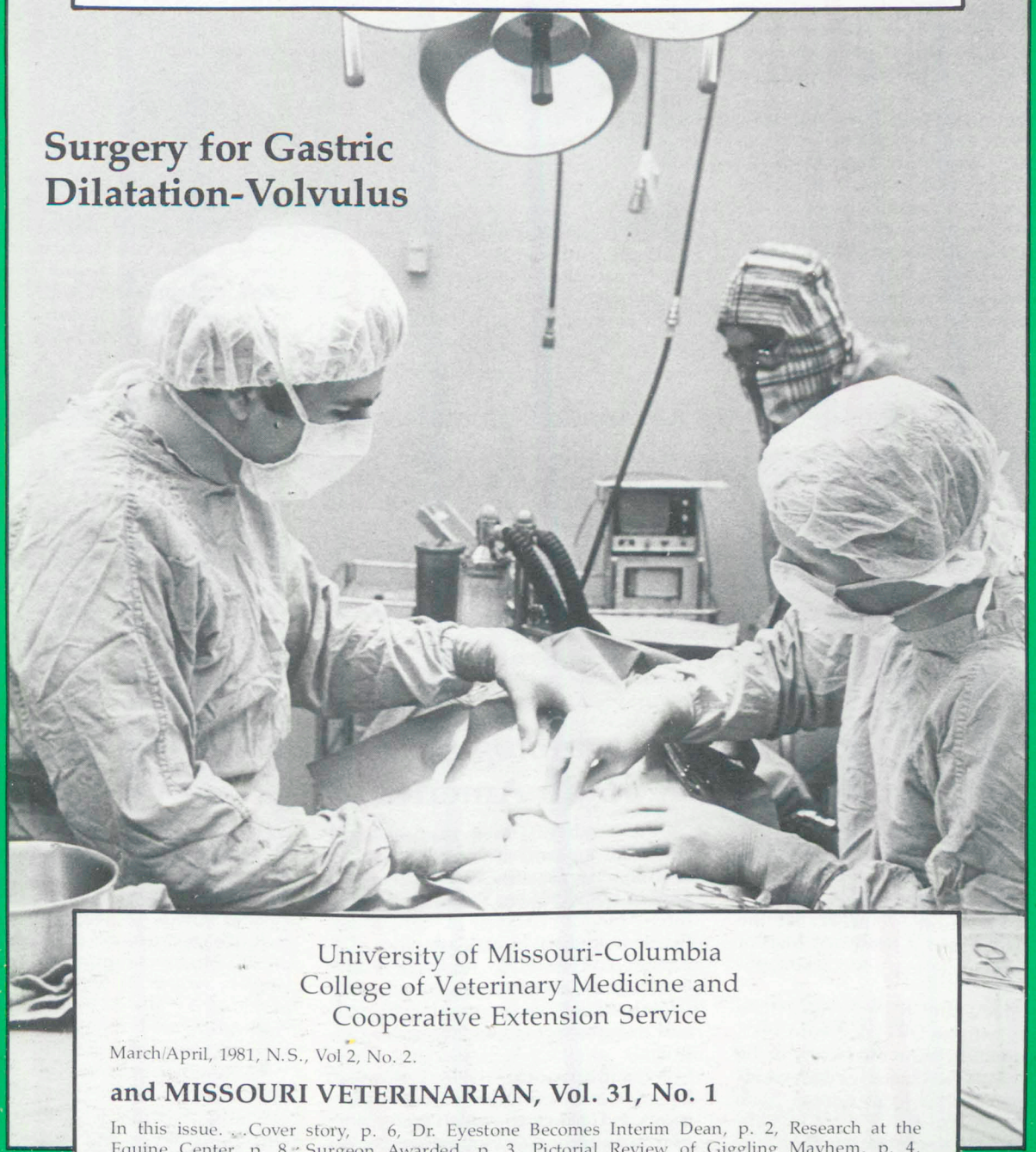
VETERINARY MEDICAL REVIEW



Surgery for Gastric Dilatation-Volvulus

University of Missouri-Columbia
College of Veterinary Medicine and
Cooperative Extension Service

March/April, 1981, N.S., Vol 2, No. 2.

and MISSOURI VETERINARIAN, Vol. 31, No. 1

Dr. Eyestone Named Interim Dean

Dr. Weide Resigned Dean's Post

University Provost Ronald Bunn named Dr. Williard H. Eyestone as interim dean for the College effective March 3, 1981. Dr. Eyestone succeeds Dr. Kenneth D. Weide who resigned as dean effective February 27.

In addition to Dr. Weide stepping down, Drs. E. A. Corley and L. C. Faulkner have left their administrative duties to return to teaching and research in the Department of Veterinary Medicine and Surgery.

Dr. Eyestone has been with UMC's College of Veterinary Medicine since March, 1972, when he began work as Chairman of the Department of Veterinary Pathology.

Dr. Eyestone was born in 1918 in Mulberry, Kansas. From Kansas State University, he received his BS degree in 1939 and his DVM degree in 1941. After working briefly as a research assistant at the University of Illinois, Dr. Eyestone joined the U.S. Army in 1942 and attained the rank of Major.

Upon leaving active duty in 1946, Dr. Eyestone studied at the School of Public Health at Harvard University, receiving his MPH degree in 1947. He then went to the University of Wisconsin where he earned his PhD degree in 1950, specializing in pathology.

A year prior to receiving his PhD degree, Dr. Eyestone went to work for the U.S. Public Health Service in research and administration. He worked at the National Cancer Institute, National Institutes of Health, in Bethesda, Maryland, until 1972. In 1959 Dr. Eyestone accepted a commision as Veterinary Officer Director for the U.S. Public Health Service Commissioned Corps.

In 1954, Dr. Eyestone was certified as Diplomate of the American College of Veterinary Pathologists. From 1961 to 1962 he served as president of that national group.

Dr. Eyestone has received several honors. In 1968, Kansas State University

conferred upon him the Distinguished Alumnus Award in the Field of Veterinary Medicine. In 1970 he received the Meritorious Service Medal from the U.S. Public Health Service, and also in 1970 he was presented the Charles A. Griffin Award from the American Association for Laboratory Animal Science.

AMVA President-Elect to Be Academic Convocation Speaker

Dr. Jacob E. Mosier will be the 1981 Academic Convocation speaker for the College. Dr. Mosier is President-Elect of the American Veterinary Medical Association.

Since graduating from Kansas State University with his DVM degree in 1945, Dr. Mosier has been on the faculty of the veterinary college there. He received his MS degree in 1948 from Kansas State University. In 1961, Dr. Mosier was appointed to head the Department of Surgery and Medicine there.

A Diplomate of the American College of Veterinary Internal Medicine, Dr. Mosier has been active in organized veterinary medicine. He is Past President of the Kansas Veterinary Medical Association, Past Chairman of the Executive Board of the AVMA, and Past President of the American Association of Veterinary Clinicians. He is Vice President of the World Veterinary Association and Treasurer of the American Association of Veterinary Medical Date Program Participants.

Recipient of several awards, Dr. Mosier was named in 1977 as the Kansas Veterinarian of the Year and in 1974 was presented the American Animal Hospital Association Award.

Dr. Mosier has held several positions as consultant and has published more than 60 papers concerning veterinary medicine and veterinary education.

