

# **IMPORTANT FINDINGS AT CKCSC, USA'S HEART SYMPOSIUM**

**(Please xerox the following article for your veterinarian)**

## **Heart Disease in Cavaliers CAN be dramatically reduced!!**

May 16<sup>th</sup>, 1998 was a historical one for Cavalier fanciers. Through the extraordinary efforts of Randi Rosvoll and Bob Sims, a panel consisting of a geneticist from Sweden and 4 veterinary cardiologists representing various countries were assembled to pass on their extensive knowledge of mitral valve disease (MVD) in Cavaliers and to give us direction in determining what strategies we can use to combat this dreadful affliction.

These findings included:

➡ Mitral Valve Disease, the leading cause of death in Cavaliers, is hereditary, passed on from generation to generation by the parents, grandparents, et al, of our dogs.

➡ The disease CAN be decreased and the age of onset delayed by breeding only **“heart-clear”** Cavaliers. **“Heart-clear”** Cavaliers are defined as Cavaliers that have been examined by a Board Certified Veterinary Cardiologist at 2½ or older and found free of MVD, AND whose parents are **“heart-clear”** at 5 years or older.

➡ Both the British and Swedish Cavalier Clubs have initiated programs of breeding only to heart-clear Cavaliers. In Britain, the names of 5 year old heart-clear Cavaliers are published on an annual basis so that Cavalier fanciers/breeders know which older Cavaliers have clear hearts. In Sweden, all information on the heart status of all Cavaliers bred is available to anyone through the Swedish Kennel Club.

**THE OVERALL CONCLUSION IS THAT IF CKCSC, USA STARTS A SIMILAR PROGRAM (SUCH AS THE BRITISH OR SWEDISH PROGRAMS) WE CAN WIN AGAINST THIS TERRIBLE DISEASE.**

## **CKCSC, USA PLANS**

**(as discussed at the National Board Meeting in Atlanta)**

➡ Our Club has initiated the Health Registry (see form in this Bulletin), similar to the British program, where we will publish an annual Health Registry booklet containing the names of 5 year old heart-clear Cavaliers in the USA.

By initiating and financially supporting this Health Registry, we hope that the current incidence of MVD (roughly 50% of Cavaliers aged 5 years and approximately 98% of 10 year olds affected) can be substantially reduced starting with the offspring of the first generation of Cavaliers who take part in the Health Registry program. Significant progress can be measured on an annual basis, as seen by the number of 5 year old heart-clear Cavaliers listed in the Health Registry booklet.

➡ Complementing the Health Registry, the Club will be starting a Cavalier King Charles Spaniel Health Foundation, largely devoted to attacking the problem of heart disease in Cavaliers. The Foundation is targeted to be up and running by the end of this year and will enable Cavalier owners and supporters to contribute tax-deductible donations.

➡ The Club is encouraging Regional Clubs to set up Cavalier Health Days, held at veterinary clinics, whereby Cavaliers can be examined by trained specialists for heart problems and other disorders. The Club will subsidize these clinics in order to provide economical health examinations for our Cavaliers.

## **WE SHALL KEEP YOU INFORMED VIA THE BULLETIN AS WE PROGRESS WITH THESE NEW INITIATIVES.**

Following is a Synopsis of the CKCSC, USA Heart Symposium. A complete transcript, to include photographs, slides, graphs, etc., will be made available for those who were unable to attend or anyone who is interested. In future Bulletins watch for ordering information.

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### *SYMPOSIUM PARTICIPANTS*

**Andrew W. Beardow, BVM&S, MRCVS**  
Veterinary Referral Centre, Little Falls, NJ

**James W. Buchanan, DVM, M Med Sci**  
School of Veterinary Medicine  
University of Pennsylvania, Philadelphia,  
PA

**DR. ANDREW BEARDOW**, now in private practice at the Veterinary Referral Centre in New Jersey, moderated and gave an overview of the symposium, saying that it was designed

**Virginia Luis Fuentes, MA, VetMB, DVC, MRCVS**  
College of Veterinary Medicine  
University of Missouri, Columbia, MO

**Bruce W. Keene, DVM, MSC**  
College of Veterinary Medicine  
North Carolina State University, Raleigh, NC

to give different perspectives in order to develop a pragmatic approach to MVD

The mitral valve, located on the left side of the heart, is crucial to how blood is circulated through the body. MVD destroys this structure. Many breeds

**Lennart Swenson, MSC**  
Department of Animal Breeding and Genetics  
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Uppsala, Sweden

develop MVD but in Cavaliers it occurs with a high frequency, starts much younger in life, progresses more rapidly and usually kills them.

There are various ways to examine the heart – auscultation (listening with a

stethoscope for murmurs), radiography (chest x-rays to see the size of the heart and the presence of fluid in the lungs) and echocardiography (ultrasound to visualize the heart). Doppler ultrasound will also show flow through the heart, the most sophisticated form of which is 2 dimensional, color-flow Doppler in which blood flow is color coded based on its direction.

