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Brave New World - A Look at Some of the Latest Advances in Veterinary Medicine

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There have been tremendous advances in both human and veterinary medicine in recent years. Just about every procedure available for humans is now available for our companion animals. Of course, not every general practitioner is going to have an MRI (magnetic resonance imaging) or CT (computed tomography) scanner, but the purpose of this article is to let you know about some of the new high tech tools available to help treat your favorite four-legged friends.

Having said that, one of the most basic surgeries performed is the spay. Increasingly, instead of the traditional open surgery laparoscopic spaying is being performed. Instead of an incision several inches long, one or two small ones only a few millimeters in length are made to enable passage of the instruments. The advantages of this technique are considerably less pain and surgical stress for the patient – surgery is faster and so is recovery and healing. Retained testicles can also be removed using the same technique. Once the rigid endoscope is in the practice, the days of “opening ‘er up for a good look” will also be gone.

Through the same endoscope the veterinarian can do a full abdominal or thoracic exploration. Through a single port she can take full thickness biopsies of liver, spleen, kidneys, pancreas or intestines with no need to grossly handle and manipulate the organs, or for an incision from sternum to pubis. The same equipment can be used for intestinal surgery – removing part of the intestines and suturing the cut ends back together, removing stones from the bladder and other procedures. In the chest it can be used to remove the sack around the heart or to take lung biopsies if needed, without breaking ribs to enter the chest wall. It can also be used to examine the nose. Our dogs frequently get foreign bodies caught in their noses and using the endoscope you can find, grasp and remove them. Long nosed dogs are at increased risk of nasal cancers and again the endoscope can be used to remove or obtain biopsy samples from growths in the nose. Exploration of the ear is also improved using endoscopy. Because the procedures are far less invasive, what once were major surgeries requiring



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prolonged hospitalization can now be done as out-patient surgery with the dog going home the same day.

Arthroscopy is another popular endoscopic procedure. There are five times as many ACL surgeries done in dogs as there are in people. They are the number one procedure in terms of veterinary revenue. With arthroscopy the stifle can be examined thoroughly without cutting through muscles, tendons and blood vessels as used to be necessary. Recovery is faster too; the dog will be bearing weight on the affected leg one to four weeks sooner than with traditional surgery. Muscle loss is reduced, and there is less catching up to do in rehabilitation. With arthroscopy you can insert implants and prosthetic ligaments, repair the joint, do vascular surgery and perform cartilage grafting.

Another technology that is appearing in general practitioners' back rooms is digital radiography. Instead of having to develop X-rays you get the image in about 4 seconds. You can reshoot, take other views and reach a diagnosis during one session. Regions of interest can be magnified, contrast and brightness adjusted, and if there is still doubt you can e-mail the image to an expert colleague for input. The image can be stored on a CD, and a copy given to the owner. Chemicals and film no longer need to be bought and stored, which is a saving for the veterinarian too, and frees up a room for other diagnostic equipment. With digital X-rays veterinarians are taking more X-rays. Nowhere is this more important than in the mouth. Like the proverbial iceberg, 9/10ths of the pathology is taking place under the surface of the gum, and now we are seeing it.

In the future we may reach a point at which surgery will be performed without sutures, and the future is coming fast. Ligasure is an electro-surgical vessel sealer which cuts and fuses vessel walls permanently. There is no swelling and bleeding two big pluses when working in the mouth and throat. Both carbon dioxide lasers and radiofrequency equipment are being used in place of the traditional scalpel. They reduce bleeding and post-surgical pain. The radiofrequency equipment works at lower heat and is faster than the laser, and preferred for working in joints.



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Nuclear medicine is also making great strides. Injected, inhaled or ingested radionucleotides can be followed through the body to look for tumors and other abnormalities. At the same time radiopharmaceuticals are being developed to target specific loci for tailored therapy.

Along the same lines, stem cell therapy may very well be the biggest new field. Stem cells are grown from adipose (fat) tissue from the animal being treated. The vet removes the fat from the animal (so far dogs and horses) and it is sent over-night to Vet-Stem in San Diego California – currently the only veterinary stem cell company. Connective tissue is removed enzymatically. The remaining substance is spun in a centrifuge; the stem cells sink to the bottom while fat floats to the top and is discarded. The concentrated stem cells are returned over-night to the veterinarian, who then injects them into the damaged site. Stem cells promote immediate regeneration. They have been used to treat tendon, ligament and joint injuries and disease. By modulating the immune system, stem cells reduce inflammation and immune cell reaction which can cause more damage. They promote the creation of new blood vessels too, and in the future will likely be used to treat heart and peripheral vascular disease. When treatment is given early, scarring can be avoided, and even later existing scar tissue will be reduced. In horses, more than 90% show some improvement and at least 75% return to their previous performance level. So far in dogs the primary use has been for dogs with severe arthritis – ones that no other treatment has been able to help. In this group 80% or more show a marked improvement in range or motion, reduction of pain and lameness and an improvement in their quality of life. Imagine what could be done if treatment was initiated early on in the disease process. Because the stem cells come from the animal's own body, side-effects are minimal. Currently the biggest drawback is cost which averages out at \$2000 for the procedure. As with everything else though, cost will likely drop as the use of stem cell therapy is brought to a wider number of animals.

We have seen the future, and it is now. It bodes well for our animal's comfort and our own peace of mind.



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