UCDAVIS VETERINARY MEDICINE
California Animal Health and Food Safety Laboratory
18760 Road 112, Tulare, CA 93274-9042
(559) 688-7543
www.cahfs.ucdavis.edu

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FINAL REPORT

Ref.#: [redacted]

Coordinator: Melissa Macias Rioseco, DVM, MPVM, PhD

E-Signed and Authorized by: Macias Rioseco, Melissa on 11/21/2019 12:52:35PM

Email To: [redacted]

Collection Site: [redacted]

This report supersedes all previous reports for this case

Specimens Received: 1 Carcass;

Date Collected: **Date Received:** 10/12/2019

Case Contacts

Submitter [redacted]

Report To [redacted]

Specimen Details

Animal/Source	ID Type	Taxonomy	Gender	Age
1	CAHFS Internal ID	African Elephant	Female	48.00 Years

Laboratory Findings/Diagnosis

One ~30 years-old female African Elephant. Lethargy, it died soon after.

Final report 11/21/2019:
Animal ID: “Elephant” Adult, African elephant cow
1.Salmonella enterica serovar Montevideo isolated from lymph node
  a.Typhlocolitis, necrotizing, diffuse, moderate, subacute with severe submucosal edema and thrombosis
  b.Lymphadenomegaly, ileocecal
2.Clostridium perfringens isolated from small intestine and cecal wall
3.Cysts, right kidney
  a.Compensatory hypertrophy, left kidney
    i.Interstitial fibrosis, diffuse, severe, chronic with dilation of Bowman ’s capsule

Case Summary

Final report 11/21/2019:
The changes in the intestine are attributed to Salmonella enterica serovar Montevideo isolated from the ileocecal lymph node. Although, immunohistochemistry for C. perfringens was performed (with the appropriate controls), revealing positive immunoreaction. This interpretation is challenging, as this microorganism could be a normal habitat of the gastrointestinal tract. Cultures for Yersinia sp. were negative. All tests are now completed.

Preliminary report 11/04/2019:
Replicated microscopic sections of the gastrointestinal tract were stained with Gram stain and evaluated (with appropriate controls), identifying several gram-negative and gram-positive microorganisms.

The microscopic changes in the cecum and colon (mainly thrombosis) could be attributed to Salmonella sp. While Clostridium

perfringens was isolated and its toxin was detected in cecum and small intestine content, this microorganism could be a normal habitat of the gastrointestinal tract. Other microorganisms were obtained in bacterial cultures (see Bacteriology section), but were considered overgrowth.

Immunohistochemistry for C. perfringens and Yersinia sp. cultures are pending, and they may provide additional information. Further information will be shared once these results are obtained.

See the Toxicology section for additional results.

Preliminary report 10/15/2019:
The changes in the gastrointestinal tract are significant; histopathology is pending and might confirm their origin. Preliminary tests identified Salmonella sp. group C1 from the ileocecal lymph node, and its serotyping is pending. Escherichia coli was also isolated from liver. The clinical relevance of these two isolations at this point is unknown. Anaerobic cultures and testing for C. perfringens toxins are pending. No parasite eggs were detected in examination of colon content. The changes in the left kidney are attributed to obstructions of the right kidney caused by the cysts.

Ancillary tests are pending, further information will be shared.

Clinical History

One ~30 years-old female African Elephant. Cow always had colic issues that have been resolved with basic therapy. Animal started to act lethargic, and went down, did not recover and died same day.
Animal ID: “Elephant” Adult, African elephant cow

Gross Observations

Animal ID: “Elephant” Adult, African elephant cow

An African elephant cow is presented for necropsy on October 12, 2019. The carcass is in good postmortem condition and good body condition based on the musculature and the adipose tissue (subcutis, mesentery, perirenal and epicardial) stores. The epiglottis is mildly thickened by a small amount of gelatinous material (edema) and there are several small firm nodules focally expanding the mucosa in this region.

Thoracic cavity: All the representative sections of lung float in 10% neutral buffered formalin.

