BFCA *Health Times*

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IN THIS ISSUE: **FALL 2009**

Health Committee Updates by Vickie Halstead

Health Incident Reports and Death Reports: As you are aware, we only received 36 breeder health surveys last year, which we know was a daunting task. It is crucial that the Bichon health data the health committee collects be accurate in order to prioritize research funds, and to recognize and prevent diseases. Data from only 36 breeders may not be accurate, so if you did not submit a breeders survey, please help us collect more Bichon health data by submitting individual reports on your Bichons. The reports are easy to complete online and are available on our health web site http://www.bichonhealth.org/SurveyInstruct.asp. These reports are used for individual Bichons who develop one or more health issues or die, can be submitted by the breeder or owner, and remain anonymous if the owner's name and email address are not included.

ANNOUNCING!!!! The new CHIC 5 Star Award

This new award offered by the health committee, in conjunction with our CHIC listings, was introduced at the BFCA national specialty. The award reflects quality, as in a 5 star hotel, and commends the efforts of breeders who augment health testing of their Bichons prior to breeding. The Bichon must pass 5 health tests to receive this award. Although AKC DNA registration is not a test, it is included as one qualifier for this award. Each issue of the BFCA Health Times will contain an ongoing list of the names of Bichons that received this award, and a certificate will be sent to the owner. Mail or email the application to Paula Hendricks, which can be downloaded from our web site at http://bichonhealth.org/CHIC.htm. Just like CHIC, once a Bichon receives the award it cannot be revoked.

The next page contains the application for the award that lists the requirements.

BICHON FRISE CHIC 5 STAR AWARD APPLICATION

The BFCA Health Committee offers this award in conjunction with our CHIC listings. This award reflects quality, as in a 5 star hotel, and commends the efforts of breeders who augment health testing of their Bichons prior to breeding. Each issue of the BFCA Health Times will list the names of Bichons with this award and a certificate will be sent to the owner.

To qualify each Bichon must have:

1) A CHIC # which means 3 tests are completed: eyes, hips, patellas.
2) Passed CERF and patella OFA certifications within last year.
3) Passed OFA requirements that rule out hip dysplasia.
4) Passed 2 other tests listed in the BFCA optional CHIC tests: DNA registered with AKC, legg-calve-perthes, cardiac OFA, urinalysis and blood tests.
5) At least one owner who is a BFCA member.

DOG'S REGISTERED NAME: _____
AKC NUMBER: _____
CHIC NUMBER: _____
BREEDER/S: _____
OWNER/S: _____
ADDRESS: _____
_____

ADDITIONAL TESTS REQUIRED FOR CHIC 5 STAR AWARD (at least 2 required)

Test	Date of test
Cardiac OFA certification by cardiologist or practitioner	_____
Legg-Calve-Perthes OFA Certification	_____
DNA registered with AKC	_____
Urinalysis for diabetes, bladder infection, crystals	_____
Bile acid blood or urine test to rule out liver shunt	_____
Standard veterinary blood panel including:	_____
CBC (complete blood count) = WBC, RBC, hemoglobin, platelets	
Electrolytes, BUN, creatinine (rule out kidney function)	
Blood glucose level (rule out diabetes)	
Liver enzymes (rule out liver disease)	
Pancreas enzymes to rule out pancreas disease	

Please fill in the date of each test done on your dog, attach a copy of the results and submit either by mail or email to:

Paula Hendricks
4208 Colonial Court
Howell, MI 48843 Paulah@wash.k12.mi.us

CHIC Report by Paula Hendricks

SUMMARY OF TOTAL CHIC NUMBERS AND UPDATES FOR BFCA TO DATE

ORIGINAL QUALIFIERS	382	July 2007
NEW QUALIFIERS	40	Dec. 2007
	68	Dec. 2008
	32	1ST quarter 2009
	27	2nd quarter 2009
TOTAL NEW QUALIFIERS	**549**	**as of Oct. 2009**
UPDATES	13	2007
	65	2008
	28	2009
T0TAL UPDATES	**106**	**as of Oct. 2009**

The total number of Bichons issues CHIC numbers since BFCA joined in July 2007 is 549 and total number of updates is 106 as of October, 2009. Updates indicate Bichons that have an existing CHIC number but in addition have completed yearly updates on CERF exams and/or patella OFA"s. Go to our health website @ www.bichonhealth.org to obtain more information and explanation of CHIC.