Research has shown that MVD in Cavaliers is a significant problem EVERYWHERE in the world. This adds credence to the fact that MVD is a genetic disorder.

**DR. JAMES BUCHANAN**, Professor Emeritus of Cardiology at the University of Pennsylvania, presented many interesting pathologic slides showing the devastation caused by MVD. He noted that 2 other conditions are more common in Cavaliers than other breeds. Patent ductus arteriosus (PDA) is a congenital (i.e. – present at birth) heart defect which can be corrected with surgery and which is found at 6 times the rate in other breeds. Cavaliers with PDA, whether corrected or not, should NOT be bred. Femoral artery occlusion (FAO) is unique to Cavaliers, having not been seen in any other breed. It causes no problem since other arteries take over for the blocked femoral artery. Diagnosis is made when the pulse on the inside of the dog's rear leg(s) is found to be weak or absent. An inherited weakness in the artery wall is suspected.

Heart murmurs are graded from 1 to 6 (the worst). Grade 1 murmurs are barely audible in a quiet room while grade 6 murmurs can be heard before the stethoscope actually touches the chest wall and, in some cases, without a stethoscope at all.

He stated that there has been no statistical improvement in Cavalier hearts since his initial report which covered 1987-1991. He's found no sex difference in onset of murmurs. Systolic clicks occur 25 times more frequently in Cavaliers than other breeds and may be a precursor to a murmur showing up a few years later. He's not prepared to say you shouldn't breed a dog with a click but it raises the level of suspicion.

Vertebral Heart Size (VHS) is a quantitative way of measuring heart size, based on a chest x-ray, and

thereby objectively determining heart enlargement.

**DR. VIRGINIA LUIS FUENTES**, Visiting Lecturer in Cardiology at the University of Missouri (formerly of England), worked with Dr. Peter Darke, noted British cardiologist, in Scotland for 7 years and was on the heart sub-committee for the English CKCSC.

In 1987 at a UK dog show Dr. Darke examined 431 Cavaliers and found that 50% of 5 year old Cavaliers had mitral valve murmurs, that there was a high prevalence of murmurs between 2 and 4 years of age and that ALL Cavaliers from 11-13 years old had murmurs. This was an alarming finding and the English CKCSC took action.

A scheme was started using a 2 part form to be filled out by any veterinarian, indicating whether the Cavalier had a murmur or not (no grade noted). The owner kept one copy and voluntarily sent the other to the Club. This scheme ultimately failed because there was no data published and breeders were given no guidelines by the English Cavalier Club.

A few years ago, following publication of the Swedish Cavalier heart study, a new scheme was implemented using a computer database tied in with English Kennel Club records. They also enlisted the services of an epidemiologist, James Wood. A booklet of Cavaliers with clear hearts at 5 years old (not all cardiology checked) was published and will be updated. It was felt that they need to have more older dogs cardiologist-checked and having heart clinics apart from shows, like those started in the US in the Northeast, is a very good way to accomplish this.

*Their breeding recommendations follow the Swedish guidelines of not breeding a Cavalier before it's 2½ years old and murmur free and only if its parents are murmur free at 5 years old. Don't breed any Cavalier that gets a murmur before the age of 5.*

In the US, you have the opportunity to set up a good breeding protocol, learning from the British experience and avoiding their mistakes.

**LENNART SWENSON, M.Sci.**, geneticist at the University of Agricultural Sciences in Uppsala, Sweden, genetic consultant to the Swedish Kennel Club and former

breeder/exhibitor of Skye Terriers discussed how to develop breeding strategies to control inherited diseases. "You must have valid information obtained by medical examinations of the right animals, in sufficient numbers, at an appropriate age, with the results of these evaluations made available to the breeders."

The Swedish Heart Study was designed to find out whether or not MVD was inherited in Cavaliers. It did just that, showing that the offspring of the most affected parents were more likely to be more severely affected and at a younger age. Conversely, the offspring of the least affected parents stayed healthier longer and were less severely affected with MVD. The strong suspicion is that MVD is a multifactorial, polygenic threshold trait, similar to hip dysplasia (HD).

As an example of how such a trait can be greatly reduced, Swenson showed that HD in Rottweilers in Sweden was reduced from 36% to 11% between 1976 and 1994. Initially, in order to register a litter, both parents had to have their hips evaluated but both dysplastic and non-dysplastic Rottweilers could be bred. That information was available to anyone who called the Swedish Kennel Club and asked. Eventually, through peer pressure, breeders stopped breeding dogs with HD. Now, only Rottweilers without HD can be bred. The incidence of HD has been dramatically reduced by using these guidelines.

