

Miniboard Exam 2011 Veterinary Pathology - Clinical Pathology

1. The following information is given for an 8 year old felid:

Na ⁺ -	138 mmol/L	Cl ⁻ -	102 mmol/L
Mg ⁺ -	2.4 mmol/L	Phos -	11.2 mg/dl
Ca ²⁺ -	10.1 mg/dl	HCO ₃ ⁻ -	10 mmol/L
K ⁺ -	7.9 mmol/L	PCO ₂ -	40 kPa

What is the anion gap?

- A. 5.8
- B. 13.9
- C. 18.2
- D. 22.4
- E. 2.1

2. Which of the following is NOT a useful analyte for determining serum osmolality:

- A. BUN
- B. Glucose
- C. K⁺
- D. Na⁺
- E. CREA

3-7. "Sunny" is a 10 year old neutered male domestic short hair cat presenting with a history of vomiting, anorexia, and urinating outside the litter box. On presentation, Sunny was dehydrated, had a low body temperature, and delayed capillary refill time.

White blood cell count:	14.0 X 10 ⁹ /L	(3.4-15.7)
Segmented neutrophils:	13.16 X 10 ⁹ /L	(1.2-13.2)
Band neutrophils:	0.0 X 10 ⁹ /L	(0-0.16)
Lymphocytes:	0.14 X 10⁹/L	(1.0-9.4)
Monocytes:	0.84 X 10 ⁹ /L	(0.1-1.2)
Eosinophils:	0.0 X 10 ⁹ /L	(0-1.2)
WBC Morphology:	Normal	
Hematocrit:	22.7%	(26.1-46.5)
Hemoglobin:	7.6 g/dl	(8.8-16.0)
MCV:	39.5 fl	(39.0-50.6)
MCHC:	33.5 g/dl(31.5-36.5)	
RBC morphology:	1+ acanthocytes, 2+ echinocytes, 1+ Heinz bodies	
Platelets:	adequate(160,000-425,000)	
Plasma:	Moderately lipemic	

BUN:	171 mg/dl	(12-39)
Creatinine:	5.2 mg/dl	(0.5-3.1)
Phosphorus:	9.1 mg/dl	(3.3-7.8)
Calcium:	7.4 mg/dl	(8.3-10.9)
Magnesium:	2.8 mEq/L	(1.6-2.4)
Total Protein:	6.5g/dl	(5.9-8.2)
Albumin:	3.0 g/dl	(2.4-4.1)
Globulin:	3.5 g/dl	(2.5-5.3)
Sodium:	133 mEq/L	(147-158)
Chloride:	84 mEq/L	(113-123)
Potassium:	2.5 mEq/L	(3.9-5.3)
Bicarbonate:	12.1 mEq/L	(12-20)
Anion Gap:	40	(19-30)
Total Bili:	0.6 mg/dl	(0.0-0.30)
ALP:	90 U/L	(2-88)
GGT:	4 U/L	(0-3)

ALT: 105 U/L (16-127)
AST: **53 U/L** (14-42)
Cholesterol: **822 mg/dl** (56-226)
Glucose: **556 mg/dl** (74-143)
Amylase: 745 U/L (555-1600)
Urinalysis: Cystocentesis
Urine specific gravity: 1.013 Ketones: 1+
Glucose: 3+ Protein: negative
Bilirubin: Negative
Sediment: rare granular casts, no WBC or RBC

3. Which of the following is the best interpretation of Sunny's CBC data?
- A. Epinephrine effects and chronic hemolysis
 - B. Corticosteroid effects and chronic hemolysis
 - C. Inflammation and anemia of chronic disease
 - D. Epinephrine effects and anemia of chronic disease
 - E. Corticosteroid effects and anemia of chronic disease
4. Which of the following is most likely contributing to Sunny's hypokalemia?
- A. Insulin deficiency and anorexia
 - B. Polyuria and anorexia
 - C. Insulin deficiency and polyuria
 - D. Oliguria and anorexia
 - E. Insulin deficiency and acidosis
5. Which of the following best explains Sunny's hyponatremia?
- A. Anorexia
 - B. Hyperglycemia
 - C. Free water loss
 - D. Acid-base disorder
 - E. Aldosterone deficiency
6. Which of the following best characterizes Sunny's acid base status?
- A. Uremic and ketoacidosis
 - B. Alkalosis due to vomiting
 - C. Mixed acid base disorder
 - D. Lactic acidosis due to poor perfusion
 - E. Normal (bicarbonate is within the reference interval)
7. What is the most likely cause of Sunny's hypercholesterolemia?
- A. Hypothyroidism
 - B. Diabetes mellitus
 - C. Nephrotic syndrome
 - D. Hyperadrenocorticism
 - E. Idiopathic hyperlipidemia
8. Which of the following may result in lymphocytosis?
- A. Chylothorax
 - B. SCID
 - C. Hypoadrenocorticism
 - D. Acute systemic infection