HEREDITARY CANINE CARDIAC DISEASES
DILATED CARDIOMYOPATHY (DCM)
Vickie Halstead RN, CCRN, CEN, CVNS, LNC

This is the third article in a series addressing canine cardiac diseases, with an emphasis on diseases that more commonly afflict Bichons Frises. Refer to the first article in the series www.bichonhealth.org/HealthInfo/CanineCardiac.asp while you read this article, for descriptions of basic cardiac anatomy and blood flow through the heart. A Bichon case study is present at the end of this article. The next article will primarily cover mitral valve disease.

Significance

Cardiac disease in dogs is prevalent, accounting for about 11% of dogs seen by veterinarians. At least 3 million dogs examined by veterinarians via ultrasounds in the US have acquired heart disease and may be in heart failure. Acquired heart diseases, both inherited and obtained from influences outside the body such as infections, will be addressed in the third article.

There are basically 3 categories of heart disease in dogs that all progress to heart failure if left untreated or interventions are ineffective:

1. Hereditary diseases that may appear later than birth, such as valve diseases, dilated cardiomyopathy (disease of the cardiac muscle), and sub aortic stenosis (a narrowing of the ventricle below the aortic valve)
2. Congenital heart diseases that are present at birth and genetically transmitted, such as patent ductus arteriosis (PDA)
3. Acquired diseases such as coronary artery disease and chronic valve diseases, which also may have an inherited component

The focus of this article will be on dilated cardiomyopathy (DCM), the second most common hereditary cardiac disease found in dogs. DCM tends to strike larger breeds, but does occur in small breeds. There are several reported cases of DCM in Bichons, and many reports of clinical signs that may indicate DCM, but no definitive diagnosis was obtained. In humans, 56 genes have been identified that cause DCM, the most common reason for heart transplantation.

The incidence of cardiac diseases in Bichons has risen significantly in the last few years, moving from the #11 position to #7. My hope is that this information will encourage Bichon breeders to obtain the OFA cardiac certifications prior to breeding, reduce the incidence of heart disease in Bichons, and help improve the health of our beloved Bichons.

Clinical Signs of Heart Failure

Cardiac diseases eventually lead to heart failure, also called congestive heart failure (CHF), which is defined as failure of the heart as a pump, meaning the heart is unable to supply the body and organs with sufficient flow of oxygen-rich blood. The heart does not stop, but functions less efficiently. This inefficiency is due to weakened muscles in the ventricles, the major pumping chambers of the heart, causing backup of blood into the venous system and the lungs. To help you understand this process, see my toilet analogy in this article posted on the Bichon health web site: http://www.bichonhealth.org/HealthInfo/CanineCardiac.asp and figure 1.

The heart attempts to compensate for the reduced pumping ability by increasing the heart rate, allowing more outflow of blood from more frequent heartbeats. Despite many compensatory mechanisms in the heart and body that preserve the balance short term, in time the stress on the heart takes its toll.

Heart failure ranges in severity from mild with minimal or no symptoms, to severe. Initially, clinical signs of heart failure are mild, vague, and easy to overlook. As time passes more blood backs up into the lungs causing exercise intolerance, loss of appetite, rapid respirations, and frequent coughing that can easily be mistaken for a respiratory infection such as kennel cough. Blood also backs up into the venous system causing engorged neck veins, liver enlargement, and swelling in the abdomen and legs. Without adequate blood flow, organs in the body malfunction and eventually fail, thus causing more severe clinical signs, such as kidney failure.

Heart murmurs, abnormal heart sounds, or irregularities in the heart beats (arrhythmias) detected during a veterinary exam are the hallmark of cardiac diseases and may be detected before any symptoms are present, highlighting the importance of an annual veterinary exam, OFA cardiac certification, and the last puppy exam before leaving the breeder.

