which prevents their slaughter as a lot consisting of one individual herd. More importantly, producers are increasingly maintaining records on individual animals at the farm level. The maintenance of slaughter data at the same level of concern will permit the evaluation of certain factors which may influence individual animal performance.

3) The system must permit the output of records according to herd or owner identification. It is only at this level that preventive medicine programs may be designed and evaluated. This permits the examination of within herd differences, e.g. trends through time and between herd comparisons, e.g. comparing individual herd statistics with other herds slaughtered at the same plant.

4) The distribution system must be such that all pertinent information is delivered, in a timely and useful manner, to those who require that information. It is certainly hoped that veterinarians represent the end user of this information, however, it must be stressed that under the present system, data collected on individual producers' animals must be considered the property of the producers. As such, they alone may dictate where the information may be sent. The distribution of summary statistics, e.g. weekly summaries from the plant, or region, would, within the confines of the Freedom of Information Act, be available to other interested parties, i.e. universities, research facilities, private industry, etc. Certainly, the issue of security will have to be addressed to ensure that the data as collected will not fall into the hands of other parties which may use the data to gain unfair advantage in the marketplace.

5) Finally, the issue of data accuracy and consistency must be resolved. With computer assisted data collection, it may be possible to identify inspectors, plants or regions condemning an inordinate number of portions or carcasses per unit of time. With follow-up investigations, the source of the variation may be identified and corrective procedures, if necessary, may be instituted.

What is presently being done in the Meat Hygiene Division to address these needs? Certainly, attempts are being carried out to correct the inconsistency of the present system through the development of modules defining the various conditions as concisely as possible leaving a minimum of choice in terms of nomenclature for the conditions noted. In developing the modules, we are attempting to answer the question: Given the time restraints and the lack of available diagnostic equipment, what name or term would best define a given set of lesions leading to the condemnation or special handling of that carcass?

A project is presently underway at the University of Guelph designed to develop a statistical algorithm which may be used to identify establishments with condemnation rates significantly different from the national norms.

A major research project by a DVSc student also at the University of Guelph will address the question of what the swine industry needs with respect to the recording of diseases or conditions seen at slaughter. A survey of swine practitioners and producers in Ontario has been planned to collect this information. Once the needs are defined, the student will then evaluate potential systems which would permit the collection and dissemination of the required data.

Finally, presentations are being made to various producer groups, veterinary associations and provincial ministries by members of the Meat Hygiene Division to indicate our commitment toward the development of this improved data collection system. Feedback from these groups will be used to define the needs and desires of each group to assist in developing a system which best meets the majority of their needs.

Diagnostic Procedures, Prognosis and Therapeutic Approaches of Chronic Respiratory Diseases in Horses

L. VIEL

The Disease Per se

Chronic respiratory diseases are responsible for approximately 20% of equine morbidity (1). The disease is by far one of the major problems encountered in equine veterinary practice. The degree of involvement ranges from the minor inconvenience of an initial exercise induced cough, to a mild, stable cough, progressing to complete disability with chronic and irreversible lung pathology.

The majority of pulmonary diseases affecting horses from birth to maturity may be categorized with respect to the animal's age. 1) In weanlings (less than one year of age) bacterial and probably viral agents account for most of the clinically recognized pneumonic syndromes (2). 2) In yearlings (two and three years old) entering the racetrack,

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influenza virus and, to a lesser extent, equine viral rhinopneumonitis account for most of the respiratory diseases recognized in Canada (3). 3) Later on, subsequent to viral reoccurrence and/or environmental conditions, horses may suffer periodic bouts of coughing which may be present for a few days or persist for several months. In the early stage, the respiratory disease is referred to as infectious or allergic bronchitis. Further progression of the clinical signs, i.e. persistent and intermittent cough, appearance of an abdominal lift, poor exercise tolerance and eventually, marked expiratory dyspnea, leads to categorization as the well known respiratory syndrome "chronic obstructive pulmonary disease (COPD)", also known as "heaves". This term is often misused, and a more realistic description of the condition would be chronic small airway disease, as you will understand better, further in the discussion (4).

