

ESVCN RESIDENT CLASS

DIETARY MANAGEMENT OF DIABETIC PATIENTS

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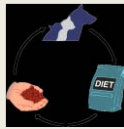
Presentation Outline

Review Nutrients of Concern

Dietary Management of Uncomplicated Cases

Dietary Management with Co-Morbidities

Dietary Management of DKA



American College of Veterinary Nutrition's Circle of Nutrition

Risk Factors?

Risk Factors for Insulin Resistance

- Breed
- Age
- Sex and Neuter status
- Body weight & BCS
- Environment
 - Diet—excess energy leading to obesity
 - Daily activity
 - Acute vs chronic stressors

Treatment Goals?

Treatment Goals

Reduce blood glucose level to within normal range

Establish a consistent feeding regimen

Work toward ideal body condition and muscle condition

Keep animal well hydrated

Manage co-morbidities

Minimize environmental stressors

Complications of Diabetes?

Major Complications of Diabetes

Microvascular

Eye

High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma

Kidney

High blood pressure damages small blood vessels and excess blood glucose overworks the kidneys, resulting in nephropathy.

Neuropathy

Hyperglycemia damages nerves in the peripheral nervous system. This may result in pain and/or numbness. Feet wounds may go undetected, get infected and lead to gangrene.

Macrovascular

Brain

Increased risk of stroke and cerebrovascular disease, including transient ischemic attack, cognitive impairment, etc.

Heart

High blood pressure and insulin resistance increase risk of coronary heart disease

Extremities

Peripheral vascular disease results from narrowing of blood vessels, increasing the risk for reduced or lack of blood flow in legs. Feet wounds are likely to heal slowly contributing to gangrene and other complications.

Graphic accessed from: <https://pubs101.ncbi.org/global/health/diabetes-mellitus/monitoring/complications>

Nutrients of Concern

- Water
- Energy
 - Protein
 - Fat
 - Carbohydrate
- Macro- and micro-minerals
- Fat- and water-soluble vitamins

Target Nutrient Levels?

Target Nutrient Levels

	ENERGY	PROTEIN	FAT	FIBER
DOGS	3.5-4.0 Kcal/g DM	40-70g/Mcal	<65 g/Mcal	20-45 g/Mcal
CATS	4.0 Kcal/g DM	70-120g/Mcal	<65 g/Mcal	18-40 g/Mcal

	ENERGY	PROTEIN	FAT	FIBER
DOGS	230 to 330 Kcals per 8-oz cup	___% DM	___% DM	___% DM
CATS	250 to 600 Kcals per 8-oz cup	___% DM	___% DM	___% DM

Hand, et al 2010 Small Animal Clinical Nutrition and current company guides

Energy Needs Depend on BCS

BCS is 5/9 → RER x 1.2
 BCS > 5/9 → RER x 0.8
 BCS < 5/9 → RER x 1.2 to 2.0

Energy requirements can be high when diabetes is uncontrolled
 → support to prevent weight loss
 → closely manage until patient is better controlled

Fat & Protein

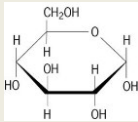
FAT

- Low fat (< 10% DM) for obese diabetic patients
- Moderate fat (12-15% DM) for patients that don't require modification
- Long term, high fat diets → can lead to insulin resistance

PROTEIN

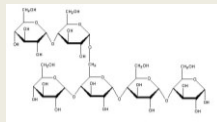
- Evidence to support a low protein diet?
- Moderate protein for patients that don't require modification
- Higher protein indicated for patients with evidence of lean muscle loss

Simple Sugars vs Complex Carbohydrates



Absorbed quickly

- postprandial hyperglycemia
- glucosuria



Starches digested slower

Slower glucose absorption too
No proof of hyperglycemia
or glucosuria

Soluble Fibre

Types:

pectine, gums,
certain hemicelluloses,
indigestible oligosaccharides

Found in:

fruit, oats, barley, legumes

Mechanisms:

gelforming in stomach → delays gastric emptying
→ shortens intestinal transit time
→ carbohydrate digestion & glucose absorption ↓
→ postprandial glucose ↓
[not digested in small intestine]



Baxter et al., 1990; Nelson et al., 1989

Insoluble Fibre

Types: cellulose, lignin, most hemicelluloses

Found in: vegetables, cereals



Mechanism: not digested in small intestine
not fermented in large intestine of dogs/cats

BULK - delayed carbohydrate digestion
- delayed glucose absorption
→ postprandial glucose ↓

Hesta et al., 2001; Burroos et al., 1982

Other Considerations?