The College's Academic Convocation will be Saturday, May 9, 1981, in the main area of the Hearnes Multipurpose Building, starting at 3:30 p.m.

Microbiologist to Serve as Consultant in South America

Dr. C. Andrew Carson, microbiologist at the College, will serve as a consultant to Colombia, Ecuador, and Peru beginning in May, 1981. At the request of the Inter-American Institute of Agricultural Sciences in San Jose, Costa Rica, Dr. Carson will travel to northern South America to analyze the hemotropic (blood-related) disease problem in cattle and to make recommendations for control.

Agriculture officials in Colombia, Ecuador, and Peru believe that anaplasmosis and babesiosis, which are malaria-like hemotropic diseases, are among the most important diseases afflicting cattle in those countries. Dr. Carson was asked to help because of his experience with these diseases over the past thirteen years.

Dr. Carson is part of the University of Missouri research team working to develop vaccines against anaplasmosis and babesiosis in cattle and falciparum malaria in man. This campus-wide effort includes research and graduate training on the Missouri campus as well as related programs in Mexico. Funding is provided by the U.S. Department of Agriculture and the U.S. Agency for International Development.

Although babesiosis was eradicated from Missouri before World War I, anaplasmosis remains a substantial problem, especially in the southern part of the state. Since babesiosis still affects cattle in Mexico and other parts of Latin America, threat of reinvasion concerns livestock producers and animal health experts in the United States.

College Holds Career Day

The Third Annual Student Career Day for the College was held February 14 at Columbia's Ramada Inn with more than 100 students attending.

Sponsored by the Veterinary College and the College's Alumni Association, the program attracted more than 25 exhibitors representing veterinary suppliers, publishers, pharmaceutical companies, agencies of the federal government, and the Missouri Veterinary Medical Association. Two speakers made presentations for the students: Dr. Gerald Johnson spoke on "Opportunities in Industrial Veterinary Medicine", and Attorney Craig Van Matre presented "Tax and Legal Aspects of Establishing a Practice in Veterinary Medicine".

Genetic Disorder to Be Studied at the College

The Chediak-Higashi Syndrome is a rare autosomal recessive genetic disorder of humans which also occurs in cats, mink, mice, cattle, and killer whales. It is a disease that affects the eyes, resistance to infection, and blood coagulation. Insight into ways of correcting or partially alleviating visual problems suffered by children with Chediak-Higashi Syndrome (CHS) and other forms of ocular albinism may be gained from a thorough understanding of eye abnormalities associated with CHS in cats. To gain this understanding, the National Institutes of Health awarded a three-year, $151,224 grant to Dr. Linda Collier, Assistant Professor at the College.

Dr. Collier plans a thorough study of the visual system of cats afflicted with CHS. Such study will include ophthalmoscopic and biomicroscopic examination of the eyes, observation of eye movements, examination of ocular tissue by light and electron microscopy, and autoradiographic anatomic mapping of the optic neural projections.

Animals and people with CHS display pale, abnormally colored irises and photophobia. The syndrome affects the size, shape, and distribution of melanin granules and possibly their relationship to lysosomes in some cell types. Lysosomes are known to function abnormally in many types of CHS cells, and they may function abnormally in the retinal pigment epithelium of the eye.

Unknown at this time is the basic biochemical defect elicited by the autosomal recessive genetic abnormality. Furthermore, other effects of this defect remain unknown at this time, but indications hint at abnormal nerve tracts in the brain, especially those tracts related to vision.

Although CHS occurs in several species of mammals, Dr. Collier selected cats to be her research subjects because they are much easier to work with and are more suitable as research animals than are mink, cattle, and whales. Cats are better than mice for this study since their eyes are much larger, which makes ophthalmologic examination and photography possible, and they provide more tissue per animal for microscopic examination. In addition, nerve tracts of normal cats have been extensively mapped, thus simplifying detecting abnormal tracts.

Veterinary Surgeon Given International Award

Dr. M. Joseph Bojrab, Professor at the College, was selected by the British Small Animal Veterinary Association (BSAVA) to receive the Bourgelat Award for 1981.

Many in the veterinary profession consider the Bourgelat Award to be the primary international recognition for outstanding contributions to the field of small animal practice.

When Dr. Bojrab traveled to London to lecture at the BSAVA's Congress on April 4 and 5 the award was formally presented. When he learned that he was to receive that prestigious award, Dr. Bojrab said, "I was extremely honored by the fact that my colleagues think so much of me."

Dr. Bojrab is editor of two texts on small animal surgery: *Current Techniques in Small Animal Surgery* and *Pathophysiology in Small Animal Surgery.* He has presented more than 100 seminars and demonstrations on veterinary surgery to veterinary associations ranging from international to local, including visiting lectureships to Japan, England, France, South Africa, and Belgium.

After receiving his DVM degree in veterinary medicine from Purdue University in 1964, Dr. Bojrab completed his internship at Cornell University in 1966. He then accepted a post as instructor of veterinary surgery at Oklahoma State University, and from there he earned an MS degree in physiology in 1968.

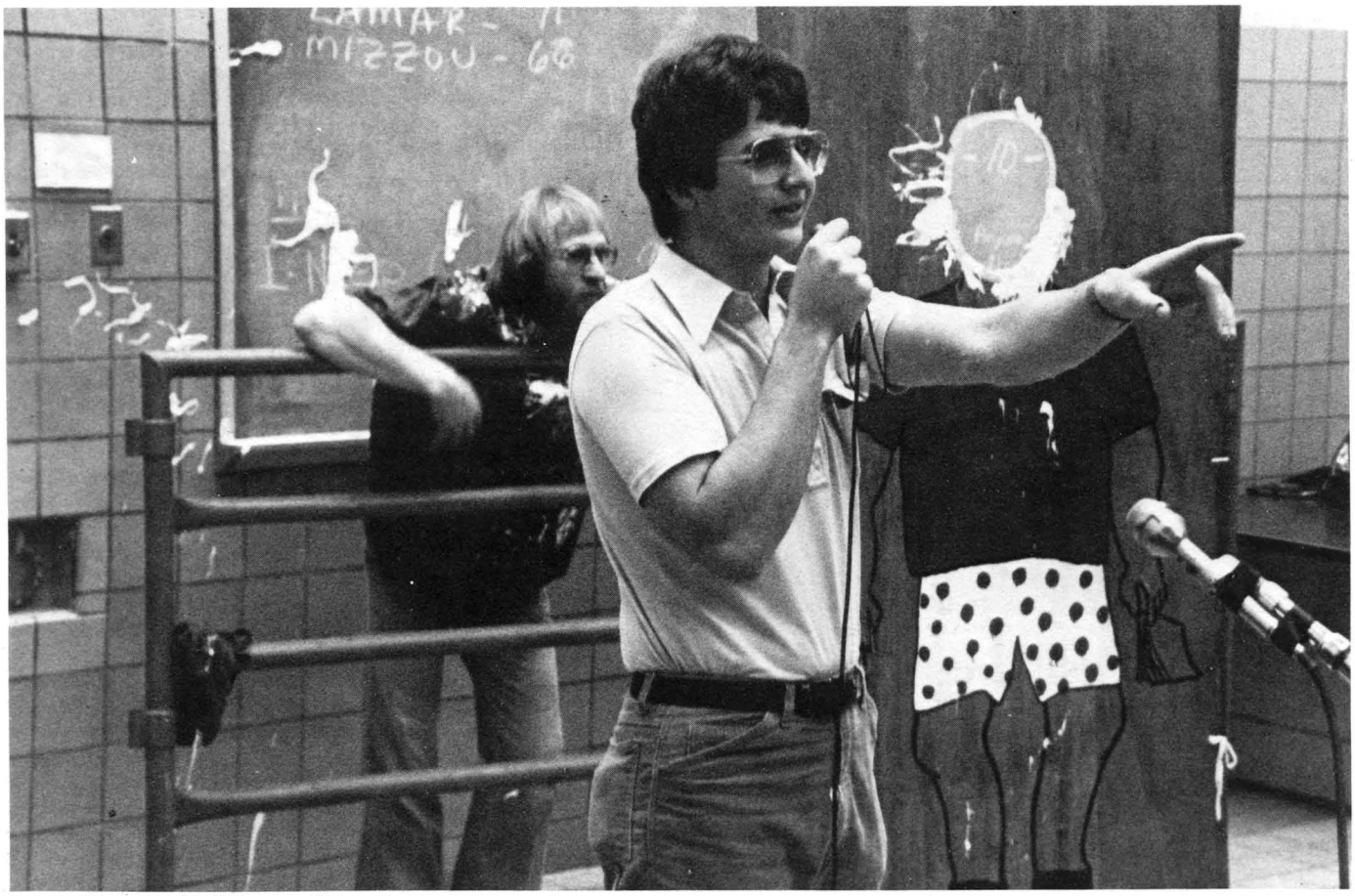
While at Oklahoma, Dr. Bojrab received a National Science Foundation Faculty Fellowship that enabled him to go to the United Kingdom, where he received his PhD degree in veterinary anatomy in 1971 from the University of Bristol.

