

## Case Report

# Cholelithiasis associated with recurrent colic in a Thoroughbred mare

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A 13-year-old Thoroughbred mare, retired from race, was admitted to Equine Hospital, Korea Racing Association with signs of colic. One and a half months following the previous treatment (second time) and 11 days following her previous discharge (third time), the mare repeatedly exhibited signs of colic and finally along with icteric eyes. Routine medical treatment with intravenous fluids, analgesics resulted in resolution of signs of colic in the first and second admission. The condition of the mare did not improve in the third admission despite over one month supportive treatment and she was subject to euthanasia at the request of the owner on the thirtieth day of hospitalization (95 days from her first admission). The clinical signs (fever, icterus, mild intermittent colic) in conjunction with clinical laboratory findings (leukocytosis, elevations of serum total bilirubin, direct bilirubin, alkaline phosphatase, aspartate aminotransferase, gamma glutamyl transferase, creatine phosphokinase, lactic dehydrogenase and blood fibrinogen indicative of obstructive biliary disease) in this mare suggested possible cholelithiasis. However, liver enzymes and bilirubin estimations are often not part of routine screening in emergency colic cases. At necropsy, multiple dark brown choleliths of various sizes obstructing hepatopancreatic ampulla were found in the hepatic duct. The choleliths were found as large as 3-5 cm in diameter, faceted to each other, dark brown in color and showed soap consistency. Histopathologic findings revealed: biliary fibrosis, plugging of the bile canaliculi with bile pigments, cholangiohepatitis and pigmentation of the hepatic lymph node with bile pigment laden macrophages. Although definitive diagnosis of cholelithiasis might be challenging, clinicians should consider this condition in the differential diagnosis of recurrent colic.

**Key words:** cholelithiasis, colic, horse

Choleliths have been described in a variety of domestic animals including cats [9,11], dogs [10,16], sheep [17], cattle [2], pigs [1,18] and horses [6,20,21,23]. Although it is accepted that choleliths are uncommon in horses, Scarratt, Saunders and Fessler [15] reviewed 13 cases. Two reports in the literature describe successful treatment [12,22] involving the fragmentation of the gall stone within the bile duct. The duct was not opened and the fragments were massaged towards the duodenum. Traub *et al.* (19) described the removal of a cholelith from the common bile duct, however this horse was destroyed 3 days later.

This report describes obstructive biliary disease associated recurrent colic resulting from the unusual cholelithiasis in a Thoroughbred mare.

**Case history and clinical findings:** A 13-year-old Thoroughbred mare, retired from race, was admitted to Equine Hospital, Korea Racing Association with signs of colic. The mare was depressed and sweating mildly at the initial physical examination. Heart and respiratory rates per minute were at 46 and 22, respectively. Hyperthermia was present (39°C). Pallor and yellow coloration of the conjunctiva were noticed. Routine medical treatment with intravenous fluids, analgesics resulted in resolution of signs of colic at the initial admission.

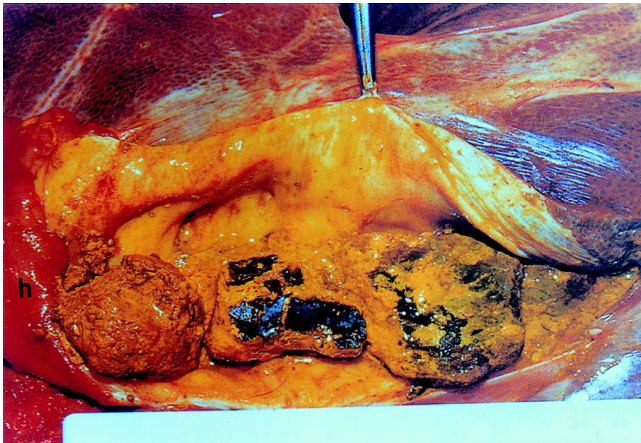
One and a half months following the previous treatment, the mare again exhibited signs of colic. Heart and respiratory rates per minute were at 42 and 24, respectively. Body temperature was 38°C. The mucous membrane was congested. Rectal palpation revealed no specific findings. The color of urine was dark brown. Again routine medical treatment as above resulted in resolution of signs of colic.

Eleven days following her previous discharge along with decreased appetite and icteric eyes, the mare was presented again to Equine Hospital of KRA. She had abnormal serum biochemical parameters including elevations of total bilirubin (8.7 mg/dl), direct bilirubin (3.1 mg/dl), alkaline phosphatase (957 IU/L), aspartate aminotransferase (576 IU/L), gamma glutamyl transferase (480 IU/L), creatine phosphokinase (155 IU/L), lactic dehydrogenase (934.2 IU/L) and fibrinogen (400 mg/dl).

