CLINICAL AND THERAPEUTICAL MANAGEMENT IN SOME CARDIOVASCULAR DISEASES IN DOGS

ABSTRACT

Key words: cardiovascular therapy, clinical, paraclinical and therapeutic investigations, cardiomyopathies, valvulopathies and vasculopathies, lesions, cardiac disorders, dilatative cardiomyopathy, hypertrophic cardiomyopathy, atrial fibrillation, atrial flutter, atrioventricular block, ventricular tachycardia, idioventricular rhythm, heart failure, rhythm affections.

Cardiovascular pathology represents a considerable part of small animals pathology and, thus, is requires a detailed knowledge of clinical and paraclinical investigation methods as well as therapeutic protocols.

Cardiovascular therapy aims, in general, rebalancing organism homeostasis with the purpose of increasing pacient life quality, following the present modifications in cardiac hemodinamics, in order to alleviate the clinical signs of cardiac arrest. In cardiovascular pathology one can find a longer or smaller period of time of insidious evolution, after which clear clinical signs are instaured, this representing the final stage of the disease. Due to this aspect, identifying the preclinical stage is, and will remain, a permanent challenge in establishing early diagnosis of cardiac diseases.

The present paper purpose is establishing clinical and therapeutical management in some cardiac diseases in dogs (dilatative cardiomiopathy, hypertrophic cardiomiopathy and some rythm and conduction affections: atrial fibrilation, atrial flutter, atrioventricular block, ventricular tahicardia, dioventricular rythm).

A complete evaluation of cardiac affections taken into study has had the purpose of compiling different anatomical elements, established on the basis of bidimensional ultrasound, color Doppler ultrasound (measuring the dimensions of cardiac compartiments, establishing different valvular lesions etc), electrocardiogram, radiology examination. All of these aspects have then been corelated with the symptomatology presented by each patient, which, thus, represented the fundamental elements in establishing a diagnosis and an adequate therapeutical conduit.

In the *first part of the thesis – Bibliographical study –* are presented the most important data in the speciality literature regarding the anatomy and physiology of the cardiovascular apparatus, as well as the actual stage of some clinical manifestations with diagnostic significance and the

therapeutical conduit of some cardiomiopathies, valvulopathies and vasculopathies in dogs. Moreover, the first part of the thesis is concentrated, alsol, on bibliographical data regarding physics principles used during the ultrasound examination and, also, some general views regarding the evolution of ultrasound examination.

The studies presented in the *second part of the thesis* were aimed on exact and early establishment of diagnosis and optimisation of the therapeutical conduit in dogs with different types of cardiomiopathies, valvulopathies and vasculopathies, taking into consideration for every type of affection the complex and multilateral approach of the clinical and evolutive manifestation, in accordance with the complementary paraclinical investigations, in order to find the most efficient algorythm in cardiac affection screening.

The elected subject of the present study is viewing the ensamble of clinical investigations of cardiac arrest syndrome, some echocardiographic, radiological and electrocardiographic aspects, as well as the evaluations of echocardiographic indices of cardiac remodelation and of the systolic function, cardiac rythm and conduction affections, in accordance with the echocardiographic modifications and therapeutic protocol efficiency for each cardiac disease, stage of cardiac affection, as well as age, breed and sex of patient.

Thus, knowing the fact that dilatative cardiomiopathy is the major cause of morbidity and mortality in dogs of specific breeds, for conducting the studies in the chapter *„Aspects regarding the clinical, paraclinical and theraptuci investigation in dilatative cardiomiopathy in dog”,* a number of 16 dogs have been elected, found in the compensated phase, as well as in the decompensated hemodynamic phase. In the light of the investigations, it was concluded that large breed dogs dominate the investigated population, highlighting that the incidence of this cardiac affection was: Doberman 31,25%, Boxer 25%, the lowest incidence (6,25%) being met in Golden Retriever, Rottweiler and Border collie.

Based on gender of the studied group, the ratio was of 2,2 in favour of male subjects, noticeable being the fact that 81,25% of patients with DCM taken into study were of over 6 years of age, while the incidence of this cardiac affection was consideraby lower ($p<0,01$) in dogs of age between 2 and 6 years, in comparison with other age cathegories.

In dogs taken in study it was concluded that the incidence of DCM, in time, leads to losing the geometry and normal shape of the left ventricle, a progressive highlight of cavitary sphere and development of a globulous left ventrical being observed, consecutive to a decrease of cardiac

reserve, leading, in some patients, to the mithral regurgitation phenomenon, which completes the clinical tableu and setting a dark prognosis.

In the case of DCM patients, echocardiography has been a complete evaluation instrument for systolic function evaluation, which allowed the study of anatomical characteristic of cardiac dilatation, measurements of telesystolic/telediastolic diametres. Based on the stage and gravity of DCM for establishing an adequate therapeutical conduit, 3 therapeutic objectives have been followed: reducing cardiac arrest (by administering diuretics, angiotensin conversion enzyme inhibitors, as well as diminishing the activity); ease of miocardic contractibility (by administering of pimobendan, dygoxin, taurine, L-carnitine); rythm problems management (by administering antiarythmics).

Mentionable is the fact that in patient with an ocult form of DCM angiotensine conversion enzyme inhibitors have been recommended (Benazepril 0,25-0,5 mg/kg/24 hours) and L-carnitine, while in patients with hemodynamic decompensation (n=11), in the first phase, symptomatic treatment of cardiac arrest was recommended (furosemide, nitrate vasodilator) as well as dobutamine, for cardiac contractibility support. The treatment was continued with Fortekor (benazepril 0,25-0,5 mh/kg/day) along with the elected treatment: Furosemide along with Vetmedine or Digoxym 0,2-0,3 mg/kg/day, especially for dogs with II-III degree DCM.

