Laparoscopic cholecystectomy in a dog with chronic cholecystitis and extensive lithiasis

Colecistectomia laparoscópica em cão com extensa quantidade de litíases

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ABSTRACT
A 12 – year – old, male dog, with hematuria, apathy, inappetence and abdominal pain, showed thickening and hyperechogenicity of the gallbladder wall through ultrasonography, filled with a quantity of echogenic content. Evidence of hyperechogenic structures adhered to the ventral wall compatible with dense mud, and biliary concretions were also demonstrated. With regard to this case, we chose to perform laparoscopic cholecystectomy. As for the histopathological examination, it was observed inflammatory infiltration of lymphocytes and plasma cells in the lamina propria, of the gallbladder. Cystic mucinous hyperplasia in the gallbladder was also observed with mineralization and cholelithiasis. It is concluded that laparoscopic cholecystectomy with three portals can be indicated in the treatment of chronic cholecystitis with multiple calculi presence in small dogs.

Keywords: canine, videolaparoscopy, gallbladder.

RESUMO
A litíase biliar é rara em cães. O presente relato descreve o caso de colelitíase em um cão, macho, da raça Yorkshire, com doze anos e histórico de presença de lama biliar e cardiopatia em tratamento havia três anos. O paciente apresentou sinais clínicos inespecíficos como hematuria, porém, ao exame ultrassonográfico foi percebido o espessamento da parede da vesícula biliar com conteúdo compatível a cálculos de vesícula biliar e cistos renais. O animal foi submetido à colecistectomia e biópsia hepática videolaparoscópicas. O paciente teve alta hospitalar no mesmo dia da cirurgia e, aos 45 dias de pós-operatório não demonstrou recidiva da doença ou sinais clínicos.

Palavras-chave: Lama biliar, videocirurgia, hepatopatia.
1 INTRODUCTION

Gallstones are formed from the crystallization and precipitation of cholesterol in bile on the form of small, solid cholesterol crystals; these accumulate near the surface of the mucosa of the inflamed gallbladder and clump together forming larger stones [3]. In more severe cases, perforation of the gallbladder secondary to cholecystitis, necrotizing cholecystitis and cholelithiasis may occur, causing biliary peritonitis [2]. In the presence of biliary sediment with a large amount of small calculi, hyperechoic vesicle content with distal acoustic shadowing is visualized, this becomes more evident with the increase of the amount of calcium and the size of the calculus [5].

Cholecystectomy is the surgical technique of choice in the case of cholelithiasis in relation to cholecystotomy, since it allows the total removal of the calculi and the reservoir to avoid future accumulation of calculi [10]. The aim of this study was to report the videolaparoscopic approach for cholecystectomy in a geriatric, cardiopath patient, thus allowing the treatment of chronic cholelithiasis with an extensive amount of gallstones.

2 CASE HISTORIES

A 12-year-old male, Yorkshire, neutered dog was attended at the University Veterinary Hospital (HVU) of the Federal University of Santa Maria (UFSM) presenting hematuria, apathy, inappetence and abdominal pain. The patient had a previous history of controlled heart disease and biliary mud found on routine ultrasound examinations three years ago. A new abdominal ultrasonography examination revealed thickening and hyperechogenicity of the gallbladder wall, filled with a severe amount of echogenic content, with evidence of hyperechogenic points adhered to the ventral wall compatible with dense mud, evidencing also biliary concretions. There was discrete formation of postacoustic shadowing without evidence of bile duct dilation. Owing to clinical and ultrasound observations, videolaparoscopic cholecystectomy was chosen. On regards to the surgical treatment decision, the patient began receiving ursodeoxycholic acid (15 mg kg⁻¹, VO, SID, indicated for 60 days). Hemogram and biochemistry were requested; alkaline phosphatase (AF) was the only altered parameter: 251.0 IU/L (reference range: 20 to 156 IU/L). The patient was considered clinically stable, and was submitted to surgery. Under general anaesthesia, with the patient in supine position, a 10 – mm portal for abdominal insufflation with CO₂ was introduced through a cutaneous incision of approximately 11 – mm in the ventral midline near the foreskin, followed by laparoscopic inspection of the cavity with a 10 – mm endoscope. Under direct visualization, two more portals were introduced lateral to the first one and in triangulation with this; one of 10 – mm on the left side, and a 5 – mm on the right side. Through the right portal, the gallbladder was exposed with the aid of a
Kelly forceps. The duct and the cystic artery were then dissected and ligated together, allowing the application of four titanium clips (one of return) on these structures (Figure 1). With a Metzenbaum scissors introduced through the left portal, the section of the cystic duct and vessel was performed. The dissection of the gallbladder was then promoted with the scissors without the use of electrosurgery, since the vesicle was well adhered to the hepatic bed. The vesicle was removed from the abdominal cavity through the portal access of the ventral midline. Six fragments were then collected for liver biopsies. After verification of hemorrhages absence, pneumoperitoneum was disrupted, and access wounds sutured, using a cross-mattress pattern with polyglactin 910 (2 – 0). As for the cutaneous suture, a Wolff pattern with 4 – 0 nylon was used. The vesicle wall was macroscopically thickened, and its content was composed almost entirely of extensive micro-calculi. Hepatic fragments, gallbladder and micro-calculi were submitted to histopathological examination. The surgical time from incision to cutaneous suture was 110 minutes. After anesthesia recovery, the patient received tramadol hydrochloride (5 mg kg\(^{-1}\), VO, QID, for 4 days) and dipyrone (25 mg kg\(^{-1}\), VO, TID, for 4 days) at home. The use of ursodeoxycholic acid followed the recommendation of administration during a period of 60 days. As for the histopathological examination, it was reported the presence of some hepatocytes with varying degrees of vacuolar degeneration and random necrosis of hepatocytes. In the gallbladder, inflammatory infiltrate of lymphocytes and plasmocytes was observed in the lamina propria. Cystic mucinous hyperplasia in the gallbladder was also observed with mineralizations and cholelithiasis.

