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How I treat......Cholecystitis in ferrets.

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Diagnostic:

Bibliographical references to cholecystitis in ferrets are limited. The author diagnosis cholecystitis in ferrets according to clinical signs, clinical examination, blood tests and imaging diagnostic. Ultrasonography is especially useful when assessing changes in the gallbladder such as dilatation, wall thickening or polyps, difficult to detect by means of examination or radiographies. The ultrasonography also allows ecoguided sampling by bile aspiration for cytology and microbiology. Upward infection by *Helicobacter mustelae* associated cholecystitis has been described in ferrets.

Once performed the imaging studies, an eco-guided biopsy from the hepatic parenchyma may be recommendable for the diagnostic of concomitant liver diseases. A biopsy of the liver parenchyma by laparoscopy or laparotomy may also be prescribed in cases suspicious of hepatitis or colagiohepatitis.

There is some anatomical variability between the gallbladder and the bile ducts. Understanding the hepatobiliary anatomy of the ferret through relevant references is recommended.

Clinical signs are commonly unspecific, such as hiporexia or anorexia, dehydration, abdominal pain more or less apparent and, less commonly, vomits or jaundice. Leukocitosis with heterophilia, increased alkaline phosphatase, gamma-GT, bile acids, bilirubin, as well as bilirubinuria are common findings in these patients.

The etiology of cholecystitis can be divided into two main categories: obstructive and non obstructive. Unlike human beings, cholelithiasis is not common in dogs or ferrets. Although biliary mud may be observed, and sometimes true calculi, the obstructive etiology uses to be associated in ferret to bile ducts compression due to masses or inflammation in the pancreatic area, abdominal lymphadenopathy, neoplasies or right suprarenal pathology. It is also possible cholestasis due to the presence of foreign bodies in the duodenum or post-surgical inflammation. According to the author's experience, mucolele are not common in ferrets, although these are seen occasionally (in general associated to other chronic diseases).

The non-obstructive etiology is more commonly associated to upward infections from intestine. Autoimmune inflammatory changes in gallbladder are not studied enough in ferrets, however there are other digestive diseases of autoimmune origin described in this species. Parasitic diseases have also been described, such as hepatic coccidiosis or bile epithelium specific changes.

Finally, a point worthy of mention is that a relatively high number of ferrets without hepatobiliary specific clinical signs show changes in the gallbladder wall, such as thickening or polyps. The clinical significance of these lesions is therefore to be determined. These are probably lesions due to chronic inflammation. In absence of signs and laboratorial findings consistent with hepatobiliary disease, the author does not prescribe treatment, although she recommends follow-up ultrasonography.
One more data to be taken into account is that intermittent presence of bacteria in the gallbladder is possible in dogs without apparent clinical involvement. We do not know whether this may also occur in ferrets.

Treatment:

The treatment of cholecystitis must always include, apart from the support treatment, appropriate antibiotherapy, based on the bile aspiration antibiotics susceptibility test, if possible. Even cases of originally non-infectious etiology, the risk of secondary bacterial infection is very high.

The support treatment includes fluid therapy to restore the hydroelectrolytic balance, analgesia, anti-inflammatory therapy, antiemetic therapy, gastric protection (ranitidine 2 mg/kg SC/IV every 12 hours) when needed and forced feeding in anorexic animals. Hepatic lipidosis secondary to hypopexia in ferrets is very common, but is uses to be easily reversible. Ferrets use to tolerate well syringe feeding. In our center, over the last 8 years, there has only been one ferret needing gastric tube. In animals eating alone, a good quality diet is indispensable. In our center, these patients also receive supplemental vitamin B complexes (1 mg/kg of VitB1 and 1 mg/kg of Vit B12 SC a week). It is advisable to assess the administration of Vit K (0.5 mg/kg/day as single dose or for 3 days) before invasive procedures in cases suspicious of severe liver diseases with coagulation disturbances.

The gallbladder and bile ducts of ferrets are highly innervated. To our knowledge from human medicine, it is reasonably to assume that this disease may cause quite severe pain. Analgesia is important and can be reached by administration of buprenorphine 0.02-0.05 mg/kg SC/IV every 8 hours. In our center, we prefer to use fentanyl (0.02 mg/kg IV as loading dose and 0.01 mg/kg/h by continuous rate infusion (CRI)) combined or not with ketamine (0.4 mg/kg IV as loading dose and 0.4 mg/kg/h by CRI) or butorphanol (0.2 mg/kg IV as loading dose and 0.05 mg/kg/h by CRI). The use of opiates by CRI keeps ferrets sedated, which improves the tolerance to intravenous fluid therapy.

In case of bile stasis and suspicion of choledochous duct obstruction/occlusion disease, laparotomy would be indicated in cases of suspicion of suprarenal, pancreatic or other neoplasia. In cases of bile ducts obstruction, persistent cholestasis, hepatobiliary neoplasia or severe conditions of the gallbladder wall, cholecystectomy would be indicated.

If obstruction/occlusion is not suspected and there is increased bile acids and/or bilirubinuria, the use of choleretic drugs, such as ursodeoxicolic acid at 15 mg/kg PO every 24 hours or 7.5 mg/kg PO every 12 hours administered with feed may be beneficial. In our center, we chose the empiric use of this drug extrapolated from canine and feline medicine. The use of ursodeoxicolic acid is contraindicated in cases of bile obstruction. More recent studies suggest that the dose must be higher in cats, but reliable data in ferrets are not available.

The author has limited experience using s-adenosylmethionine in ferrets: profuse diarrhea was observed in three ferrets patients of the practice following the administration of 20 mg/kg per oral route within the first 48 hours. However, it has not been concluded whether this was a side effect of the drug or diarrhea due to other causes. There are no evidences in favor of the use of silimarine in ferrets. Its use is considered potentially beneficial in dogs at 20-50 mg/kg every 24 hours.

In cases suspicious of pancreatitis or detection of lymphadenomegalia, an appropriate anti-inflammatory treatment must be established (meloxicam 0.2 mg/kg SC/IV, and then 0.1 mg/kg SC/IV/PO every 24 hours).

In case of ruling out the other etiologies and having evidence of autoimmune conditions (i.e. when diagnosing by means of intestinal, gastric or liver biopsies), the use of immunosuppressors such as corticosteroids (prednisolone 1 mg/kg PO every 24 hours) may be considered.

REFERENCES:


