

Practical Clinical Pathology: a case-based discussion.
Sharon M. Dial, DVM, Phd, Diplomate ACVP
Arizona Veterinary Diagnostic Laboratory
Tucson, AZ

Clinical Pathology data interpretation is a daily responsibility for practicing veterinarians. This discussion will use clinical cases to illustrate mechanisms of pathophysiology that underscore the common (and not so common) hematological, clinical chemistry and cytological changes seen in private practice. The cases will be presented in a discussion format. Your participation is greatly appreciated. Following the determination of a diagnosis, the most critical changes in laboratory data will be summarized in light of the underlying disease process.

Case 1:

“Queenie” is a 6 year old spayed female Boxer dog that presented with a history of jejunal resection and anastomosis for removal of a jejunal mass 3 days ago at the referring veterinarian. After surgery she was described as stable but slow to recover. Her owners noted that she was uncomfortable and she re-presented to an emergency clinic. On physical examination, Queenie was laterally recumbent, painful, had a prolonged capillary refill time, and abdominal bruising was noted. Queenie had thready pulses.

White blood cell count:	2.7 X 10 ⁹ /L	(4.0-13.3)
Segmented neutrophils:	0.81 X 10 ⁹ /L	(2.0-11.2)
Band neutrophils:	1.19 X 10 ⁹ /L	(0-0.3)
Lymphocytes:	0.51 X 10 ⁹ /L	(1.0-4.5)
Monocytes:	0.19 X 10 ⁹ /L	(0.2-1.4)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	Rare activated monocytes, 1+ reactive lymphocytes, 3+ toxic change	
Hematocrit:	42%	(37-60)
Red blood cell count:	5.95 X 10 ¹² /L	(5.5-8.5)
Hemoglobin:	14.3 g/dl	(12.0-18.0)
Nucleated RBC/100 WBC:	8	
MCV:	70.7 fl	(60.0-77.0)
MCHC:	34.0 g/dl	(33.6-36.6)
RBC morphology:	2+ anisocytosis, 1+ Howell-Jolly bodies, 1+ polychromasia	
Platelets:	clumped, appear decreased, macroplatelets present	

BUN:	81 mg/dl	(9-31)
Creatinine:	3.4 mg/dl	(0.6-1.6)
Calcium:	7.2 mg/dl	(9.3-11.5)
Phosphorus:	10.7 mg/dl	(3.3-6.8)
Magnesium:	4.3 mg/dl	(1.7-2.4)
Total Protein:	2.2 g/dl	(5.0-6.9)
Albumin:	0.9 g/dl	(2.7-3.7)

Globulin:	1.3 g/dl	(1.7-3.5)
Sodium:	140 mmol/L	(145-153)
Chloride:	107 mmol/L	(109-118)
Potassium:	3.3 mmol/L	(3.6-5.3)
Bicarbonate:	14 mmol/L	(15-25)
Anion gap:	22	(15-28)
Total Bili:	3.6 mg/dl	(0.0-0.3)
ALP:	315 IU/L	(8-139)
GGT:	<3 IU/L	(0-6)
ALT:	43 IU/L	(22-92)
AST:	294 IU/L	(16-44)
Glucose:	34 mg/dl	(75-117)
Cholesterol:	65 mg/dl	(143-373)
Amylase:	1606 IU/L	(275-1056)

PT: 9.8s (6.2-7.7)
PTT: 55.7s (9.8-14.6)
FDPs: >20 ug/dl (<5)

Case 2:

“Lady” is a 13-year-old spayed female American Eskimo dog who presented acutely recumbent and dull. Lady had a distended abdomen with a fluid wave, was febrile and tachycardic. Her mucus membranes were dull red with a capillary refill time (CRT) of 3.5 seconds. A large amount of fluid was collected during abdominocentesis. Lady’s laboratory data include the following:

