Detailed Case Report – Chisai

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Herbal treatment of Feline Diabetes

Abstract:

Diabetes Mellitus is relatively common in older cats and can be challenging to treat in patients that are more fearful and difficult for owners and veterinarians to physically handle for blood glucose testing and insulin injections. These animals may be left untreated and/or euthanized due to poor quality of life. Chisai was one such cat. She allowed minimal handling without sedation, and sedation events had lasting adverse behavioral effects for her. Her owner travelled periodically as well, and for these reasons had chosen euthanasia instead of injectable insulin if Chisai could not be kept comfortable. Using Western herbal formulas and dietary changes, she lived 4 years comfortably with few clinical signs, and no discernable discomfort.

Chisai – 10-year old spayed female domestic shorthair cat (DSH) cat, 11 lbs

History:
Chisai presented on July 29, 2011 for a housecall examination and evaluation for herbal treatment of diabetes. She had a 1-year history of not doing well. Problems ranged from constipation and anal gland impactions to flea infestation and subsequent over-grooming along lateral sides and hindlimbs.

Chisai was seen for polyuria and polydipsia at the previous veterinarian's office six months earlier on January 19, 2011. Bloodwork revealed a glucose level of 381 mg/dl (normal 70-120) and a diagnosis of type 2 diabetes mellitus was made. The owner did not wish to give insulin therapy, mainly due to frequent traveling and the difficulty of having pet sitters give injections, but also due to Chisai's personality and general struggle with handling. Oral hypoglycemic medication was also declined due to inability to administer pills. The previous veterinarian had tried diet change, but continued to use a dry form. Diets were chosen upon recommendations from the Science Diet helpline. Hill's DM diet was given initially and when no improvement occurred, this was switched to Hill's K/D dry, which was her current diet upon my initial examination. Neither of these dietary changes decreased the clinical signs of diabetes. Blood glucose continued to range between 321-381 mg/dl on rechecks over 6 months with the previous veterinarian. The cat would become extremely stressed on these visits and during blood draws, so some elevation of glucose is expected, though this level is still high. Signs of PU/PD continued, as well as a dry haircoat and bare skin areas from excessive grooming. She had lost 4 pounds (from 15lbs) since first being seen in January and did seem to be a bit more active according to her owner.

7/29/11 Physical exam:
My services were requested for herbal supportive treatment specifically, and for the convenience of housecall visits with an anxious cat. On physical exam, 7/29/11, Chisai weighed 11.14 pounds with a Body Condition Score (BCS) of 3.5/5, slightly overweight. Her coat was rough and dry with dandruff flakes and areas of non-pruritic alopecia along the hindlimbs, her teeth and gums appeared healthy with a pale pink tongue, and she was described as mildly "heat-seeking" by her owner. Ectoparasites had been ruled out with prior treatment and the current dermatologic signs appeared to be due to excessive grooming, with a possible combination of factors due to her general poor health and anxiety.

With a water intake of approximately 2 full bowls (2 cups) daily, PU/PD was significant. Polydypsia in a cat is considered at water intake levels greater than 100 ml/kg/day. Chisai's water intake was approximately 500 ml/kg/day. Chisai was generally nervous and would only tolerate examination in small steps, though according to her owner she was more relaxed and friendly with visitors than in her younger years. Gentle attempts at drawing blood were unsuccessful and Chisai's owner declined having her taken into the clinic for further testing or treatment, even with the suggestions of sedation for handling. She no longer wanted to put her through that kind of stress as it took days to weeks for her to recover a somewhat more relaxed demeanor. Insulin therapy and oral Glipizide pills, though less ideal, were discussed and once again declined. Prognosis without insulin was given as poor and the owner was educated to

watch for clinical signs of decline caused by untreated diabetes such as inappetance, lethargy, and neurological signs including changes in gait, seizure, coma and death. The owner was prepared to euthanize rather than initiate insulin therapy. In light of these decisions, treatment options were limited to what Chisai would willingly take orally.

