Cytological Diagnosis of Coccidial Infections in Turkeys

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Summary

Coccidial infections in turkeys cause significant economic losses because of decreased growth and feed utilization. To detect infection, gross evaluation of the intestinal tract and a microscopic evaluation of a wet smear are used as routine diagnostic methods. Cytology is infrequently used as a diagnostic method. The aims of this study were to determine how useful cytology would be for diagnosing coccidial infection in turkeys and to compare cytology with other methods of diagnosis (fecal floatation, wet smear, and histopathology). Histopathology was used as the "gold standard" for comparing diagnostic techniques. Sixty-one turkeys between 14 and 42 days of age from 16 flocks belonging to two integrators in North Carolina were evaluated. Pools of fecal contents were collected and examined by fecal floatation for each flock. Wet smears, mucosal impressions, and a tissue sample were obtained from the middle jejunum, ileum, and cecum from each turkey. Mucosal impression smears were stained with a commercial "dip" stain used for hematology.

Fecal floatation identified coccidial infection in 7 flocks compared to 9 flocks identified by wet smear and cytology and 11 flocks identified by histopathology. Coccidia in various stages were readily identified by cytology, especially when the bird was heavily infected. Wet smears, cytology, and histopathology detected 17 (27.9%), 23 (37.7%), and 27 (44.3%) infected birds respectively. Cytology correlated well with histopathology (83.6%) and wet smears (80.3%). These results indicate that cytology compares favorably with other diagnostic methods and it is a rapid, inexpensive, and accurate method for diagnosing coccidial infections in turkeys.

Introduction

- Coccidiosis is a common cause of enteritis in turkey poults.
- Enteritis affects the growth, development, and ability of turkey poults to efficiently use feed causing significant economic losses.
- Several diagnostic tools are available for evaluating the intestinal health of commercial poults and identifying the causative agents in an enteritis problem.
- Previous studies on poults suffering from Poult Enteritis Complex (PEC) have shown cytology as a rapid, inexpensive procedure for identifying cellular changes and infectious agents.

Objectives

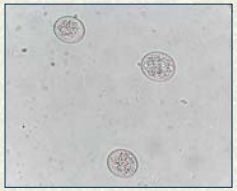
- Compare cytology to other diagnostic methods including fecal floatation, wet smear, and histopathology for diagnosis for coccidial infections in turkeys.
- Correlate results of diagnostic methods to identify relationships and determine the best method(s) for determining coccidial infections

Materials & Methods

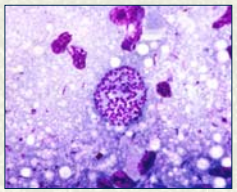
Study Design: 2 Integrators, 16 Flocks (14 - 42 d), 61 birds

Fecal Floatation: composite sample from each flock (n= 3-5 poults/sample) examined by sucrose centrifugal floatation.

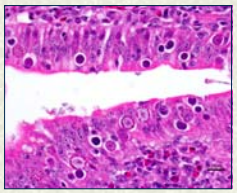
Wet Smears: deep scrapings from the mid-jejunum, ileum, and cecum were prepared and evaluated microscopically.



Cytology: impression smears were made from mid-jejunum, ileum, and cecum of each bird and stained with a "dip" stain.



Histopathology: 3-4 cm sections of mid-jejunum, ileum, and cecum were fixed in 10% buffered neutral formalin, stained with H&E , and evaluated microscopically.



Results

Table 1. Positive coccidial diagnosis in 16 turkey flocks by different techniques.

n =	Float	Direct	Cyto	Histo
16	7/15*	9/16	9/16	11/16

Table 2. Positive coccidial diagnosis in 61 turkeys by different techniques.

n =	Direct	Cyto	Histo
61	17/61	23/61	27/61

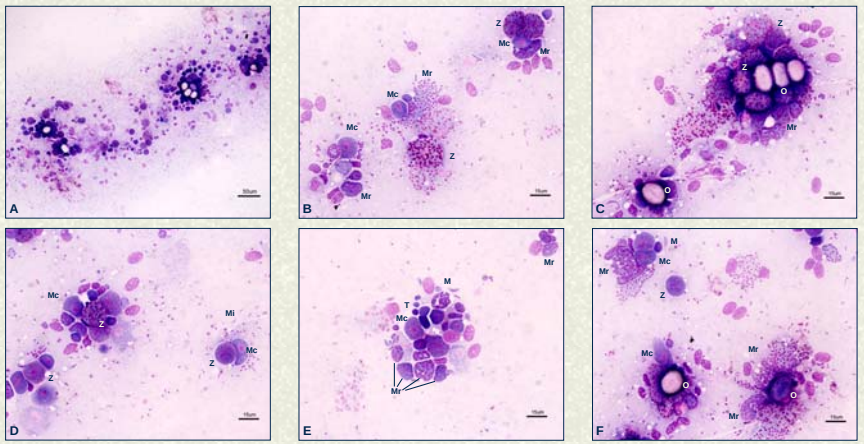
Table 3. Coccidial diagnosis in individual turkeys comparing cytology with histopathology.

	Histo +	Histo -	Total
Cytology +	20	3	23
Cytology -	7	31	38
Total	27	34	61
Agreed - 51/61 (83.6%)			

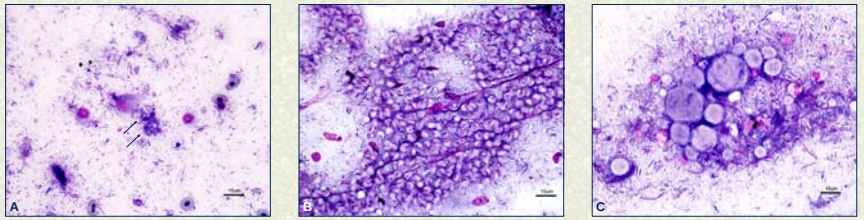
Table 4. Coccidial diagnosis in individual turkeys comparing wet smears with histopathology.

	Cyto +	Cyto -	Total
Smear +	14	3	17
Smear -	9	35	44
Total	23	38	61
Agreed - 49/61 (80.3%)			

Cytology:



In heavy infections parasites are numerous and coccidial infection can be quickly diagnosed at low magnification (A). Various stages of coccidia can be identified. Representative stages are indicated (B-F, M = merozoite, Mc = macrogametocyte, Mi = microgamete, Mr = meront [schizont], O = oocyst, T = trophozoite, Z = zygote). Generally only oocysts can be recognized with certainty in wet smears.



In addition to coccidia, other intestinal protozoa including amoeba (A, arrows), trichomonads (B), and *Blastocystis* (C) can be identified.

Conclusions

- **Cytology compares favorably with other methods of coccidial infection diagnosis.**
- **Based on number of flocks and turkeys found infected Histopathology > Cytology > Direct Smear > Fecal floatation**
- **Advantages of cytology include: a) inexpensive, b) rapid, c) provides a permanent record, d) microscope not needed in the field, e) time and place to make diagnosis can be arranged, f) all stages in life cycle can be detected, and g) other organisms compromising intestinal health can be identified.**