Diet & Feeding Management

- Form (wet or dry)
- Time of feeding
- Number of meals and snacks
- Availability and source of water

Case #1: Princess Grace



6.5 year old, spayed female Spaniel

Current Weight: 11.8 kg (26 lbs)

BCS: 7/9, 30% body fat, ideal Wt. 10.3 kg

MCS: 3/3 (within normal limits)

Current diet: Pedigree Adult Chicken (1 cup morning, 1/2 cup evening, and 2-3 treats per day)

- **Clinical signs:** polyuria, polydypsia, polyphagia -1 week duration
- **Diagnostic tests:** CBC, Biochem, urinalysis, urine culture
- **Treatment initiated:** Caninsulin/Vetsulin (0.5U/kg BID)

Estimating Energy Needs & Intake

- **Estimated Energy Needs:**
- $RER = (Ideal\ BW_{kg}^{0.75})70 = 403\text{ Kcal/day}$
- $Ideal\ BW = [(BW_{kg} \times LBM)]/0.80$
- **Estimated Daily Calorie Intake:**
- 1 cup in morning and 1/2 cup in the evening, plus treats when coming indoors after a walk.

Pedigree Adult:

319 Kcal per 8-oz cup x 1.5 cups = **478 Kcal** total per day

Treats = 25 Kcal each; giving 2-3x each day = **50-75 Kcal** per day

Estimating Protein Needs & Intake

- **Dogs: 2.2 g dietary protein per kg body weight per day**
- **Cats: 4.5 g dietary protein per kg body weight per day**
- 2.2 g x 11.8 kg (current) = 26 g/day
- 2.2g x 10.3kg (ideal) = 22.6 g/day
- If Princess Grace eats 400-500 Kcal/day, will she also be getting enough to meet a minimum protein estimate?

Pedigree Adult: 319 kcal/cup; 3,429 kcal/kg; CP 21%

$21 + 1.5 = 22.5/0.3429 = 6.56\text{g protein per 100 kcal}$

$6.56 \times 400\text{-}500/100 = 26\text{ to }33\text{ g protein per day}$

'Beyond the Guaranteed Analysis', *Today's Veterinary Practice*. Shmalberg, 2013

TABLE 1. STEP BY STEP: ESTIMATING NUTRIENT CONCENTRATION ON A CALORIC BASIS	
Step 1	<ul style="list-style-type: none">• Add 1.5% to protein percentage from pet food label• Add 1% to fat percentage from pet food label
Step 2	Divide kcal/kg by 10,000
Step 3	Divide estimated protein % and fat % by number obtained in Step 2

TABLE 2. COMPARISON OF PET FOODS BY CALORIC BASIS				
Canine Diets	MRC RAC ¹ (g/1000 kcal)	Low (g/1000 kcal)	Moderate (g/1000 kcal)	High (g/1000 kcal)
Protein	25	< 60	60-90	> 90
Fat	13.8	< 30	30-50	> 50
Carbohydrate	n/a	< 50	50-90	> 90

Feline Diets	MRC RAC ¹ (g/1000 kcal)	Low (g/1000 kcal)	Moderate (g/1000 kcal)	High (g/1000 kcal)
Protein	50	< 80	80-120	> 120
Fat	22.5	< 40	40-60	> 60
Carbohydrate	n/a	< 25	25-70	> 70

¹National Research Council recommended allowance

TABLE 3. CONVERSION OF GUARANTEED ANALYSES + COMPARISON OF TWO COMMERCIAL DOG FOODS			
Ingredient	PET FOOD 1 (DRY)	PET FOOD 2 (WET)	
GUARANTEED ANALYSIS			
Crude protein (min)	25%	8%	
Crude fat (min)	15%	5%	
CALORIE CONTENT			
kcal/kg	3606	1198	
CONVERSION			
Protein	1. 25% + 1.5% = 26.5% 2. 3606 kcal/kg / 10,000 = 0.3606 3. 26.5 / 0.3606 = 74 g/1000 kcal	1. 8% + 1.5% = 9.5% 2. 1198 kcal/kg / 10,000 = 0.1198 3. 9.5 / 0.1198 = 79 g/1000 kcal	
Fat	1. 15% + 1% = 16% 2. 3606 kcal/kg / 10,000 = 0.3606 3. 16 / 0.3606 = 44 g/1000 kcal	1. 5% + 1% = 6% 2. 1198 kcal/kg / 10,000 = 0.1198 3. 6 / 0.1198 = 50 g/1000 kcal	
FINAL RESULT	Moderate protein / moderate fat	Moderate protein / high fat	

