Metropolitan Minutes

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Chiari-Like Malformation with Syringomyelia in Cavaliers and Other Small-Breed Dogs

by Todd Axlund, DVM, MS, ACVIM (Neurology)

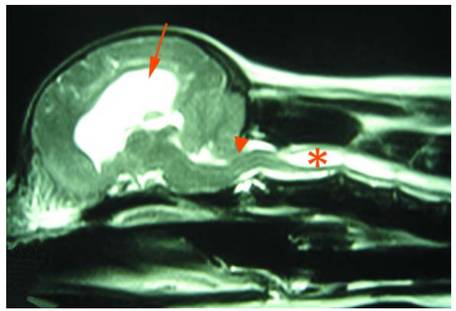
Chiari (kee-are-ee) malformations are a series of congenital defects in the posterior brain fossa and intracranial structures that were originally described in humans in the late 1800s by Hans von Chiari. Several years ago, veterinarians began to notice a similar set of congenital defects occurring in certain breeds of dogs, particularly Cavalier King Charles spaniels.

These animals appeared to have clinical signs that stemmed from compression of the brainstem secondary to cerebellar herniation. Further postmortem investigation revealed a small caudal fossa, that portion of the skull that contains the cerebellum and brainstem, relative to the size of the intracranial structures. Since the skull is not large enough to fully contain the intracranial structures, the cerebellum herniates through the foramen magnum. The resulting compression of the brainstem leads to altered cerebrospinal fluid (CSF) dynamics. Through a mechanism that is not yet fully understood, this causes a cavity to form within the spinal cord itself.

These changes are nearly identical to those described in humans, so many veterinarians began calling this condition "Chiari-like malformation" to describe the underlying pathology, and "syringomyelia" to describe the changes that occur within the spinal cord.

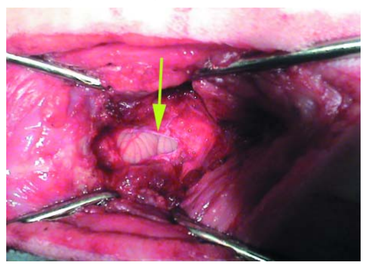
Animals with this condition often develop clinical signs within the first few years of life, but onset may be greatly delayed in some cases. Owners may describe signs such as inappropriate "yelping" (as if the animal was in great pain), paraparesis, tetraparesis and cervical pain. Interestingly, many dogs with this condition will exhibit scratching activity directed toward the head and neck, but close observation often determines that the paw does not consistently make contact with the skin. Breeds in which this condition is commonly seen, other than Cavaliers, are Yorkshire terriers, Maltese, and other small-breed dogs.

The diagnosis of this condition requires the use of MRI. Other modalities such as myelography and CT scanning are ineffective. In fact, it is likely that the need to perform an MRI to confirm the diagnosis is the reason recognition of this condition was delayed for many years. It wasn't until fairly recently that MRI was easily attainable for use in non-humans. Changes commonly seen on MRI include hydrocephalus of varying severity, cerebellar herniation (in particular the vermis of the cerebellum), attenuation of the subarachnoid space at the foramen magnum, and cavity formation in the spinal cord. Interestingly, the cavity formation in the spinal cord typically spares the first few spinal segments then can involve any amount of the remaining spinal cord.



MRI of a Yorkshire terrier with changes associated with Chiari-like malformation and syringomyelia. Note moderate hydrocephalus (arrow), attenuation of the subarachnoid space (arrow head), and cavity in the cervical spinal cord (asterisk).

Treatment typically involves surgical decompression and medical management. The surgery most commonly performed is a foramen magnum decompression, involving removal of the supraoccipital bone, a partial dorsal laminectomy of the first cervical vertebra, and a durotomy.



Intraoperative photograph of an animal that has had a foramen magnum decompression. Note the cerebellar vermis with the indentation from previous compression at the foramen magnum (arrow). The dura has been incised, and the supraoccipital bone and a portion of the cranial dorsal lamina of the first cervical vertebra have been removed.

Medical management is aimed at both decreasing CSF production as well as managing pain. Prednisone is given to decrease CSF production. A combination of opoids, gabapentin and amantadine is used by most neurologists to manage the pain. Acupuncture also may offer some relief.