Pathogenesis and conventional treatment:
Diabetes mellitus (DM) is relatively common in middle-aged and older cats, with obesity being a significant contributing factor along with diets high in carbohydrates, inactivity of indoor cats, and genetics. Chronic systemic inflammation, particularly involving the cytokine tumor necrosis factor-alpha (TNF-α), has been shown to be a factor in insulin resistance (Little, 2012). Adult onset type 2 DM, the most common type of diabetes in cats, is due initially to insulin resistance in peripheral cells, leading to over activity and progressive damage to the pancreatic beta islet cells, decreasing production of insulin over time. Insulin is necessary to allow glucose to pass from the bloodstream into cells to be used by the body, if this cannot occur, glucose then accumulates in the bloodstream and is secreted by the kidneys once it overflows the renal threshold at a blood glucose of approximately 288 mg/ml. In cats, which are obligate carnivores adapted to a low carbohydrate/high protein diet, amino acid (protein) ingestion is a stimulus for insulin production instead of glucose, making dietary management important for diabetes treatment (Greco, 2014). Injectable insulin therapy is considered the treatment of choice for diabetic cats, though it is possible for some diabetic cats, when diagnosed early in the disease process, to go into remission with dietary changes alone or combined with short-term insulin therapy. The disease may or may not recur within a few years after remission.

Western herbal medicine approach:
In Chisai's case, having clinical signs of diabetes for over six months, the possibility of achieving remission or full control of the diabetes without the use of insulin was poor. Treatment goals were based on slowing the disease process by reducing inflammation and supporting the organ systems. Herbs with anti-inflammatory actions, particularly against TNF-α had the potential to help on multiple levels. Specific goals were a reduction of blood glucose levels and prevention of insulin resistance, while improving overall health and immunity to avoid diabetic immunosuppression, improving gastrointestinal function to reduce constipation and anal gland impactions, supporting the dermatologic system to reduce inflammation and improve haircoat, supporting the cardiovascular system to reduce long term vascular damage of diabetes, in addition to supporting the nervous system and any anxiety that might affect healing, and general well-being. Along with herbal medications, dietary changes were a significant part of the therapeutic plan.

The following herbs were selected for Chisai's initial formula (see material medica for details):

- **Gymnema *(Gymnema sylvestre*)** – Gymnema was chosen primarily for its hypoglycemic and pancreatic supportive actions that have been shown to be due to a combination of physically decreasing glucose absorption as well as stimulating insulin production along with the regeneration of pancreatic β-cells (Tiwari et al., 2014; Ahmed et al., 2010). In addition to these effects, gymnema has antioxidant and anti-inflammatory actions that

have been shown to be neuroprotective in mice with induced diabetic neuropathy (Fatani et al., 2015).

- **Rehmannia (*Rehmannia glutinosa*)** – In addition to its hypoglycemic effects, rehmannia is considered to be an adaptogen, supporting the body's response to stress and illness. It has been found to be protective of liver and kidney function, has antioxidant and anti-inflammatory properties and is a mild laxative, which was needed with Chisai's tendency toward constipation. In diabetic mice, rehmannia decreased blood levels of TNF-α, IL-6 among other inflammatory indicators (Zhou et al., 2015), and has shown neuroprotective potential (Zhang et al., 2008; Liu et al., 2013). Rehmannia's use for inflammatory skin conditions was also considered to be a potential benefit with Chisai's dermatological signs.

- **Dandelion root *(Taraxacum officinale*)** – Dandelion was selected to support the function of Chisai's gastrointestinal system, liver and pancreas along with providing mild laxative properties. Having anti-inflammatory and antioxidant effects, dandelion has shown protective effects against pancreatitis, specifically by reducing interleukin (IL)-6 and TNF-α production (Seo et al., 2005). The constituent taraxasterol has recently been found to have protective effects against rheumatoid arthritis in mice by significantly reducing clinical signs as well as decreasing the inflammatory indicators TNF-α, IL-1β, IL-6 and nuclear factor-κB, along with significantly reducing nitric oxide, prostaglandin E2 and cyclooxygenase-2 (Cox-2) levels compared with a rheumatoid arthritis control group (Jiang et al., 2015).