From a total of 27 dogs with specific DCM symptoms, 11 of these have presented this affection secondary to a *Dirofilaria immitis* infestation. The clinical tableu of the 11 dogs was polimorfous, expressed by cardiac arrest, but also a nervous and cutanous sindrome, with inconstant presence, the gravity of cardiopulmonary symptoms being determied by the degree of infestation, the activity of the host and the immune response.

The diagnosis for dirofilariosis was established by microscopy examination of blood and use of enzymatic kits of 95-98% accuracy. In treatment of dirofilariosis in the study group, distruction of adult dirofilaria was aimed, by use of Melarsomine (Immiticide), administered i.m profound at the level of lumbar muscles, and in patients with mild form of the disease was administered Melarsomine 2,5 mg/kg/day, two days, while in patients with severe forms a disociated protocol was used (one administration followed by two other consecutive administrations after a month, one day appart.

In the chapter *„Aspects regarding clinical and therapeutical investigations in cardiac hypertrophy in dogs”*, from the total of 79 patients with arterial hypertension of different origins, 22 dogs were selected that presented hypertrophic cardiomiopathy (8 dogs with primary

hypertrophic cardiomiopathy and 14 with secondary hypertrophic cardiomiopathy). Due to the fact that left cardiac hypertrophy is a complication of arterial hypertension, the left ventricle is responsive to a chronic increase of intracavitary blood volume through excentric hypertrophia,

its excessive and chronic overload leading to subendocardiac ischemia, due to reduced coronary perfusion, responsable for diminished miocardiac kinetics, conjunctive substitution (fibrosis) and cardiac arrest.

In patienta taken in study, early fatigue, muscle fatigue and even effort syncope were registered consecutive the deficit at the level of ejection tract of the left ventricle, and different intensity dyspnea was generated by the increase of ventricular fill pressures, as a consequence of ventricular dyastolic disfunction through lower compliance and ventricular relaxation. Worthy of mention is the fact that cardiac echography is a much sensible diagnosis method than electrocardiographic examination in diagnosin and appreciation of cardiac hypertrophy.

The medication with a high theraprutical efficiency used in patients with ventricular hypertrophy were angiotensine conversion enzyme inhibitors: benazepril, enalapril, ramipril; calcium channel blokers: diltiazem; diuretics: Furosemide, Sprinolactone, Diurex with higher efficiency, attributed to reducing intraarterial pressure, reducing miocardial remodelation processes and preserving the systolic function.

Thus, in the case of patients with secondary cardiac hypertrophy, after administering the recommended treatment, in 64,2% (n=9) a regression of ventricular mass was associated with reducing of cardiovascular events, lowering the risk of cardiac arrest, while in 35,7% (n=5) the risk of cardiovascular mortality was still very high (3 of these died during clinical and therapeutical observation period). In the case of patients with primary ventricular hypertrophy, the prognostic was, generally, favourable, thus, after treatment, in 75% of the dogs in study a bettering of the clinical signs was oted after the first 5 days of treatment, and in 25% after 10 days of treatment.

In the chapter *„Aspects regarding clinical and therapeutical investigations in different rythm and condcution affections in dogs”* the study was conducted on 16 cases, the most representative, which presented cardiac rythm deficiencies: atrial fibrilation, tachicardia, idioventricular rythm and atrioventricular block (I, II and III degree) and which could have been evaluated accordingly and followed up in dynamics, after an established investigative protocol.

The clinical screening of diagnosed patients with rythm deficiencies were persistant chronic fatigue and low tolerance to effort. On the same clincal coordinates, syncope (as

unfavourable prognosis symptom) was registered only in advanced stages of pathology, associated with decreased cardiac debit, in large or giant breeds.

In the case of patients with cardiac rythm deficiencies, the alteration of propagatory impulses in the miocardic tissue and their succesion in time, respectively heart beats and/or atrial and ventricular ratio, cand be diagnosed easily and with maximum accuracy through electrocardiographic examination, along with an echocardiographic examination, for idetifying the possible miocardic and/or valvular modification.

The major clinical and therapeutical objective in atrial fibrilation treatment is represented by conversion of the fibrilation to a sinus rythm (diminishing the ventricular depolarisation frequency through slowing the atrio-ventricular conduction), identifying and treating the complementary affections and curative intervention modulation for individual response. Thus, in 60& of patients Digoxin was administered (0,005-0,01 mg/kg/day) due to its prompt positive inotrope effect and moderate bradicardiac effect, lowering the electrical impulses at the sino-atrial and atrio-ventricular nodule, in combination with benazepril (Fortekor, Cibacen or Cardalis), 0,25-0,5 mg/kf/day).

In 40% of patients with atrial fibrilation, a calcium channel blocker was administered, Diltiazem, 10 mg/kg/24 hours (which lowers the cardiac frequency through diminishing the electric impulse at the atrio-ventricular nodule and leads to a better coronary circulation and a reduced miocardic oxygen consumption), with favourable and fast effects.

In patients with ventricular tahycardia, an emergency treatment was installed, adminstering antiarythmic of IB class (which grows the stimulation level of the ventricle, inhibiting the miocardiac automatism) – Lidocaine i.v., 2 mg/kg and after for maintenance through adminstering amiodarone (10 mg/kg/7 days, followed by 5 mg/kg/48 hours).

In patients with idiovenricular rythm was recommended in association with antiarythmics of II class, that block the β1 receptors and have the effect the suppression of 4^{th} phase of depolarization with antiarythmic of IV class, that block the calcium channels, shortening the action potential (Diltiazem). In patients presenting tachycardia and atrioventricular block I degree, atropine was administered 0,025 mg/kg i.v., vagolitic substance necessary for lowering atrioventricular conduction, which determined the acceleration if the sinusal rhythm.