Correlations between cavitary remodeling and arrhythmias and conduction disturbances in dilated cardiomyopathy patients

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Dilated cardiomyopathy importance is underlined by the fact that this disease presents an increasing incidence, a poor prognosis, with a mortality of 30-50% a year, while about 40% of patients requiring admission in hospital during the first year after the diagnosis, due to decompensation of heart failure.

Complications include arrhythmias, which significantly influences patient prognosis. The occurrence of malignant ventricular arrhythmias (ventricular tachycardia, ventricular fibrillation) has a significant impact on disease progression, resulting in an immediate increase in mortality while installing atrial fibrillation in these patients has resulted directly reduce cardiac output and accelerating progression to heart failure.

The choice of therapeutic option in case of occurrence of arrhythmias in the CMD is often a difficult problem, which must take into account a number of issues linked to the correct diagnosis and stage of disease evolution, the choice of therapy must be directed towards a therapeutic alternative leading not only to improve symptoms but also to reduce mortality and long term.

This presentation aims to study mechanisms underlying the occurrence and progression of arrhythmias in the CMD, and approaching them with modern therapeutic methods. Thus, is studied in the study the role of remodeling of cardiac chambers in the generation of atrial arrhythmias, atrial fibrillation, remodeling that ventricular remodeling role in the generation of ventricular arrhythmias, remodeling studied by modern three-dimensional imaging techniques such as echocardiography or angio CT 3D computer multislice 64

However, the analyse aims and study the response to reduce progression to the modern regimens such arrhythmias and heart failure progression of DCM, from the medication until the implantation of pacemakers and coronary revascularization in ischemic DCM.

Theoretical study involved the analysis of electrophysiological parameters and echocardiographic markers representing proarrhythmia factors, considering the premise that the choice of those parameters that can be used in clinical practice with high specificity on economic cost-effectiveness that therapeutic improvement in life expectancy patients with this pathology.

Thus, the present is studied in the doctor’s role in triggering remodeling of cardiac chambers arrhythmias such as atrial remodeling role in generating atrial fibrillation or ventricular remodeling role in the generation of ventricular arrhythmias, remodeling studied by modern three-dimensional imaging techniques such as 3D echocardiography angio computerized or multislice CT 64.

In particular, it was sought to establish indicators that constitute risk markers for prediction of relapse in arrhythmia after application of therapeutic strategies to restore the rhythm that include modern techniques such as ablation by magnetic field electroanatomical navigation- Carto.

The study proposes the use of three-dimensional techniques in the study of remodeling post-infarction myocardial infarction and viability, and three-dimensional imaging techniques for evaluation of the results of revascularization of coronary occlusion in particular in cases with preserved myocardial viability and assess the role of revascularization in reducing the frequency and severity of ventricular arrhythmias.
Chapter I and II concludes an analysis of statistical data that characterizes the group of patients, methods of profile analysis approach is clinical and case (laboratory tests, echocardiographic data), Holter ECG monitoring. Profile distribution of case law has shown pleiomorphism condition, results superimposable over those published in the research of this type to the dilated cardiomyopathy.

Chapter III is devoted to the standard three echocardiographic applied in current clinical practice, monitoring the cavity size measurements, ejection fraction, mitral regurgitation in the pulmonary artery pressure that determine the parameters that were the subject of numerous investigations in an attempt to find factors predictive value for cardiac arrhythmias in this patient

In Chapter III 4 was made a correlation between functional capacity assessed by exercise test in accordance with current recommendations and geometric and functional parameters of the ventricle, determining those indicators with statistical significance. Except izovolumetric relaxation time were found statistically significant differences in echocardiographic parameters examined (ventricular and atrial diameters and volumes, ejection fraction and left atrial and left ventricular shortening, indicators of abnormal diastolic left ventricular diameter and volume indexed AS) between the control group (healthy volunteers) and lots of patients with heart failure. In terms of exercise capacity, all of which express functional capacity were significantly negatively influenced by functional class, degree of expansion that hollow heart rate at rest (P <0.001). Analyzing the curves of variation of the diameters of AS indexed related the incidence of cardiovascular events, it was found that the highest specificity has a value of systolic diameter indexed over 19 mm/m2 AS, and this parameter shows a greater sensitivity to the value of AS-diastolic diameter indexed. All these results lead to the conclusion that impaired exercise capacity occurs before atrial dysfunction to become manifest, there is a period in the evolution of the expansion profile of patients with marked reduction in exercise capacity is a predictor for the progression of heart failure. On the other hand, the volume of AS indexed demonstrated that echocardiography is the most important parameter on survival in patients with idiopathic dilated cardiomyopathy, and the diameter of AS indexed with ratio E / A as an indicator of diastolic dysfunction is to be independent factors arrhythmic risk for cardiovascular events

Chapter III 4 Studies have tried to use hemodynamic monitoring to assess the dynamics of ventricular function bioimpedance shown that cardiac output by determining the correlation with intrathoracic fluid content and pulmonary and systemic vascular resistance values as indicators of heart failure in different stages of development of dilated cardiomyopathy. By correlating the data obtained, it was shown that the best correlation with clinical status and patient symptoms has intrathoracic fluid content and value of systemic vascular resistance (p <0.005) but the dynamics of these parameters not only correlate with the risk of cardiac decompensation, and not the incidence of arrhythmic events.

Chapter III 5. Exploration of ischemic cardiomyopathy patients with invasive has demonstrated the effect polivascular coronary artery involving the previous downward being constantly present in cases with significant expansion of the left ventricular cavity.

