AMERIVET
VETERINARY PARTNERS

Quick Guide to Diabetic Ketoacidosis

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1. Clinical Signs and PE
    a. Signs
        i. Lethargy, weakness, depression, anorexia, weight loss, vomiting, and/or diarrhea
        ii. Polydipsia and polyuria
    b. PE
        i. Dehydration, decreased mentation, hypovolemic shock, cardiac arrhythmias, cranial organomegaly, cataracts, patients may be overweight or underweight
2. Diagnostics
    a. Baseline
        i. CBC, Biochemistry, Electrolytes, Blood gas, Urinalysis
        ii. Remember patients may not be acidemic but ketosis is a process of acidosis so so that if you have ketosis you have acidosis
    b. Additional Diagnostics of Consideration
        i. Urine culture, thoracic radiographs, abdominal US, thyroid evaluation, blood culture
    c. Going to look to document ketonuria or ketonemia
        i. Urine dipsticks only evaluate for acetoacetate and acetone not beta-hydroxybutyrate which is initial predominate ketone body
        ii. If suspect DKA but negative urine ketone add a drop of serum/plasma to urine dipstick
3. Treatment
    a. Fluid Therapy
        i. Address hypovolemia, dehydration, and ongoing losses
        ii. Balanced electrolyte solution, ex: P-Lyte, Norm-R, LRS
            1. 0.9% NaCl is not recommended due to being an acidifying fluid, and true hyponatremia is not present
        iii. If hypovolemic restore vascular volume by administering 20-40 ml/kg rapidly and reassessing perfusion parameters, continuously rebolus until perfusion parameters normalize and normovolemia is re-stored
        iv. Aggressively rehydrated deficits over 12 to 24 hours

v. Reassess patients need and ongoing losses frequently
vi. Rule of thumb generally replace 3-5% of dehydration deficit over first 4-6 hours prior to starting insulin CRI

b. Treatment recommendations electrolyte derangements
  i. Potassium supplementation based on serum levels
  ii. Once patient starts insulin therapy generally supplement minimally maintenance needs
    1.

Serum K	mEqKCl for 1L Fluids
<3.0	60 to 80
3.0 to 4.0	40 to 60
4.1 to 5.5	20 to 40
>5.5	Recheck or 20

    2.

Serum K	mEq/Kg/hr
Severe <2.0	0.4 to 0.5
Moderate 2.0 to 3.0	0.3 to 0.4
Mild 3.0 to 4.0	0.2 to 0.3
Maintenance 4.0 to 5.0	0.1 to 0.2

  iii. Hypophosphatemia
    1. Treated with CRI of potassium phosphage
      a. If serum < 2.0 mg/dl dose is 0.03 to 0.06 mmol/kg/hr
      b. If serum <1.0 mg/dl dose is 0.12 to 0.2 mmol/kg/hr
  iv. Easy rule of thumb is calculate potassium supplementation need and administer as half KCl and half KPhos
  v. Hypomagnesemia
    1. Supplement if ionized Mg +2 is <0.4 mmol/L
    2. 0.5 to 1.0 mEq/kg/24 hours

c. Insulin Therapy
  i. Regular insulin administered via an intravenous CRI or intramuscular route
  ii. Goal is to reduce glucose by 50 to 100 mg/dl/hr
  iii. IM Protocol
    1. Initial dose of 0.2 u/kg IM
    2. Followed by 0.1 u/kg q1h until glucose reaches 300 mg/dl
    3. Then 0.25 to 0.5 u/kg IM q4 to 6 hours
    4. Once patient is hydrated is may be switched to SQ administration
  iv. Continuous Rate Insfusion
    1. Preferred for critically ill patients, allows more precise control of blood glucose

2. 2.2 u/kg of regular insulin to 250ml NaCl
3. Make a new CRI every 24 hours
4. Allow first 50mls to run out and fill line
5.

Blood Glucose mg/dl	Insulin Rate Dogs	Insulin Rate Cats	% Dextrose in Fluids
>250	10	5	0
200 to 250	7	3	2.5
150 to 250	5	2	2.5
100 to 150	5	2	2.5
<100	0	0	5

v. Alternate CRI Protocol
1. Add 20 units of regular insulin to 20mls of NaCl = 1 u/ml
2. Starting dose 0f 0.05 to 0.2 u/kg/hr
3. Change syringe every 12 to 24 hours
4. Once made fill extension set with solution allow to sit 10 minutes and then refill with appropriate volume
5.

Blood Glucose mg/dl	Insulin Rate (u/kg/hr)	Dextrose Concentration
>250	No change or Increase by 0.05	0
<250 (1st time)	Increase by 0.05	2.5
250 to 350 (on insulin)	Increase by 0.1	2.5
200 to 250	Increase by 0.05	2.5
150 to 200	No change	2.5
80 to 150	Decrease by 0.05	2.5
<80	0	5

d. When to switch to Long Acting Insulin
   i. Patient is stable
   ii. Receiving full RER enterally either by eating on own or feeding tube

4. Monitoring
   a. Blood glucose every 1 to 2 hours
   b. Electrolytes and Blood gas
      i. Based on severity may be as frequently as q4-6 hours and then tapered back to q12-24 hours
   c. PCV/TS
      i. Q12h-24 hours
   d. Serum/plasma ketone q24h

5. Ancillary Treatment
    a. Antibiotics- start pending culture results and based on urinalysis evaluation
    b. GI Protectants
        i. Acid reducers preferrable PPI over H2 blocker
    c. Anti-emetics
    d. Nutritional support
    e. Sampling catheters
    f. Avoid urinary catheter if able