Glendale Animal Hospital
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Hepatic Lipidosis

(Accumulation of Fats and Lipids in the Liver)

Basics

OVERVIEW

- Disease in which fats and lipids (compounds that contain fats or oils) accumulate in the liver (condition known as “hepatic lipidosis”)
- Possible complication of lack of appetite (known as “anorexia”) in obese cats
- Feline hepatic lipidosis—more than 80% of liver cells (known as “hepatocytes”) accumulate triglycerides, results in severe decrease or stoppage of the flow of bile (known as “cholestasis”) and liver dysfunction in the cat
- Usually secondary to another underlying disease process or simply lack of food intake (such as a cat accidentally being locked in basement)
- The liver is the largest gland in the body; it has many functions, including production of bile (a fluid substance involved in digestion of fats); production of albumin (a protein in the plasma of the blood); and detoxification of drugs and other chemicals (such as ammonia) in the body
- Bile ducts begin within the liver itself as tiny channels to transport bile—the ducts join together to form larger bile ducts and finally enter the extrahepatic or common bile duct, which empties into the upper small intestine; the system of bile ducts is known as the “biliary tree”

SIGNALMENT/DESCRIPTION OF PET

Species

- Cats primarily affected
- Dogs rarely affected (puppies, especially with storage disease as in the Maltese; “storage disease” is an inherited metabolic disease in which harmful levels of materials accumulate in the body's cells and tissues)

Mean Age and Range

- Mean—8 years of age (range, 1–16 years of age)
- Primarily middle-aged adults

SIGNS/OBSERVED CHANGES IN THE PET

- Lack of appetite (anorexia) and weight loss
- Yellowish discoloration to the gums and other tissues of the body (known as “jaundice” or “icterus”)
- Sluggishness (lethargy)
- Weakness progressing to collapse
- Vomiting, diarrhea, or constipation
- Excessive salivation (known as “ptyalism”), may reflect hepatic encephalopathy (brain disorder caused by

accumulation of ammonia in the system due to inability of the liver to rid the body of ammonia) or food aversion
- Abnormal position of the head and neck, in which the chin is located near the chest (known as “neck ventroflexion”)
- Enlargement of the liver (known as “hepatomegaly”)
- Dehydration
- Abnormalities due to underlying diseases

CAUSES

- More than 85% cats with hepatic lipidosis have disorders causing lack of appetite (anorexia) or problems absorbing nutrients into the body following digestion (known as “malassimilation”); remaining affected cats have histories of lack of food
- Primary liver disease—portosystemic shunt (condition in which blood vessels allow blood to flow abnormally between the portal vein [vein that normally carries blood from the digestive organs to the liver] and the body circulation without first going through the liver); inflammation of the bile duct or biliary tree (known as “cholangitis”) and inflammation of the bile ducts and liver (known as “cholangiohepatitis”); blockage of the extrahepatic or common bile duct (known as “extrahepatic bile duct obstruction”); presence of hard, solid material in the bile duct or gall bladder (known as “cholelithiasis”); cancer
- Gastrointestinal disease—blockage or obstruction of the gastrointestinal tract; cancer (such as lymphoma, a type of cancer that develops from lymphoid tissue, including lymphocytes, a type of white-blood cell formed in lymphatic tissues throughout the body); inflammatory bowel disease (IBD); inflammation of the pancreas (known as “pancreatitis”)
- Urinary tract disease—long-term (chronic) inflammation of the tissue spaces in the kidneys (known as “chronic interstitial nephritis”); lower urinary tract disease; kidney failure
- Nervous system disorders
- Infectious diseases—toxoplasmosis; feline infectious peritonitis (FIP); feline immunodeficiency virus (FIV) or feline leukemia virus (FeLV)-related disorders
- Excess levels of thyroid hormone (known as “hyperthyroidism”)
- B12 deficiency (may increase susceptibility to develop hepatic lipidosis in cats)
- Many other generalized (systemic) conditions or toxins
- Too rapid weight loss protocol

RISK FACTORS

- Obesity
- Lack of appetite (anorexia)
- Breakdown of lean muscle mass and body tissues (known as “catabolism”)
- Rapid weight loss
- B12 deficiency

Treatment

HEALTH CARE

- Inpatient—necessary for cats that are recumbent (that is, lying down and reluctant or unable to stand or move) or those with abnormal position of the head and neck, in which the chin is located near the chest (neck ventroflexion; caused by muscular weakness which can be due to severe electrolyte disturbance of potassium or phosphate, or to thiamine [a B vitamin] deficiency)
- Home care after stabilization and feeding tube has been placed and is functioning problem free
- Outpatient—reduces stress and thereby facilitates recovery in some cats
- Balanced fluids
- Potassium supplementation is important
- Phosphate supplements usually needed
- Magnesium supplements rarely needed

