

# Organization of Interventional Arrhythmological Care in The Republic Of Kazakhstan

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Article History:

Submitted: 15.01.2020

Revised: 16.03.2020

Accepted: 20.04.2020

## ABSTRACT

In the Republic of Kazakhstan, interventional arrhythmology is developing dynamically, the number of high-tech centers as well as the number of implantable devices are also growing. Therefore, there is a need to improve not only the quantitative potential but also qualitative indicators of arrhythmological assistance.

**Key words:** cardioverter-defibrillator implantation, interventional arrhythmology, prevention of the sudden cardiac death.

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DOI: [10.31838/srp.2020.4.63](https://doi.org/10.31838/srp.2020.4.63)

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## INTRODUCTION

Sudden cardiac death (SCD) is the death within one hour from the moment of the first clinical signs either with or no witnesses. In some cases, SCD take place unexpectedly in a person with none of clinical signs during the previous 24 hours [1]. Ventricular tachyarrhythmias (ventricular tachycardia, polymorphic ventricular tachycardia, ventricular fibrillation) are the main cause of SCD in 70-80% of cases. Ventricular tachyarrhythmias are characterized by the sudden onset and malignancy, which is manifested in a pronounced hemodynamic disturbance detectable during the first seconds of its occurrence. Therefore, neither the patient nor the people around are not able to take adequate measures to eliminate this health-threatening condition. Moreover, 90% of SCD cases are considered as mainly non-hospital events.

In this regard, the development of effective organizational, therapeutic, endovascular and surgical approaches to prevent and to treat SCD represents one of the main challenges worldwide. In the early 1980's, implantable cardioverter-defibrillators (ICDs) were developed and introduced into clinical practice. ICD are antiarrhythmic devices that can automatically recognize the occurrence of ventricular tachyarrhythmia and eliminate it by the programmed algorithm [2].

Studies using AVID, CASH, CIDS, and others showed that ICDs have no alternatives in the prevention of the sudden death in patients who already experienced cardiac arrest. Several studies such as MADIT, MADIT-II, MUSTT showed a decrease in mortality by 30-60% associated with the use of ICD in a group of patients with the chronic heart failure. In addition to, the COMPANION study demonstrated that three-chamber ICDs have advantages over three-chamber

pacemakers (TCP) in improving the survival rate of the patients with congestive heart failure [3].

According to the European Heart Rhythm Association, 105,730 ICD operations were performed in 2555 centers in 2016. At the same time, the average number of centers increased from 2.38 in 2015 to 2.65 per million in 2016, with approximately the same number of ICDs per million: 101 in 2016 and 102 in 2015 respectively. Nonetheless, indicators varied among EU countries, in particular, in the western EU region the ICD index was almost 3 times higher compared to the East Europe and non-European countries in the European Society of Cardiology, 229 and 59 and 54 respectively [4].

## STUDY AIM

To evaluate the status and efficacy of the interventional arrhythmology in the Republic of Kazakhstan.

## MATERIALS AND METHODS

In 2015 there were 19 high-tech medical centers, 527 cardioverter-defibrillators were implanted; in 2016, the number of the centers increased to 25 and, accordingly, the number of ICDs increased to 791 respectively. In Almaty, the biggest city of Kazakhstan, for the period from 2015 to 2017, 546 ICDs were conducted in all hospitals that provide cardiac surgery service, in particular, Almaty City Cardiology Center, Central Clinical Hospital of the Administration of the President of the Republic of Kazakhstan, Cardiology and Internal Diseases Research Institute, Surgery Research Center named after A.N. Syzganov, Sema Clinic, Mediterra Clinic. We studied 93 ICD cases that were conducted at the City Cardiology Center (Almaty) using statistical, analytical and descriptive methods.

## RESULTS AND DISCUSSION

Table 1: Demographic data on the patients with ICD (n=93).

No	Sex/Age	30-39	40-49	50-59	60-69	70-79	80-89	Total
1	Men	2,6	16,7	30,8	39,7	10,2	-	100
2	Women	-	20,0	26,7	33,4	13,4	6,5	100
3	Both sexes	2,2	17,2	30,1	38,7	10,8	1,0	100

In the cohort of the ICD patients there were more men than women, 83.9% and 16.1% respectively. In its turn, among men, the majority of the patients were of age groups of 50–59 years (30.8%) and 60–69 years (39.7%). In women, the majority of the patients were of 50–59 years (26.7%) and 60–69 years (33.4%) respectively. The oldest patient was 84-year old, the youngest was 30-year old, the average was  $58.9 \pm 10.3$ . The majority of the operated patients was from Almaty, in particular, in 72.1% of cases; whereas, 27.9% were from other regions of the country. The social status was as follows: the majority of the patients, in particular, 66.8% were retired; 16.6% were disabled with the cardiac pathology, 16.6% were unemployed. The patients were admitted to hospital by ambulance (60.2%). Other admission routes included self-referrals, in particular, 22.6% as well as transfer from diagnostic health care facilities, in particular, 17.2% of the cases.