- **Panax ginseng (*Panax ginseng*)** – Panax was chosen for its general adaptogenic support and specific indication for diabetes. It has hypoglycemic actions and is supportive of liver and pancreatic functions primarily through its antioxidant and anti-inflammatory effects (Gui et al., 2016; Kim et al., 2016; Yuan & Chung, 2010). The constituent protopanaxatriol ginsenoside Re was found to inhibit inflammation and colitis in mice by inhibiting the expression of TNF-α and IL-1β as well as COX-2 and iNOS, at least partially through inhibiting the activation of the inflammatory nuclear factor kappa B (NF-κ B) pathway (Lee et al., 2012).

- **Milk Thistle (*S. marianum*)** – Milk thistle is well known for its protective effect on the liver, and has a similar action on pancreatic cells (Wang et al., 2012). It is also a strong antioxidant and has anti-inflammatory and demulcent (mucoprotective) properties. It added warmth to the formula and the glycerin extract form significantly improves palatability.

Herbal Formula and dosage:

- 7 ml Gymnema *(G. sylvestre*) 1:1
- 7 ml Rehmannia (*R. glutinosa)* 1:2
- 3.5 ml Dandelion root *(T. officinale*) 1:2
- 3.5 ml Panax ginseng (*P. ginseng*) 1:2
- 7 ml Milk Thistle glycetract (*S. marianum*) 1:1

1ml orally twice daily (28ml) The herbal formula was gradually introduced over 5 days, given in a small amount (~1Tbsp) chicken baby food and was easily accepted.

Safety and potential herb-drug interactions:
All herbs used in this formula have a wide dose range for safety and the majority of them have been used as food. Although Chisai was not on insulin, a similar formula could be used in those cases keeping in mind the concern for hypoglycemia when treating diabetic animals with insulin and herbs together. As long as treatment remains consistent daily and care is taken when dosage adjustments are made this can be considered an advantage as the dosage of insulin may potentially be reduced.

Additional treatment recommendations:
Chisai's owner was not prepared to commit to a homemade diet for many reasons, including a busy schedule and regular and extended traveling. It was then my priority to switch her to a moist diet, as diabetic cats are often shown to improve drastically with this one change, reducing the dietary carbohydrate levels inherent to dry kibble. Chisai was switched to a high protein/ low carbohydrate canned diet (Wellness brand) along with a fish oil supplement (Welactin 250 mg/day). Omega-3 fatty acids have been found to have anti-inflammatory and antioxidant benefits and to be useful in the treatment of diabetes as well as supporting general cell health, including ocular, renal, dermatologic, neurologic, cardiovascular, gastrointestinal and other organ systems (Bauer, 2011).

9/7/11- Follow-up:
Chisai was started on the dietary change first (gradual switch to Wellness canned), as the owner was traveling for a few weeks. This modification did begin to help, though the owner feels that significant change occurred after the addition of the herbal formula on August 17, 2011. A recheck on 9/7/11 revealed a significant reduction in water intake from 2 bowls, approximately 2 cups (500ml), of water a day to less than ¼ cup (60ml) per day, and an estimated reduction of at least half of the urine volume. Chisai was more active, jumping up and more playful. Another significant improvement was that her haircoat was no longer dry and flaky, and had regrowth of hair beginning in the areas of alopecia. Her weight had decreased to a healthy 10.6 pounds.

Ideally, further monitoring would include bloodwork and in-home glucose testing, however Chisai declined bloodwork. Without the use of insulin, the danger of hypoglycemia was not a concern. The follow-up plan included continuation of the dietary and herbal therapies, and monitoring of physical signs, weight and urine glucose.