Symptoms and clinical signs of heart failure include:

1. Slow capillary refill in the gums (> 2 seconds is required for the gums to regain the pink color after pressing with a finger)
2. Weak and rapid pulses
3. Cardiac rhythm irregularities (arrhythmias) that may cause sudden death
4. Abnormal heart sounds, murmurs
5. Congestion heard in the lungs with a stethoscope
6. Enlarged heart and lung congestion seen on xray
7. Reduced stamina, weakness, lethargy, loss of appetite
8. Shortness of breath, wheezing, coughing, rapid respirations
9. Fainting episodes that may appear to be a seizure
10. Confusion due to diminished blood flow to the brain

11. Cyanosis (blue tint) in the white part of the eyes or gums
12. Abdominal distension, jugular (neck veins) venous distension
13. Enlarged liver palpated in the abdomen
14. Elevated atrial natriuretic peptide (ANP or proANP) that correlates with the severity of heart failure (blood test)
15. Late stages: abnormal blood tests that indicate failure of kidneys, liver, and/or other organs

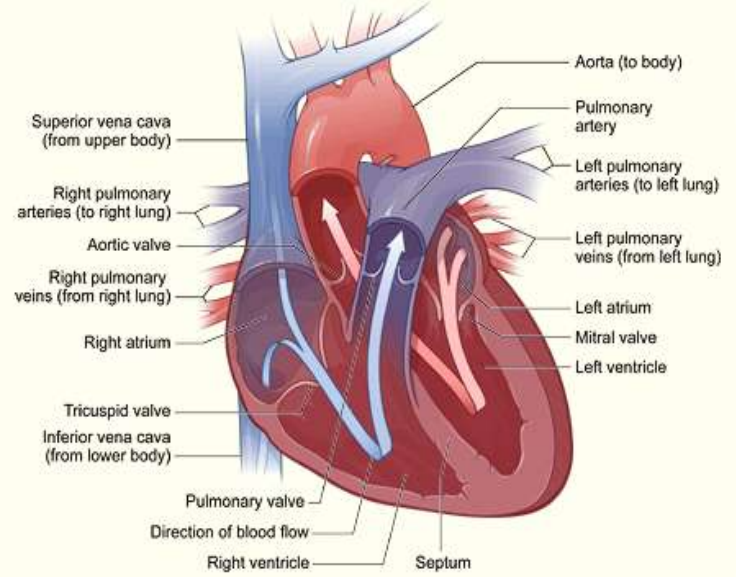

Figure 1 Diagram from The National Heart, Lung, and Blood Institute http://www.nhlbi.nih.gov/health/dci/Diseases/pda/pda_heartworks.html

Pathophysiology of Cardiomyopathy

Cardiomyopathy is defined as a disease of the muscle of the heart (myocardium), rendering the ventricles weakened and unable to pump an adequate amount of blood to the body. Initially the thickness of the myocardium increases (hypertrophy) to strengthen the contractions to eject more blood, just as your bicep muscles increase in size with exercise (see figure 2). In time, the interior chamber of the ventricle dilates to allow increased capacity for blood volume. Eventually these compensatory mechanisms fail and heart failure ensues.

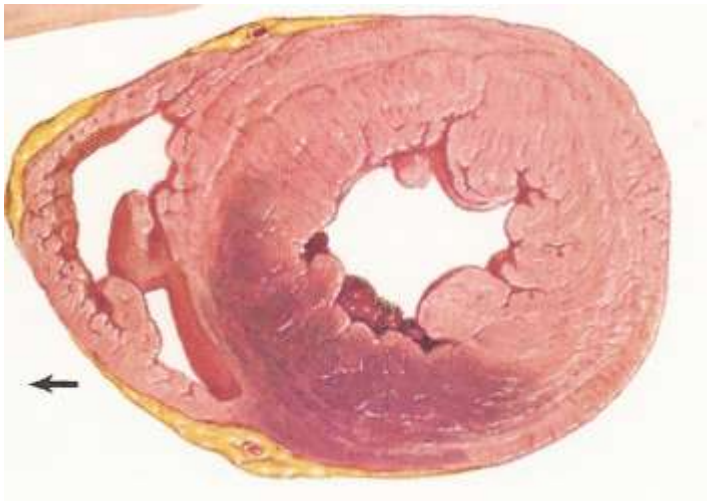

Figure 2 A cross-section slice of the ventricles of the heart, exhibiting a myocardial infarction and hypertrophic cardiomyopathy (left ventricle is on the right side)