Dr. Bojrab joined the UMC faculty in 1973, and he is now Head of Small Animal Surgery. He is also a Diplomate of the American College of Veterinary Surgeons.

Incidentally, Dr. Bojrab is pictured on this issue's cover. He is at the left.

Kennel Club Donates to Teaching Hospital

The Southeast Missouri Kennel Club, Inc., donated last January $1,000 to the Small Animal section of the College's Teaching Hospital. Club members suggested that the funds be used for purchase of instrumentation.



Who wanted to pay hard-earned money to hit Dr. Stoll? Ken Kopp asked for bids from an enthusiastic audience.

Pie in the Eye

Revenge Wrought with Whipped Cream; Students and Faculty Exchange Splats

The Student Chapter meeting for March 12 progressed inocuously; first the business, then a presentation by Dr. Mike McCulloch, the Visiting Lecturer. Following a short break for refreshments, however, the meeting went wild.

Ken Kopp, VMIV, started by explaining the purpose and "rules" for what was promised as "cream your professor". Several faculty had volunteered their faces in a fund-raising effort for a final party of seniors before they graduated. As Mr. Kopp explained, he would take bids for the privilege of slinging pies made of whipped cream in selected faculty member's face. Each target was to pose with his (or her) head poking out of a hole in a board. Any group of students could pool financial resources to bid, although at most only two people could wield the pie.

To be fair, though, after being whacked, the faculty member could select a senior to "return the favor".

The pace for what followed was set by Mr. Kopp who, after explaining "rules", lured Ms. Sally Burgess, a technician, out onto the floor on the pretense of a faked argument. When Burgess was within range, Kopp flipped a pie into her face. She pulled what was left of the pie from her face and assaulted Kopp with it. As with many other violent acts, innocent bystanders sometime fall victim—Roger Fingland's camera was hit.

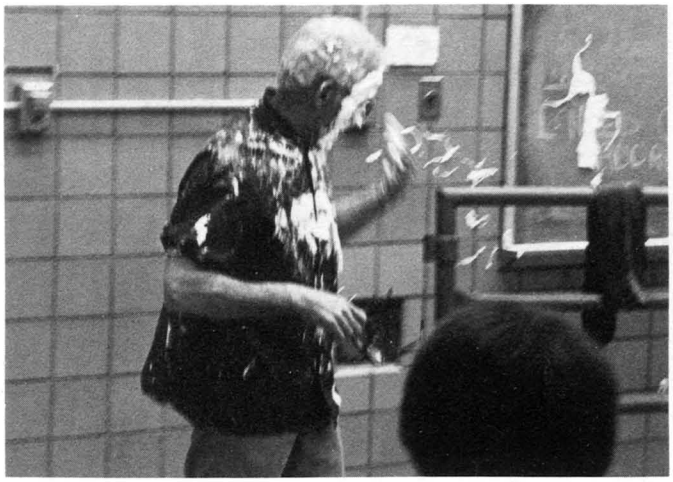
The bidding was almost as much fun as the pie throwing. Bids on Dr. McClure topped $30 when he promised to wear his bow tie through the ordeal. Freshmen were willing to bid $72 on Dr. Dale when he assured them that not only would he submit to receiving whipped cream ablutions but would also not give those students a little test the following day.

Other faculty victims were Drs. Stoll, Simpson, Dallman, Digilio, and Noxon. Dr. Bierschwal was struck by his own daughter, Beverly, with a pie made of "processed hay" produced by a cow. (Dr. Bierschwal found the senior, Pierre Tung, who perpetrated that particular pie and returned the same pie into the student's face.)

The stricken faculty retaliated by singling out individual seniors to rub in some revenge. Student victims included Mark Beverly, Mary Whitlock, Betty Bassett, Roger Fingland, Ken Kopp, and of course Tung. At one point Dr. Simpson barely restrained himself from flinging a pie up into the audience.

The evening's uproar concluded with Drs. Digilio and Noxon lining up five seniors on the pretense of selecting one for a pie but then hosing down all five with two cans of whipped cream. One of the hose-ees, Mark Beverly, made a valiant attempt to respond with what was left of Bierschwal's and Tung's pie.

The auction, held under near riot conditions, netted more than $300.



Dr. Dale was a good sport about getting it in the face.

And the audience gave Dr. Dale a standing ovation (although no one called for an encore).