White blood cell count:	6.8 X 10 ⁹ /L	(6.0-17.0)
Segmented neutrophils:	4.6 X 10 ⁹ /L	(3.0-11.0)
Band neutrophils:	1.2 X 10 ⁹ /L	(0-0.3)
Lymphocytes:	0.7 X 10 ⁹ /L	(1.0-4.8)
Monocytes:	0.2 X 10 ⁹ /L	(0.2-1.4)
Eosinophils:	0.1 X 10 ⁹ /L	(0-1.3)
WBC Morphology: Mild toxic change in neutrophils		
Hematocrit:	44%	(37-55)
Red blood cell count:	6.3 X 10 ¹² /L	(5.5-8.5)
Hemoglobin:	14.7 g/dl	(12.0-18.0)
MCV:	71.9 fl	(60.0-77.0)
MCHC:	33.4 g/dl	(31.0-34.0)
RBC morphology: Appears within normal limits		
Slight hemolysis of plasma		
Platelets:	127 X 10 ⁹ /L	(250-450)
Glucose:	92 mg/dl	(65.0-120.0)
BUN:	51 mg/dl	(8-33)
Creatinine:	1.7 mg/dl	(0.5-1.5)
Phosphorus:	6.0 mg/dl	(3.0-6.0)
Calcium:	10.5 mg/dl	(8.8-11.0)
Magnesium:	2.2 mEq/L	(1.4-2.7)
Total Protein:	7.0 g/dl	(5.2-7.2)
Albumin:	4.1 g/dl	(3.0-4.2)
Globulin:	2.9 g/dl	(2.0-4.0)
A/G ratio:	1.4	(0.7-2.1)
Sodium:	149 mEq/L	(140-151)
Chloride:	106 mEq/L	(105-120)
Potassium:	3.9 mEq/L	(3.8-5.4)
HCO ₃ :	18 mEq/L	(16-25)
Anion Gap:	25	(5-18)
Total Bili:	0.63 mg/dl	(0.10-0.50)
ALP:	2769 IU/L	(20-320)
ALT:	9955 IU/L	(10-95)
AST:	4847 IU/L	(15-52)
Cholesterol:	259 mg/dl	(110-314)
Triglycerides:	83 mg/dl	(30-300)
Amylase:	957 IU/L	(400-1200)

Case 3:

“Jasper” is a 15 year old neutered male Keeshond that presented with a 1.5 year history of elevated serum enzyme activities. 3 months ago, an ultrasound demonstrated a mass effect in the area of the pancreas but no biopsy was performed. Past history includes hip dysplasia, idiopathic vestibular disease, chronic cough after Bordetella infection 2 years ago, and an open sore on his side. At the time of presentation to the emergency service, Jasper was lethargic, had runny diarrhea, anorexia, and was reluctant to move.

White blood cell count:	10.9 X 10 ⁹ /L	(4.1-13.3)
Segmented neutrophils:	2.94 X 10 ⁹ /L	(2.1-11.2)
Band neutrophils:	2.40 X 10 ⁹ /L	(0-0.13)
Lymphocytes:	1.53 X 10 ⁹ /L	(1.0-5.1)
Monocytes:	4.03 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	3+ activated monocytes, 1+ reactive lymphocytes, 3+ toxic change	
Hematocrit:	25.6%	(39-56.5)
Hemoglobin:	8.6 g/dl	(13.5-19.9)
MCV:	71.1 fl	(64.0-73.0)
MCHC:	33.6 g/dl	(33.6-36.6)
RBC morphology:	29 nRBC/100 WBC	
Platelets:	190,000	(160,000-425,000) 3+ large platelets
Plasma is moderately icteric		

BUN:	87 mg/dl	(9-31)
Creatinine:	1.9 mg/dl	(0.6-1.6)
Phosphorus:	7.8 mg/dl	(3.3-6.8)
Calcium:	10.2 mg/dl	(9.4-11.6)
Magnesium:	2.4 mEq/L	(1.7-2.5)
Total Protein:	6.3 g/dl	(5.0-6.9)
Albumin:	2.8 g/dl	(2.7-3.7)
Globulin:	3.5 g/dl	(1.8-3.7)
Sodium:	147 mEq/L	(145-153)
Chloride:	118 mEq/L	(109-118)
Potassium:	5.2 mEq/L	(3.6-5.3)
HCO ₃ :	15 mEq/L	(15-25)
Anion Gap:	28	(15-28)
Total Bili:	0.8 mg/dl	(0.0-0.30)
ALP:	681 U/L	(8-139)
GGT:	8 U/L	(0-6)
ALT:	10636 U/L	(22-92)
AST:	3589 U/L	(16-44)
Cholesterol:	455 mg/dl	(143-373)
Glucose:	94 mg/dl	(75.0-117.0)
Amylase:	3529 U/L	(275-1056)
Lipase:	4277 U/L	(0-755)

PT: 7.8 s (6.2-7.7)
PTT: 13.5 s (9.8-14.6)
FDPs: 5-20 ug/ml(<5)

Case 4:

“Squirt” is a 6 year old domestic short hair spayed female cat with a 2 month history of polyuria and polydipsia, and 2 days of lethargy and anorexia. Squirt threw up the day before presentation. On physical examination, Squirt was depressed, dehydrated, unkempt, and had cat litter sticking to her paws.