Dilated cardiomyopathy (DCM) differs from classic cardiomyopathy in that the walls of the ventricles do not hypertrophy. Instead, the ventricular walls become thin and the ventricular chambers dilate, resulting in considerable weakness of the ventricles and an enlarged heart (see figure 3). In both types of cardiomyopathy, the ventricles become stiff and difficult to fill with blood, which alters the heart sounds that can be heard with a stethoscope.
The dilated ventricles produce another consequence, dilation of the rings at the base of the mitral and tricuspid valves (see figure 4), rendering the valves incompetent. When blood flow is altered in the heart by leaking valves, it produces turbulence that can be heard with a stethoscope, called a murmur.

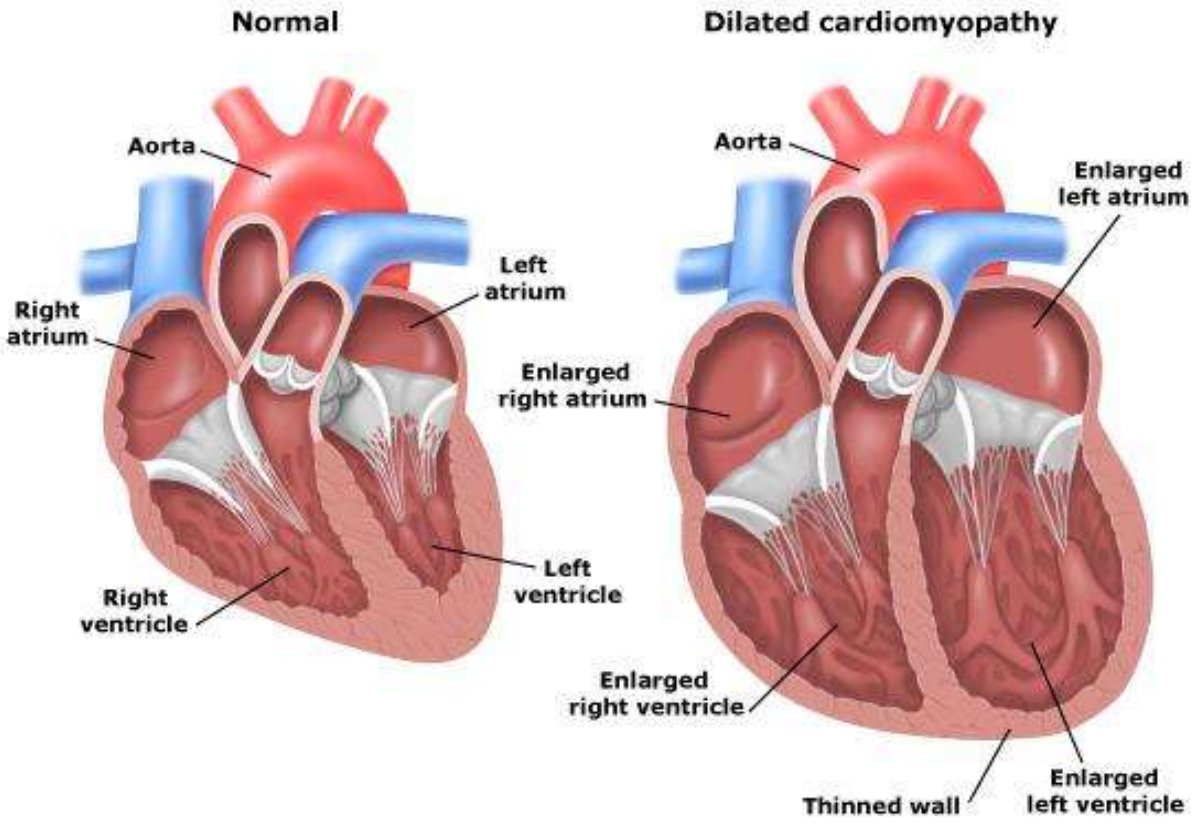

Figure 3 ***NOTE*** the normal thickness of the muscle walls of the left ventricle in the normal heart on the left, compared with the thickness of the left ventricular muscle wall (hypertrophic cardiomyopathy) above in figure 2. The diagram on the right depicts dilated cardiomyopathy (DCM), showing dilatation and enlargement of atrial and ventricular chambers with thinning of both ventricular walls. Note the overall increased size of the heart with DCM as compared to the normal heart on the left.

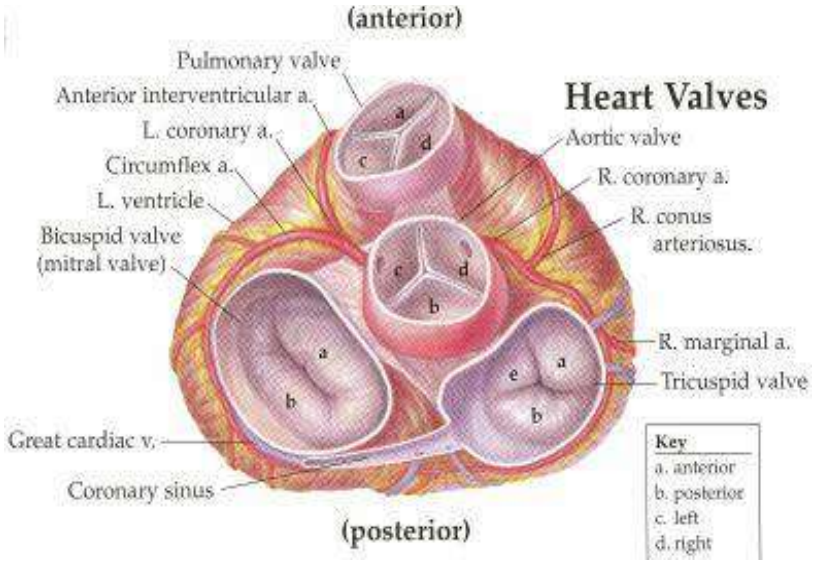

Figure 4 View of the heart valves from above the heart, showing the valvular rings that surround the leaflets of the valves, which can dilate with DCM