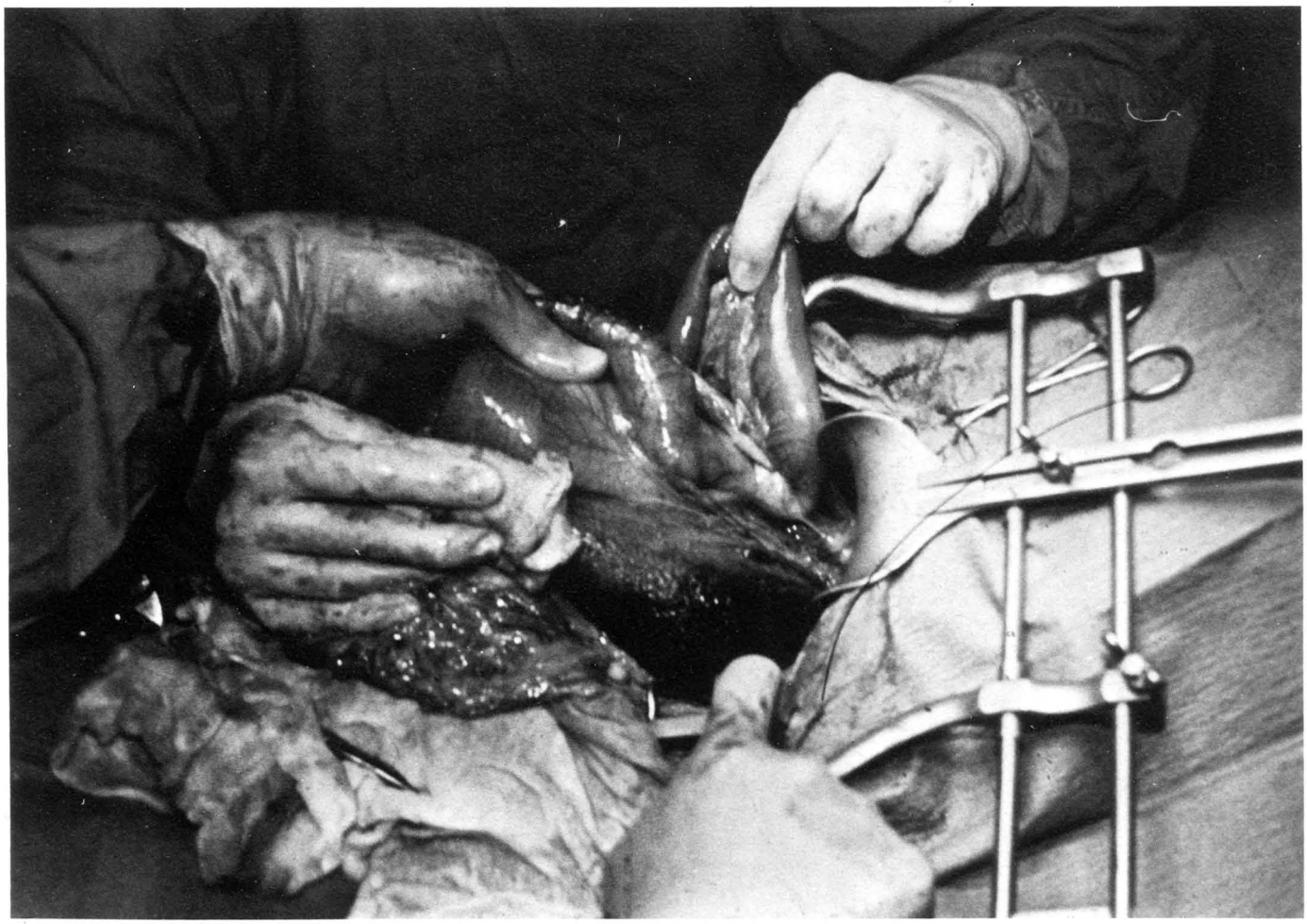
Betty Bassett braced herself for Dr. Dale's onslaught.

Dr. Simpson applauded his aim after "sticking it to" Mary Whitlock.

Dr. McClure tried to cheat by wearing face protection—by popular demand he removed the mask.

Mark Beverly wore an opaque expression.

Roger Fingland delighted in tormenting Dr. Digilio by posing her fate in front of her only moments before she encountered that fate.



As soon as the animal is stabilized, surgical therapy to reposition the stomach should be performed in all cases of gastric volvulus.

Surgical Management of Gastric Dilatation-Volvulus

Treatment Is in Two Phases: Initial Management and Definitive Surgical Therapy.

Amelia Toomey, Resident
Dept. Veterinary Medicine & Surgery

Canine gastric dilatation-volvulus (GDV) is a syndrome familiar to all small animal veterinary practitioners. Because of its acutely devastating nature, quick and decisive action is necessary in order to achieve successful therapy. The death rate from the first attack of GDV is estimated to be around 33%. If we add to this the number of animals that eventually die from recurrence, this figure rises to nearly 50%. These alarming statistics emphasize the importance for any practitioner handling these cases to have a thorough understanding of the mechanisms involved in the disease and an aggressive therapeutic regimen formulated.

In order for acute gastric dilatation (AGD) or dilatation with volvulus to develop, two factors must be present: 1) a source of fluid and/or gas for distention and 2) an obstruction to gastric emptying. In the young animal (less than one year old) AGD is usually the result of overconsumption of food and rarely leads to volvulus. In the older animal gaseous distention is most commonly seen. Dilatation in these animals often leads to eventual volvulus. The source of gas in GDV is not well documented but recent studies support aerophagia as the most likely cause.[5] The exact mechanism responsible for increased swallowing of air in these animals has yet to be elucidated.

Why the stomach is unable to rid itself of this gaseous accumulation is also unknown. Several mechanical and functional abnormalities have been proposed but none have been conclusively proven. Delayed gastric emptying has been found radiographically in a large percentage of these animals. Biopsy specimens taken at surgery often show mucosal hyperplasia of the pylorus. It is postulated that delayed gastric emptying due to mechanical obstruction at the pylorus is an important predisposing factor in this disease.

Medical and surgical protocols for handling GDV have changed considerably over the years as our knowledge of its etiology and pathophysiology increases. Once gastric dilatation or dilatation with volvulus ensues, a number of anatomical and physiological changes occur that affect many organ systems. Hypovolemic shock leading to the eventual demise of the animal progresses

rapidly without immediate and vigorous medical intervention. Emphasis in this article will be based on therapeutics. For a thorough explanation of the important pathophysiologic changes which occur the reader is referred to references 3-5 listed below.

Gastric dilatation-volvulus is seen most commonly in the large deep-chested breeds, but it has been reported in smaller dogs and with increasing frequency in the cat. Both sexes are equally affected and it may occur at any age. It is most common in the mature animal. On presentation a painful, progressively distending abdomen is usually found. Non-productive vomiting, excessive salivation and a saw-horse stance are common clinical features. Many animals present in a comatose state. Radiography is usually not necessary to establish a diagnosis but may be helpful in differentiating GDV from other causes of acute abdominal distress when the diagnosis is in question. Radiography may also be helpful in differentiating simple dilatation from dilatation with volvulus.

Once the diagnosis of gastric dilatation or dilatation with volvulus has been made, proper therapy must be instituted immediately. Treatment is divided into two phases: initial management, which consists of stabilization of the patient and decompression of the stomach, and definitive surgical therapy to attain anatomic repositioning and prevent recurrence.

The aim of initial management is to correct both the hemodynamic changes responsible for hypovolemic shock and the metabolic alterations resulting from shock. Restoration of circulating blood volume is attained by the infusion of lactated Ringers solution through a large bore intravenous catheter. Up to 90 mls/kg. of fluid is administered as rapidly as possible until evidence of improved cardiovascular function and peripheral perfusion is seen. Once the pulse pressure has increased and the capillary refill time is normal, fluid infusion may be slowed to a rate that will maintain adequate arterial pressures. This can be roughly monitored by placing a urinary catheter and adjusting the fluid input to maintain urine production of at least 1 ml/kg/hour.

Corticosteroids at pharmacological doses are administered after an initial period of fluid loading. Dexamethasone (4 mg/kg) is probably the steroid of choice since the expense of using the immediate acting corticosteroids, such as hydrocortisone sodium succinate, at the necessary dosage (20 mg/kg) is prohibitive in most of these large dogs. At pharmacologic doses dexamethasone not only provides beneficial effects in the treatment of hypovolemic shock but has also been shown to be protective against the development of endotoxic shock.

