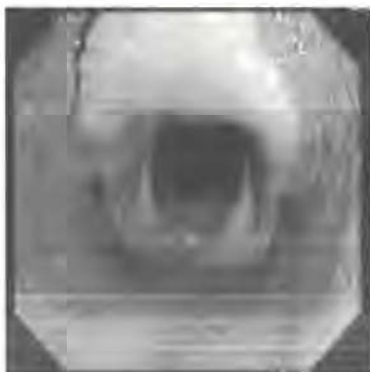


Fast surgery for giant patients

The patients weigh a ton each and arrive at New Bolton in huge trailers from as far away as Iowa, Florida and Wisconsin. They are draft horses diagnosed as "roarers" and are brought to New Bolton because surgeons here have developed a reputation for being able to repair this condition safely.

"These Clydesdales, Belgians, Percherons and Shires are a challenge," says Dr. Eric Tulleners, associate professor of surgery. "They weigh anywhere from 1,600 to 2,525 lbs. twice as much as the typical Thoroughbred. Their weight is a huge challenge for anesthesia as the animal can develop nerve and muscle damage from being in one position without adequate padding for too long." To avoid this problem, clinicians at New Bolton have created a team approach for these patients to keep the time on the operating table to a minimum. "We have a well-planned anesthetic and surgical approach and because we have performed this procedure on more than 70 draft horses, everyone knows their part. We do as much of the surgical preparation as possible while the horse is standing. Our anesthesia crew and operating room nurses are skilled and dedicated and we are able to keep the anesthesia as short as possible. The anesthesia time for many of these surgeries is around one hour."

Surgery is needed to repair a paralysis on the left side of the larynx, a common problem of draft horses. The animals make a whistling or roaring noise while inhaling and many cannot tolerate exercise. "The condition is caused by a paralysis of the muscle which moves the cartilage and vocal cord on the left side of the larynx," explains Dr. Tulleners. "The paralyzed vocal cord collapses into the wind pipe, creating an obstruction. The whistling or roaring sound is caused by the tissue flapping when the animal breathes. There are two cartilage flaps at the back of the windpipe. Normally they are upright and capable of moving into a fully open position, but when paralysis occurs, the affected flap folds over the windpipe opening every time the animal



*Left:
Normal
cartilage flaps*

*Right:
Collapsed
cartilage flap*

inhales. This dramatically impedes air intake. Between the flapping vocal cord tissues and the collapsed cartilage flap, the animal is deprived of about 50% of its air intake."

This narrowing of the airway creates problems as the oxygen supply is drastically reduced. It may not be so apparent while the horse moves at a walk, but when it is asked to move at a fast trot, the animal quickly tires. Most of these horses are exhibited, drawing heavy wagons at a good trot. They usually are part of a team, perhaps as a four, six or eight horse hitch. If one or two animals in this team cannot maintain speed because of fatigue, then the hitch cannot function. Draft horses usually begin their "working careers" later than race horses, so the condition often does not become evident until the animal reaches five to seven years of age. "It's not a life threatening problem," says Dr. Tulleners, "but it interferes with performance. Roaring in horses is also not a new problem, it is mentioned in 16th century works on horses."

New Bolton Center's operating room in the Kline Center is equipped to handle these equine giants. The monorail used to move patients from the induction stall to the operating table is strong enough to carry the load and the table is big enough to handle the huge patients.

"We use a two-pronged approach to correct the problems," says Dr. Tulleners. "First, with the aid of an endoscope an Nd:YAG laser is used to remove the collapsed vocal cord, a technique which is called a ventriculocordectomy. Then an incision is made in the neck to reach the cartilage flap to tie it back permanently (laryngoplasty). The procedures are performed under sterile conditions. We are able to complete both procedures in an

average time of 45 minutes. Obviously, we strive to keep the duration of anesthesia as short as possible."

Recently Dr. Tulleners performed a retrospective study of 65 draft horse patients to determine the long term outcome of the surgery which he first performed in 1984. The time period covered was 1984 to 1995. All the horses were treated for left laryngeal hemiplegia. They were 61 geldings, and four mares. Of these animals, seven had previous surgery for the condition at other clinics which had failed.

All the horses were treated by prosthetic laryngoplasty, and a left ventriculectomy or ventriculocordectomy was done on those animal which had not had a ventriculectomy. After the surgery four of the horses developed transient (less than 12 hours) single limb myopathy/neuropathy which responded completely to medical therapy. The incision in all but one animal healed without trouble. One horse developed an infection at the incision which was cured with drainage and antibiotics. None of the animals had difficulty swallowing, excessive coughing, development of pneumonia, or nasal discharge. Owners reported that 77% of the horses did not make any more respiratory noise and returned to normal exercise tolerance and they considered the results of the procedure to be excellent. A good result was reported for 11% of the horses, with noise being reduced by 90%. A fair result, defined as an estimated 50% reduction in objectionable noise and improvement in exercise tolerance, was achieved in 8% of the horses. A poor result, defined as an inconsistent reduction of noise heard during exercise was seen in 4% of the horses.