2/14/2012 – **Urinalysis** (the first and only sample the owner was able to obtain free-catch):
Glucose – 2000mg/dl
Specific Gravity – 1.046 (well concentrated which may have contributed to such a high glucose accumulation)
Ketones negative, no wbc or rbc seen

Following this significantly elevated urine glucose, the herbal dose was increased from 1ml BID to 1.5 ml BID. A small amount of marshmallow root was added to the formula for palatability and gastrointestinal support.

Dose modification and increase:

- 28 ml Gymnema *(G. sylvestre*) 1:1
- 28 ml Rehmannia (*R. glutinosa)* 1:2
- 14 ml Dandelion root *(T. officinale*) 1:2
- 14 ml Panax ginseng (*P. ginseng*) 1:2
- 28 ml Milk Thistle glycetract (*S. marianum*) 1:1
- 8 ml Marshmallow glycetract (*A. officinalis*) 1:5

1.5 ml orally twice daily. (120ml)

4/2/2012 – Using Purina Glucotest urine "confetti sprinkles" in the litter for 5 days, the owner reported most urine measurements at 600mg/dl (the highest reading on the strips) and morning readings at 300mg/dl. Although clinical signs of diabetes appeared to be resolved, blood glucose levels remained above normal as indicated by spill-over into the urine. At this recheck she continued to do well, her weight was 10.5 pounds and her water intake measured at 10-20ml daily plus water content of the canned diet.

Over the next two years, Chisai's weight remained stable between 10.5 and 10.6 pounds, and she was active and content. Formal and informal rechecks occurred regularly with delivery of herbal refills. She always came for a greeting at the door, but only allowed limited physical handling.

6/11/14 – Chisai began to show increased signs of diabetic effects with an increase in water intake (though not to the degree seen initially) and the slow development of cataracts. Her activity level was slowly decreasing and she was also developing areas of alopecia again along her legs and abdomen. Her weight dropped slightly to 10.3 pounds. The herbal dose was increased from 1.5ml to 2ml twice daily and milky oat glycetract was added to the formula for anti-anxiety/nervous support, along with 1ml of ginger glycetract added to the 4 oz bottle for warmth and circulatory stimulation as well as anti-inflammatory action and gastrointestinal support.

The inevitable decline in the face of untreated diabetes along with quality of life considerations were discussed for continued monitoring and adaptations to improve what time Chisai had left. At this time, Chisai still seemed quite content and euthanasia was not a consideration.

Dose modification and increase:

- 28 ml Gymnema *(G. sylvestre*) 1:1
- 28 ml Rehmannia (*R. glutinosa)* 1:2
- 14 ml Dandelion root *(T. officinale*) 1:2
- 14 ml Panax ginseng (*P. ginseng*) 1:2
- 28 ml Milk Thistle glycetract (*S. marianum*) 1:1

- 8 ml Marshmallow glycetract (*A. officinalis*) 1:5
- 8 ml Oat glycetract (*A. Sativa*) 1:2.5
- 1 ml Ginger root glycetract **(***Z. officinale***)** 1:5

2 ml orally twice daily. (129 ml)

Following this dosage adjustment, dermatological signs improved and general clinical well-being and activity increased for some time although cataract formation continued.

4/21/15 – Chisai was again experiencing a gradual decline, and we were unable to increase herb dose without rejection of food. Chisai began to show a periodic mild plantigrade stance, and occasional bouts of constipation that resolved with pumpkin added to diet as needed.
Gotu kola was added to support the neurological and circulatory systems and for its connective tissue benefits for potentially arthritic joints as well as skin support.

