Hepatic Encephalopathy

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KEYWORDS

• Portosystemic shunting • Ammonia • Inflammation • Manganese • Neurotransmitter

KEY POINTS

- Clinicians should be aware that hepatic encephalopathy signs can be subtle and intermittent.
- Ammonia is not the only factor that drives hepatic encephalopathy (HE); there is strong evidence for inflammation also playing a key role. Knowledge of these other factors and precipitants improves management of these cases.
- Dietary protein restriction is no longer the cornerstone of HE management.

Video content accompanies this article at http://www.vetsmall.theclinics.com.

INTRODUCTION

Hepatic encephalopathy (HE) is most usefully defined in veterinary medicine as neurologic dysfunction caused by hepatic disease and/or portosystemic shunting. This definition allows the diverse consequences of liver disease on the central nervous system (CNS) to be encompassed. Broad categories of hepatic disease resulting in HE have been defined in human medicine and are applicable to veterinary medicine (**Table 1**).[1] In veterinary medicine, although acute hepatopathy occurs not infrequently, as a result of the reserve capacity of the liver, acute liver failure (category A) is a relatively uncommon cause of HE in dogs and cats. Category B is the most common cause of HE seen in veterinary practice because of the high prevalence of congenital portosystemic shunts (CPSS). For companion animals it has been suggested that category C should be widened to encompass all chronic intrinsic liver disease, rather than purely the end-stage of cirrhosis.[2]

CLINICAL SIGNS

The spectrum of clinical signs varies from subtle behavioral abnormalities through to coma. Seizures can occur with HE, although these would be part of a constellation of

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Table 1
Category of hepatic disease process resulting in hepatic encephalopathy with suggested veterinary modification

HE Type	Disease Process	Subcategory	Subdivision	Veterinary Modification
A	Acute liver failure			
B	Portosystemic bypass with no intrinsic hepatocellular disease			
C	Cirrhosis and portal hypertension or portosystemic shunts	Episodic Persistent Minimal	Precipitated Spontaneous Recurrent Mild Severe	Intrinsic hepatocellular disease leading to portal hypertension and portosystemic shunting

clinical signs rather than in isolation. A grading scale for humans has been modified for veterinary patients (**Table 2**, Video 1: Dog exhibiting grade II HE).[3,4] In human medicine, a more subtle grade is recognized; minimal HE where individuals seem neurologically normal but cognitive deficits are revealed during psychometric testing. It has been suggested that the human scale undergo revision, combining minimal and grade I, partly because of the subjectivity in accurately defining grade I.[5,6] These would be combined into "covert HE" and grade II-IV termed "overt HE." It is unlikely, beyond research into veterinary HE, that there is a benefit in detecting minimal HE in our patients. It is likely, however, that detecting grade I suffers from increased subjectivity in veterinary medicine; within the confines of a consultation, decreased mental alertness is a relative term and comorbidities (eg, degenerative joint disease in the dog with chronic hepatitis) may contribute to apathy. Therefore it is possible that grade I animals may be classified as asymptomatic and vice versa. Clinical signs of HE often wax and wane with animals moving between symptomatic and asymptomatic. Chronic HE may be subdefined as persistent or episodic (see **Table 1**). Because clinical signs may be subtle and episodic, clinicians should maintain a high index of suspicion in animals at risk of HE. Unrecognized HE may contribute morbidity, and ultimately mortality because of reduced quality of life. Owners are often surprisingly unaware when their animal is displaying obvious behavioral abnormalities, both in young animals with a CPSS and older animals with acquired shunts. Client education improves management of this condition, particularly of cases with episodic HE.

Table 2
Veterinary modification of West Haven grading scale for hepatic encephalopathy

HE Grade	Clinical Signs
0	Asymptomatic
I	Mild decrease in mobility, apathy, or both
II	Severe apathy, mild ataxia
III	Combination of hypersalivation, severe ataxia, head pressing, blindness, circling
IV	Stupor/coma, seizures

Data from Proot S, Biourge V, Teske E, et al. Soy protein isolate versus meat-based low-protein diet for dogs with congenital portosystemic shunts. J Vet Intern Med 2009;23(4):794–800.