"We are very happy with these

results," says Dr. Tulleners. "They prove to us that the team concept and the carefully devised anesthetic approach enables us to safely and efficaciously treat these animals with no long term adverse

effects. The key is that every member of the team knows what to do so we can be extremely efficient and keep anesthesia time to a minimum. It is wonderful to watch these horses regain their stamina

and go back to work, fit and quiet. We have now treated over 70 draft horses from 15 states and three Canadian provinces."

Vaccination Program Against Pseudorabies

Pseudorabies, also known as Aujeszky's disease, is a viral disease of swine causing reproductive failure, neurologic signs and death in baby pigs, and respiratory disease in growing swine. In 1989, a national pseudorabies eradication program was initiated after consideration by state, federal, and industry leaders of the costs of such a program and potential benefits to the swine industry. The goal of this program is elimination of pseudorabies from the national swine population by the year 2000. Progress towards this goal was slow at the beginning of the program, but has been gaining momentum in recent years. Currently, about 3,500 of the nation's 200,000 swine herds are quarantined for pseudorabies infection.

On these quarantined farms, procedures to control the disease are carried out. These procedures include segregation of different age groups, removal of infected animals, and vaccination of breeding and growing swine. Vaccination or the natural infection induces high levels of antibody to appear in the colostrum of sows, and this antibody is passively transferred to their progeny soon after birth. This antibody protects the young pig against natural pseudorabies infection, but also has the potential to inhibit pigs' response to vaccine given later in life. This phenomenon is well recognized and evidence for this inhibition is obtained via serological sampling.

Dr. Paul M. Pitcher, clinical educator in the Department of Clinical Studies - New Bolton Center, spent two years with USDA-APHIS, Veterinary Services assisting Pennsylvania Bureau of Agriculture officials in the State-Federal-Industry cooperative program to eradicate pseudorabies. During his tenure there, he

worked with many quarantined producers in establishing effective cleanup plans. Typically, serial sampling of a cross-section of pigs of various ages was carried out as part of establishing vaccination programs on these farms which would be effective in controlling the disease. The results of these investigations indicated that the response of piglets to pseudorabies vaccine could be predicted based on semi-quantitative interpretation of antibody levels at the time of vaccination.

Dr. Pitcher, after joining the School's faculty in July, 1994, built on experience gained in pseudorabies control and utilized his work with the USDA as pilot work for a controlled field study to further investigate the interaction between passively transferred maternal antibody to pseudorabies and the response to pseudorabies vaccine. This study, completed last summer, used pigs in two commercial units - one at New Bolton Center, one in Lancaster county. Nearly 1200 blood samples were collected and analyzed at BAI's Summerdale laboratory for the presence of pseudorabies antibody.

Results of this investigation showed that pigs from non-immune sows exhibited no impairment of immune response to pseudorabies vaccine, even when vaccinated as young as six weeks of age. Pigs from immune sows exhibited inhibition of the primary serologic response to vaccine if antibody levels were in the "positive" range of an ELISA test at the time of vaccination.

One of the most encouraging findings of this study was that pigs demonstrated

immune system priming and an anamnestic serologic response to pseudorabies vaccine, even if the primary serologic response was completely inhibited due to high levels of maternal antibody. These findings have important implications for the design of vaccination programs in swine herds infected with pseudorabies. If sustained antibody levels are needed, pigs from sows immune to pseudorabies should be booster vaccinated against pseudorabies. That is, pigs need to receive two doses of vaccine, at least two weeks apart in order to be fully protected against natural infection throughout the growout period. A single dose of vaccine is insufficient to stimulate a biologically significant response in such pigs. Evidence for immune system priming should be encouraging to producers battling the disease in their herds, because it means that benefits are being realized from the initial dose of vaccine, even though no serologic response occurs. The findings also have important implications for immune responses to other antigens.

Dr. Pitcher presented the findings of this work to practitioner groups at the 27th Annual Meeting of the American Association of Swine Practitioners in Nashville in March, 1996 and the 14th International Pig Veterinary Society meeting in Italy in July, 1996. In addition, a pamphlet will be prepared for distribution to swine producers via the Pennsylvania Animal Health and Diagnostic Commission, and the work will be published in a peer-reviewed journal later this year.