Recent studies provide clear evidence that "chronic bronchitis" is not commonly present in the coughing horse because bacteria isolated from tracheal aspirates were normal airway flora and were not present in lower airways (4). The question remains: What is responsible for the large amount of inflammatory cells (neutrophils) found in the mucopurulent discharge originating from the airways? The pathological changes observed in the small airways are now thought to be a manifestation of an immune phenomenum, such as hypersensitivity type I and III. The hypersensitive response of the immune system to allergenic substances can be shown diagrammatically as follows.

The interference of normal airflow is the result of bronchoconstriction, thickening of the airway epithelium, excess mucus production with inflammatory cell infiltration and poor mucociliary clearance mechanisms. The disease can vary in progression and severity due to several factors including the environmental exposure period to allergen, the age of the animal, and their individual response mechanisms to the disease.

Prognosis will depend on the ability to identify the disease correctly and early.

Example: A horse suffering from hypersensitivity type I appears clinically similar to the "heaves horse". If diagnosis and treatment is correct for this horse, the prognosis is good, but misdiagnosis and inappropriate treatment will result in progressive deterioration.

Diagnostic Procedures

To perform a good examination of the respiratory system, veterinarians in general have access to three basic diagnostic procedures: auscultation, percussion and exercise testing. Auscultation is a very subjective interpretation of the underlying pathology, however it is useful especially if done after exercise. Another, too often forgotten, simple diagnostic tool is chest percussion. In moderate to severe small airway disease ventral border and caudal lung fields always show hyperresonance. Pleural effusion can be diagnosed when a fluid line is detected during chest percussion. Areas of dullness however may indicate an abscess or consolidation of the lungs. Assessment of horses after mild exercise such as 15-20 minutes of lunging will certainly accentuate lung sounds, and often allows the clinician to detect hidden abnormalities nonapparent at rest, e.g. the horse which maintains an elevated respiratory rate, and presents poor recovery time after the exercise test.

Today more advanced techniques are available to the veterinarian. These techniques are pulmonary function tests, in particular, the nitrogen washout test. The nitrogen washout indicates the ventilation efficiency of the lungs and provides an indication of the number of small airways occluded either by mucus plugging, bronchial constriction, or epithelial hyperplasia. A lung biopsy may also provide supportive and conclusive evidence of your diagnosis if necessary. Although the technique to obtain lung biopsy has been of concern for most veterinarians, in fact the procedure is easy and simple and can be performed under minimal restraint.

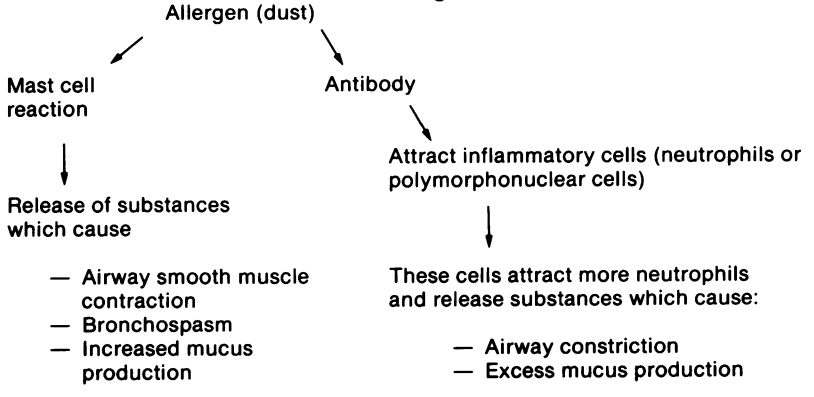
More accessible now to the veterinary practitioner is the use of fiberoptic bronchoscopy by direct visualization of the upper and part of the lower airway passage. While performing the bronchoscopic procedure, samples from the lower part of the trachea can be obtained for bacteriology, virology titers and cytology. The technique is not invasive and surpasses by far the conventional transtracheal aspirates.