White blood cell count:	22.9 X 10 ⁹ /L	(3.4-15.7)
Segmented neutrophils:	21.30 X 10 ⁹ /L	(1.2-13.2)
Band neutrophils:	0.23 X 10 ⁹ /L	(0-0.16)
Lymphocytes:	1.15 X 10 ⁹ /L	(1.0-9.4)
Monocytes:	0.23 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology: 1+ reactive lymphocytes		
Hematocrit:	35.6%	(26.1-46.5)
Hemoglobin:	12.9 g/dl	(8.8-16.0)
MCV:	45.0 fl	(39.0-50.6)
MCHC:	36.3 g/dl	(31.5-36.5)
RBC morphology: Rare Howell-Jolly bodies, 25-50% Heinz bodies		
Platelets:	adequate	(160,000-425,000)
Plasma: normal		

BUN:	53 mg/dl	(12-39)
Creatinine:	1.9 mg/dl	(0.5-3.1)
Phosphorus:	3.5 mg/dl	(3.3-7.8)
Calcium:	8.9 mg/dl	(8.3-10.9)
Magnesium:	2.2 mEq/L	(1.6-2.4)
Total Protein:	8.3 g/dl	(5.9-8.2)
Albumin:	3.7 g/dl	(2.4-4.1)
Globulin:	4.6 g/dl	(2.5-5.3)
Sodium:	140 mEq/L	(147-158)
Chloride:	92 mEq/L	(113-123)
Potassium:	2.8 mEq/L	(3.9-5.3)
HCO ₃ :	6.1 mEq/L	(12-20)
Anion Gap:	45	(19-30)
Total Bili:	1.3 mg/dl	(0.0-0.30)
ALP:	120 U/L	(2-88)
GGT:	2 U/L	(0-3)
ALT:	263 U/L	(16-127)
AST:	202 U/L	(14-42)
Cholesterol:	489 mg/dl	(56-226)
Glucose:	459 mg/dl	(74-143)
Amylase:	342 U/L	(555-1600)

Urinalysis:

Urine specific gravity: 1.030

Glucose: 4+

Bilirubin: 1+

Ketones: 3+

Protein: 3+

Few RBC and epithelial cells

Case 5:

“Jazzmine” is a 12 year old female spayed domestic short hair cat that presented with a history of lethargy and anorexia. She had a mass removed from her neck area the previous day, and re-presented after an episode of vomiting.

White blood cell count:	1.01 X 10 ⁹ /L	(3.4-15.7)
Segmented neutrophils:	0.53 X 10 ⁹ /L	(1.2-13.2)
Band neutrophils:	0.12 X 10 ⁹ /L	(0-0.16)
Lymphocytes:	0.29 X 10 ⁹ /L	(1.0-9.4)
Monocytes:	0.07 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	normal	
Hematocrit:	26%	(30-47)
Hemoglobin:	8.8 g/dl	(9.8-16.8)
MCV:	50.0 fl	(37.0-50.6)
MCHC:	33.0 g/dl	(32.1-39.7)
RBC morphology:	13 nRBC/100 WBC	
Platelets:	101,000/ul	(160,000-425,000)
Plasma:	icteric	