Abdominal cavity: The edges of the liver are rounded; the organ is diffusely mottled and firm with an enhanced reticular pattern. The mucosa of the stomach is multifocally congested, and the content is a creamy yellow tan paste mixed with feed. The mucosa of the small intestine (jejunum) is multifocally effaced by small 0.5 to 2.5 cm diameter well demarcated dark red foci and its content is dark red watery. The cecum has a marked submucosal edema with severe congestion of the mucosa, and its content is pale red and watery. The submucosa of the proximal colon is also markedly edematous and the mucosa is diffusely congested with several pinpoint dark red foci. The spleen is meaty and measures 130.0 cm long. The calyces of the right kidney are multifocally distended, therefore, numerous cysts are throughout the organ. The left kidney is about 3 times the right kidney’s size. The ileocecal lymph nodes are mildly enlarged. The cerebrospinal fluid is very cloudy.

Tissues examined include tongue, trachea, lungs, heart, gastrointestinal tract, liver, pancreas, adrenal glands, kidneys, urinary bladder, spleen, lymph nodes, skeletal muscles, eyes, and brain.

Bacteriology

BACTERIAL AEROBIC CULTURE

Animal/Source	Specimen	Specimen Type	Results
1	(2)	Lung Tissue	Bacillus sp. Rare#
1	(3)	Liver Swab	Escherichia coli Sm# Mixed flora Mod#
1	(4)	Small Intestinal Swab	Aeromonas sp. Sm# Mixed flora Sm#

1	(5)	Cecal Swab	No growth after 48 hours
1	(6)	cecum wall swab	Mixed flora Sm#
1	(10) colon LN swab	Ileocolic Lymph Node Tissue	Salmonella group C1
1	(14) Elephant	Cerebral Spinal Fluid	Mixed flora Rare#
1	(16) 1	Kidney Swab	Escherichia coli Rare# Mixed flora Rare#

BACTERIAL ANAEROBIC CULTURE

Animal/Source	Specimen	Specimen Type	Results
1	(4)	Small Intestinal Swab	Clostridium perfringens Mod# Mixed Flora Sm#
1	(5)	Cecal Swab	Clostridium butyricum Mod#
1	(6)	cecum wall swab	Clostridium perfringens Sm#
1	(11) Elephant	Colon Contents	Clostridium perfringens Lg# Mixed Flora Lg#
1	(15) Elephant	Small Intestinal Contents	Clostridium perfringens Lg# Clostridium sp. Lg# Mixed Flora Lg#
1	(16) 1	Kidney Swab	Clostridium perfringens Sm#
1	(21) Elephant	Kidney tissue, left	No anaerobes detected
1	(22) Elephant	Kidney tissue, Right	Clostridium perfringens Mixed Flora Sm#
1	(23) Elephant	Colon	Clostridium perfringens Mixed Flora Mod#
1	(24) Elephant	Jejunum Tissue	Clostridium perfringens Mixed Flora Lg#

Biotyper Organism Identification

Animal/Source	Specimen	Specimen Type	Results
1	(2)	Lung Tissue	Bacillus sp.
1	(3)	Liver Swab	Escherichia coli
1	(4)	Small Intestinal Swab	Aeromonas sp. Clostridium perfringens
1	(5)	Cecal Swab	Clostridium butyricum
1	(6)	cecum wall swab	Clostridium perfringens
1	(10) colon LN swab	Ileocolic Lymph Node Tissue	Salmonella sp.
1	(16) 1	Kidney Swab	Escherichia coli Clostridium perfringens
1	(20) Anaerobe #1	Bacterial Isolate, Small Intestine	Clostridium sp.
1	(25) Elephant	Bacterial Isolate	Clostridium perfringens

1	(26) Elephant	Bacterial Isolate	Clostridium perfringens
1	(27) Elephant	Jejunum Tissue	Clostridium perfringens

C, perfringens Toxins ELISA

Animal/Source	Specimen	Specimen Type
1	(15) Elephant	Small Intestinal Contents

Analyte	Result	Units
Alpha toxin	alpha toxin positive	
Beta toxin	beta toxin negative	
Epsilon toxin	epsilon toxin negative	
C. perfringens	C. perfringens positive	