The use of sodium bicarbonate in the initial management of GDV is a widely debated subject. Despite the development of metabolic acidosis due to hypovolemic shock many of these animals, especially in the early stages, have normal pH, pCO_2 and HCO_3 values on blood gas analysis. Developing concurrently with the acidosis is a respiratory alkalosis resulting from panting due to pain and a metabolic alkalosis from the loss of hydrogen ion into the distending stomach. The combination of these factors produces a variable acid-base status in these patients. In most cases sodium bicarbonate administration is not necessary, and probably unwise, unless accurate blood gas values can be obtained to monitor base balance.

High levels of broad spectrum antibiotics are an important part of the initial management. Antibiotics are used both to protect against endotoxemia and also as prophylaxis against abdominal contamination at surgery. Intravenous chloramphenicol is the antibiotic of choice since it has been shown to be most effective in the treatment of endotoxic shock.

As soon as fluid therapy is initiated, attempts should be made to decompress the stomach. In cases of simple dilatation or incomplete volvulus this can usually be accomplished by passing a flexible, large bore, stomach tube. The distance from the tip of the animal's muzzle to its abdomen, at the level of the ziphoid, should be premeasured and marked on the tube to prevent overpenetration and passage of the tube through a devitalized stomach wall. After intubating and emptying the stomach, it should repeatedly be lavaged with warm saline until the run off is clear. This is followed by the administration of an antacid such as Pepto-Bismo®, DiGel® or Mylanta®. The animal is then closely monitored for recurrence of gastric distension.

When a stomach tube cannot be passed and the animal is in critical condition, trocarization with a large bore needle along the left body wall may provide temporary relief and sometimes allows subsequent passage of the tube. If this in turn also fails, a decision must be made between immediate laparotomy and temporary gastrostomy to achieve decompression.

If the animal's condition permits, immediate laparotomy may be performed, but for those animals in poor condition temporary gastrostomy is the procedure of choice. This technique can be easily performed under local anesthesia, provides continuous decompression of the stomach and allows time for stabilization of the patient before general anesthesia and definitive surgical therapy are attempted. Surgeons who routinely use this procedure report lower mortality rates than those reported for animals undergoing immediate laparotomies. The technique of temporary gastrostomy has been previously reported and can be found in reference #5. Gastric lavage is accomplished through the gastrostomy incision in the same manner as described above.

As soon as the animal is stabilized, surgical therapy to reposition the stomach should be performed in all cases of gastric volvulus. In cases of acute dilatation without volvulus, or in those animals in which repositioning is achieved by non-surgical means, surgical intervention should be strongly encouraged. Without surgery the recurrence rate approaches 80% and most of these animals will eventually suffer an attack of gastric volvulus. Recurrence may be seen days, months or even years following the initial attack. While by no means perfect, surgical intervention reduces the recurrence rate to around 30%. The recurrence rate following repair by newer surgical techniques has not as yet been reported but promises to be even lower.

In those cases in which gastric decompression and patient stabilization is not acomplished prior to laparotomy, anesthesia must be cautiously administered. Hypotensive agents and respiratory depressants should be avoided. Narcotic agents or low doses of thiobarbiturates may be used for induction, with maintenance on gas anesthetics. Nitrous oxide should be avoided until gastric decompression is achieved. Continuous cardiac monitoring and assisted ventilation should be performed throughout the procedure.

When a temporary gastrostomy has been performed this incision is closed prior to definitive surgical therapy. The animal is then placed in dorsal recumbuncy and a ventral midline incision is made from the xyphoid caudally past the umbilicus. Self-retaining abdominal retractors greatly facilitate visualization. If a gastric volvulus is present, this is reduced first. The pylorus is located, usually in the upper left quadrant of the abdomen, and grasped in one hand while the fundus, near the dorsal midline, is grasped in the other. By pulling the pylorus caudally in an arc from left to right, while rotating the fundus in a counterclockwise direction, repositioning can usually be accomplished. If prior decompression and lavage were not done, they can now be accomplished by the passage of a stomach tube orally. In some cases decompression by trocariza-

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Progress Report: Research at the Equine Center

Broad Base of Research Helps to Maintain a Stimulating Academic Environment in Clinic Work at the Equine Center.

Richard Markell, Research Assistant
Equine Center

To conduct a pilot study on the characterization of laminitis in the horse, the Morris Foundation awarded ten years ago a grant to Drs. Harold Garner and James Coffman, Professors of Veterinary Medicine and Surgery at the College. Little was known about the pathophysiology of this crippling disease accredited with the second largest number of equine insurance claims in the country (colic being first). Since then over 18 laminitis research papers, 22 national and international seminars, some 50 related cardiovascular papers and three textbook contributions have evolved from the equine research here at the college. The scope of studies has included crossover studies of isoflurane, ethrane methoxyflurane, and halothane upon endocrine and cardiovascular systems of the pony. These physiological studies have utilized blood gas measurements. blood pressure, electroencephalographic characterizations, respiratory volumes, renin-aldosterone and cortisol measurements. In addition, dose response studies have been made with furosemide and pyrentamide (Hoecht-Rousel Inc.) used commonly as diuretics in the horse. More recently, pharmacological studies have been performed investigating the bronchiole dialator effects of Clembuterol® on respiratory resistance funded by Boehringer Ingelheim Ltd. that will soon be published in the *Journal of Veterinary Pharmacology and Therapeutics*. Results of this research was presented by Dr. Garner at the American Association of Equine Practitioners in Aneheim, California, in December 1980.

Almost $400,000 has been obtained through grants and fellowships for equine research here at the College's Equine Center in the last ten years. We are fortunate to have one of the most successful, progressive and respected equine research laboratories in the country.

This broad base of basic and applied clinical research helps to maintain a stimulating academic environment in the clinical department here. The interplay of clinics and research has been a key objective to the equine center faculty's philosophy for the last ten years. In a recent interview, Dr. Coffman commented, "A clinical department without all levels of research will become academically bankrupt within a few years. Expansion of scientific information is tremendous and outdates some clinical practices quickly."

In order to have an ongoing research program that progresses and expands, commitments must be made to continually be writing new grant applications, assessing old and new data, writing publications and performing the actual research. In addition, these responsibilities are to be shared with other clinic and teaching responsibilities. At institutions where a ridged allotment of 25% of a faculty member's time can be spent on research, little more than pilot projects can be accomplished. While these projects may lead into larger projects, very little "research momentum" can be accomplished. A program of this nature is scattered and stagnant.

The equine research program here at the college has adopted a philosophy that has taken a sincere look at the interest of the four senior faculty members involved and developed a highly productive research program within these interests.

Dr. Coffman, Dr. Boulton, and Dr. Tritschler have a primary interest in clinics with an appreciation for research, and to conduct selected clinical investigations and pilot projects. Dr. Garner's interests focus on patho-physiological research. In addition to an appointment as Research Investigator at Dalton Research Center, University of Missouri, Dr. Garner teaches equine anesthesia as a faculty member of the College.

The goal of the Equine Center has been to provide a faculty commitment of 1/3 teaching, 1/3 service (clinics) and 1/3 research. As a group, the 1/3 research commitment has been satisfied by scheduling, allowing Dr. Garner to commit a majority of his time to the ongoing research program, while concurrently meeting the interests of the other faculty members. With senior research assistant Dan Hatfield, Dr. Garner has established a fully instrumented cardiovascular research facility.