Dose modification:

- 26 ml Gymnema *(G. sylvestre*) 1:1
- 26 ml Rehmannia (*R. glutinosa)* 1:2
- 14 ml Dandelion root *(T. officinale*) 1:2
- 16 ml Panax ginseng (*P. ginseng*) 1:2
- 22 ml Milk Thistle glycetract (*S. marianum*) 1:1
- 12 ml Marshmallow glycetract (*A. officinalis*) 1:5
- 12 ml Gotu Kola *(C. asiatica*) 1:1
- 1 ml Ginger root glycetract **(***Z. officinale***)** 1:5

1.5 ml orally twice daily. (128 ml)

Chisai showed continuing signs of decline over the last few months of her life. These included an increase in PU/PD, mild occasional plantigrade stance, decreasing appetite and activity. Her weight decreased to 9.3 lbs. Constipation became more of an issue again, but was managed well with Metamucil and canned pumpkin. Nearing the end, she showed no discernable signs of nausea, vomiting, respiratory distress or other physical discomfort or pain, and seemed content to spend most of her time sleeping comfortably in her bed. As she remained comfortable and her owner was home and able to care for her, euthanasia was reserved for emergency needs only. Chisai died at home on 8/26/2015.

Discussion:

The herbal selection for this case included multiple plants with specific indications in the treatment of diabetes, including hypoglycemic actions as well as support for organ functions including the pancreas, liver, immune and gastrointestinal systems. All herbs had anti-inflammatory and antioxidant activity contributing to general comfort in an aging cat with the potential to reduce systemic damage and clinical signs of chronic diabetes including neuropathy and immunosuppression. Studies have shown many herbs have anti-inflammatory action that reduces TNF-*a* and other cytokines through multiple modes of action, which may be of benefit in the diabetic patient due to the links with pancreatic inflammatory causes.

Chisai lived comfortably for another four years after the initial dietary changes and herbal treatment began. Although it was not an ideal treatment situation, initial clinical response to the dietary change and herbal therapy were dramatic and her owner was very pleased. Her owner felt that she was well controlled clinically and was committed to continuing the herbs, fish oil and canned diet. Chisai took all medications readily, which made it easy for a pet-sitter to give the herbs in food.

Although the clinical signs were significantly controlled, diabetes was not cured in this patient. As is indicated by the positive glucosuria, blood glucose levels remained above the renal threshold (288 mg/ml) for most if not all of her remaining life. What the disease progression might have been with dietary changes alone is unknown as every case of feline diabetes is unique. Without follow-up bloodwork, it is impossible to know if Chisai's ultimate decline was due to diabetic complications or another compounding medical condition. Overall, her comfort level and quality of life remained high and this, along with her relative longevity, appeared to be a significant benefit of the herbal therapy.

Materia Medica:

Gymnema *(G. sylvestre*)

Family: Apocynaceae (formerly Asclepiadaceae)
Parts used: Leaves, root
Chemical Constituents: triterpene saponins (gymnemic acids, gymnemasaponins, gymnemasides), the peptide gurmarin, anthraquinones, flavones, resins, tannins, and others
Clinical actions: hypoglycemic, pancreatic trophorestorative, astringent, mildly diuretic, antioxidant, anti-inflammatory, neuroprotective (Wynn & Fougere, 2007; Tiwari et al., 2014; Fatani et al., 2015)
Energetics: Slightly cooling
Indications: Used in the treatment of diabetes: reduces glucose by decreasing taste and cravings of sugar in humans, but also decreases glucose absorption, supports pancreatic cells and increases insulin production (Tiwari et al., 2014; Ahmed et al., 2010).
Contraindications: None unless combined with hypoglycemic medications- see below.
Potential Drug/Herb Interactions: May decrease blood glucose, use caution with glucose lowering drugs such as insulin.
Dose: Dried: 50-500mg/kg daily
Liquid extract (1:1) 1.0-1.25 ml/10kg daily, give with meals.