BUN:	90 mg/dl	(12-39)
Creatinine:	2.9 mg/dl	(0.5-2.1)
Phosphorus:	11.9 mg/dl	(3.3-7.8)
Calcium:	9.9 mg/dl	(8.3-10.9)
Magnesium:	3.7 mEq/L	(1.6-2.4)
Total Protein:	5.9 g/dl	(5.9-8.2)
Albumin:	2.8 g/dl	(2.4-4.1)
Globulin:	3.1 g/dl	(2.5-5.3)
Sodium:	143 mEq/L	(147-158)
Chloride:	102 mEq/L	(113-123)
Potassium:	4.8 mEq/L	(3.9-5.3)
Bicarbonate:	10 mEq/L	(12-20)
Anion Gap:	35	(19-30)
Total Bili:	3.7 mg/dl	(0.0-0.30)
ALP:	547 U/L	(2-88)
GGT:	8 U/L	(0-3)
ALT:	1961 U/L	(16-127)
AST:	4986 U/L	(14-42)
Cholesterol:	120 mg/dl	(56-226)
Glucose:	156 mg/dl	(74-143)
Amylase:	1096 U/L	(555-1600)

Case 6:

“Jimmy” is a 5 year old intact male English Pointer that presented with a history of intermittent vomiting and diarrhea. On physical examination he had marked dehydration, pale mucous membranes and poor pulse quality.

White blood cell count:	8.4 X 10 ⁹ /L	(4.1-13.3)
Segmented neutrophils:	6.22 X 10 ⁹ /L	(2.1-11.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.13)
Lymphocytes:	1.85 X 10 ⁹ /L	(1.0-5.1)
Monocytes:	0.08 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology: Normal		
Hematocrit:	64%	(39-56.5)
Hemoglobin:	22.6 g/dl	(13.5-19.9)
MCV:	68.7 fl	(64.0-73.0)
MCHC:	35.4 g/dl	(33.6-36.6)
Platelets:	146,000	(160,000-425,000)
rare large platelets		
Plasma:normal		

BUN:	91 mg/dl	(9-31)
Creatinine:	3.7 mg/dl	(0.6-1.6)
Phosphorus:	10.4 mg/dl	(3.3-6.8)
Calcium:	10.2 mg/dl	(9.4-11.6)
Magnesium:	3.8 mEq/L	(1.7-2.5)
Total Protein:	6.3 g/dl	(5.0-6.9)
Albumin:	3.1 g/dl	(2.7-3.7)
Globulin:	3.2 g/dl	(1.8-3.7)
Sodium:	121 mEq/L	(145-153)
Chloride:	93 mEq/L	(109-118)
Potassium:	7.0 mEq/L	(3.6-5.3)
Bicarbonate:	12 mEq/L	(15-25)
Anion Gap:	30	(15-28)
Total Bili:	0.3 mg/dl	(0.0-0.30)
ALP:	53 U/L	(8-139)
GGT:	3 U/L	(0-6)
ALT:	51 U/L	(22-92)
AST:	53 U/L	(16-44)
Cholesterol:	90 mg/dl	(143-373)
Glucose:	52 mg/dl	(75.0-117.0)
Amylase:	1008 U/L	(275-1056)

PT:	9.8 s	(6.2-7.7)
PTT:	17.1s	(9.8-14.6)
FDPs:	<5 ug/ml	(<5)

Urine Specific Gravity: 1.016. No abnormalities on dipstick or sediment analysis

Case 7:

“Angel” is a 10 year old female spayed Golden Retriever that presented to the emergency service with a 1 week history of progressive weakness, lethargy anorexia and vomiting. On physical examination, she had a non-healing, draining abscess along her left mandible. On presentation, Angel was depressed, minimally responsive, and dehydrated. Her mouth was painful.

White blood cell count:	64.3 X 10 ⁹ /L	(4.1-13.3)
Segmented neutrophils:	50.8 X 10 ⁹ /L	(2.1-11.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.13)
Lymphocytes:	2.57 X 10 ⁹ /L	(1.0-5.1)
Monocytes:	10.93 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	Normal	
Hematocrit:	43%	(39-56.5)
Hemoglobin:	5.0 g/dl	(13.5-19.9)
MCV:	67.3 fl	(64.0-73.0)
MCHC:	34.6 g/dl	(33.6-36.6)
RBC morph:	Occasional schistocytes	
Platelets:	132,000	(160,000-425,000)
	2+ large platelets	
Plasma:	normal	

