

**Differential Diagnosis of Lymphoid and Myeloid Tumors
in the Chicken**
(slide set and text)

John R. Dunn¹, Isabel M. Gimeno², Pat Wakenell³, and Yoko Sato⁴

¹US National Poultry Research Center, United States Department of Agriculture,
Agricultural Research Service, Athens, GA 30605

²Department of Population Health and Pathobiology, Veterinary School, North Carolina
State University, Raleigh, NC 27607

³Department of Comparative Pathobiology, School of Veterinary Medicine, Purdue
University, West Lafayette, IN 47906

⁴Department of Veterinary Diagnostic and Production Animal Medicine, College of Veterinary
Medicine, Iowa State University, Ames, IA 50010

Table of Contents

Abstract	3
Purpose and Scope	3
Introduction	4
Disease Syndromes	6
Principles of Lymphoma Diagnosis	8
Samples	10
Tests	11
Table 1: List of tests and procedures	12
Diagnostic Strategy	14
Criteria for Differential Diagnosis	15
• Group A (neural)	16
• Group B (early tumor)	18
• Group C (bursal tumor)	22
• Group D (late tumor)	25
Flow Chart	30
Mixed Infections and Tumors	31
Diagnosis of Infections	32
Future Directions	32
Conclusions	33
Acknowledgments	33
Slide Legends	34
Appendix I	44
References	46

Abstract

This slide set and associated text is to assist diagnosticians and veterinary pathologists in making accurate diagnoses of field cases in chickens where lymphoid or myeloid tumors are suspected. Lesions and other diagnostic features that distinguish Marek's disease (MD), lymphoid leukosis (LL), myeloid leukosis (ML) and the bursal and nonbursal lymphomas associated with reticuloendotheliosis (RE) are discussed and illustrated. Differentiation of these neoplasms from nonneoplastic syndromes and assorted other tumors is also discussed. Emphasis is placed on diagnostic strategies rather than specific procedures.

A system is presented by which a diagnostic case is first assigned to one of four clinical types based mainly on gross lesion and age. This approach reduces the number of possible conditions to be considered, thus simplifying the process.

Differential diagnosis continues to be based primarily on gross and microscopic lesions. Additional tests of proven value for diagnosis include determination of T-cell and B-cell frequency, determination of viral antigen expression, and quantitative PCR (qPCR). Tests for detection of specific viruses or their antibodies have only limited value but can be adjuncts to other methods in some cases. Several additional tests with potential value are presented to encourage further development and field testing by reference laboratories. Some unpublished data relevant to diagnosis are presented in summary form.

Purpose and Scope

This documentation and slide study set is to provide a conceptual basis for the differential diagnosis of lymphoid and myeloid tumors in chickens and may also serve as a teaching aid. It is directed primarily to the academician although students and field veterinarians should also find the information useful. No attempt is made to include all lesions associated with tumor virus infection in chickens as this is considered in other slide sets. Description of MD in turkey and quails can be found in slide study set # 31. Methods to differentiate chickens infected with Marek's disease virus (MDV) from those that are

developing MD are also covered in slide study set #31 and will not be covered in this slide study set.

An attempt is made to discuss diagnostic methods on two levels. **Standard criteria (level 1)** are based on gross and histological lesions which can be ascertained by virtually all diagnostic laboratories. **Advanced criteria (level 2)** involve more specialized techniques and, in some cases, may require the assistance of reference laboratories. The detection of virus, viral antigens or their antibodies is a subset of advanced criteria. When standard criteria may be suitable for presumptive diagnoses in many cases, advanced criteria may be needed to establish a definitive diagnosis.

Introduction

Lymphoid tumors (lymphomas) occur commonly in chickens, usually the result of infection with Marek's disease virus (MDV), avian leukosis virus (ALV) or reticuloendotheliosis virus (REV). The lesions induced by these viruses differ in various respects and, in most cases, constitute unique diseases. Myeloid tumors occur most commonly in meat-type chickens, frequently as the result of infection with ALV subgroup J (ALV-J).