Rehmannia (*R. glutinosa)*

Family: Orobanchaceae (formerly Scrophulariaceae)
Parts used: Root (cured or raw)
Chemical Constituents: Bitter constituents (iridoids including catapol, ajugol, rehmanniosides), phenylethanoid glycosides (verbascoside, echinacoside), sugars, sterols, and others.

Clinical actions: Adaptogen, antioxidant, anti-inflammatory, hypoglycemic, hypolipidemic, mild laxative, bitter tonic, antipyretic, antibacterial, diuretic, hepatoprotective, renal protective, and potentially neuroprotective (Wynn & Fougere, 2007; Zhu et al., 2016; Zhang et al., 2008; Liu et al., 2013; Zhou et al., 2015).
Energetics: sweet, slightly warm (cooked form); sweet, cold, slightly bitter (raw)
Indications: In diabetes, used to decrease blood glucose and may also protect against neuropathy. Antioxidant and anti-inflammatory effects may be generally beneficial. Also used in the treatment of renal and hepatic disease, atopic dermatitis and other dry inflammatory skin diseases.
Contraindications: Can cause diarrhea, contraindicated with diarrhea and indigestion.
Potential Drug/Herb Interactions: None known
Dose:

Dried herb: 50 - 100 mg/kg divided daily if extracted and dried; triple or quadruple dose for unprocessed herb.
Decoction: 5-30 gm /cup water, give ¼-½ cup per 10kg divided daily.
Tincture (usually 25% - 35% ethanol) 1:2 – 1:3 1.0-2.0 mL per 10kg divided daily.

Dandelion (*Taraxacum officinale*)

Family: Asteraceae
Parts used: Roots, leaves, flowers
Chemical Constituents: Sesquiterpene lactones (such as: taraxinic acids, triterpenes: beta-amyrin, taraxol and taraxerol); carotenoids, including lutein; inulin; saponins; fatty acids such as myristic acid; flavonoids, including apigenin, luteolins and chrysoeriol; minerals (up to 4.5% potassium); phenolic acids (chicoric and monocaffeyltartaric acids); coumarins (cichoriin and aesculin); sitosterol, stigmasterol and taraxasterol; sugars; vitamin A; quercetin gylcocydes
Clinical Actions: Digestive/bitter tonic, liver tonic, alterative (improves overall tissue metabolism), choleretic (stimulates bile production by hepatocytes), cholagogue (stimulates release & flow of bile), hepatorestorative, hepatoprotectant, diuretic, pancreatic stimulant, mild laxative, antihypertensive, anti-inflammatory (Wynn & Fougere, 2007; Jiang et al., 2015; Seo et al., 2005).
Energetics: Bitter, cold, dry
Indications: Liver disease; gallstones; pancreatitis; diabetes; GI disease including signs of dyspepsia, loss of appetite, flatulence, intestinal bloating and constipation; oliguria; cystitis; edema; muscular rheumatism; chronic skin diseases
Contraindications: Bile duct obstruction and acute bile duct inflammation, intestinal obstruction.
Potential Drug/Herb Interactions:
- High mineral content may interfere with the absorption of quinolone antibiotics.
- Increase in potassium, diuresis and mild BP lowering effects should be taken into account with other medication use. (though potassium in dandelion leaves could also serve to replace potassium lost through diuresis)

Dose:

Root or whole plant: Tincture (25-70% ethanol): 1:2 – 1:3: 0.5-1.5 ml per 10kg divided daily.

Leaf: Tincture (25-70% ethanol): 1:2-1:3: 1.0-2.5ml per 10kg divided daily.