3 DISCUSSION

Gallstones are formed from the crystallization and precipitation of cholesterol in bile on the form of small, solid cholesterol crystals, which accumulate near the surface of the inflamed gallbladder mucosa forming larger stones [3]. In dogs, when the gallbladder cannot absorb free calcium in the bile, it remains available for calculus formation [8]. Concerning the patient in question, in spite of the extensive amount of gallstones, none of the complementary exams showed an increase in cholesterol levels during the preoperative period.

In canines, biliary thickening may be associated with other diseases, but is found frequently in clinically healthy elder patients [7]. Also, sex was not considered a risk factor for mud development and; bile thickening was not restricted to a specific breed [1], however, some authors refer that older, female dogs of small breeds such as Schnauzer and Poodle are more predisposed [5]. Our patient is into the elderly and small breed category, but he did not present any detectable disease that could be associated to the appearance of biliary mud.
Bile sludge was found in routine ultrasonography exams. Another clinical team indicated only the clinical follow-up of this patient who presented asymptomatic. Animals affected by cholelithiasis may remain without clinical signs; however, the most related changes are vomiting, anorexia, weakness, polyuria, polydipsia, weight loss, jaundice, fever and abdominal pain [6]. In more severe cases, perforation of the gallbladder secondary to cholecystitis, necrotizing cholecystitis and cholelithiasis may occur, causing biliary peritonitis [2]. Jaundice is more noticeable when mud or calculus causes obstruction of the bile duct [9], which did not occur in this case, as the patient had only gallbladder wall thickening due to the chronicity of the disease. Abdominal pain, apathy and inappetence were the only clinical signs. Despite this, we believe that the indication for surgery should have been much earlier, considering that in three years there was no signs of regression of the hepatic changes with the clinical treatment instituted.

Bile retention is the most potent stimulus for higher production of alkaline phosphatase (AF) as it is present in the membrane of the bile ducts, kidneys, bowel and bone. It is not a specific biomarker of liver disease, but it can be used as an indicator of cholestasis [10], confirming the results found in the exams reported from this patient, in which the only biochemical or hematological alteration observed was increased levels of alkaline phosphatase.

Usually, ultrasonographic imaging allows the identification of gallstones presence through the formation of hyperechoic interface and acoustic shadowing. It is visualized biliary sediment with a large amount of small gallstones, hyperechoic vesicle content with postacoustic shadowing. This becomes more evident with an increase in the amount of calcium and the size of the calculus [5], as observed in the ultrasonographic examination of this patient.

Ursodeoxycholic acid (UDCA), administered orally, has been extensively studied for gallstones dissolution. This drug decreases the secretion of cholesterol in the bile and prolongs the crystals nucleation time [4]. This drug causes increased fluidization of bile secretions, due to its hepatoprotective action and choleretic effect. Is useful in adjuvant therapy on cholestatic liver disorders of dogs, and it is safe when used at a dosage of 10 to 15 mg kg⁻¹ orally, once a day. In this case, UDCA was indicated before the surgical procedure and after; it was prescribed during 60 days at a dosage of 10 mg kg⁻¹ (VO, SID). After this period, biochemical tests were repeated and no changes in any parameters were shown. After 180 days postoperatively, the patient remained without any clinical signs.

Cholecystectomy is the first-choice surgical technique in the case of cholelithiasis in relation to cholecystotomy, since it allows the total removal of the calculi and the reservoir to avoid future accumulation of gallstones [10]. Laparoscopic surgery is currently considered the "gold standard"
approach in human medicine for gallbladder removal and has been successfully used in dogs and cats with biliary diseases. As already demonstrated in dogs, it results in lesser immunosuppression and inflammatory reaction, as well as lesser formation of intra-abdominal adhesions [4]. Regarding this patient, the choice for minimally invasive surgery, was based on the possibility of significantly reduction of surgical lesions, improvement of recovery time, in addition to other benefits of incontestable advantages, considering the possibility of proceeding with the treatment in an appropriate operative time, since it was a geriatric animal with compensated cardiac alterations. We believe that this was the safest and most effective option in the present case.

One hundred and eighty days after surgery, the animal was clinically stable, showed no signs of cholestasis, demonstrating the adequate indication and application of the proposed surgical treatment. Thus, it is concluded that laparoscopic cholecystectomy with three portals can be indicated in the treatment of chronic cholecystitis with the presence of multiple gallstones in small dogs.

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