The geographical location of the research facilities, only a few hundred yards away from teaching & clinic facilities, puts the equine clinics and research in a position where they can interact on a daily basis. This allows the clinic to receive input from research and the research remains relevant to what is going on in the clinic. A good example of this interaction was presented in a 1972 paper on "Indirect Measurement of Blood Pressure in the Horse" (Garner, H. E.; Coffman, J. R.; Hahn, A. W.; Harley, J.; A.A.E.P. Proceedings, 17:343-349, 1972). This paper opened up a whole new diagnostic technique for the clinician. Until then, blood pressure measurement in the horse was limited to an invasive procedure of carotid cannulation. For apparent reasons, this procedure was impractical on client's horses. As principal investigator, Dr. Garner developed and applied the Doppler-shift method of indirect blood pressure measurement in the horse. This simple, non-invasive technique has become a standard in many anesthesia settings in veterinary medicine.

The clinical influence of the research is apparent in the current projects Dr. Garner and his associates are investigating. With U.S. Department of Agriculture (USDA) and American Quarter Horse Association grants, the characterization and treatment of laminitis is being investigated. While laminitis symptoms result in inflammation of the soft lamina in a horse or ruminant's hooves, research here has found that this disease is systemic, involving all body systems and especially the cardiovascular system. Experimental laminitis is induced by administering a carbohydrate overload orally. This overload (analogous to a horse who accidently over-eats a grain ration) alters cecal pH and therefore makes the environment in the cecum unfavorable for many endogenous gram-negative microflora. These dead bacteria are absorbed as endotoxins and present many of the clinical signs of laminitis in the horse. This recent association of laminitis and endotoxemia has not only brought a cure prevention that much closer to discovery but served as link between veterinary and human oriented research. Endotoxic shock in man and the horse brings the horse in a position to serve as an excellent model for human cardiovascular and immunological research. This crossover between human and veterinary oriented research has been one of the key reasons for the success of the program here.

The majority of research here has been able to marry two objectives: the ability to do research relevant to diseases that are important in the horse and at the same time continue to characterize the horse and pony as models for human oriented research. This has resulted in a very close relationship with the researchers at UMC-Medical Center and

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Dalton Research Center. This collaboration expands the program here by drawing and contributing to a larger scientific pool maximizing productivity and allows for National Institute of Health as well as other human related research funding.

Traditionally, USDA has not considered the horse a food animal and therefore has been ineligible for USDA research funding. However, the USDA has recently funded horse projects including one entitled "Endotoxemia and Lactic Acidosis: Their Specific and Combined Contribution to Equine Laminitis Onset." Dr. Garner is the principal investigator on this project and works in concert with several other scientists in the College and in the Medical School. While these grants are highly competitive throughout the nation, our Department of Veterinary Medicine and Surgery received two grants. In addition to Dr. Garner's grant, Dr. Ronnie G. Elmore received funding to study agalactia in sows. These prestigious grants open up new areas of research here at the College.

At the present time, equipment and protocols are being assembled to begin "at exercise" cardiovascular research on some of the center's resident research horses and ponies. This equipment will monitor various physiological parameters while the pony is at different states of exercise. It promises to be an exciting and productive addition to the equine research program here at the College of Veterinary Medicine.

Gastric, cont.

tion and suctioning may be necessary before repositioning of the stomach is possible.

The stomach wall is carefully examined and any areas of necrosis, as evidenced by blackened serosa, are resected. Necrosis is most common along the greater curvature, especially in the area supplied by the short gastric arteries, since collateral circulation in this region is poor. If the mucosal surface of the stomach is visualized, more extensive necrosis than that evident on the serosal surface is often observed. This usually regenerates quickly and should be be resected unless the serosal surface is also devitalized.

Repositioning of the stomach will also reposition the spleen in most cases. Once returned to its normal position its vascular engorgement soon subsides. The spleen should not be removed unless vascular thrombosis has occurred or other abnormal pathology is present. Splenectomy has not been found to decrease the incidence of recurrence of this disease.

The last aspect of the surgical procedure is to provide protection against recurrence. Numerous surgical techniques have been developed towards this end with varying degrees of success reported. To date the two procedures that have proved most beneficial are pyloroplasty and tube gastrostomy.

As stated earlier, delayed gastric emptying time is believed to be an important predisposing factor to gastric dilatation. A procedure to increase the diameter of the pylorus and therefore decrease gastric emptying time should be performed on all of these patients. Most practitioners are familiar with the Fredet-Ramstedt pyloromyotomy and Heineke-Mikulicz pylorplasty (Reference #1) so these procedures will not be detailed here. Which procedure is chosen will depend on the surgeon's preference and patient's condition. The Heineke-Mikulicz pylorplasty provides a wider opening and possibly more permanent result but takes longer to perform than the Fredet-Ramstedt pyloromyotomy which may be preferred if the patient's condition dictates a speedy closure.

To prevent rotation of the stomach on its mesenteric axis, and therefore prevent torsion, several methods have been utilized which adhere a portion of the stomach to the abdominal wall. The problem with most of these gastropexies has been that they break down after only a short period of time. An increasingly popular method of gastropexy which develops a firm and permanent adhesion is that formed by the use of a tube gastrostomy. The technique for placing a tube gastrostomy is simple, quick and has several advantages in addition to the adhesion that it creates. Placement of a tube allows continued gastric decompression postsurgically, lavage of the stomach if necessary and monitoring of the gastric contents.

A 24 to 26 French Foley catheter is inserted into the abdomen through a stab incision in the right abdominal wall a few centimeters off midline behind the last rib. The catheter is then inserted into the lumen of the stomach through a small stab incision in the pyloric antrum. A purse-string suture of 0 silk is placed in the stomach wall around the tube and tied snugly. A second purse-string suture is then placed around the first to allow inversion of several millimeters of stomach wall around the tube. The bulb of the Foley catheter, which is in the lumen of the stomach, is then inflated. The stomach is drawn to the right abdominal wall by applying traction on the catheter. A gastropexy with 0 silk is then performed by sewing the stomach wall to the abdominal wall around the Foley catheter. The greater omentum is mobilized and tacked around the gastropexy site to help protect against leakage of stomach contents and enhance formation of a fibrous adhesion.

The final step in the surgical procedure is to thoroughly lavage the abdominal cavity with warm saline solution. The incision is closed in a routine manner and the Foley catheter is tacked to the skin of the abdominal wall to maintain traction on the stomach wall at the gastropexy site.

The vast majority of dogs who die from gastric dilatation-volvulus do so within the first 48 hours following the operation. This fact underlines the importance of rigid postoperative therapy and monitoring. Heart rate, pulse pressure, capillary refill time, and mucous membrane color should be observed regularly. Fluid therapy is continued to maintain adequate urine production and the composition is adjusted as necessary to correct electrolyte or pH abnormalities. Antibiotics are also continued for several days after the operation.

Since paralytic ileus of the gastrointestinal tract is often present, food and water are withheld orally for the first 24 to 48 hours. Vomition is not an uncommon postoperative problem and may be due to mechanical irritation from the Foley catheter or ulceration of the gastric mucosa. If vomition does occur, the bulb of the Foley catheter should be deflated to see if this will alleviate the problem. Cimetidine (Tagamet^{R}), an H_2 antagonist, may be helpful in the treatment of gastric ulceration along with antacid preparations. Once peristalsis has returned, soft foods in small quantities are introduced at frequent intervals. The gastrostomy tube is pulled in 5 to 7 days and the exit wound left to close by granulation.