ACTIVITY

- Cats recently diagnosed or early in recovery phase of hepatic lipidosis may be too weak for any activity

- Activity may help to improve motility of the stomach, when partial paralysis of the muscles of the stomach (known as “gastroparesis”) complicates feeding

DIET

- Nutritional support—cornerstone of recovery
- High-protein, high-calorie feline diet is essential
- Energy—50–60 kcal/kg ideal body weight/day, with gradual transition to full calorie intake over 3–5 days; feed multiple small meals
- Forced feeding of some type usually is required; however, forced feeding by mouth may lead to food aversion
- Tube feeding; initially by tube placed into the nose, down the esophagus (the tube from the mouth to the stomach) and into the stomach (known as a “nasogastric tube”) and then an esophageal tube after corrected hydration and electrolyte status, and administration of vitamin K1
- Avoid surgery to place a stomach feeding tube, as cats with hepatic lipidosis have high mortality
- Cautiously offer food daily to assess interest in food
- Human “stress-formula” intestinal diets generally are not recommended—require supplemental amino acids (arginine [or citrulline], and taurine)—amino acids are the smallest components of protein; taurine is an amino acid that is an important component of the diet of cats; cats cannot produce enough taurine in their bodies and so, must obtain taurine from their food to maintain the health of several organs, including the retina (back of the eye) and heart
- Supplements—improve survival in severely affected cats: L-carnitine; taurine; thiamine (a B vitamin); vitamin B12; water-soluble vitamins (vitamin B, vitamin C); vitamin E; thiol donors (such as *S*-adenosyl-L-methionine [SAMe]); potassium gluconate (for low levels of potassium in the blood [known as “hypokalemia”]), reduces fluid potassium supplements; marine oil in food
- Carnitine supplements have wide variability in bioavailability; Carnitor (liquid medical grade carnitine) is recommended

SURGERY

- Exploratory surgery and liver biopsy (if indicated)—inspect for underlying disorders; possibly biopsy the pancreas, stomach, and/or small bowel
- Avoid surgical interventions until hydration, electrolyte depletions, and any blood abnormalities or blood-clotting disorders (known as “coagulopathies”) are corrected

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Vitamin K1—recommended for all cats suspected of having hepatic lipidosis
- Drugs to decrease signs of hepatic encephalopathy (such as drooling, seizures, aggression, and disorientation) usually are not needed; hepatic encephalopathy is a brain disorder caused by accumulation of ammonia in the system due to inability of the liver to rid the body of ammonia
- Medications to control vomiting (known as “antiemetics”)—metoclopramide, dolasetron (Anzemet), or maropitant (Cerenia); metoclopramide for vomiting, nausea, and partial paralysis of the muscles of the stomach (gastroparesis)
- Famotidine—an H2-histamine blocker used to decrease stomach acid; helps to protect the lower esophagus (the tube running from the throat to the stomach) in pets that are vomiting
- Systemic antibiotics—as appropriate for coexistent infections
- *S*-adenosyl-L-methionine (SAMe; Denosyl-SD4)

Follow-Up Care

PATIENT MONITORING

- Frequent reevaluations—imperative
- Body weight and condition, hydration, electrolytes
- Judicious adjustments of energy, fluids, and electrolyte provisions—important

- Serum bilirubin—"bilirubin" is a normal bile pigment formed from the breakdown of hemoglobin; "hemoglobin" is the compound in red-blood cells that carries oxygen to the tissues of the body; the liver takes up the hemoglobin following normal or abnormal breakdown of red-blood cells and processes it to form bile (a fluid substance involved in digestion of fats), which provides a means of eliminating bilirubin from the body; bilirubin levels in the blood can increase if the flow of bile is blocked—in the case of hepatic lipidosis, bilirubin is not eliminated from the body at a normal rate, so they increase—serum bilirubin levels decline within 2 weeks of adequate medical management of hepatic lipidosis and predict recovery
- Liver enzyme activity levels are slow to return to normal; do not predict recovery
- Discharge for home care—when vomiting is controlled, partial paralysis of the muscles of the stomach (gastroparesis) has resolved, serum bilirubin levels are declining, pet is able to walk around (known as being "ambulatory"), and tube-feeding apparatus has been problem-free
- Tube feeding—discontinued only after confirmed voluntary food consumption for 2 weeks

PREVENTIONS AND AVOIDANCE

- Obesity—prevent; weight reduction must not exceed 2% body weight per week
- Caution owner to verify food intake during weight loss regimens and during at-home stress