THE BIGGEST REASON THAT BREEDING SCHEMES FAIL IS THAT BREEDERS DON'T FOLLOW THEM! Compliance with schemes is enhanced by using relatively cheap, simple, effective measuring methods and then publishing results for all to see.

The main difference between the Swedish Heart Study data and data gathered in other countries is that in Sweden, more 5 year old males than females had murmurs (55% vs. 35%). Elsewhere the ratio was roughly 50-50.

**DR. BRUCE KEENE**, Associate Professor of Cardiology at North Carolina State University, spoke about developing a screening program, deciding what tests to use and how best to allocate our resources. As well as developing a breeding protocol, we might also think about funding research

into drugs or techniques that can benefit Cavaliers that have or will get MVD. This would be one of the rolls of the newly established CKCS Health Foundation.

He presented the findings of a Swedish study that compared the accuracy of detecting MVD through auscultation (stethoscopic examination) by a cardiologist versus echocardiography. A cardiologist's auscultation was found to be 90% accurate and due to its wide availability and low cost, he felt it should be the method of diagnosis for screening Cavaliers for MVD and for determining the severity of their murmurs. Unfortunately there is no perfect screening test but a test with 90% accuracy that can be used by 100% of the people, is, in the long run, the best choice.

Dr. Beardow summarized. Keep in mind that systolic clicks may be a sign we should consider. FAO may indicate a more generalized disease process. In some studies, at any given age, more males than females are more affected with MVD. Parental disease status seems to have a major effect on the probability of developing MVD and its progression in their offspring. MVD is most likely a multifactorial, polygenic threshold trait, similar to HD. Murmur free females with litterbrothers who have developed MVD should be considered suspect. Breeding values based on parental status or perhaps even earlier generations than that may allow younger dogs to be bred; thus the reason for the UK booklet of 5 year old heart-clear Cavaliers. General considerations are that a screening test should be widely and easily available or people will not use it. The test should be specific enough to identify MVD but not so sensitive that we eliminate all of the breeding stock. Testing should not be financially prohibitive. A breeding program should be widely supported and uniformly implemented and therefore should be well presented and well understood.

Questions and answers followed. This is a summary of the salient points.

♥ In the future the UK heart registry booklet should not just list heart-clear 5 year old dogs but also have statistical

information, which would be easily extractable from the computer database they've set up.

♥ When an asymptomatic dog first develops a mitral valve murmur, the logical next step is to take a baseline chest x-ray, since the degree of any heart enlargement is the most accurate way of determining how compromised the heart function is. It's best to have a cardiologist or radiologist read these x-rays since, due to the Cavalier's chest conformation, many general practitioners may incorrectly diagnose an enlarged heart (cardiomegaly). Radiographs can be taken by a general veterinarian and sent to a specialist.

♥ The availability, or lack thereof, of cardiologists was mentioned. A list of cardiologists will be published in the CKCSC, USA, Health Registry. The information is also available on the American College of Veterinary Internal Medicine's web site at <http://acvim.org/>.

♥ There is no problem differentiating a PDA murmur from a mitral valve murmur using a stethoscope.

♥ Might there be 2 types of MVD – that which progresses rapidly and another form which progresses slowly? With the Cavalier heart database in the UK, they hope to eventually answer that question but so far the information is only anecdotal. In general terms, the earlier the onset of a murmur, the shorter life the dog will have.

♥ There is a lot of individual variation in the expression of MVD but, generally speaking, a lag time of 34 years was found between the time when a mitral valve murmur is first found by a cardiologist and when clinical signs begin to appear.

♥ There are a couple of ongoing prospective clinical trials trying to determine if angiotensin converting enzyme inhibitors (ACE inhibitors such as enalapril, the active ingredient in Enacard® and Vasotec®) will keep dogs with MVD healthier longer and delay the onset of heart failure. Results should start to come in a couple of years. In humans these drugs have been shown to help once heart failure begins and to prolong the interval before heart failure occurs.

♥ The new UK heart form for Cavaliers has a place to grade any murmurs found and a box to check if the

examination was done by a cardiologist. Only cardiologist's exams are entered into their database.

♥ Interest was shown in how and why the Swedish Kennel Club requires heart testing in Cavaliers as a prerequisite for registering litters. Lennart Swenson said that the Swedish Kennel Club works closely with the University in Uppsala with regard to genetic health programs. Once a disease is shown to be genetically based, the Swedish Kennel Club requires testing for that problem in that breed. In the first years both affected and unaffected dogs can be bred, with the results made public. Eventually only unaffected sires and dams can be bred. If a breeder violates these rules they will get a letter from the Kennel Club stating that they've violated the rules.

♥ Someone asked about environmental influences being the cause of MVD in Cavaliers. The panelists agreed that it was not logical to think that environmental factors were the cause or that you can alter the progress of the disease by changing the environment. There is no reason to think that the environment of Cavaliers is any different than any other dog but it's only Cavaliers that have this problem in such a serious form.