Cardiomyopathy (dilated, ischemic and hypertrophic) was the main medical condition for ICD implantation, in particular, in 51.6% of the cases. In 40.8% of the cases ischemic heart disease, that included angina pectoris, myocardial infarction) represented the main medical condition. In 7.5% of the cases the medical basis for the operation were arrhythmias. Furthermore, the sinus rhythm was recorded in 73.9% of the patients, atrial fibrillation and atrial flutter were observed in 22.1% of the cases, paroxysmal supraventricular and ventricular tachycardia was observed in 3%. Initially, all patients had clinical signs of chronic heart failure. According to transthoracic echocardiography, there was a significant decrease in the global contractile function of the left ventricular myocardium (the average value of the ejection fraction was  $30.38 \pm 12.97\%$ ), an increase in its size (the average end diastolic size was  $6.45 \pm 1.11$ , the average finite systolic size  $5.36 \pm 1.28$ ). The mean pressure in the pulmonary artery was  $54.16 \pm 18.81$  mm Hg. Art.

The main disease was most often accompanied by arterial hypertension, which was registered in 83.1% of the cases. In addition, 20% of the patients had diabetes mellitus type 2; 3.1% suffered from the impaired glucose tolerance; 7.7% suffered from the chronic kidney disease stage I-III. Moreover, studying the life history of the patients showed that 10.8% had stroke, previous myocardial infarction (69.2%), syncope (4.6%), and dizziness (26.2%).

According to laboratory data, the average level of total cholesterol was  $4.44 \pm 1.36$  mmol / l, low-density lipoprotein was  $3.16 \pm 1.12$  mmol / l. Among patients with diabetes, the level of glyated hemoglobin was  $6.91 \pm 1.68$ . The data suggest that patients did not reach targeted values for glyated hemoglobin and lipids, and all the patients had chronic heart failure with a reduced ejection fraction.

The number of bed-days that the patients spent in the hospital was in average  $10.8 \pm 2.93$  days with the longest being 18 days and the shortest 4 days. The patients' stay in the intensive care unit varied from 1 to 8 days. Positive dynamics (recovery, improvement) was observed in 100% of patients after the ICD implantation. A year-survival rate of the patients was 83.3%; the three-year survival rate was 75%. In average, the survival rate of the ICD patients was  $30.0 \pm 2.63$  (CI 24.84-35.10) with a maximum observation time of 36

months after the surgery. 30% of cases were re-admitted to the hospital with life-threatening conditions.

## CONCLUSION

In our country, there is an increase in the amount of cardiac surgical interventions, although we are far from the developed countries. Analysis of the clinical and demographic data of the 93 patients implanted with ICD at the City Cardiology Center of Almaty showed a medical and social portrait of the patient, in particular, a man (in 83.9% of the cases), aged from 50 to 69 years (70.5% of the cases), retired (66.8% of the cases), admitted by ambulance (60.2% of the cases), diagnosed with cardiomyopathy (51.6% of the cases), with concomitant arterial hypertension (83.1%) and being discharged with a positive outcome of the treatment (100 % of the cases). At the same time, our data showed insufficient survival rate of the patients - 83.3%, which is low compared to the literature data [5, 6], according to which a one-year survival of the patients after ICD implantation ranges from 92 to 98%.

## FUNDING

Financial support for this project was not sought from any external funding body or commercial organization

## REFERENCES

1. Bockeria L.A., Revishvili A.Sh., Imminent N.M., Lomidze N.N. Implantable cardioverter-defibrillators in the treatment of arrhythmias and the prevention of sudden death // *Siberian Medical Journal*. - 2010. - Volume 25, №2. - Issue 2. - p. 13-19.
2. Bockeria L.A., Revishvili A.Sh., Imminent N.M., Lomidze N.N. Implantable cardioverter-defibrillators in the treatment of arrhythmias and the prevention of sudden death // *Siberian Medical Journal*. - 2010. - Volume 25, №2. - Issue 2. - p. 13-19.
3. Ladeev A.Yu., Marochkov A.V., Dmitrieva V.N. The history of the creation and development of implantable cardioverter-defibrillators // *Surgery News*. - Volume 20, №1. - 2012. - p. 317-327.
4. Pekka Raatikainen M.J., David O. Arnar, Bela Merkely, Jens Cosedis Nielsen, Gerhard Hindricks, Hein Heidebuchel, John Camm. A Decade of Information on the Use of Cardiac Implantable Electronic Devices and Interventional Electrophysiological Procedures in the European Society of Cardiology Countries: 2017. Report from the European Heart Rhythm Association // *Europace*. - 2017. Vol. 19. - P.1-90.
5. Yancy C.W., Fonarow G.C., Albert N.M., Curtis A.B., Stough W.G., Gheorghide M., et al. Influence of patient age and sex on delivery of guideline-recommended heart failure care in the outpatient cardiology practice setting: findings from IMPROVE HF // *Am. Heart J.* - 2009. - № 157(4). - P. 754-762.
6. Christian Sticherling, Barbora Arendacka, Jesper Hastrup Svendsen, Sofieke Wijers, Tim Friede et al. Sex differences in outcomes of primary prevention implantable cardioverterdefibrillator therapy:

combined registry data from eleven European countries // Europace. – 2017. – P. 1-8.  
doi:10.1093/europace/eux176