Panax ginseng (*P. ginseng*)

Family: Araliaceae
Parts used: Root, berries gaining popularity for diabetes
Chemical Constituents: Triterpenoid saponins (ginsenosides), sterols, flavonoids, sesquiterpenes, vitamins, and others
Clinical actions: Adaptogenic, stimulant, tonic, antioxidant, anti-inflammatory, hypoglycemic, immune stimulant, hepatoprotective, cardioprotective, protective of the pancreas, anti-arrhythmic, increases adrenocorticotrophic hormone (ACTH) (Wynn & Fougere, 2007; Kim et al., 2016; Lee et al., 2012; Gui et al., 2016; Yuan & Chung, 2010).
Energetics: Sweet, slightly bitter, slightly warming
Indications: Short term benefits for stress or disease recovery; immune support; long-term use in geriatric patients and those with chronic illnesses particularly diabetes, liver disease, and cancer.
Contraindications: Avoid in hypertension due to potential contraindication
Potential Drug/Herb Interactions: Rare. Potential interaction with warfarin, also uncertain interference with metabolism of substances using the cytochrome P450(CYP)3A or P-gp metabolism pathways and having a narrow therapeutic range. (Ramanathan & Penzak, 2016)
Dose:

Dried herb: 25-75 mg/kg divided daily
Decoction: 5-30 gm /cup water, give ¼-½ cup per 10kg divided daily
Tincture (60% - 70% ethanol) 1:2 – 1:3 : 0.5-1.5 mL per 10kg divided daily

Milk Thistle (*Silybum marianum*)

Family: Asteraceae
Parts used: Primarily fruit (often referred to as seeds), flower heads, leaves
Chemical Constituents: Silymarin -a flavonoid complex w/ 3 parts: silibinin, silidianin, and silichristine. Silibinin is thought to be the most active.
Also contains: sterols, fixed oil, flavonoids (apegenin, quercitin, kaempferol), lignans**,** biogenic amines (tyramine, betaine), and mucilage.
Clinical Actions: Hepatoprotective, protects cell membranes generally (protective for kidney and pancreas in addition to liver), hepatic trophorestorative, demulcent (soothes, protects and restores mucous membranes), cholagogue (stimulates release & flow of bile), galactagogue (promotes lactation), antioxidant, anti-inflammatory. (Wynn & Fougere, 2007; Wang et al., 2012).
Energetics: Bitter, warm
Indications: Hepatitis, cholangiohepatitis, liver damage or disease, abnormal liver function, hepatic lipidosis, exposure to chemical pollutants, anesthetics or liver damaging drugs, toxic injury to liver (esp. aflatoxin), skin diseases involving liver dysfunction, dyspepsia, preventing gallstone formation, gallbladder problems, protection of pancreas during pancreatitis or drug damage, hyperlipidemia, adjunct to metronidazole tx for giardiasis – decrease adverse effects, increase lactation and protect dairy cows from ketonemia.

Contraindications: Relatively non-toxic, used as food. May decrease insulin requirements in diabetics. Side effects rare – mild GI signs, mild laxative, 2 cases of anaphylactic shock reported, rare increase in ALT. Allergy to Aster family.
Potential Drug/Herb Interactions: May reduce insulin requirements in some diabetic patients; Silymarin shown to protect against organ toxicity induced by cisplatin, acetaminophen, butyrophenones, halothane, phenothiazines, tacrine, and vincristine.
Dose:
Fluid extract (1:1)(60-80% ethanol): 1.0-2.0ml per 10 kg divided daily.
Glycetract (1:1): 1.0-2.0ml per 10kg divided daily.

Marshmallow (*Althaea officinalis*)

Family: Malvaceae
Parts used: Root, leaf
Chemical Constituents: *Root*: 5%-35% mucilage, asparagines, tannins
Leaf: mucilage, flavonoids, phenolic acids
Clinical Actions: Nutritive, demulcent (soothes, protects and restores mucous membranes), antitussive, vulnerary (aids in wound and skin healing, usually refers to external application or direct GI contact in this case), diuretic
Energetics: Sweet, bitter, cold
Indications: Gastroenteritis, gastric ulcer, stomatitis, diarrhea, urinary tract inflammation (cystitis, nephritis, urethritis), respiratory tract inflammation (laryngitis, bronchitis, cough)
Topically for open wounds, ruptured abscesses, ulcers
Contraindications: None known, except known allergy
Potential Drug/Herb Interactions:
- May interfere with the absorption of other medications given at the same time due to mucilage content.
- May lower blood glucose (anecdotal), use with caution in patients at risk for hypoglycemia
Dose: Tincture (usually 25-35% ethanol or glycetract) 1:2 – 1:3, 0.5-1.5ml per 10kg divided daily.