Approximately 80 percent of animals will show signs of improvement and experience greatly improved quality of life. However, return of clinical signs does occur in a small number of animals. It is thought that these animals have had recompression of the surgical site by the formation of scar tissue. These animals may respond to another surgical procedure. Another technique has been used in a small number of animals, in which titanium mesh is placed over the surgical site once a foramen magnum decompression (FMD) has been performed. Preliminary investigation of the results of this procedure has revealed a similar success rate to that of a standard FMD, as well as a similar recurrence rate. Further investigation is ongoing.

If you think you have an animal with signs consistent with Chiari-like malformation, please feel free to contact Dr. Todd Axlund at 330.670.2358 to discuss diagnostic and treatment options.

Practice Points

Akron Veterinary Internal Medicine/Oncology Practice (AVIMP) has an excellent employment opportunity for a boarded or board-eligible internist for a full-time clinical position. Boarded or board-eligible oncologists are encouraged to apply. We are seeking an individual with excellent client/referring veterinarian communication skills, dedicated work ethic and a good sense of humor. A strong interest in oncology is strongly desired. The successful candidate will work four days per week and participate in our rotating weekend on-call schedule. Compensation will be determined by experience and includes a generous benefits package. Feel free to contact Dr. Carothers or Dr. Gamblin at 330.670.2351 for additional information or to schedule an interview. We look forward to hearing from you!

The specialists of **Northeast Ohio Internal Medicine Associates** are noting an increased incidence of certain infectious diseases in dogs and cats. Infectious concerns for dogs currently include leptospirosis and tick-borne diseases such as ehrlichiosis, Rocky Mountain spotted fever and Lyme disease. Another concern for dogs is Neospora caninum. Cats in the area are prone to infection with toxoplasmosis. Screening for these diseases can be done with routine blood work. If you would like information about these infections and the recommended laboratories for screening, please contact Dr. Jennings or Dr. Turner at 330.670.2355.

Acupuncture is more than a valuable treatment for relief of pain. **Dancing Paws Animal Wellness Center** wants you to know that that the combination of acupuncture, Chinese herbs and spinal manipulation can be an effective adjunct in the treatment of epilepsy in animals. While these treatments may not eliminate the need for traditional medication, they often can reduce the necessary dosage and/or reduce the severity and frequency of seizures. Treatment protocol involves weekly sessions for six weeks, tapering to once monthly. Please call Dr. Sivula at 330.664.6504 or e-mail dancingpaws@metropolitanvet.com for further information.

Veterinary Ophthalmology Service of Northeast Ohio reminds you that corneal ulcers can be vision-threatening. Non-healing indolent ulcers in older patients are generally superficial and not emergency cases, although they require treatment to promote healing and comfort for the patient. Ulcers extending deeper into the stroma of the cornea are much more critical and should be seen as soon as possible, especially those which have a "melting" appearance. Ulcers in these categories also are truly emergency cases: a defect is visible in the cornea; it fails to stain with fluorescein, but appears clear into the anterior chamber; it is classified as descemetoceles. Your help in accurately assessing these lesions and relaying the information to our staff gives us the best chance to treat your patients and maintain their vision. Contact Dr. Belknap at 330.670.2360 with questions or to consult on the urgency of a case.

The doctors of **Ohio Veterinary Surgery and Neurology** have been spearheading the adoption of digital radiography and a hospital-wide Patient Archival and Communication System (PACS). PACS allows comprehensive and concise management of digital patient information. Radiology, CT, echocardiography, arthroscopy/thoracoscopy/laparoscopy, intra-operative fluoroscopy and digital photography are already sending images to the PACS server. In the next few months, endoscopy and ultrasound will be added. Currently, off-site MRIs are either downloaded or transmitted remotely. When on-site MRI is added, studies will be transparently "pushed" to the server. Access to patient diagnostic and treatment information will be available at any computer that can access the PACS. This system, combined with the power of software and personal computers, allows us to look at our diagnostic images in new and powerful ways. To learn more, contact the practice at 330.670.2358.