BUN:	178 mg/dl	(9-31)
Creatinine:	8.0 mg/dl	(0.6-1.6)
Phosphorus:	20.6 mg/dl	(3.3-6.8)
Calcium:	8.6 mg/dl	(9.4-11.6)
Magnesium:	4.0 mEq/L	(1.7-2.5)
Total Protein:	5.7 g/dl	(5.0-6.9)
Albumin:	2.0 g/dl	(2.7-3.7)
Globulin:	3.7 g/dl	(1.7-3.5)
Sodium:	141 mEq/L	(145-153)
Chloride:	95 mEq/L	(109-118)
Potassium:	5.9 mEq/L	(3.6-5.3)
Bicarbonate:	11 mEq/L	(15-25)
Anion Gap:	39	(15-28)
Total Bili:	2.6 mg/dl	(0.0-0.30)
ALP:	2398 U/L	(8-139)
GGT:	21 U/L	(0-6)
ALT:	85 U/L	(22-92)
AST:	113 U/L	(16-44)
Cholesterol:	403 mg/dl	(143-373)
Glucose:	248 mg/dl	(75.0-117.0)

PT: 6.6 s (6.2-7.7)

PTT: 13.7s (9.8-14.6)

FDPs: >20 ug/ml (<5)

Urine: Cystocentesis

Urine Specific Gravity: 1.019

Glucose/Ketones: negative

Bilirubin: Trace

Protein: 3+

Sediment:

RBC: 5-20/HPF

WBC: 5-20/HPF

Bacteria: Moderate cocci

8-10 granular casts/low power field

Rare hyaline casts

Rare mixed cellular casts/low power field

Occasional bilirubin crystals

Case 8:

“Perry” is a 5 year old Norwegian Forest cat presenting with a 6 week history of intermittent vomiting, hiding, and not eating as much as normal. Two nights ago he had a seizure. On physical examination, Perry is laterally recumbent and mentally dull, is approximately 5% dehydrated with icteric mucous membranes, and has strong pulses.

White blood cell count:	17.8 X 10 ⁹ /L	(3.4-15.7)
Segmented neutrophils:	17.09 X 10 ⁹ /L	(1.2-13.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.16)
Lymphocytes:	0.18 X 10 ⁹ /L	(1.0-9.4)
Monocytes:	0.18 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.36 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	normal	
Hematocrit:	17.5%	(30-47)
Hemoglobin:	6.3 g/dl	(9.8-16.8)
MCV:	39.7 fl	(37.0-50.6)
MCHC:	35.8 g/dl	(32.1-39.7)
RBC morphology:	25% Heinz bodies, 2+ echinocytes, 2+ acanthocytes	
Platelets:	Adequate	(160,000-425,000)
Plasma:	icteric	

BUN:	9 mg/dl	(12-39)
Creatinine:	0.7 mg/dl	(0.5-2.1)
Phosphorus:	1.1 mg/dl	(3.3-7.8)
Calcium:	7.6 mg/dl	(8.3-10.9)
Magnesium:	1.5 mEq/L	(1.6-2.4)
Total Protein:	4.8 g/dl	(5.9-8.2)
Albumin:	2.1 g/dl	(2.4-4.1)
Globulin:	2.7 g/dl	(2.5-5.3)
Sodium:	136 mEq/L	(147-158)
Chloride:	95 mEq/L	(113-123)
Potassium:	3.7 mEq/L	(3.9-5.3)
Bicarbonate:	25.8 mEq/L	(12-20)
Anion Gap:	15	(19-30)
Total Bili:	11.8 mg/dl	(0.0-0.30)
ALP:	1652 U/L	(2-88)
GGT:	11 U/L	(0-3)
ALT:	551 U/L	(16-127)
AST:	650 U/L	(14-42)
Cholesterol:	202 mg/dl	(56-226)
Glucose:	138 mg/dl	(74-143)
Amylase:	806 U/L	(555-1600)

Urine: Cystocentesis

Urine specific gravity: 1.010

Glucose/ketones: negative Protein: trace/1+ Bilirubin: 3+, few RBC, no WBC or bacteria

PT: 10.7s (7.4-12.8)

PTT: 13.8s (11.1-16.4)

Case 9:

“Lucy” is a 9 year old female spayed Chesapeake Bay Retriever with a history seizures for which she receives Phenobarbital treatment. Recently, she has become lethargic and has started urinating in the house.