The myocardium requires massive amounts of energy to be able to contract at least every second, and to maintain its structural integrity, similar to other muscles in your body during strenuous exercise. The majority of the energy is derived from oxygen and glucose contained in the blood that feeds the myocardium via the coronary arteries. If blood flow is suddenly reduced to the myocardium during a myocardial infarction (heart attack or MI), myocardial cells die (infarction) causing weakness in the muscle. The dark area of the myocardium of the left ventricle in figure 2 is an infarction. If blood is chronically reduced to the myocardium (ischemia) due to coronary artery disease, the myocardium will weaken due to ineffective contractile cells. Once myocardial cells die, they cannot be regenerated.

In addition to oxygen and glucose, the myocardial cells utilize other nutrients to function optimally, a deficiency of which may cause cardiomyopathy. Carnitine is needed to transport fatty acids that are required for energy into the myocardial cells. Taurine has diuretic effects that help rid cells of excess water, plus it helps maintain calcium balance in the myocardial cells, which strengthens myocardial contractility. Adequate levels of Coenzyme Q10 promote proper function of myocardial cells by assisting in maintenance of cellular energy stores. These three nutrients are found in animal proteins that are present in foods, smaller amounts in processed dog foods and larger amounts in fresh raw foods, and can be purchased as supplements. The levels of the electrolytes, especially Calcium and Magnesium, must also be normal for effective function of the contractile cells of the myocardium.