Chapter III 6 Most important personal contributions have sought atrial and left ventricular remodeling and correlate with the incidence of arrhythmias. Thus, one aim of the present PhD is a three-dimensional analysis of left atrial remodeling in atrial fibrillation and correlate with three-dimensional aspects of the evolution of these arrhythmias, and identification while searching on the parameters captured by 3D echocardiography, markers of objective, quantifiable that predict risk of arrhythmia.

In the present study have been selected 67 patients with atrial fibrillation and CMD. It is noted that both indices expressing the remodeling process and those who express their echo on the hemodynamic function of the left atrium and left ventricle function shows a negative trend in patients with atrial fibrillation who did not convert to sinus rhythm or it failed. Thus, it can be concluded that left atrial
dilatation in the process of remodeling in atrial fibrillation leads to impaired left atrial hemodynamics, with significant decreases in contractile function of it, which is reflected to some extent and impaired ventricular function.

Another technology used in the study was to analyze the 64 multislice CT angio atrial remodeling in patients with atrial fibrillation.

**Chapter III 7 A** Objective of this study was the introduction of new methods of diagnosis and treatment of arrhythmias, methodologies such as intracardiac echocardiography, endocavitary mapping and radiofrequency ablation. Thus, were selected for study 36 patients with DCM and various forms of supraventricular arrhythmias: paroxysmal supraventricular tachycardia 20 cases, 5 cases with atrial fibrillation, atrial flutter five cases and 6 cases of syndromes preexicație by bundles accessories. In all these patients, in addition endocardial mapping procedures were performed 3D reconstruction of cardiac chambers and aiming to architectonics and volume changes and ventricular fibrillation, the results were correlated with the presence or absence of intracavitary thrombosis, arrhythmia with age, severity of illness Basic and treatment developments. In 21 cases it was shown and possible to perform radio frequency ablation, which in 6 cases was performed under intracardiac ultrasound guidance, methodology introduced recently in practice.

This chapter aims at assessing ventricular remodeling and its involvement in the genesis of ventricular arrhythmias from the finding that at present there is a validated objective model based on measurable parameters and visual analysis to eliminate subjectivity in assessing the kinetics segmentation.

The following echocardiographic parameters were defined as follows:

- **Model-quality geometric left ventricular remodeling assessed by cardiac cycle on the dynamic real-time 3D echocardiography**
- **Quantitative-parameter**: evidence of segmental and regional expansion, kinetic analysis by ventricular contraction curves (instantaneous change of ventricular volume in various stages of ventricular ejection), indicators of ventricular volume curve flattening.
- **Dissincronismului assessing ventricular-ventricular dissincronism index** - defined as the ratio between the amount of time intervals needed to reach maximum amplitude for each segment with abnormal contraction kinetics and number of segments with wall motion abnormalities.

The research presented in Chapter III, started the concept of "reverse remodeling" that refers to the regression of post-infarction remodeling process, as a result of therapeutic intervention of revascularization.

One hypothesis is studied intensively in recent years artery open late theory, which refers to late revascularization of chronic total occlusions, which could lead to myocardial recovery irrigated land where non-invasive examinations reveal at this level of hibernating myocardium, the myocardium can recover function after revascularization.

The objective of this study was to use three-dimensional imaging techniques and benchmarks for the study of remodeling post-infarction myocardial infarction and viability, and three-dimensional imaging techniques for evaluation of the results of revascularization of coronary occlusion in particular in cases with preserved myocardial viability watching infarction is less frequent arrhythmias.

All patients were carried out computer processing of three-dimensional echocardiography ventricular architecture, in assessing the degree of left ventricular remodeling secondary to myocardial ischemia, infarction, identifying areas that have undergone processes of remodeling and aneurysm development.

As a final conclusion regarding the study should be retained cavitary remodeling following aspects:

1. Computerized 3D echocardiography is a useful imaging technique for providing nine extremely complex data, targets, on the kinetics of ventricular remodeling and viability of myocardial infarction.
2. Multislice CT angiography is also a modern 3D imaging technique that provides highly complex data on both the state and the coronary circulation and segmental kinetics of its damage directly correlated.
with coronary lesions identified.
3. Advantages of CT angiography increased accuracy of the information consists even in difficult cases ultrasound window and providing objective data on the kinetic parameters based on the most loyal ventricular (degree of myocardial wall thickening), and the disadvantage is the impossibility of testing association dobutrex because of the limited heart rate at below 60/min imposed by CT.
4. At 6 months follow up in patients with myocardial infarction postinterventional, 3D echocardiography showed a more pronounced expansion especially in the LV cavity infarcted areas in patients with late revascularization of a coronary chronic occlusions.
5. Analysis of the remodeling process in patients with ischemic DCM show a more pronounced remodeling in the infarcted area correlated with wall motion deficit at this level.
6. The computer analysis shows that the regression process of redesigning the process of remodeling is greater in patients who received primary angioplasty, both in the remodeling of the infarcted segments and the segments at uninfarcted.
7. Severe ventricular arrhythmias seen in our cases rather correlates with the extension process of remodeling, which is more expressed in patients with DCM infarction treated conservatively, at which the amplitude is higher remodeling process.

In the last chapter the modern electrophysiological therapies address type implantation single or bicameral endocavitary stimulators, intracardiac defibrillators and cardiac resynchronization. Regarding these patients the evolution of ejection fraction after implantation was found that while implanting DDD cardioverters type developments led to improved patient expressed by ejection fraction increased from 40.36% in average to 43 5% on average in patients with type cardioverters VVI implantation was a reduction in ejection fraction enrolling from 39.8% to 36.45% at 6 months. This can be explained by the loss of synchronism after single cameral stimulation of atrioventricular contraction, which reduces the deterioration of cardiac performance over time.

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