In the past four years we have used fiberoptic bronchoscopy to provide access to deeper areas (bronchioles and alveoli) of the equine respiratory tract. Bronchoalveolar lavage consists of the infusion of large amounts of fluid into a specific lung lobe rapidly followed by reaspiration of this fluid which contains large numbers of respiratory free cells. This technique has provided new insight and has stimulated newer concepts in the characterization, pathogenesis and therapeutic approaches to horses with small airway disease.

Therapy

Although our knowledge of chronic airway disease has progressed in the past few years, there is still no magic cure for a horse presenting this problem. However, a better understanding of the pathogenesis of the naturally occurring disease will obviously help in the application of a more effective

Figure 1.



treatment. First, respiratory disease seen in the young horse should be considered as a potential source of, or a precurser to, chronic airway problems if good care is not taken. Secondly, sufficient resting time or lay off for performing or racing animals is the best treatment regime to viral infection frequently seen in two to three year olds. Thirdly, recognition of the early stage of chronic airway disease would likely prevent and reduce the number of horses progressing to more severe respiratory problems. Initial treatment of chronic small airway disease should consist of removing the animal from the environmental predisposing causes to control the allergic challenge. In our early discussion, allergic reaction was shown to be responsible for causing obstruction of the small airway (Figure 1), through bronchospasm and excess mucus production with subsequent poor ciliary clearance. Pharmacological agents capable of controlling or reducing inflammatory cells involved in the immune reaction are glucocorticoids. We all know that there are wide ranges and strengths of glucocorticoids, as well as the numerous side effects of these drugs. The use of long-term, short-acting steroids were shown at the Ontario Veterinary College to be more effective than their long-acting counterparts. In our experience, long-term administration refers to a period of at least four weeks with a maintenance dose for three to four weeks. To reduce the bronchospasm and accelerate the removal of excess mucus production, use of a bronchodilator is the most efficient therapeutic approach. Again, the treatment regime should not be restricted to one to two weeks but spread over four to six weeks. At any time when treating a horse for a respiratory disorder, it is of great importance to remember that the cough is a primary component of the clearance mechanism and therefore cough suppressants should never be administered.

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Bovine Brucellosis — Diagnosis and Eradication

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This paper reviews the standard serological tests used for the diagnosis of bovine brucellosis in Canada in recent years and discusses two new procedures which have been investigated in our laboratories, an enzyme-immunoassay and a hemolysis-in-gel test. This is followed by an update on some important progress that has been made with regard to key antigens of the Brucella cell surface. Finally, it considers three issues related to diagnosis that will continue to have importance following the eradication of bovine brucellosis.

Standard Tests for the Diagnosis of Brucellosis in Canada

Prior to 1981, our diagnostic operations were based on the standard tube agglutination test which was performed at serum dilutions of 1/50, 1/100 and 1/200 (1). Based on calibration against the international standard for anti-brucella serum, 3+ or 75% agglutination at each of these dilutions corresponds to antibody levels of approximately 60, 120 and 240 international units per mL, respectively (2).

Sera which reacted to the tube test were subsequently tested by the standard plate agglutination test (1) using the same volumes of sera employed in the three "equivalent" dilutions of the tube agglutination test. This test served to confirm reactions obtained by the tube test and to verify that the correct serum sample had been identified.

During this era, and for years dating back to early findings of Drs. Mitchell and Moore (3), the complement fixation test was used to diagnose brucellosis in "problem herds". At first the phrase "problem cattle herds" (4) referred to cases in which infection persisted in herds despite repeated efforts to eliminate brucellosis using standard tests and the slaughter of reactors. With time, its meaning evolved in Canada to include all herds that posed diagnostic problems whether due to suspected infection or nonspecific reactions. Thus our "problem herd" approach in the laboratories also evolved to the parallel testing of all sera by the standard tube, standard plate and the complement fixation tests.

By the mid 1970's, some important

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