CLOSTRIDIUM DIFFICILE CULTURE

Animal/Source	Specimen	Specimen Type	Results
1	(5)	Cecal Swab	No Clostridium difficile detected
1	(7) jejunum contents	Intestinal Contents	No Clostridium difficile detected

SALMONELLA CULTURE - MAMMALIAN

Animal/Source	Specimen	Specimen Type	Results
1	(8) Intest swab & jejunal conts	Intestinal Contents Pool	No Salmonella sp. detected
1	(9) cecum mucosa & wall pool	Cecal Swab	No Salmonella sp. detected
1	(10) colon LN swab	Ileocolic Lymph Node Tissue	Salmonella sp. detected - Group C1
1	(16) 1	Kidney Swab	No Salmonella sp. detected

SALMONELLA SEROTYPING

Animal/Source	Specimen	Specimen Type	Results
1	(13) colon LN swab	Ileocolic Lymph Node Tissue	S. Montevideo

YERSINIA SP ISOLATION-COLD ENRICHMENT

Animal/Source	Specimen	Specimen Type	Results
1	(7) jejunum contents	Intestinal Contents	No Yersinia isolated

Histology

Colon, cecum and small intestine (moderate autolysis): The submucosa is diffusely expanded by an abundant amount of flocculent pale eosinophilic material and ectatic lymphatics (edema). Multifocally, the lumen of several vessels is occluded by organized eosinophilic, beaded and fibrillar material (fibrin thrombi). There is loss and blunting of villi along with loss of the crypts. The superficial mucosa is covered by numerous short gram-positive bacilli and other small clusters of gram-negative bacilli, all these admixed with necrotic debris, fibrin and large numbers of free erythrocytes.

Kidney: The architecture has been effaced by abundant amount of fibrous tissue that expands the interstitium, decreases the number of collecting ducts and tubules, but occasionally dilates the Bowman's capsule. Some glomeruli are shrunken others are hypercellular. The Bowman's capsules are effaced by adhesions between the glomerular tufts to Bowman's capsule (synechiae). Multifocally throughout the interstitium there are several areas expanded by small to medium numbers of lymphocytes and plasma.

Lung: There is a small amount of dark granular material expanding the cytoplasm of several macrophages (dust granulomas).

Liver: Scattered throughout the section, the Kupffer cells that contain a small amount of globular brown pigment (hemosiderin or bile).

Esophagus: The mucus glands within the submucosa are occasionally dilated and the lamina propria is infiltrated by medium numbers of plasma cells and lymphocytes.

Tissues examined include lungs, heart, gastrointestinal tract, liver, adrenal glands, kidneys, spleen, lymph nodes, and skeletal muscle.

ImmunoHistoChemistry

Clostridium perfringens immunohistochemistry

Animal/Source	Specimen	Specimen Type	Results
1	(17) block 31	cecum/colon	Positive

Parasitology

FECAL EXAM - MCMASTER

Animal/Source	Specimen	Specimen Type	Results
1	(11) Elephant	Colon Contents	No parasite eggs detected <50eggs/g

Toxicology

Reporting Limit (Rep. Limit): The lowest routinely quantified concentration of an analyte in a sample. The analyte may be detected, but not quantified, at concentrations below the reporting limit. Sample volumes less than requested might result in reporting limits that are higher than those listed.

While we don't have established "normal" liver mineral reference ranges for this species, the detected concentrations are unremarkable.

HEAVY METAL SCREEN

Animal/Source	Specimen	Specimen Type
1	(12) Elephant	Liver Tissue

Analyte	Result	Units	Rep. Limit	Units
Lead	Not Detected	ppm	1	ppm
Manganese	2.6	ppm	0.1	ppm
Iron	380	ppm	1	ppm
Mercury	Not Detected	ppm	1	ppm
Arsenic	Not Detected	ppm	1	ppm
Molybdenum	2.3	ppm	0.4	ppm
Zinc	40	ppm	0.3	ppm
Copper	4.2	ppm	0.3	ppm
Cadmium	2.8	ppm	0.3	ppm

SELENIUM - TISSUE/OTHER

Animal/Source	Specimen	Specimen Type	Results	Units	Rep. Limit
1	(12) Elephant	Liver Tissue	0.67	ppm	0.020