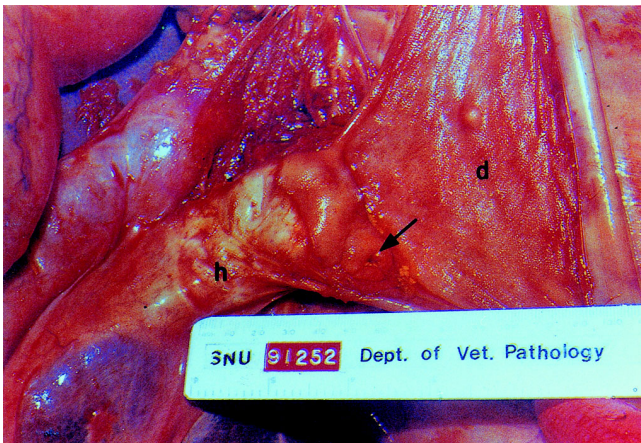
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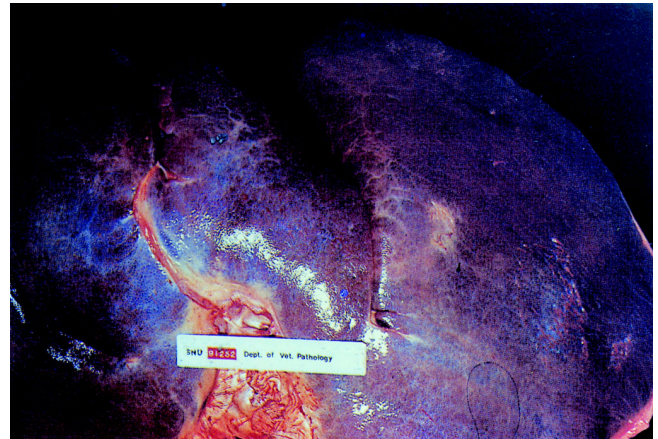
**Fig. 1.** The figure shows several choleliths faceted to each other in the dilated hepatopancreatic ampulla (h).



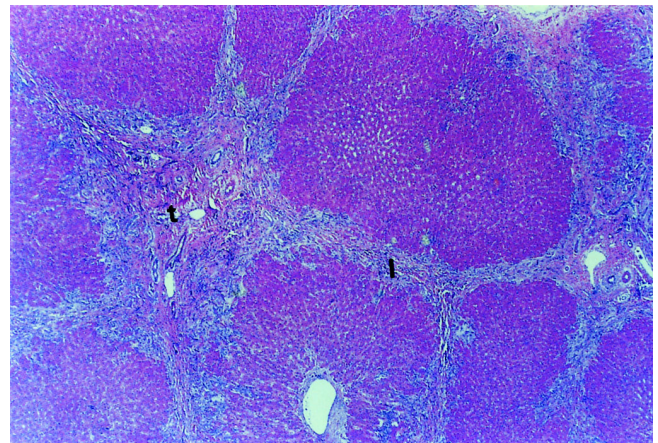
**Fig. 2.** The figure shows the obstructed hepatopancreatic ampulla (arrow) and dilated hepatic duct (h).

She also had abnormalities in hematological parameters including elevated PCV (55%) and WBC counts (11,055/ $\mu$ l). Abdominal paracentesis yielded approximately 3 L of bloody peritoneal fluid. The clinical and laboratory findings prompted the suspected liver disease. The condition of the mare did not improve despite over one month supportive treatment and she was subject to euthanasia at the request of the owner on the thirty eighth day of hospitalization (95 days from her first admission).

**Pathological findings:** A complete gross and histological examination was performed. At necropsy, multiple dark brown choleliths of various sizes obstructing hepatopancreatic ampulla were found in the hepatic duct (Fig. 1). The choleliths were found as large as 3-5 cm in diameter, faceted to each other, dark brown in color and showed soap consistency. Hepatic duct and hepatopancreatic ampulla were much dilated (Fig. 2). The liver was swollen, cirrhotic and yellow brownish in color (Fig. 3). There was a