References
1. Hill PC, Quader CL, Quader KC, et al. Comparison of the guaranteed analysis with the measured nutrient composition of commercial pet foods. J Anim Sci 2008; 206(3):347-361.
2. National Research Council Ad Hoc Committee on Dog and Cat Nutrition. Nutrient Requirements of Dogs and Cats. Washington, DC: National Academies Press; 2006.
This information can be downloaded and printed for use in your practice at today.veterinarypractice.com.

"Beyond the Guaranteed Analysis", *Today's Veterinary Practice*, Shmalberg, 2013

Problem List & Dietary Considerations

• Problem List

Diabetes Mellitus (Type I)
 Obesity → goal is weight loss

• Dietary Considerations

Nutrients of concern
 Estimate energy and protein needs
 Product options (OTC or veterinary therapeutic?)
 Food type (dry/kibble or wet/canned?)
 Number of meals?

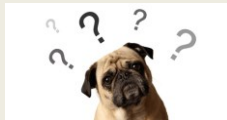


Photo credit: <http://www.safesundogs.com/faq/>

Meal Feeding

Two basic approaches:

- Goal - maximise food utilisation & minimise hyperglycemia
- Feed in conjunction with insulin (before injection)
- Nibble throughout the day (small snacks offered at regular intervals)
- Eat a set amount of food within a set amount of time
 - 1 injection → 2 meals
 Before insulin: 50% DER + 8-10 h later: 50% DER
 - 2 injections → 2 or 4 meals
 2 meals just before injection (+ 2 snacks 6 hours later)

Comparing Label Information

Nutrient	Pedigree Adult	Product A	Product B	Product C
Kcals per 8-oz cup	319	276	260	311
Protein (g/100 kcal)	6.6	11.0	8.2	6.8
Fat (g/100 kcal)	3.2	3.6	3.6	3.6
TDF (g/100 kcal)	n/a	5.1	n/a	6.0
NFE (g/100 kcal)	n/a	8.6	11.7	13.9

OTC vs Therapeutic Products

Nutrient	Pedigree Adult	Royal Canin Diabetic	Hill's Metabolic	Purina DCO
Kcals per 8-oz cup	319	276	260	311
Protein (g/100 kcal)	6.6	11.0	8.2	6.8
Fat (g/100 kcal)	3.2	3.6	3.6	3.6
TDF (g/100 kcal)	n/a	5.1	n/a	6.0
NFE (g/100 kcal)	n/a	8.6	11.7	13.9

Royal Canin Options

Nutrient	Royal Canin Diabetic	RC GI Fibre Response	RC Satiety	RC Calorie Control
Kcals per 8-oz cup	276	287	225	232
Protein (g/100 kcal)	11.0	7.2	11.1	9.4
Fat (g/100 kcal)	3.6	4.9	3.5	2.8
TDF (g/100 kcal)	5.1	6.3	10.2	2.2
NFE (g/100 kcal)	8.6	10.4	10.9	10.1

Pedigree Adult Dog Food:
 Kcals/cup: 319
 Protein: 6.6 g/100 kcal
 Fat: 3.2 g/100 kcal

Hill's Pet Nutrition Options



Nutrient	Hill's r/d	Hill's w/d	Hill's Metabolic	Metabolic & Motility
Kcals per 8-oz cup	245	240	260	291
Protein (g/100 kcal)	10.5	5.9	8.2	8.0
Fat (g/100 kcal)	2.5	2.8	3.6	4.2
TDF (g/100 kcal)	4.2	n/a	n/a	n/a
Soluble (g/100 kcal)	0.5	0.3	n/a	n/a
Insoluble (g/100 kcal)	7.2	8.8	n/a	n/a
NFE (g/100 kcal)	n/a	15.9	11.7	10.4

Pedigree Adult Dog Food:
Kcals/cup: 319
Protein: 6.6 g/100 kcal
Fat: 3.2 g/100 kcal