POSSIBLE COMPLICATIONS

- Feeding tube malfunction or obstruction—tube blockage or obstructions may be relieved by papaya juice, carbonated soft drink, or pancreatic enzyme slurry, as directed by your pet's veterinarian
- Rare to have hepatic encephalopathy (brain disorder caused by accumulation of ammonia in the system due to inability of the liver to rid the body of ammonia) develop after dietary support introduced
- Liver failure, leading to death
- Untreatable underlying cause

EXPECTED COURSE AND PROGNOSIS

- Untreated—progressive disease and death
- Optimal response to tube feeding and nutritional supplements—recovery in 3–6 weeks
- Treatment as described—85% recovery of severely affected pets
- Underlying disease influences outcome
- Hepatic lipidosis rarely recurs
- Hepatic lipidosis does not cause long-term (chronic) liver dysfunction in pets that are treated and recover

Key Points

- Sequential bloodwork (serum biochemical assays) needed to assess recovery
- Learn use and care of feeding tube
- Feeding tubes may be retained for 4–6 months
- Underlying disease influences outcome
- Hepatic lipidosis rarely recurs
- Hepatic lipidosis does not cause long-term (chronic) liver dysfunction in pets that are treated and recover

CLIENT INFORMATION HANDOUT
TUBE FEEDING YOUR PET

_____ had an esophagostomy tube (e-tube) placed under anesthesia while hospitalized. We will use this tube to administer food and medications to them until they are eating better on their own. We have put together this information to help you start using the tube.

The Feeding Tube

1) The feeding tube enters through the skin down the esophagus and stops just before the stomach. It is not painful.

2) At the end of the tube is a plastic cap, that should be in place at all times unless you are in the process of feeding through the tube. This cap helps keep the food from backing up or leaking out of the stomach.

How To Feed Your Pet

1) Have all of the food and medications prepared, mixed, warmed to room temperature, drawn up in the syringe and ready to give before you begin feeding through the tube. This will make the feeding process easier for you. Make sure the mixture is watery and smooth.

2) Remove the cap at the end of the tube. Flush the tube with 5mls of tap water prior to using the tube. You can give the medications at the same time as feeding and they can be mixed in the food. Feed slowly over a 5-10-minute period time.

Slow down the feeding or stop it entirely, if your pet starts to salivate or act uncomfortable. Stop the feeding if vomiting occurs.

3) Once all the food or medications are administered, flush the tube with 5mls of tap water. This will help prevent the tube from clogging. **EVERY** time you administer something through the tube other than water, **you must flush** the tube with water.

4) Once you have finished please make sure to replace the cap back on to the end of the tube.

Tube Care

1) Each day you should make sure that the tube is not migrating out of place. If you feel it is migrating out, please contact your veterinarian at once to decide what should be done next.

2) Also inspect the entry site of the tube in the skin for things such as tenderness or pain when touching, redness, swelling, discharge or foul order. If you see any of these things, please contact your veterinarian as soon as possible

3) **If the tube is plugged at any time:**

--If you are feeding food through the tube, it may be too thick and have caused a clog in the tube. Try to flush the tube with water. If the feeding tube flushes well, check to see if the clog is at the tip of the syringes that you are currently feeding with.

--Try to aspirate back (draw back with an empty syringe) after trying to flush with water. This often unblocks the tube.

--If you cannot unplug the tube with firm, but not excessive pressure, leave the tube filled with water and replace the cap as you would normally do. Leave the water in place for 20 minutes.

Again, try to flush the tube. If the tube is still clogged, instill 3mls of Coca-Cola into the tube and leave in place for 20 minutes and then attempts to flush again with water. If this does not unclog the tube, close off the tube

again and call your veterinarian that day, or if it happens at night time, do not attempt any further feedings through the tube.

When To Call The Hospital

1) If the entry site into the skin is irritated, painful, or discharge is present from the entry site, etc. as previously described.

2) If the tube falls out at any time. It is a possible emergency, especially if it is within the first week of the tube being placed.

3) If the tube is clogged and you are unable to unclog it after following the directions above.

4) If your pet continues to vomit during or after feedings, feels lethargic, depressed, or acts painful in the abdomen.

Daily Claire Requirements: _____ calories per day

Diet:

Hills A/D – Mix 1 can of food with 30mls of water, which leads to 1kcal/ml

Feeding Schedule:

We start with slowly reintroducing food over the next few days. Ideally by day 2-3 **_____** will be on a normal amount of food.

1) Day 1 offer **_____mls** of food four times daily
2) Day 2 offer **_____mls** of food four times daily
3) Day 3 offer **_____mls** of food four times daily
4) Day 4 offer **_____mls** of food four times daily
5) Day 5 offer **_____mls** of food three times daily until recheck examination