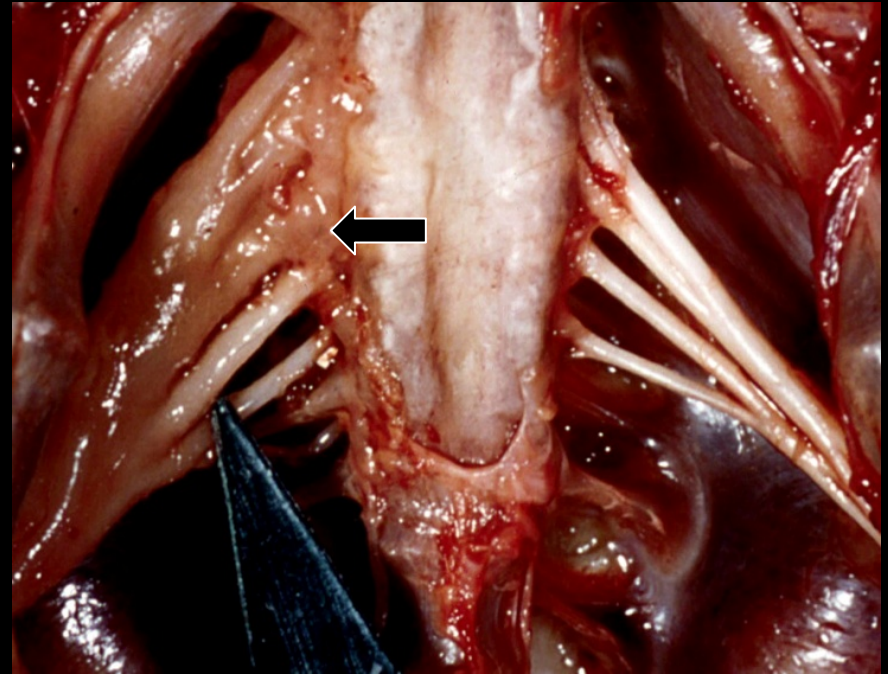
Lymphoid and myeloid tumors are economically important to commercial poultry management and have been studied extensively. When these tumors occur in the field a specific diagnosis is important so that disease incidence can be monitored, and appropriate control measures instituted. In some cases, a specific diagnosis is needed to determine liability for losses.

The diagnosis of lymphomas is fundamentally different from the diagnosis of many other diseases of chickens. The tumors are caused by three distinct virus types, of which at least two consist of multiple subgroups or pathotypes. Thus, there is an array of potential etiologic agents representing a wide variety of pathogenic potentials. Lymphomas induced by the three virus classes may appear similar on superficial inspection since, by definition, they are all composed of lymphocytes. Although organ and tissue tropisms differ, there is

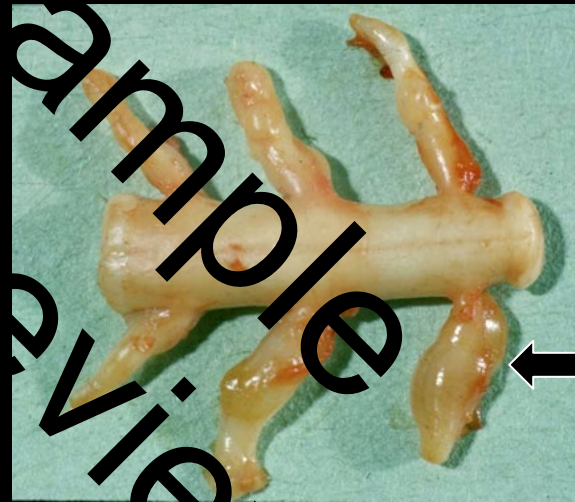
1 – MD Nerve



Enlarged vagus (From L. Dudnikov)



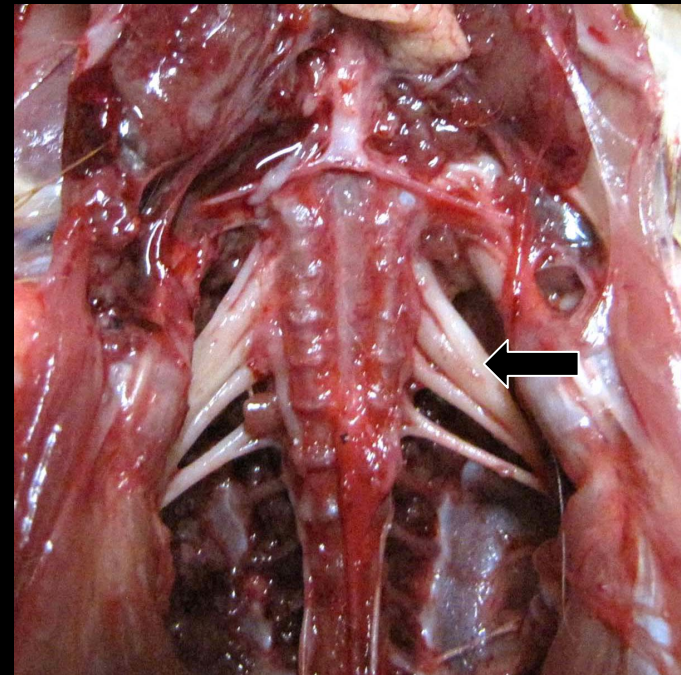
Unilateral enlargement
sciatic plexus



Swollen
Dorsal root
ganglia

2 – PN Nerve

Enlarged
sciatic



Enlarged vagus
(top 4)

Normal vagus

3 – RE Nerve



Enlarged vagus

Normal vagus

4 – MD Tumor