White blood cell count:	12.25 X 10 ⁹ /L	(4.1-13.3)
Segmented neutrophils:	11.03 X 10 ⁹ /L	(2.1-11.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.13)
Lymphocytes:	0.49 X 10 ⁹ /L	(1.0-5.1)
Monocytes:	0.74 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology: Normal		
Hematocrit:	43%	(39-56.5)
Hemoglobin:	14.7 g/dl	(13.5-19.9)
MCV:	69.8 fl	(64.0-73.0)
MCHC:	34.7 g/dl	(33.6-36.6)
RBC morph: 1+ echinocytes		
Platelets:	350,000	(160,000-425,000)
Plasma:normal		

BUN:	44 mg/dl	(9-31)
Creatinine:	1.3 mg/dl	(0.6-1.6)
Phosphorus:	5.2 mg/dl	(3.3-6.8)
Calcium:	8.7 mg/dl	(9.4-11.6)
Magnesium:	3.1 mEq/L	(1.7-2.5)
Total Protein:	6.5 g/dl	(5.0-6.9)
Albumin:	3.0 g/dl	(2.7-3.7)
Globulin:	3.5 g/dl	(1.7-3.5)
Sodium:	133 mEq/L	(145-153)
Chloride:	99 mEq/L	(109-118)
Potassium:	4.6 mEq/L	(3.6-5.3)
Bicarbonate:	6.7 mEq/L	(15-25)
Anion Gap:	32	(15-28)
Total Bili:	0.3 mg/dl	(0.0-0.30)
ALP:	909U/L	(8-139)
GGT:	12 U/L	(0-6)
ALT:	133 U/L	(22-92)
AST:	126 U/L	(16-44)
Cholesterol:	376 mg/dl	(143-373)
Glucose:	496 mg/dl	(75.0-117.0)
Amylase:	5240 U/L	(275-1056)

Urine: Cystocentesis
Urine Specific Gravity: 1.016
Glucose: 4+
Ketones: 4+
Bilirubin: neg
Protein: 2+
Sediment:
RBC: none
WBC: None
Bacteria: None

Case 10:

“Sophie” is a 12 year old female spayed miniature schnauzer that presented for lethargy, panting, vomiting, disorientation, and anorexia for 48 hours. She has lost 3 pounds in the last month. On physical examination, Sophie was 5% dehydrated, showed muscle atrophy and inadequate body condition (3/4 body score). She was mildly uncomfortable on abdominal palpation and had severe dental disease.

White blood cell count:	9.83 X 10 ⁹ /L	(4.1-13.3)
Segmented neutrophils:	6.59 X 10 ⁹ /L	(2.1-11.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.13)
Lymphocytes:	2.65 X 10 ⁹ /L	(1.0-5.1)
Monocytes:	0.59 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology: 1+ reactive lymphocytes		
Hematocrit:	49%	(39-56.5)
Hemoglobin:	17.9 g/dl	(13.5-19.9)
MCV:	69.3 fl	(64.0-73.0)
MCHC:	36.3 g/dl	(33.6-36.6)
RBC morph: normal		
Reticulocytes:	57,000	(<60,000)
Platelets:	400,000	(160,000-425,000)
Plasma:yellow		

BUN:	312 mg/dl	(9-31)
Creatinine:	8.0 mg/dl	(0.6-1.6)
Phosphorus:	19.7 mg/dl	(3.3-6.8)
Calcium:	9.9 mg/dl	(9.4-11.6)
Magnesium:	3.8 mEq/L	(1.7-2.5)
Total Protein:	7.6 g/dl	(5.0-6.9)
Albumin:	3.2 g/dl	(2.7-3.7)
Globulin:	4.4 g/dl	(1.7-3.5)
Sodium:	147 mEq/L	(145-153)
Chloride:	100 mEq/L	(109-118)
Potassium:	5.2 mEq/L	(3.6-5.3)
Bicarbonate:	10.6 mEq/L	(15-25)
Anion Gap:	42	(15-28)
Total Bili:	0.4 mg/dl	(0.0-0.30)
ALP:	533 U/L	(8-139)
GGT:	7 U/L	(0-6)
ALT:	104 U/L	(22-92)
AST:	26 U/L	(16-44)
Cholesterol:	294mg/dl	(143-373)
Glucose:	184 mg/dl	(75.0-117.0)
Amylase:	1635 U/L	(275-1056)

Urinalysis: cystocentesis

Specific gravity: 1.014

pH: 6.0

Negative for glucose, ketones, blood

Protein 2+

Occasional WBC, no RBC, no bacteria