Camel Digital Necropsy Guide

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Abstract
Jaundice / Icterus

Jaundice / icterus is yellowing of tissue due to elevated bilirubin levels. The tissue under the skin and on the surfaces of the stomachs and intestines is normally white to cream colored. If it is yellow, the animal is jaundiced/icteric. Three processes can lead to jaundice: 1. Over-production of bilirubin due to increased red blood cell destruction, 2. Liver disease, and 3. Bile duct obstruction. In a jaundiced animal, carefully assess the liver. If the liver appears normal, the jaundice may be due to increased red blood cell (erythrocyte) destruction, which can occur with certain blood parasites, such as anaplasmosis. Note that the dromedaries do not have a gall bladder.

Disciplines
Veterinary Anatomy | Veterinary Microbiology and Immunobiology | Veterinary Pathology and Pathobiology | Veterinary Preventive Medicine, Epidemiology, and Public Health

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b Independent
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This publication was made possible through support provided to the ALS-CC CRSP by the Bureau for Economic Growth, Agriculture, and Trade, U.S. Agency for International Development, under the terms of Grant No. XXXX: The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the U.S. government.
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Chapter 8
Diseases of the Liver

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Jaundice / Icterus

Jaundice / icterus is yellowing of tissue due to elevated bilirubin levels. The tissue under the skin and on the surfaces of the stomachs and intestines is normally white to cream colored. If it is yellow, the animal is jaundiced/icteric. Three processes can lead to jaundice: 1. Over-production of bilirubin due to increased red blood cell destruction, 2. Liver disease, and 3. Bile duct obstruction. In a jaundiced animal, carefully assess the liver. If the liver appears normal, the jaundice may be due to increased red blood cell (erythrocyte) destruction, which can occur with certain blood parasites, such as anaplasmosis. Note that the dromedaries do not have a gall bladder.
Liver abscesses:
Abscesses in the liver are the result of bacterial infection which can arrive in the liver in a variety of ways, including:
1. Direct extension from navel infection (observed in calves)
2. Via the biliary system
3. From the portal circulation following ulceration of the gastrointestinal tract.

Liver Abscesses
**Hepatic lipidosis (fatty liver)**

Fatty liver has been reported in camels. Disease is usually the result of mobilization of fat stores in an animal with decreased calorie and protein intake, often combined with nutritional stress such as late gestation or early lactation.

Gross changes: The liver will be enlarged, pale, tan to yellow in color, friable (breaks apart easily), greasy on cut surface, have rounded edges, and will float in formalin.
Accentuated lobular pattern:

The liver below has an accentuated lobular pattern. This lesion is not specific and can occur with any condition that preferentially affects one part of the hepatic lobule more than another. It may occur following exposure to toxins, in animals with severe anemia, and with cases of right heart failure. If you observe this lesion, check the color of the lungs (if they are very pale, the liver changes may be due to anemia). If the animal also has clear fluid in the abdomen, carefully evaluate the heart as the liver changes may be due to right heart failure (“nutmeg” liver due to chronic passive congestion). If the animal has been recently moved to a new grazing area, the lesions may be due to a toxin.
Chronic Liver Disease (Cirrhosis)

Chronic damage to the liver by a variety of insults including, toxins, infectious agents, and heart failure, can lead to cirrhosis.

Cirrhosis - Gross changes:
A. The liver is smaller than normal with an irregular, nodular surface
B. The liver is pale in color
C. The liver will be firm and fibrotic
Liver Cysts (Hydatid cysts)

Hydatid disease, or echinococcosis, is an infectious disease caused by the larval stages of several species of the cestode (tapeworm) Echinococcus, which is a parasite whose definitive host is the dog. Cysts may be present in any organ, but in camels they are most commonly found in the lung, liver and (rarely) spleen. Cysts can spread the parasite to the dog (the definitive host), making humans who are in close contact with infested dogs susceptible to develop cyst if they accidentally ingest the tapeworm eggs. Organs containing cysts should therefore be destroyed so that dogs could not eat them, become infested and pose danger to humans who are close to them.
Liver Flukes
Infection by the liver flukes *Fasciola gigantica* and *Fasciola hepatica* has been described in African camels. Lesions and flukes may be identified in animals from regions with higher rainfall and irrigation systems which favor the survival of the intermediate snail hosts. Liver damage consists of fibrous tracts resulting from migration of larvae through the liver (photo A) and fibrous cysts surrounding adults (photo B).