E. Thymic necrosis

9. Which of the following correlates with stage 2 of lymphoma staging?

- A. The liver and spleen are involved
- B. Generalized lymph node involvement
- C. Single lymphoid tissue involvement excluding the BM
- D. Several regional nodes involved
- E. Involvement of solid organ with BM, blood and/or other organs

10. Which of the following regarding canine lymphoma is TRUE:

- A. Cutaneous is most common form
- B. Majority of canine lymphomas are T-cell origin
- C. Mycosis fungoides is predominantly multicentric
- D. Multicentric lymphoma is usually of B-cell origin
- E. Frequently associated with hypocalcemia

11. Basophil granules contain all of the following except ?

- A. Histamine
- B. Heparin
- C. Acid hydrolases
- D. Sulfated mucopolysaccharides

12. Toxic change of neutrophils include all of the following except?

- A. Cytoplasmic vacuolation
- B. Döhle bodies
- C. Nuclear hypersegmentation
- D. Toxic granulation
- E. Cytoplasmic basophilia

13. A clinically important left shift in a bird is indicated by which of the following?

- A. Heterophils > 300 bands /ul
- B. Heterophils > 500 bands/ul
- C. Heterophils > 1,000 bands/ul
- D. Greater than 1% of heterophils immature in a heteropenia
- E. Birds do not exhibit left shifts

14. Dog – What is the most likely diagnosis based on the following panel?

TEST	RESULT	REF INTERVAL
Sodium	143	144-157 mEq/L
Chloride	114	115-126 mEq/L
Potassium	3.3	3.6-6 mEq/L
Urea	14	8-29 mg/dL
Creatinine	1	0.7-1.6 mg/dL
Glucose	113	59-100 mg/dL
Cholesterol	90	97-210 mg/dL
Total Bilirubin	0	0-1 mg/dL
ALP	30	12-110 U/L

ALT	38	5-70 U/L
Total Protein	3	5-7.2 g/dL
Albumin	2	2.9-3.8 g/dL
Globulin	2	2.3-3.7

- A. Hepatic failure
- B. Protein losing nephropathy
- C. Gastrointestinal foreign body
- D. Protein losing enteropathy
- E. Failure of passive transfer

15. Dog– What is the most likely diagnosis given the following results?

TEST	RESULT	REF INTERVAL
Cobalamin	180	290-400 ng/L
Folate	17.5	2-10 ug/L
TLI	< 0.1	5-20 ug/L

- A. Exocrine pancreatic insufficiency
- B. Small intestinal bacterial overgrowth
- C. Proximal small intestinal disease
- D. Distal small intestinal disease
- E. Both proximal and distal small intestinal disease

16. Dog – what is the most likely diagnosis based on the following results?

TEST	RESULT	REF INTERVAL
Sodium	159	144-157 mEq/L
Chloride	128	115-126 mEq/L
Potassium	5.8	3.6-6 mEq/L
TCO2	22	17-29 mEq/L
Urea	50	8-29 mg/dL
Creatinine	2.0	0.7-1.6 mg/dL
USG	1.040	
ALT	54	5-70 U/L
ALP	60	12-110 U/L
Amylase	2500	350-1380 U/L
Lipase	970	180-460 U/L

Total Protein	7.5	5-7.2 g/dL
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- A. Renal failure
- B. Dehydration
- C. Pancreatitis
- D. Proximal duodenal foreign body
- E. Portosystemic shunt

17. One-year-old bull. All of the following are potential diagnoses EXCEPT?

TEST	RESULT	REF INTERVAL
Sodium	135	150-160 mEq/L
Chloride	90	118-128 mEq/L
Potassium	3.1	4-5.8 mEq/L
TCO2	40	14-26 mEq/L

- A. Proximal duodenal foreign body
- B. Abomasal displacement
- C. Bovine renal failure
- D. Secretory diarrhea
- E. All of the above are likely

18. Cat – Which of the following diagnoses is most likely given the following profile?

TEST	RESULT	REF INTERVAL
Total Bilirubin	6.3	0-1 mg/dL
ALP	800	16-75 U/L
ALT	332	13-55 U/L
AST	30	6-98 U/L
GGT	2	0-7 U/L

- A. Cholangiohepatitis
- B. Hepatic necrosis
- C. Cirrhosis
- D. Bile duct obstruction
- E. Hepatic lipidosis

19. Horse – Which diagnosis is most likely given the following results?

TEST	RESULT	REF INTERVAL
Total Bilirubin	6.4	0.6-2.1 mg/dL
AST	200	185-300 U/L
GGT	15	7-17 U/L
CK	355	140-405 U/L
Ammonia	40	20-60 umol/L

- A. Pancreatitis
- B. Bile duct obstruction
- C. Anorexia
- D. Cholangiohepatitis

E. Gastrointestinal disease

20. Which of the following erythrocyte characteristics are most likely with pyridoxine (vitamin B6) deficiency?

- A. Macrocytic hypochromic
- B. Microcytic hypochromic
- C. Macrocytic normochromic
- D. Microcytic normochromic
- E. Normocytic hypochromic