Nestle Purina Options

Nutrient	Purina DCO	Purina OM	Purina Light & Healthy	Dog Chow Senior
Kcals per 8-oz cup	311	235	291	322
Protein (g/100 kcal)	6.8	10	9.0	8.5
Fat (g/100 kcal)	3.6	2.1	2.6	3.2
Fiber (g/100 kcal)	2.0	3.6	2.3	1.5
TDF (g/100 kcal)	6	8.1	n/a	n/a
Soluble (g/100 kcal)	1.4	0.9	n/a	n/a
Insoluble (g/100 kcal)	4.7	7.2	n/a	n/a
NFE (g/100 kcal)	13.9	15.4	14.7	12.5

Pedigree Adult Dog Food:
Kcals/cup: 319
Protein: 6.6 g/100 kcal
Fat: 3.2 g/100 kcal

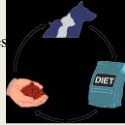
Diet Plan for Princess Grace



- Select a product based on calorie, protein and fat content
- Initial calorie goal target should be aimed for modest weight loss
(400 Kcals/day is a reasonable starting point)
- Consider owner's ability to conveniently purchase and use
- Design feeding plan around owner's ability to meal feed
(Owners need time to get used to administering insulin)
- Include options for treats or small snacks (support human-animal bond)
- Provide suggestions for increased activity (are there ways in which Princess Grace can 'work for her calories' instead of just going to the bowl?)

Monitoring Princess Grace

- When possible, keep pet on current food while owners get used to administering insulin every day
- Closely follow and support owners who are transitioning from ad lib to meal feeding
- Transition from current to new food after one week of insulin injections (make sure owner has enough of the old food for a gradual diet transition)
- Follow-up on suggestions for daily activity
- Be patient and persistent in your educational messages



Case #2: Leo

4.5 year old, MN, domestic shorthair cat
 Current Weight: 7.3 kg
 BCS: 8/9, 40% body fat, ideal Wt. 5.2 kg
 MCS: 3/3 (within normal limits)
 Current diet: Cat Chow dry and Friskies wet



- **Clinical signs:** PU/PD of 1 week duration; lethargy, some inappetence
- **Diagnostic tests:** CBC, Biochem, urinalysis + urine culture
- **Treatment initiated:** PZI-Protamine Zinc Insulin (1 U, BID)

Photo credit: Sarah K. Alwood

Estimaing Energy Needs & Intake

• Energy for Ideal Body Weight:

$$\text{RER} = (\text{BW}_{\text{kg}})^{0.75} \times 70 = 240 \text{ Kcal/day}$$

$$\text{MER} = \text{RER} \times 0.8 \text{ to } 1.0 = 190 \text{ to } 240 \text{ Kcal/day}$$

• Estimated Daily Calorie Intake:

Owner sets down about 1 cup of dry food for nibbling all day, plus 1 Tbsp of wet offered each morning and evening

Cat Chow Healthy Weight provides 364 Kcal per 8-oz cup x 1 cup = 364 Kcal/day (if all food is eaten)

Friskies wet food contains approx 45 Kcal per 2 Tbsp

Estimate of total daily intake is 300 Kcal between dry and wet food

Estimating Protein Needs & Intake

- **Dogs: 2.2 g dietary protein per kg body weight per day**
- **Cats: 4.5 g dietary protein per kg body weight per day**
- 4.5 g x 7.3 kg (current) = 32.9 g/day
- 4.5 g x 5.2 kg (ideal) = 23.4 g/day
- If Leo eats between 250 and 300 Kcals/day, will he also be getting enough to meet a minimum protein estimate?

Cat Chow Healthy Weight: 364 kcals/cup; 3419 kcals/kg; CP 37%

$37 + 1.5 = 38.5$
 $38.5 / 0.3419 = 11.3$ g protein per 100 kcals
 $11.3 \times 250\text{-}300 / 100 = 28$ to 34 g protein per day

'Beyond the Guaranteed Analysis', *Today's Veterinary Practice*, Shmalberg, 2013

Dietary Considerations for Leo

• Problem List

Diabetes Mellitus and Obesity

• Dietary Considerations

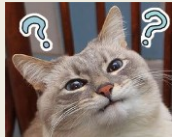
Nutrients of concern

Estimate of energy and protein needs

Product options (OTC or veterinary therapeutic)

Food type (dry/kibble or wet/canned)

Number of meals



Comparing Label Information

Nutrient	Cat Chow Healthy Weight	Product A	Product B	Product C
Kcals per 8-oz cup	364	495	592	390
Protein (g/100 kcal)	10.8	12.1	12.9	12.1
Fat (g/100 kcal)	3.0	5.2	4	3.2
TDF (g/100 kcal)	n/a	n/a	2.7	3.0
NFE (g/100 kcal)	n/a	3.6	14.7	6.6

Comparing Label Information

Nutrient	Cat Chow Healthy Weight	Hill's Metabolic	Purina DM	Royal Canin
Kcals per 8-oz cup	364	495	592	390
Protein (g/100 kcal)	10.8	12.1	12.9	12.1
Fat (g/100 kcal)	3.0	5.2	4	3.2
TDF (g/100 kcal)	n/a	n/a	2.7	3.0
NFE (g/100 kcal)	n/a	3.6	14.7	6.6

OTC Feline Products—Suitable?