Oats (*Avena sativa*)

Family: Poaceae
Parts used: bran, seeds, straw (dried stems)
Chemical Constituents: б-glucans, saponins, phenols, alkaloids, sterols, flavonoids, starch, proteins, vitamins and minerals, silica
Clinical actions: Straw - nervine, antidepressant, diaphoretic; grain (milky tops) – antidepressant, nervine, nutritive; bran – reduces cholesterol, antithrombotic
Energetics: Warm, sweet
Indications: General tonic (restores and strengthens, nutritive and normalizes physiologic function), nervine tonic (nourishes and strengthens the central nervous system), stimulant, antidepressant
Contraindications: None known
Potential Drug/Herb Interactions: None known
Dose:

Infusion: 5-30 g/cup, give ½-4 cups divided daily.
Tincture (75% glycerine and 25% ethanol) 1:2 or 1:3 0.5-1.5 mL/10 kg divided daily.

Ginger (*Zingiber officinale*)

Family: Zingiberaceae
Parts used: Root (Rhizome)
Chemical Constituents: Oleoresins – a mixture of resins and volatile oils (gingerols & shogaols), sesquiterpenes (zingiberene, beta-Sesquiphellandrene & beta-Bisabolene), and others.
Clinical actions: Carminative (promotes proper intestinal function), antispasmodic, antiemetic, anti-inflammatory, antioxidant, circulatory stimulant, anti-microbial, anti-platelet.
Energetics: Hot, dry
Indications: Used to treat osteoarthritis, to improve circulation especially in geriatric and non-ambulatory animals, for nausea in chemotherapy patients, also as an adjunct in heartworm treatment
Contraindications: Avoid with anti-coagulant drugs, coagulation disorders, and gallstones.
Potential Drug/Herb Interactions: May decrease vomiting caused by cyclophosphamide. Potentially increases the absorption of oral drugs.
Dose:

Dried Herb –15-200 mg/kg divided daily.
Tincture (60-90% ethanol) - 1:2 or 1:3 0.25-0.5 mL/10 kg divided daily.

Gotu Kola (*Centella asiatica*)

Family: Apiaceae
Parts used: Aerial (leaves and stems), sometimes whole plant
Chemical Constituents: Triterpenes (Asiatic acid and madecassic acid), and triterpene ester glycosides derived from them (asiaticoside and madecassoside)
Clinical Actions: Adaptogen (increases the body's response to stress acting on the nervous, endocrine & immune systems, allowing it adapt as needed to illness), connective tissue regenerator, nerve tonic (nourishes and strengthens the central nervous system), mild diuretic, alterative (traditional term - improves overall tissue metabolism)
Energetics: Bitter, cold, slightly astringent
Indications:

Topical: wound healing & scar reduction– lick granulomas, equine granulomatous lesions, delayed healing, degloving injuries, feline leprosy ulcers, anal furunculosis. (humans- keloids, hypertrophic scars, burns, skin ulcers)

Internal: helicobacter pylori infection with ulceration of stomach, asprin/NSAID induced gastritis; lymophoma and possibly other tumors in mice; improves circulation - cognitive enhancement, edema
Contraindications: None known. Low toxicity even at very high doses. Possible topical sensitization.
Potential Drug/Herb Interactions: May possibly increase sleeping time when given with phenobarbital.

Dose: Tincture (25%-40% ethanol): 1:2-1:3 0.5-1.5ml/ 10kg divided daily.

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