♥ Could the use of vitamin E forestall MVD in adult Cavaliers or prevent the development of MVD in the offspring of females given vitamin E during their pregnancy? There was no good evidence either for or against the efficacy of vitamin E in influencing the incidence or progression of MVD in the dogs themselves or in their offspring. Proper clinical trials are needed.

♥ A question was asked about using supplements, special diets and holistic approaches to controlling MVD and the resistance of most veterinarians to try these things. Dr. Keene said that when several supplements, etc. were used there was no way of knowing which, if any, might be working. There have been no clinical trials proving that any of these supplements or approaches work. However, the CKCS Health Foundation, once up and running, could choose to allocate funds for research into one or more of these supplements, etc. Veterinarians feel that they must do the best possible for

their patients and thus prescribe drugs and treatments that have been proven to work. Most do not mind if clients want to give supplements, feed special diets, etc. as long as they don't think any of the things would be detrimental to the dog and the client discusses it with them. If and when clinical trials support the efficacy of any of the holistic approaches, they would have no problem using them.

♥ Surgical valve replacement was asked about. A few veterinarians are using a surgical procedure where they do cross stitching of the annulus of the mitral valve but not valve replacement. Next week a Texas veterinarian will report on 9 such surgeries. The cost is estimated to start at \$2500. Success has not been high, mainly because most cases are in end-stage heart failure. Earlier intervention could yield better results. Also, putting such a small animal on heart by-pass requires special machines. Human replacement valves are too big for a Cavalier.

♥ There was mention of our breed initially starting with only 4 dogs and consequently our gene pool is very small and would Cavaliers ever be "free" of MVD. Lennart Swenson felt that more than 4 dogs were used in the beginning but it really didn't matter since all breeds began with just a few dogs (6-8 in Cocker Spaniels, etc.). He said the goal is not to rid the breed of MVD but to have all Cavaliers die a natural death before they get MVD, then it's no longer a problem.

♥ If every, or at least most, breeders followed the breeding protocol, how many generations would it take to see results? Lennart Swenson said that by using the Swedish protocol and with good compliance, you would see a major improvement in just 1 generation. However it wouldn't be until those puppies were 79 years old that you would actually be able to confirm that an increased percentage of them were still murmur free. He said in 2-3 generations you will have a much better situation but **ONLY IF YOU ACTUALLY USE THESE TECHNIQUES**. He most fears that breeders will not follow the program.

♥ What about developing a genetic test for MVD? MVD is not controlled by a single gene so a genetic test is probably not possible at this time.

However there might be a dominant gene that controls the disease in 30% of the cases. If this is true, this gene will be the first to disappear once breeders start selectively breeding to reduce MVD and you will therefore take away the possibility of identifying that gene **BUT** that is a **GOOD THING**.

♥ How has the English CKCSC been able to require their breeders to do the heart testing and to send in the test results? Dr. Luis Fuentes was not sure what proportion of English breeders were following the scheme but with any new program, there tends to be a core of active, committed people versus others who don't want to confront the problem. Eventually people who don't take part in the program will become marginalized. Things such as public lists of heart-clear 5 year old Cavaliers help bring people into the breeding scheme. Sweden is "lucky" in being able to take control of the situation through Kennel Club mandated programs.

♥ How did the Swedes come up with the ages in their breeding protocol? They used 5 years and heart-clear because of the bell curve showing that about 1/2 of Cavaliers had already gotten a murmur by 5 years and 2/3 years was selected because it is half of 5.

♥ The panelists said that 14 months old was the youngest age at which they've detected a mitral valve murmur.

♥ Some folks worried that there will not be very many heart-clear 5 year old sires to breed to and too many dogs would be eliminated from the breeding population. Lennart Swenson said that when breeders say they can't afford to cut out this much of the population they forget that they already do just that. They only breed about 10% of males and the rest are cut out of the population because of their lack of "beauty". Breeders are willing to make hard decisions and cut away a lot of dogs for the beautification of the breed but when they discuss hearts, suddenly it is different. Swenson finds that very "peculiar".

♥ There were many questions about specific situations regarding when dogs get murmurs after the age of 5 (having been clear at 5 years), if they should be bred and, if so, should it be based on the grade of murmur first noted, etc. The discussion ended with the message

that we shouldn't get hung up on numbers and individual situations. A protocol must be established and adhered to, even though it may change or be updated sometime in the future. You have to have a starting point. The panelists basically agreed on every point.

Anne Robins thanked all the panelists for their very, very interesting presentations. She urged everyone to read their Bulletins for information on the upcoming Health Registry and the CKSC Health Foundation. The Bulletin is our only means of communication. Special thanks were extended to Randi Rosvoll and Bob Sims for making this symposium happen.