Diabetes in the Real World
Diabetes Mellitus

- Common hormonal disorder of dogs and cats due to insufficient insulin being produced or cells not being able to respond to insulin

- Results in hyperglycaemia and consequent glucosuria leading to clinical signs of diabetes
The Role of Insulin

Insulin is a hormone produced by the PANCREAS within Islets of Langerhans by β-cells. Insulin is released in response to an increase in blood sugar

• Insulin acts to reduce blood sugar by facilitating glucose movement into cells

• It also has anabolic effects promoting protein synthesis and fat deposition
“Diabetic cats aren’t the same as diabetic dogs”
Why?

- Different causes…..
- **Dogs = Type 1 diabetes most common**
  Auto-immune or idiopathic ß-cell destruction, commonly resulting in absolute deficiency of insulin

- **Cats = Type 2 diabetes most common**
  Combination of insulin resistance and/or impaired insulin secretion
Clinical Signs of Diabetes Mellitus

- **Polyuria Polydipsia**
- **Polyphagia**
  - Brain thinks it is starved
- **Weight loss**
  - anabolism to create energy

Or

- **Anorexia, vomiting, collapse associated with ketoacidosis**
Diagnosis of Diabetes Mellitus

- History & consistent clinical signs
- Urine – glucose +/- ketones C&S
- Full Bloods
- Fructosamine
  - HEALTHY 221-341
  - DIABETIC 325-834
  - Well controlled 350-450  Poor control >500
- Other tests
  - Cushings
  - Thyroid
  - Pancreas
  - Acromegaly
AGE ~ Middle-aged– older dogs & cats
SEX ~ Entire bitches, neutered male cats
BREED PREDISPOSITIONS
OBESITY- insulin depletion
HORMONES- entire bitches, Cushings
Core Treatment Goals

Improve quality of life for pet and owner by:

- **Minimising** the clinical signs of diabetes
- **Minimising** the risk of hypoglycemia
- **Minimising** the risk of long term complications by controlling blood glucose

- cataracts in dogs
- polyneuropathy in cats
Management of Diabetes Mellitus

- Spay- before stabilisation (unless DKA)
- Treat complicating factors if possible (e.g. Cushings, UTI, dental disease)
- Diet
- Exercise
- Insulin
FEED THE ANIMAL IN FRONT OF YOU

**Dogs** – Higher fibre = better glycaemic control to reduce post prandial surge

- dry > wet

**Cats** – Higher protein: lower CHO

- wet > dry

BUT cats are Grazers

Feed to ideal weight – ½ ration at each injection if twice daily dosing
First Stabilisation Consult

1) Hand holding

2) Explanation of diabetes at a level client can understand

3) Insulin – Storage, Administration, Vetpen/syringes, Needle disposal

4) Signs of HYPOglycaemia

4) Routine- including diet exercise and insulin timings

5) Monitoring at home
A Moment to Consider the Owner.....

Struggling to handle syringes? Unable to see the dosing line? Or simply scared?

A survey published in The Journal of the American Animal Hospital Association said 50% of newly diagnosed diabetic pet owners had fear of injecting.
VetPen™
- the veterinary insulin injection pen
Benefits of VetPen

- Simple to use and less intimidating
- Easier to use if owner has manual dexterity issues, poor eyesight
- Increased dosing accuracy
Useful Support Items

• Diabetes Training for Pet Owners– download from www.caninsulin.co.uk under Support Materials or order hard copy from your MSD Area Manager

• Diabetes in Cats/Dogs Owner Manual

• Diabetes Owner Website – www.diabeticpets.co.uk

• VetPen Instructional DVD

• Injection Training
Initial Caninsulin Treatment:
- 0.25iu/kg for small dogs** (<10kg)*
- 0.25-0.5iu/kg for larger dogs*
- 1 iu twice daily for cats with BG <20mmol/l
- 2iu twice daily for cats with BG >20mmol/l

*1/3 dogs stabilise on once daily  ** Terriers
Setting Realistic Expectations: Treatment stages

- Diagnosis
- Monitoring
- Stabilisation
- Maintenance

3 Months
Blood Glucose Curve Protocol

- First blood sample after morning meal and prior to insulin injection
- Subsequent blood samples at least every 2 hours for at least 8 - 12 hours
- Plot blood glucose concentrations against time
- Nadir is variable (4-7 hours typically)
Stabilisation of Diabetes Mellitus

• MAINTAIN INITIAL DOSE (UNCHANGED) FOR 7-21 DAYS
• This will allow time for the animal’s blood glucose levels to reach a steady state.
• Do not alter the dose more frequently than every 3 days in dogs
• and
• 7 days in cats.
• Establish owner routine.
Further stabilisation clinic consult

Every 7-21 days until stable

- **Look at the animal!**
  - Appearance of the animal
  - Weight
- Monitor water intake – Diabetic diaries (at home)
- Monitor blood glucose – blood glucose curve
- Other tests
  - Urine glucose (at home)
  - Fructosamine
- **Look at the animal!**
Blood Glucose Curves

• If clinical signs *and* the blood glucose curve suggest the dose is insufficient then increase by 10% for dogs and by 0.5-1iu for cats and small dogs (<10 kg)
• Reassess in 7 days (no earlier than 3 days in dogs)
• Repeat these steps until there is resolution in clinical signs ie no longer Pu/Pd
• Do not be tempted to chase the numbers for the “ideal” BG curve!!
Unstable Diabetics

1) poor insulin storage & administration
2) underlying disease - UTI, Dental Disease, In season, cushings
3) Inconsistent diet
   Inconsistent activity

IN CATS? ACROMEGALY OR REMISSION
Somogyi Overswing

Blood glucose (mmol/l)

Time

9am 11am 1pm 3pm 5pm 7pm 9pm 11pm 1am 3am 5am 7am 9am
Long Term Monitoring clinics

- Every 3 months:
  - Monitor
  - weight
  - thirst/water intake
  - demeanour
  - appetite
Key points regarding Caninsulin

• BID use offers superior BG control

• Maintenance dose typically <1IU per Kg per dose

• Average is 0.6-0.8 IU per kg per dose

• Investigation warranted if using >1IU per kg and little response

• Nadir usually 4-7 hours post injection (variable in each patient)
Home Blood Glucose Monitoring

- The future for pet diabetes management
Urine Glucose and Ketone Monitoring

- Easy, painless, inexpensive
- Negative when diabetes is well controlled
- Fluctuates substantially with stress, concurrent illness, change in activity level and overeating
- Serious limitations
- More useful in dogs than in cats
Limitations of Urine Monitoring

- Time lag between the blood glucose and urine glucose levels
  - Reflect average blood glucose levels in the preceding period
  - Should not be used to try to achieve regulation
- Do not show if blood glucose was too low
- Inaccuracy exaggerated in animals that urinate infrequently
  - Reflect average blood glucose concentration over a longer period
- Can be used once animal stable to check for glucose spilling over into urine
Which factors increase the treatment success of a diabetic pet?

- Insulin
- Consistent routine
- Feeding
- Exercise
- Regular monitoring
- DEDICATED WELL-EDUCATED OWNER
Factors to consider in the uncontrolled Diabetic

• Dose delivery
• Owner compliance
• Concurrent problems
• Other medications
• Stress response
• Feeding regime
• Remission

If in doubt, reduce the dose and re-evaluate