



LIVER LOBE TORSION IN RABBITS: 16 CASES (2007 TO 2012)

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Abstract

The objective of this retrospective case series was to determine the clinical signs, diagnostic test results, treatment protocols, and outcomes of rabbits treated for liver lobe torsion during a 5-year period at a large referral institution. A total of 16 rabbits diagnosed with liver lobe torsion at Angell Animal Medical Center (Boston, MA USA) during January 2007 to March 2012 were included in the study. The diagnosis of liver lobe torsion was made at surgery, during abdominal ultrasound, or on postmortem examination. Medical records of the subject animals were reviewed for signalment, history, clinical signs, results of clinical pathology testing, diagnostic imaging findings, treatment, surgical and histopathology findings, hospitalization time, and outcome. The most common clinical signs of rabbits diagnosed with liver lobe torsion in this study included anorexia, lethargy, and decreased fecal production lasting 1 day. Lop breeds, particularly mini lops, were overrepresented. Anemia was the most common hematologic abnormality, while elevated levels of alanine aminotransferase, alkaline phosphatase, aspartate aminotransferase, blood urea nitrogen, and creatinine were the most common serum biochemical abnormalities. Abdominal ultrasonography with Doppler assessment was used in 14 rabbits and provided a diagnosis of liver lobe torsion in all cases. The caudate lobe was involved in 10 rabbits (62.5%, 95% CI: 38.8 to 86.2), followed by the right lateral lobe ($n = 5$; 31.25%, 95% CI: 8.6 to 53.9), the left lateral lobe ($n = 2$; 12.5%, 95% CI: 3.7 to 28.7), and the right medial lobe ($n = 1$; 6.25%, 95% CI: 5.6 to 18.1). Two rabbits had more than 1 torsed liver lobe. Exploratory laparotomy and liver lobectomy were performed in 9 rabbits, and all of them survived. Supportive care alone was provided for 7 rabbits, 3 of which survived. The results suggest that nonspecific clinical signs of anorexia, lethargy, and decreased fecal production, in conjunction with anemia and high serum hepatic enzyme activities, should increase the index of suspicion for liver lobe torsion in rabbits. Abdominal ultrasonography with Doppler assessment is useful to confirm the diagnosis. The long-term prognosis for rabbits undergoing liver lobectomy and surviving the hospitalization period is excellent. Copyright 2014 Elsevier Inc. All rights reserved.

Key words: gastrointestinal stasis; hepatic; liver lobe torsion; lobectomy; rabbit; ultrasound

Liver lobe torsion is rarely reported in any species, but reports exist in humans, horses, dogs, pigs, otters, rats, mice, and rabbits.¹⁻²⁵ In veterinary medicine, liver lobe torsion is most commonly described in dogs.^{3,12,13,15,18} In rabbits, the caudate liver lobe is reportedly prone to displacement, theoretically because of its narrow attachment to the dorsal hilar region of the liver.²⁶ Clinical signs of liver lobe torsion in rabbits can be nonspecific, and ancillary diagnostics, including serum biochemical analysis and abdominal ultrasound, are necessary for diagnosis.¹⁴

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The veterinary literature contains 17 reported cases of liver lobe torsion in rabbits.^{11,14,16,22,23}

Only 1 report of liver lobe torsion in rabbits describes multiple animals ($n = 4$) surviving hepatectomy for liver lobe torsion.¹⁴ Based on this report, prompt diagnosis and hepatectomy of the affected lobe may be associated with an excellent prognosis. However, other reports provide varied outcomes for this syndrome in rabbits, with many cases being diagnosed postmortem. Therefore, more information about liver lobe torsion in rabbits would be useful. The purpose of this study was to determine the history, diagnostic test results, therapy, and outcome of rabbits treated for liver lobe torsion at a large referral institution.

MATERIALS AND METHODS

Rabbits diagnosed with liver lobe torsion at Angell Animal Medical Center (Boston, MA USA) during January 2007 to March 2012 were included in this retrospective case series. The diagnosis was made at surgery, during abdominal ultrasound, or on postmortem examination.

Medical records were reviewed to obtain the signalment, history, duration and type of clinical signs, clinicopathologic findings, diagnostic imaging results, treatment, and outcome for each case in the series. Included in the clinicopathologic findings were results of complete blood count (CBC) and serum biochemical profiles. Although clotting profiles were not examined, subjective assessment of prolonged clotting time after venipuncture was noted. Anesthetic and surgical reports were reviewed to identify the timing of surgical intervention, surgical technique used, liver lobe affected, and any intraoperative complications. Postoperative complications, histologic findings, culture results, and duration of hospitalization were also documented. Long-term follow-up information was obtained from owners on an annual basis via telephone interview or e-mail communication or by patient examination during the study period.

Data were examined graphically and expressed as either mean \pm standard deviation or median and range depending on whether they were normally or abnormally distributed, respectively.

RESULTS

A total of 16 rabbits were included in the study. The median age at the time of presentation was 5.15 years (range: 1.5 to 9 years). Of the rabbits, 7 were females (all spayed) and 9 were males (7 castrated). The median body weight was 2.57 kg

(range: 1.3 to 3.38 kg). Rabbit breeds included the following: 1 Dutch, 1 Holland Lop, 1 American Fuzzy Lop, 11 Mini Lops, and 2 mixed breeds.

The median duration of clinical signs before presentation was 1 day (range: 1 to 2 days). Of the rabbits, 10 had no previous relevant medical problems. A prior history of gastrointestinal (GI) stasis was present in 4 rabbits, and 1 of this group of animals had a history of recurrent episodes of GI stasis shortly before being diagnosed with liver lobe torsion. Another rabbit had a history of a suspected GI obstruction and gastrotomy 4 years before presentation for liver lobe torsion. One rabbit reportedly had a history of obesity, and another had a previous head tilt that resolved spontaneously.

For all 16 cases, history and physical examination findings were documented at presentation. The most common complaints were anorexia ($n = 15$, 94%), lethargy ($n = 9$, 56%), decreased fecal production ($n = 6$, 38%), inappropriate urination or defecation ($n = 4$, 25%), crouched or hunched body position ($n = 4$, 25%), hiding behavior ($n = 2$, 13%), and soft stools ($n = 2$, 13%). The most frequently recorded physical examination findings included abdominal pain ($n = 12$, 75%), dehydration ($n = 6$, 38%), increased intestinal gas ($n = 5$, 31%), tachypnea ($n = 4$, 25%), decreased borborygmi ($n = 3$, 19%), dull mentation ($n = 3$, 19%), hypothermia ($n = 3$, 19%), and a mass effect or palpable liver edge in the cranial abdomen ($n = 3$, 19%). Other physical examination findings included tachycardia ($n = 2$, 13%) and an elevated body temperature ($n = 1$, 6%). One of the cases presented on an emergency basis and was sent home without diagnostic testing, as testing had been performed by the attending emergency clinician before presenting again the following day to the Exotic Animal Medicine Service.

A CBC was submitted for evaluation in 14 (87.5%) of the 16 rabbits. A clotted sample prevented completion of the CBC in 1 rabbit, and collapsing veins prevented blood collection in 2 others; however, a postoperative CBC was evaluated in one of the latter. A complete serum biochemical profile was evaluated in 15 (94%) rabbits. A small sample collected from the remaining rabbit was sufficient for measurement of aspartate aminotransferase, blood urea nitrogen, and creatinine levels. The blood lead level was recorded in 1 rabbit.

The most common hematologic abnormality was anemia ($n = 11$, 68%). The median packed cell volume was 28.2% (range: 13.2% to 39.5%;

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