**Fig. 3.** The figure shows the swollen cirrhotic liver lobes.



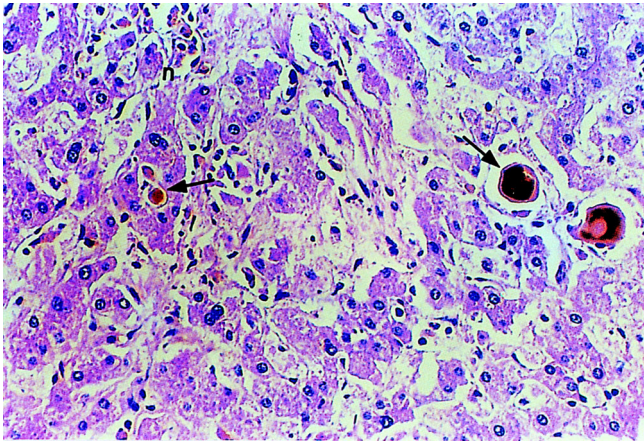
**Fig. 4.** The hepatic lobules shows extensive fibrosis of the portal triad (t) and the limiting plate (l). Hematoxylin and eosin stain 50 $\times$ .

network of thickened interlobular speta of the liver.

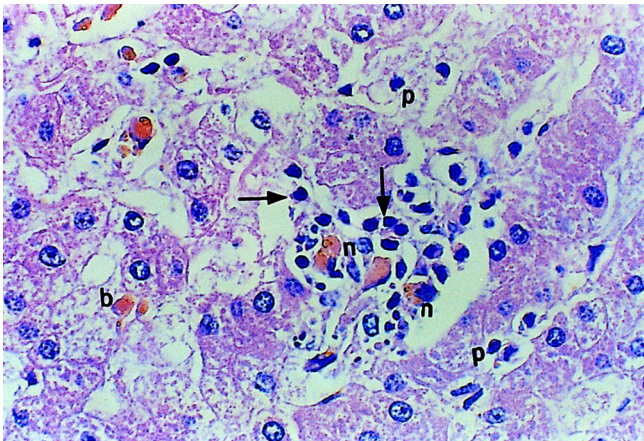
Histopathologic findings revealed: biliary fibrosis (Fig. 4), plugging of the bile canaliculi with bile pigments (Fig. 5), cholangiohepatitis (Fig. 6) and pigmentation of the hepatic lymph node with bile pigment laden macrophages.

The scarcity of information regarding equine bile stones and the anatomical differences of the horses biliary system in horses render cholelithiasis an unlikely differential diagnosis. But the clinical signs (fever, icterus, mild intermittent colic) in conjunction with clinical laboratory findings (leukocytosis, elevations of serum total bilirubin, direct bilirubin, alkaline phosphatase, aspartate aminotransferase, gamma glutamyl transferase, creatine phosphokinase, lactic dehydrogenase and blood fibrinogen) indicative of obstructive biliary disease in this mare suggested possible cholelithiasis. However, liver enzymes and bilirubin estimations are often not part of routine screening in emergency colic cases. This case underlines the





**Fig. 5.** The figure shows bile stasis in the bile canaliculi (arrow) Hematoxylin and eosin stain 200 $\times$ .



**Fig. 6.** The figure shows necrotic liver cells (p) and infiltration of granulocytic leukocytes (arrows). Hematoxylin and eosin stain 400 $\times$ .

need to consider the assessment of liver status in recurrent colic cases.

Although it is accepted that choleliths are uncommon in horses, cholelithiasis is the most common cause of biliary obstruction in horses. Proposed mechanisms include ascariasis [6], biliary stasis, biliary infection and changes in bile composition [8]. A foreign body acted as the nidus for bile-salt deposition and ascending cholangitis [4]. Estrogens could promote gallstone formation by alteration of biliary lipids and cholesterol nucleation time [22]. A large cholelith was the cause of the duodenal obstruction [7]. No aetiological agent was found or proposed in this case.

Radiographic imaging of the equine abdomen is not feasible. The use of ultrasound as a diagnostic imaging modality allowed positive identification of bile stones in equine patients [12]. Ultrasonographic findings accurately depicted the histologic changes in the hepatic parenchyma in horses with cholelithiasis. Ultrasonographic findings

revealed greater than normal amount of hepatic parenchyma. The echogenicity of the liver was greater than normal, and thick distended bile ducts were seen [3,13]. Ultrasonographic assessment along with serum biochemical analysis would improve diagnostic accuracy of cholelithiasis in equine patients.

Intermittent colic in the horse, unless related to a septic focus, is unlikely to be accompanied by pyrexia and so the presence of fever should perhaps have been suggestive of cholangitis [5]. Successful surgical treatments of cholelithiasis in horses have been described [5,14,19,21].

Although definitive diagnosis of cholelithiasis might be challenging, clinicians should consider this condition in the differential diagnosis of recurrent colic.

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