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Specialist Spotlight

Canine Total Hip Replacement: The Current State of the Art

By Mark Daye, DVM, MS, Diplomate ACVS

History:

Canine total hip replacement has been used successfully for decades in the treatment of osteoarthritis of the coxofemoral joint, coxofemoral luxation, and fractures of the femoral head and neck. Figure 1 illustrates a typical middle-aged dog with marked osteoarthritis that would benefit from total hip replacement. The procedure is useful in patients with lameness or disability that cannot be attributed to other orthopedic or neurologic conditions. It is the treatment of choice for patients that cannot find relief from conservative means like weight loss, low-impact exercise, nutraceuticals and NSAIDs, or complimentary modalities like chiropractic or acupuncture.


Figure 1

Hip replacement is clearly the best surgical option for osteoarthritic medium to giant breeds. Some orthopedic surgeons argue it is the treatment of choice for small breeds, providing a more reliable and full recovery than femoral head ostectomy (FHO). Implantation in Shetland sheepdogs, poodles and other small dogs has become more common. Figure 2 depicts a micro-sized total hip replacement suitable for dogs as small as 10 to 15 pounds, depending on bone size and body condition.


Figure 2

Though technically demanding, in the hands of an experienced surgeon, total hip replacement is a highly successful procedure. Good to excellent results are seen in 95 percent of patients. Short-term complications such as luxation (2 percent to 3 percent) and infection (1 percent to 2 percent), though serious, are infrequent. Luxation is generally treatable with revision surgery, but infection typically necessitates explantation.

Greater experience and longer follow-up has identified the long-term complications including aseptic loosening and, rarely, neoplasia. In the eternal quest for "better" there have been significant changes to the hip replacement implants and implantation techniques in recent years. This article presents some of these changes.

Motivation for change:

With luxation, infection and fracture at acceptably low rates, aseptic loosening in the chronic time frame has arguably become the dominant focus in canine hip replacement. Aseptic loosening becomes even more important considering hip replacement is frequently performed in barely mature patients, giving them ample lifespan to "wear out" an implantation. Figure 3 illustrates a clinically painful young dog that is too large to have a reliably successful FHO and too lax to be a good triple pelvic osteotomy (TPO) candidate. Total hip replacement is the best surgical option in this patient, but the implantation will need to last a lifetime.


Figure 3


Figure 4


Figure 5

Aseptic implant loosening occurs both with the acetabular and femoral components, but is more commonly identified with the femoral stem. Issues with cement-bone and cement-implant interface have been studied. The change in cemented hip implant design from Figure 4 (Richards™) to Figure 5 (BioMedtrix CFX™) is the result of some of this work.

Cementing techniques including vacuum mixing, liquid phase injection, medullary cement pressurization/restriction and femoral stem centralization have been adopted to produce a longer lasting cement-implant and cement-bone interface. Figure 6 shows a cement injection gun, cement extension tube, medullary cement restrictor and a centralizer mold employed in modern cementing techniques.


Figure 6

Another approach is to abandon cement altogether. Several alternatives to cementless implantation exist. Commercially available systems include the BioMedtrix BFX™ (Figure 7), Kyon Zurich Cementless™(Figure 8), and more recently MedicatecVet Helica™(Figure 9). Each uses a different method for initial implant fixation relying on "press-fit", locking screw technology or implant surface features, respectively.


Figure 7


Figure 8

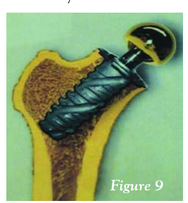
Figure 9

Short-term stability depends on patient selection, host bone quality and surgical technique. Long-term stability depends on bone incorporating into or onto the implants. Short- and long-term stability are intimately related and depend on good initial surgical decision-making and execution. In other words, cementless implants are generally less forgiving in their application than comparable cemented implants.

Studies documenting reduced aseptic loosening using cementless prostheses are not yet available in the dog. Short-term studies reveal comparable success and complication rates between cemented and some of the cementless implants. To my knowledge, there are no published scientific reports of Helica™ hip implantations.

At Ohio Veterinary Surgery and Neurology (OVSN), We perform BioMedtrix CFX™(cemented) and BFX™(cementless) total hip arthroplasties. The BioMedtrix system was chosen secondary to my experience with the system, the company's history and dedication to product testing, education and development, and the vastly more comprehensive veterinary literature on the system.