If possible electrocardiographic monitoring of the cardiac rhythm should be employed freuently during the first 48 hours following surgery. Over 50% of dogs presenting with GDV develop cardiac arrythmias. Most of these are ventricular in origin and the majority are first seen in the post-operative period. Frequent monitoring allows early detection and treatment if necessary.

Upon discharge of the patient further instructions are given to the client to help prevent recurrence. The diet should be changed so that softened food is fed in smaller quantities at least 2 to 3 times daily. Exercise and water intake should be restricted around feeding time. The fact that recurrence is possible must be stressed and the client informed of the early signs so that veterinary assistance is obtained quickly.

Dean's Corner

Instead of reading what I have to say, let's take a look at what your classmates and fellow alumni have said about what has been happening to them recently.

What they have been doing is interesting and exciting, but I would also like to hear from you. I'm sure you're involved in activities as interesting as what's reported here. So, please, take just a moment to jot down a few items about yourself, and drop that note in the mail to me.

Sincerely,

Kenneth H. Niemeyer, D.V.M.
Assistant Dean for Student and Alumni Affairs

Alumni Notes

Dr. M. D. Conrad (50) of Plattsburg, Missouri, has retired.

Dr. Kyle Kent (53) has been in mixed practice in Green City, Missouri, since his graduation.

Dr. Theodore Higgins (53) retired from practice.

Dr. Leon Russell (56) was installed in February, 1981, as second vice president of the Texas Veterinary Medical Association.

Dr. Paul Nicoletti (56) is a professor at the College of Veterinary Medicine, University of Florida, Gainesville.

Dr. Taylor Woods (59) has just begun his third term as Director of Animal Health for the state of Missouri.

Dr. James Creed (61) has just completed his year as President of Optimist International, and he will continue to serve on the Board of Directors for another two years.

Dr. George Jury (62) has been elected Chairman of the Board of Directors for the Texas Veterinary Medical Association.

Dr. Robert Tharp (63) now directs the Northwest Missouri Veterinary Diagnostic Laboratory at Cameron, Missouri.

Dr. James Cooper (63) has been promoted to rank of Colonel, and he is staff veterinarian at Fort Lee, Virginia.

Dr. Frederick Rucker (70) is a pathologist for Ralston Purina. In September, 1980, he passed his certifying examination for the American College of Veterinary Pathologists.

Dr. Ted Lock (71) received the 1980 Norden Award for Distinguished Teaching in Veterinary Medicine. He works at the College of Veterinary Medicine at the University of Illinois.

Dr. C. C. Tyner (71) has an established small animal practice in Conway, Arkansas.

Dr. James Simpson (71) works for Pfizer, Inc., and he has recently been named Manager, Small Animal Research, in Groton, Connecticut.

Dr. Gregory Papp (74) opened a new practice in Jefferson City, Missouri.

Dr. Jerry Williams (75) is a staff veterinarian for the St. Louis Veterinary Emergency Group.

Dr. Thomas Hohl (75) started a small animal practice in Duluth, Minnesota.

Dr. James Cornelius (75) is a pathologist for the Arkansas Livestock and Poultry Commission. In addition, he is Captain in the Arkansas Air National Guard.

Dr. Rebecca Gibson Palmer (75) is now married and living in Australia.

Dr. Ray Jackson (76) is enjoying a mixed practice in Platte City, Missouri.

Dr. Leo Carbal (76) is a research veterinarian for product development at the Ralston Purina Farm in Gray Summit, Missouri.

Dr. Mollie Wright (76) is an assistant professor of anesthesiology at Colorado State University. She married in November, 1980.

Dr. Barbara Kingsborough (77) is in small animal practice in St. Louis, Missouri.

Dr. Rodney Chapman (77) started a veterinary practice in Versailles, Missouri.

Dr. Jerry Eber (77) works for USDA-APHIS and the state of Iowa as brucellosis epidemiologist.

Dr. Ignacio Dela Cruz (77) serves as member of the Board of Education for the Northern Mariana Commonwealth. He is also the Chief of the Division of Animal Health and Animal Industry of that area's Department of Natural Resources.

Dr. Dennis Stuttgen (77) is associated with a five-man practice in Loyal, Wisconsin.

Dr. Deane Novak (78) owns three veterinary practices located in Parker, Mohave Valley, and Lake Havasu, Arizona.

Dr. James McNeill (78) is now married to Lou Younker, MEd, UMC (77).

Dr. John Haddock (78) has married. He has traveled extensively in the South Pacific studying tropical veterinary medicine. He had been associated with a practice in Hawaii, but he is now opening a solo equine practice in Bend, Oregon.

Dr. David Moser (79) is a one-man practice in Las Vegas, Nevada.

Dr. John Rife (80) is associated with the Aspenwood Animal Hospital in Denver, Colorado.

Dr. Lana Linton (80) works in a small animal practice in Las Vegas, Nevada.

Dr. Alan Hunnicutt (80) is associated with the Countryside Veterinary Clinic in Bolivar, Missouri.

Dr. Robert Tugel (80) is employed in an equine practice in Rochester, New York.

Anesthetic Management of Tracheal Surgery Patients

Nicholas Pisoni, VMIII

Along with advances in surgery have come problems for anesthetic management in special situations. One of these is tracheal surgery. A compromised respiratory system is inherent in most of these patients, and tracheal manipulation during the surgical procedure adds to the problem for any animal. With an understanding of a few concepts and techniques, anesthetic management can be improved during these surgeries.

Gas anesthesia is particularly well suited for use during tracheal surgery. An awake patient can overcome the increased resistance of a compromised airway by conscious effort. An anesthetized patient, however, may not be able to compensate because of central nervous depression brought about by anesthesia. If compensation cannot occur, hypoxemia develops.

When using an anesthetic machine, the oxygen concentration delivered to the patient is up to four to five times that of room air. A patient that has a reduced tidal volume during anesthesia will be less likely to develop hypoxemia when being helped by an anesthetic machine than when allowed to breathe room air. An anesthetized patient that cannot move adequate volume can be assisted easily if the animal is on an anesthetic machine. Intermittant positive pressure ventilation (IPPV) can be maintained easily during a thoracotomy if the intrathoracic trachea is involved. With an animal that is struggling to breathe, IPPV can be used throughout the procedure to reduce the animal's workload and therefore its oxygen consumption.

The small body size of many of these patients affects surgical and anesthetic conditions. Small animals are predisposed to hypothermia. As in any anesthetic procedure on a small animal, necessary precautions should be taken to avoid this problem. Use of heating pads on the surgery table and use of warm water during scrubs will help prevent this condition along with warming any fluids given.

When the animal is draped, access to the head is limited. Manipulation of the trachea tube and evaluation of mucus membrane color, capillary refill time, eye position and reflexes may be difficult. Make sure before proceeding that these activities can be accomplished.

Several things can be done before and during induction that will make it go

cont., next page

What's Your Diagnosis

A two and one half month-old Labrador Retriever was admitted to the Veterinary Medicine Teaching Hospital because he regurgitated after nearly every meal, especially if he ate rapidly. He could keep water down. He was nonetheless very active and alert.

Crackles in the lungs were heard on auscultation with a stethoscope as well as heard grossly. There was a palpable enlargement of the cervical esophagus that felt like it could be a mass or possible air bubble.