There are 2 classifications of cardiomyopathy, **extrinsic** and **intrinsic**. **Extrinsic cardiomyopathy** is caused by factors outside of the myocardium that lead to destruction of the muscle cells:

1. Coronary artery disease that reduces blood flow to the myocardium
2. Hypertension (high blood pressure) causes excessive resistance to outflow of blood from the left ventricle, leading to hypertrophy (thickening of ventricular wall)
3. Nutrition deficiencies such as reduced levels of Taurine, L-carnitine, Coenzyme Q10, electrolytes, and Thiamine (vitamin B-1)
4. Endocrine diseases such as diabetes, thyroid disease, Cushing's disease
5. Viral or bacterial infections that becomes systemic (spread throughout the body) and attack the muscle cells of the myocardium
6. Autoimmune myocarditis (inflammation of the myocardium)

7. Toxins that destroy the muscle cells of the myocardium, such as drugs or poisons
8. Dental disease: It is important to note that dental disease, the #4 disease in Bichons, can lead to cardiomyopathy. Diseased gums/teeth release high levels of bacteria and pro-inflammatory components (endotoxins). These bacteria and endotoxins gain access to the systemic circulation via the very vascular oral tissues and then travel to the heart muscle destroying myocardial cells, as well as to other organs in the body.

Intrinsic cardiomyopathy, the second classification of cardiomyopathy, occurs without identifiable external causes. In at least 50% of the cases of DCM, no cause can be found (idiopathic), however DCM is suspected to be genetic.

Diagnosis of DCM

DCM is an adult-onset disease, so signs may not be apparent until well into the breeding years. A definitive diagnosis of DCM can be obtained by echocardiography (ultrasound) that will demonstrate the dilated, poorly contractile ventricles. If echo is not available, a presumptive diagnosis of canine DCM is based upon the physical examination and clinical signs of heart failure; a chest xray that reveals an enlarged heart with congested lungs; and an electrocardiogram that reflects enlarged ventricles with possible irregularities in the heart rhythm. In addition, any potential extrinsic causes of cardiomyopathy must be ruled out via blood samples, such as serum deficiencies of Taurine or Carnitine or endocrine diseases such as diabetes, Cushing's or thyroid disease.

An additional blood test may reveal elevated atrial natriuretic peptide (ANP or proANP) that correlates with the severity of heart failure. Heart failure causes increased pressure in the atria (the heart chambers above the ventricles) as the blood backs up from the weakened ventricles that cannot empty properly. The increased pressure in the atria stimulates the release of the hormone ANP. Early detection of heart failure facilitates more effective treatment, and screens dogs that may need further evaluation. A new screening tool for proANP can be obtained from NationWide Laboratories called "Canine Cardiac Screen" at this web address http://www.nwlabs.co.uk/canine-cardiac-screen.html.

Treatment of DCM

Considering the high mortality rate with survival at 1 year about 15%, aggressive medical treatment is imperative. Up to 50% of affected dogs die suddenly due to arrhythmias (irregularities in the heart rhythm). If a cause for the DCM can be determined, treatment or stabilization of that cause may improve the cardiac status of the dog. Earlier treatment, prior to symptoms of heart failure, will produce a better outcome.

Medications that may be prescribed by the veterinarian to improve the efficiency of the ventricles:

1. Diuretics such as Furosemide (Lasix) that promote loss of excess fluid
2. Pimobendan (Vetmedin) improves contractility of the ventricles and dilates blood vessels (decreases the workload of the heart)
3. ACE inhibitors such as Amlodipine, Enalapril, Benazapril improve contractility of the ventricles
4. Drugs to treat arrhythmias that may develop

Dietary supplements that promote a healthy heart include fish oils, multiple vitamins that contain minerals and the B vitamins, Vitamin E, Taurine, L-carnitine, and Coenzyme Q10. However, there are no formal studies to prove that these supplements benefit the heart. Commercial lamb meal based diets may cause a Taurine deficiency.

Sodium restriction in the diet is essential to avoid stressing the heart and lungs with excess fluid. Beware that high levels of sodium can be hidden in cheese, lunchmeats, canned dog foods, and most dog biscuits and treats. Many commercial dry kibbles do not indicate the levels of sodium. The best diet to avoid sodium is fresh raw foods and avoiding table scraps. Also, low sodium prescription diets are available through your veterinarian.