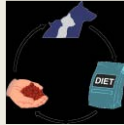
Nutrient	Hill's Ideal Balance Hairball	Purina ProPlan Weight Mgmt	Royal Canin Hairball	RC Weight Care
Kcals per 8-oz cup	366	427	338	276
Protein (g/100 kcal)	8.0	12.4	9.5	12
Fat (g/100 kcal)	4.5	2.8	3.9	3.1
TDF (g/100 kcal)	n/a	n/a	n/a	n/a
NFE (g/100 kcal)	9.7	6.8	n/a	n/a

Diet Plan for Leo

- Select a product based on calorie, protein and fat content
- Initial calorie goal target should be aimed for modest weight loss
(200 Kcals/day is a reasonable starting point)
- Consider owner's ability to conveniently purchase and use
- Design feeding plan around owner's ability to meal feed
(Owners need time to get used to administering insulin)
- Include options for treats or small snacks (support human-animal bond)
- Provide suggestions for increased activity (are there ways in which Leo can 'work for his calories' instead of just going to the bowl?)

Monitoring Leo

- When possible, keep pet on current food while owners get used to administering insulin
- Closely follow owners who are transitioning from ad lib to meal feeding
- Transition from current to new food after one week of insulin injections (make sure owner has enough of the old food for a gradual diet transition)
- Follow-up on suggestions for daily activity



Case #3: Ellie Mae

9.5 year old, F-S, Dachshund
 Current Weight: 13 kg
 BCS: 7/9, 30% body fat, ideal Wt. 10 kg
 MCS: 3/3 (within normal limits)
 Current diet: unbalanced homemade (+ treats)

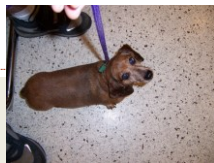
History:
 Diabetes Mellitus dx at 9 years of age
 Insulin (type, amount, frequency)
 Glucose NOT controlled
 2-3 day history of PU/PD and vomiting

Hospitalised: further diagnostics → pancreatitis



Photo credit: Sarah K. Alwood

Ellie Mae's Diet History



Past: Commercial puppy food until 12 months of age
 Commercial adult dry kibble from 1 year to 8.5 years

Most recent 12 months:
 Owner decided to feed homemade -- made up his own recipe
 Beef, chicken, turkey or pork + rice, carrots, peas, squash
 Treats include ice cream, cheese, apple slices, bananas
 Total amount separated into 2 feedings per day

Photo credit: Sarah K. Alwood

Energy & Protein



Estimated Energy Requirement: 480 Kcals /day

Maintenance Energy Needs:

$RER \times 1.2 = 480 \text{ to } 580 \text{ Kcals/day}$

Minimum Protein Estimate: $2.2 \text{ g/kg/day} = 28 \text{ grams}$

Photo credit: Sarah K. Abood

Dietary Considerations

- Problem list

Diabetes Mellitus Type I (uncontrolled)
Pancreatitis

- Dietary treatment

Diet options during hospitalization:

- commercial canned
- enteral liquid
- homemade food

Route of delivery?

Number of meals?

- since hospitalization: 2 insulin injections per day

****Avoid feeding diet in hospital that you want patient to eat at home**

Multi-Phase Diet Plan



- Short-term: start with low-fat commercial food while **working with owner to get dog's blood glucose regulated**
- Mid-term: transition dog from commercial food to balanced homemade diet
- Long-term: modify caloric goal to reach ideal body weight; once insulin is effective, energy requirement will drop

Photo credit: Sarah K. Abood

Case #4: Frankie



12 year old, M-N, Siamese

Current Weight: 3.1 kg

BCS: 3/9, 10% body fat, ideal Wt. 4.1kg

MCS: 2/3 (within normal limits)

Current diet: veterinary therapeutic diabetic diet--
canned (2 meals, 12 hrs apart)

- **Clinical signs:** lethargy, inappetence, weight loss
- **Further diagnostics** → renal disease

Energy & Protein



Estimated Energy Requirement: 163.5 Kcals /day

Maintenance Energy Needs:

RER x 1.5 to 1.8 = 245 to 295 Kcals/day

Minimum Protein Estimate: 4.5 g/kg/day = 14 grams

Dietary Considerations

• Problem List

Diabetes Mellitus (Type II)
Renal disease
Inappetence
Weight Loss

• Dietary Considerations

Diet options during hospitalization:

- diabetic product or renal product?
- canned or dry kibble
- enteral liquid

Route of delivery:

- is patient a candidate for feeding tube?

