condition of inorganic origin [3, 5]. Studies have been conducted that link the emergence of VHR with electrolyte disorders or as first manifestations of diseases that manifest themselves after pregnancy, which has become a provoking factor for them [4]. Physiological changes that occur during pregnancy, namely, an increase in the volume of fluid in the body by 40-50%, leads to an increase in cardiac output and, consequently, mechanical overload of the woman's heart [1, 6], which in turn activates the ion channels and contributes to arrhythmias. Equally important in the mechanisms of arrhythmias is the physiological increase in the heart rate, contributes to the shortening of the intervals on the ECG, namely the intervals PQ and QT, which contribute to arrhythmogenesis [7, 8]. It should be noted that the development of pregnancy is not accompanied by the emergence of specific changes in the structure of the heart, contributing to the emergence of the VHR [5]. However, in the study of literary sources, there is an insufficient number of publications that reflect an analysis of cardiac rhythm disturbances in pregnant women without cardiovascular damage, but VHR can be threatening to the fetus and mother.
THE AIM
The aim is to study the occurrence of cardiac rhythm disturbances in healthy pregnant women, depending on the gestational age, when arrhythmias, the number of previous pregnancies, infectious diseases during pregnancy, hemoglobin parameters and arrhythmia analysis, which required antiarrhythmic treatment, were first recorded.

MATERIALS AND METHODS
Retrospectively 60 individual cards of pregnant women and women in childbirth of the Central Regional Clinical Hospital of Vinnitsa, Ukraine were analyzed. Criteria for inclusion in the study: cards of healthy pregnant women, who had identified any VHR. The criteria for exclusion from the study were: the presence of congenital or acquired heart defects, increased blood pressure, presence of VHR before pregnancy. The design of the study included estimating the gestational age when the VHR was first recorded, the number of previous pregnancies, infectious diseases during pregnancy, and hemoglobin. An electrocardiogram and ECG monitoring was performed to identify the VHR, the results of which were presented in an individual card or described during a doctor's appointment. All pregnant women underwent ultrasound examination of the heart to exclude structural changes. The average age of pregnant women was 17-36 years.

All pregnant women were prescribed antiarrhythmic drugs (beta-blockers, calcium channel antagonists, verapamil groups) due to poor subjective tolerability of the VHR. In one case, urgent measures were taken, such as cardioversion.

All the data obtained as a result of the study were processed using the SPSS software using variational statistics methods with the deduction of the mean M, the standard deviation S, the average error of the average value m, the reliability criterion t, the reliability value p. Statistically significant differences were considered for p <0.05. The investigated quantities are given in the form (М ± m). Pair group comparisons were carried out by nonparametric Mann-Whitney methods.

RESULTS AND DISCUSSION
In the study of cards, it was found that 54 pregnant (90%) VHR appeared in the second trimester of pregnancy and 5% pregnant had VHR in the third trimester, which may be due to the appearance of an increase in the standing of the diaphragm [3, 9], the appearance of active fetal movements that may increase as a result of the appearance of humoral-metabolic changes in the body of a woman or hypoxia of the fetus [10]. Important role in arrhythmogenesis is played emotional excitement which contributed to re-visit to the doctor [9, 11]. Among the VHR were: supraventricular extrasystoles (SVE) in 51 (85.0%), ventricular extrasystoles (VE), which in all cases were combined with SVE in 38 (63.33%), unstable supraventricular paroxysmal tachycardia in all cases from the AV node in 11 (18.33 %) and unstable monomorphic ventricular paroxysmal tachycardia in 4 (6.66%). The appearance of unstable paroxysmal tachycardias in healthy pregnant women did not affect the hemodynamic parameters. Their appearance can be explained by changes in the vegetative nervous system, which is confirmed by several other authors [9, 11]. The predominant predominance of extraordinary contractions over paroxysmal tachycardia is confirmed by other studies [1, 10]. Only 3 pregnant VHR appeared in the third trimester and this was a combined disorder in the form of SVE and VE. All cases of VHR were hemodynamically stable. In the study of the QT interval, normal indicators were noted, the occurrence of paroxysmal tachycardias was not associated with a lengthening of the QT interval.