All laboratory data was within normal ranges. Plain radiographs were taken of the thorax (shown).

On the basis of the plain radiographs, a barium study and fluoroscopy were done. The esophagram indicated a constriction of the esophagus at the base of the heart compatible with a persistent right aortic arch. The esophagus deviated to the left as it passed over the base of the heart. On the fluoroscopic examination it was possible to notice pulsation of the wall of the esophagus where the aorta was beating against the enlarge esophagus.

What's your diagnosis?

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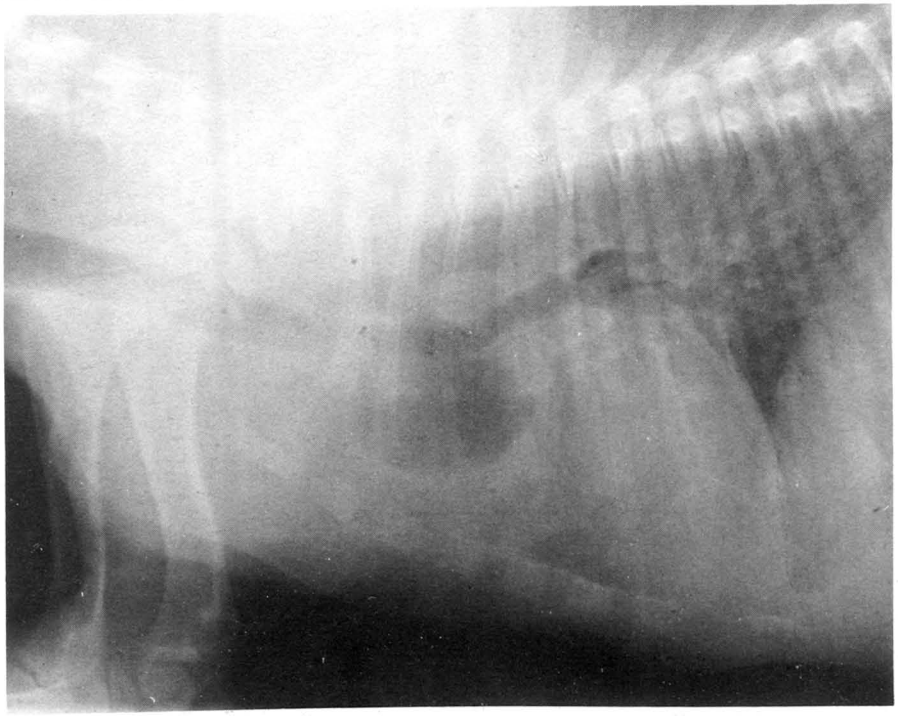
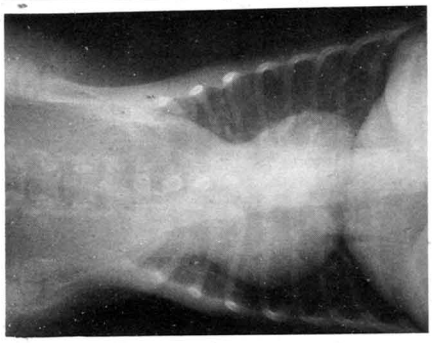
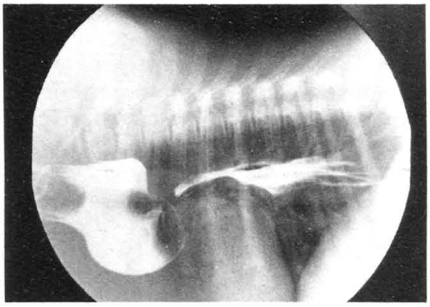




Missouri Veterinarian
Vol. 31, No. 1 (1981)
Editor ..... Sue Graves
Editorial Staff .. Pat Bradford, Jennifer Whiteside
Faculty ..... Drs. E. Brown & R. Miller

Missouri Veterinarian is published three times yearly by the students of the College of Veterinary Medicine, University of Missouri-Columbia. Opinions and comments not credited to specific persons are those of the publication staff and are not necessarily those of the College of Veterinary Medicine.



Diagnosis.

Studies indicated the presence of a persistent right aortic arch (PRAA) with relatively severe compression of the esophagus at the base of the heart. The cranial mediastinal esophagus was dilated and atonic.

Surgery was performed. The PRAA constricting the esophagus was cut. It was not patent. Surrounding adventitia and mediastinal pleura were dissected on either side of the stricture site for approximately 2 cm all around the esophagus.

Prognosis for recovery was good because the esophagus was not as dilated as much as first believed, but recovery would take several months. The puppy had been treated with Ampicillin and Aminophylline since being admitted to the Teaching Hospital, and he was sent home to continue this regimen for an additional ten days. The owners were instructed to feed him a gruel mixture of canned dog food and water. While eating, the dog was to stand in an upright position, and he was to be held in this position for 15 minutes after eating to be sure the food had settle into his stomach. The puppy would have to be fed in this manner for several months until he could keep the food down when he ate.

Tracheal, cont.

smoothly. First, avoid stressing the animal. In a calm state the animal's ventilation may be adequate for its body's needs, but an excited animal may not be able to maintain adequate gas exchange for its increased needs. Related to this is preoxygenation before excessive handling of the animal. An animal that becomes apneic while breathing room air will experience hypoxemia in less than 90 seconds. If an animal has been breathing 100% oxygen for three to five minutes before becoming apneic, it will go five to eight minutes before hypoxemia developes. If the animal is calm and manageable, a mask induction may work well as there will be a high oxygen concentration during induction. For less manageable animals, preoxygenation followed by intravenous induction and subsequent intubation may be more appropriate. If the animal is small enough an induction chamber can be used.

There are three basic types of tracheal surgery: 1) resection of a portion of the trachea, 2) application of polypropylene C-rings, and 3) tracheal plication. The different types need different anesthetic techniques to provide good surgical conditions.

With tracheal resection a slightly smaller endotracheal tube than normal should be used to allow for manipulation of the trachea. The cuff should be inserted beyond the area to be resected. If after the trachea has been cut better access is needed to the proximal portion, the endotracheal tube can be withdrawn until out of the surgical area and a sterile endotracheal tube introduced into the opening of the distal tracheal segmant through the surgical site. The cuff on the sterile tube is inflated thereby establishing an airway and allowing manipulation of the proximal tracheal segment. When rejoining the ends of the trachea, if a sterile tube was used it should be removed and the original tube advanced back down the trachea into the opening of the distal segment. If the original tube was left in place for the whole procedure the cuff should be deflated. The two tracheal ends can then be pulled into apposition and the cuff reinflated.

Application of C-rings and tracheal plication are similar in their management. A smaller tube than normal should be used. This allows room for the surgeon to work around it. The endotracheal tube can either be inserted far enough down the trachea that the cuff is past the surgical site or the tube can be pulled back at the start of the procedure and the surgeon work below it. The position of the cuff must be carefully determined to prevent suturing it to the trachea.

During and after recovery the patient needs to be observed for respiratory distress. Edema may develop in the trachea post operatively and due to partial tracheal obstruction supplemental oxygen may have to be administered to prevent hypoxemia. Recurrent laryngeal nerve damage occuring during the surgical procedure is a possible complication to be aware of as well as subcutaneous emphysema developing from a leak in the trachea.

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Veterinary Medical Review

College of Veterinary Medicine
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