The other dramatic advantage to the BioMedtrix system is the ability to hybridize the implantation. Cemented and cementless acetabular cups and femoral stems can be intermixed in any combination, providing the most adaptable fit available. Figures 10 through 12 show a BFX-only implantation, a CFX-only implantation, and a hybrid implantation with BFX cup and CFX stem.


Figure 10


Figure 11


Figure 12

If you have any questions or would like to refer one of your patients for a total hip replacement evaluation please call Ohio Veterinary Surgery and Neurology (OVSN) at 330.666.2358 or fax at 330.666.0519. Dr. Daye would be happy to share his experience with both cemented and cementless hip replacement in the dog.

Future Notes

Hear Metropolitan Veterinary Referral Group Members Presenting at Conferences

Feb. 2, 2008 – *Akron All Breed Training Club – Dr. Sivula's topic, "Holistic Veterinary Medicine"*

Feb. 6, 2008 *– Mustard Seed Market, Montrose, Ohio – Dr. Sivula's topic, "Pet Food Basics"*

Feb. 28 – Mar. 2, 2008 *– Healing Oasis Wellness Center, Sturtevant, Wisconsin – Dr. Sivula's topic, "Basic Animal Chiropractic"*

April 12-13, 2008 – *Healing Oasis Wellness Center, Sturtevant, Wisconsin – Dr Sivula's topic, "Craniosacral for Animals"*

Help us Update our Mailing List

You can assist in our efforts to keep pace with the changing local veterinary population. If you are receiving copies of this newsletter for someone no longer at your practice or would like to add someone, please call Kelli Riley at 330.670.2355. Thank you!

Contact Us

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New Thinking

Natural Hemostat: Clinical Use of Yunnan Paiao

by Neal Sivula, DVM, PhD

Yunnan Paiao is an inexpensive Chinese herb-based medicine believed to have positive hemostatic effects. It is thought to have an enhanced platelet effect or coagulation factor. Use of the formula preoperatively may reduce the need for blood products. It can reduce hemorrhage from cut nails or other open wounds.

The blend was developed in the Yunnan Province, where it is used to stop bleeding, promote wound healing and relieve pain. It does not have an exact herbal formula, but is known to contain Chinese yam root, panax ginsing, wild yam root, sweet geranium, galangal rhizome, ox gall bladder and borneol.

Yunnan Paiao has been used orally and topically to stop bleeding and minimize blood loss in a variety of species including humans. Foreign soldiers have carried it as an emergency hemostatic agent. In veterinary medicine, it may reduce the need for blood products at the time of surgery.

A number of mechanisms of action of the formula have been proposed, including increased permeability of platelet membranes, shortened clotting times and shortened bleeding times. It has been useful in the treatment of internal and external bleeding tumors, sheared nails, surgical bleeding incidents, epistaxis, gastrointestinal bleeding, disseminated intravascular coagulation and aural hematomas. Various studies have supported these theories in laboratory animals.

Other proposed mechanisms of the formula include peripheral vasoconstriction, a particle effect from the polysaccharide base, and a calcium-mediated effect. The starch and calcium may contribute to the effectiveness of the formula when applied topically.

The dose ranges vary. For dogs and cats, it has been advised to topically sprinkle the powder on wounds. Oral doses for dogs range from between 250 and 500 mg/5-10 kg sid to bid. Oral does for cats are 125 to 250 mg bid.

Yunnan Paiao has the appearance of a tan powder and has a sweet, pungent odor. Microscopically, it looks granular, with brown or red flecks visible. When suspended in water it has a pH of 4.7. Analysis shows a high concentration of polysaccharides (due to the potato-starch base).

It is widely available from local Asian markets or through Chinese herbal supply houses. It comes in foil sheets of sixteen 250 mg gelatin capsules, with five sheets in a box. This package usually costs less than $10. It also is packaged in a 4 gm bottle, which is equivalent to 16 capsules. Each bottle is usually packaged with a small red pill as well, which contains 4 gm of the herb. As with all Chinese herbs, it is important to purchase from a reputable retailer to minimize possible contamination issues.

There have been no adverse side effects of the formula demonstrated, although from a traditional Chinese medical perspective, it should not be used chronically. Mild to moderate elevations in liver enzymes have been reported with chronic use.