Sinus tachycardia occurred in 52 pregnant women (86.67%), sinus bradycardia in 8 (13.33%), in which symptoms of the inferior vena cava (dizziness, nausea, lowering of blood pressure lying on the back) were noted. In pregnant women with sinus tachycardia, hemoglobin parameters were included in the study. It was found that 37 patients with sinus tachycardia (61.66%) had grade I anemia (p <0.001). When comparing the heart rate in pregnant women with anemia and without it, 108 ± 3,41 and 96 ± 2,32 beats / min (p <0,01) were revealed. Correction of hemoglobin level contributed to a decrease in the heart rate and improvement of the general condition of the pregnant woman, and also decreased the subjective feeling of palpitation and irregularities in the work of the heart. According to other authors [11], about 37% of cases of pregnancy in women with VHR took place against the background of anemia of 1-2 degrees. In 31 women (59.62%) with sinus tachycardia, according to the data of individual cards, an ultrasound examination of the thyroid gland was performed. All indicators were in the normal range. The findings suggest that in pregnant women without cardiovascular diseases, various VHR appear that have stable hemodynamics, but are poorly tolerated and require antiarrhythmic drugs and more dynamic monitoring from a cardiologist. In this category of women, the occurrence of VHR can be associated with repeated pregnancy, later gestation and the development of anemia. The literature describes the changes in the electrical systole of the heart, electrolyte imbalance in pregnant women against the background of cardiovascular diseases. We noted that in healthy pregnant women, VHR is more associated with emotional instability and the occurrence of additional factors, such as anemia. The study of the vegetative status of healthy pregnant women can be considered in prospective studies with the development of preventive measures.

Pregnant women were also divided into 2 groups depending on the number of previous pregnancies: the first group (one or two pregnancies) 50 people, the second group (three or more pregnancies) - 10 people who had paroxysmal arrhythmias [11].

In addition, an analysis was made of the appearance of the VHR depending on the previous history of infectious diseases during pregnancy, which was included in the study. Two groups are formed: the first group includes pregnant women who have had infectious diseases of the bronchopulmonary system (acute respiratory viral
diseases, bronchitis, pneumonia) during pregnancy, and the second group - without the transferred diseases. The number of women in the two groups was 18 and 42, respectively. VHR in the groups were found without significantly significant indicators, possibly due to small samples.

CONCLUSIONS

Thus, the vast majority of violation of the heart rhythm in healthy women appears in the second trimester of pregnancy, needs additional cardiology consultation during this period. Most often are supraventricular extrasystoles, sinus tachycardia. Sinus tachycardia significantly (p <0.001) occurs more often with concomitant anemia. When tachycardia occurs, it is additionally necessary to evaluate the level of hemoglobin, the correction of which helps to reduce the heart rate. Sinus bradycardia occurs at signs of constriction of the inferior vena cava with an enlarged uterus, which requires the training of a pregnant woman to change the position of the body during sleep. With an increase in the number of pregnancies a woman’s risk of heart rhythm disorders increases. Accordingly, such women require more detailed examination and control by the cardiovascular system in most cases, the appointment of antiarrhythmic drugs. The past infectious diseases of the bronchopulmonary system during pregnancy do not significantly affect the onset of the violation of the heart rhythm.

REFERENCES


The work was performed within the framework of the research work Department of Internal Medicine 3, National Pirogov Memorial Medical University, Vinnytsya, Ukraine “Pathogenetic parallels between neurohumoral, metabolic and structural-functional disorders and the nature of the course of various cardiovascular diseases and comorbid conditions, optimization of pharmacological correction” (State registration number 0114U007197, scientific advisor – Grand PhD of Medical Sciences Valerii P. Ivanov)

Authors’ contributions:
According to the order of the Authorship.

Conflict of interest:
The Authors declare no conflict of interest.

CORRESPONDING AUTHOR
Oksana I. Afanasin
Department of Internal Medicine №3
National Pirogov Memorial Medical University
Zabolotnoho St., 8/15, 21037 Vinnytsya, Ukraine
tel: +380677669618
e-mail: o.afanasinuk@gmail.com

Received: 01.12.2018
Accepted: 27.02.2019