Limit strenuous activities to allow for adequate rest. Maintain a normal weight since extra pounds strain the heart. Seek veterinary services for any signs of respiratory distress, progressive lethargy, or fainting.

New technology—stem cells: Any disease that results from a premature loss of cells has the potential for benefit from treatment with stem cells that can be obtained from the dog's intrinsic cells or a close relative. Myocardial cells do not regenerate after injury, however stem cells may be able to generate new myocardial cells to replace those that died and to repair some of the damaged cells. The stem cells are injected intravenously with hopes they will migrate to the heart, or they are injected into the coronary arterial system, or directly into the heart muscle.

A Case Study of a Bichon Frise with DCM

An 8-year-old female Bichon Frise presented to a veterinary internist with a probable diagnosis of cardiomyopathy. During a pre-surgical exam her primary veterinarian discovered an arrhythmia (irregular heart beat), and then referred her to the internist for further evaluation. DCM was then verified by echocardiogram.

Her past history was negative for health issues. Her owner denies any symptoms of heart failure. She completed her AKC championship and was bred one time near the age of 4 years, producing 5 healthy puppies via C-section. She tolerated pregnancy, the C-section, and nursing well. Had she been bred again after her DCM had progressed, she may not have tolerated this type of stress to her body.

On exam at the internist's office, her pulses were normal, her color was normal (pink), and there were no murmurs detected. Her blood tests were all normal, ruling out diabetes, thyroid disease, kidney disease, liver or pancreas disease, electrolyte imbalances, and anemia. Her electrocardiogram revealed frequent premature beats (an arrhythmia). Her echocardiogram (ultrasound) revealed dilatation of both ventricles, mild leaking of the mitral valve, and an ejection fraction (EF) of 18%. EF is calculated during the echocardiogram, which indicates the average amount of blood ejected from the left ventricle. A normal EF is 60-70%, so 18% is significantly reduced, reflecting the weakness of the ventricular contractions.

She was prescribed Benazapril and Pimobendan to strengthen myocardial contractility, and Procainamide to treat the arrhythmia, which was later discontinued due to stomach issues. Taurine, and L-carnitine were also prescribed but may be discontinued soon since the vet does not feel these supplements have made an impact on her cardiac status. Her status remains stable with perhaps slight improvement in her heart function after 9 months of treatment. Her owner still does not discern any symptoms of heart failure.

Despite the fact that this Bichon did not exhibit symptoms of heart failure, the red flag that urged the veterinarian to investigate further was an irregular heart rhythm (arrhythmia). The lesson that can be learned from this case is to obtain the cardiac OFA certification prior to breeding, which would detect arrhythmias and murmurs, and to obtain annual vet exams for Bichons we are breeding in case an arrhythmia develops.

Breeding Advice

Specific genes for DCM have not yet been identified in dogs, but inheritance patterns in specific breeds have been established. DCM is autosomal recessive in some breeds (not sex-

linked and both parents must be a carrier or affected), is sex-inked in some breeds (found more often in males), and is autosomal dominant in other breeds (only one affected parent is needed to pass it to offspring). 56 defective genes that cause DCM have been identified in humans, so in time the defective genes will be identified in dogs. We need to consider that even if an extrinsic cause for DCM is identified, such as a Taurine deficiency, that dog may have the genetic predisposition to develop DCM when that trigger event occurs.

Affected dogs and their parents should not be used for breeding. Siblings should only be used after careful cardiac screening. See the link below to Dr. Jerold Bell's article for more information on modes of inheritance.

The BFCA Health Committee feels that this disease deserves vigilance. We encourage you to share data with our committee on any Bichons with DCM, which will remain confidential, so that we can be aware of current trends in health problems in Bichons. Contact either a committee member, or complete a health incident form located on www.bichonhealth.org.

References:

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   http://www.offa.org/cardiacinfo.html
   http://www.bichonhealth.org/HealthInfo/Startegies.asp (Dr. Bell's article)