Multi-Phase Diet Plan

- **Short-term:** place feeding tube to deliver controlled amount of food while cat is in hospital; liquid diet for NE tube or canned gruel through E-tube
- **Mid-term:** transition cat from hospital to home and re-acclimate to former diet for convalescence period of 7-14 days; work with owner to carefully monitor food intake, BW and BCS
- **Long-term:** gradually introduce renal diet over 7-10 days; work with owner to carefully monitor food intake, BW and BCS

OTC vs Feline Veterinary Therapeutics

Nutrient	Current Diet	Renal 1	Renal 2	Renal 3
Kcals per 8-oz cup	592	521	373	398
Protein (g/100 kcal)	12.9	6.6	6.6	6.6
Fat (g/100 kcal)	4	5.1	4.3	3.2
TDF (g/100 kcal)	2.7	n/a	2.7	2.2
NFE (g/100 kcal)	14.7	9.7	10.5	12

Feline Renal Options

Nutrient	Feline OTC	Hill's g/d	Hill's k/d	RC Renal Support	RC Multi-function	Purina NF
Kcals per 8-oz cup	350	297	521	373	238	398
Protein (g/100 kcal)	10	7.9	6.6	6.6	11.4	6.6
Fat (g/100 kcal)	3.7	4.5	5.1	4.3	3.0	3.2
TDF (g/100 kcal)	n/a	n/a	n/a	2.7	7.8	2.2
NFE (g/100 kcal)	n/a	9.7	9.7	10.5	9.0	12

What's Happening in DKA?



Pathophysiology of DKA



DKA defined by hyperglycemia, ketone bodies and acidosis

Anorexia, vomiting, diarrhea can lead to hypovolemia, hypoperfusion and lactic acidosis

Once the respective renal thresholds are reached, both ketones and glucose act as osmotic diuretics

Negatively charged ketones require concurrent renal elimination of positive cations...so loss of electrolytes is common

Excessive amounts of Na, Cl, K, P and water can be lost—leading to volume contraction and tissue hypoperfusion

Treatment Goals for DKA Patients?



Treatment Goals for DKA

- Address hypovolemia with IV fluids (balanced isotonic solution)
- Correct electrolyte abnormalities with appropriate supplementation
- Insulin therapy generally delayed 4-6 hours after fluids initiated
- Once patient is stabilized, determine best delivery route for nutrition
- If patient can eat orally, deliver food per os
- If patient cannot or will not take food orally, plan for enteral nutrition delivery
- If GI tract is not functional, plan for parenteral nutrition

Case #5: Spike



13 year old, MN, Poodle

BW: 6 kg

BCS: 4/9, MCS: 2/3

Controlled diabetic for past 5 years

Inappetent 2 days post-dental, became dehydrated and lethargic

On PE → characteristic acetone smell to breath

Further Diagnostics → ketones in urine, glucose in urine

Photo credit: Sarah K. Aboud

Plan for Spike

Rehydrate patient first
Correct electrolyte abnormalities
Normalize blood glucose

Initiating nutrition is not an emergency, but supporting the patient is critical

Place feeding tube to deliver controlled amount of food while dog is in hospital; liquid diet for NE tube or canned gruel through E-tube

Case #6: LuLu Bell



15 year old, Female, Spayed, DSH

BW: 2.5 kg

BCS: 3/9, MCS: 2/3

Controlled diabetic for past 2 years

Acute inappetence, dehydration, lethargy

Further Diagnostics → ketones in urine, glucose in urine

Photo credit from <http://fdmb-cin.blogspot.com/2011/05/>

Plan for LuLu Bell

Rehydrate patient first

Correct electrolyte abnormalities

Normalize blood glucose

Initiating nutrition is not an emergency, but supporting the patient is critical

Parenteral or Enteral Delivery?

CONCLUSION