21. Which of the following erythrocyte characteristics are most likely with cobalamin (vitamin B12) deficiency?

- A. Macrocytic hypochromic
- B. Microcytic hypochromic
- C. Macrocytic normochromic
- D. Microcytic normochromic
- E. Normocytic hypochromic

22. Which of the following disease processes is NOT a potential cause of hyperammonemia in a horse:

- A. Gastrointestinal disease with bacterial overgrowth
- B. Liver disease
- C. Nursing foals with portosystemic shunts
- D. Genetic abnormality of Morgan foals
- E. Urea toxicity

23. In cats with hyperthyroidism, which isoenzyme(s) is/are responsible for the increase in serum ALP?

- A. L-ALP
- B. B-ALP
- C. I-ALP
- D. L-ALP and B-ALP
- E. L-ALP, B-ALP, and I-ALP

24. In dogs, corticosteroid-induced ALP is of:

- A. Liver origin
- B. Intestinal origin
- C. Bone origin
- D. Placental origin
- E. Both bone and liver origins

25. Cats with disease processes that lead to a decreased sodium: potassium ratio often concurrently have evidence of:

- A. Hyperadrenocorticism
- B. Body cavity effusion
- C. Gastrointestinal parasitism
- D. Neurologic disease
- E. Dermatitis

26. All of the following correlate with the severity of hepatic lipidosis in cattle EXCEPT?

- A. OCT
- B. AST
- C. Total bilirubin
- D. Serum bile acids
- E. All of the above correlate

27. Dogs with congenital portosystemic shunts have decreases in all EXCEPT?

- A. Platelets
- B. Factor II
- C. Factor V
- D. Factor VII
- E. Factor VIII

28. All are good indicators of hepatocellular injury in rats EXCEPT?

- A. ALT
- B. SDH
- C. ALP
- D. GDH
- E. Bile acids

29. Diabetes mellitus can be associated with excess glucagon in the presence of hyperglycemia in which of the following species?

- A. Ferrets
- B. Guinea Pigs
- C. Birds
- D. Rabbits
- E. None of the above

30. Bilirubinuria without disease is a common finding in which species?

- i. Dogs
- ii. Ferrets
- iii. Rabbits
- iv. Sheep
- v. Cats

- A. i
- B. i, ii
- C. i, ii, iii
- D. i, ii, iii, iv
- E. i, ii, iii, iv, v

31. Which is the primary breakdown product of heme in birds?

- A. Bilirubin
- B. Biliverdin
- C. Cholate
- D. Stercobilinogen
- E. Urobilinogen

32. ALP increases in birds are most likely due to?

- A. Cholestatic liver disease
- B. Gastrointestinal disease
- C. Renal failure
- D. Osteoblastic activity
- E. Corticosteroid treatment

33. Which is the most liver specific enzyme in birds?

- A. AST
- B. ALT
- C. GDH
- D. ALP
- E. GGT

34. Food restriction can lead to changes in which enzyme in rats?

- A. AST
- B. ALT
- C. GDH

- D. ALP
- E. GGT

35. In equine endometrial cytology the presence of eosinophils has been associated with which of the following:

- A. *Taylorella equigenitalis* infection
- B. Active inflammation
- C. Equine Herpes III infection
- D. Equine piroplasmiasis outbreaks
- E. Pneumouterus

36. Abdominocentesis is performed on a dog in an ER clinic run by Dr. Taylor Chance, who doesn't know his ass-from-a-hole-in-the-ground so he calls you for help. The cytologic specimen he describes has the following features:

"neutrophils, macrophages, moderate numbers of binucleate and multinucleate cells with occasional mitosis and moderate anisokaryosis, erythrocytes, lymphocytes, some proteinaceous debris, and occasional macrophage contains few bacteria and yellow-green to blue-green pigment." A likely diagnosis may be:

- A. Ruptured bowel
- B. Pancreatic "carcinomatosis"
- C. Uroperitoneum
- D. Bile peritonitis
- E. Acute abdominal trauma

37. A dog has the following thyroid profile:

fT4=decreased; fT4=decreased; TSH=Within Reference Interval; TgAA= Neg

All of the following are possible explanations EXCEPT:

- A. Sick euthyroidism,
- B. Nonthyroidal illness
- C. Secondary hypothyroidism due to pituitary gland dysfunction
- D. Hypothyroxemia due to effects of drugs
- E. Primary hypothyroidism due to thyroid atrophy

38. All of the following may cause hypermagnesemia EXCEPT:

- A. Increased urinary excretion
- B. Increased intestinal absorption of Mg^{2+} without increased PTH
- C. Milk Fever
- D. Shift of free Mg^{2+} from ICF to ECF
- E. Excessive IV infusion of MG

39. All the following parasites predominantly cause extravascular hemolysis EXCEPT:

- A. *Babesia* spp.
- B. *Anaplasma* spp.
- C. *Cytauxzoon* spp.
- D. *Theileria* spp.
- E. *Trypanosoma* spp.

40. From the following values, what is the approximate sensitivity of a certain ELISA test?

True positives- 90
True negatives- 110
False positives- 10
False negatives- 5

- A. 80%
- B. 90%

- C. 95%
- D. 98%
- E. 100%