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Learning

Insights into Congenital Portosystemic Shunts in Dogs and Cats

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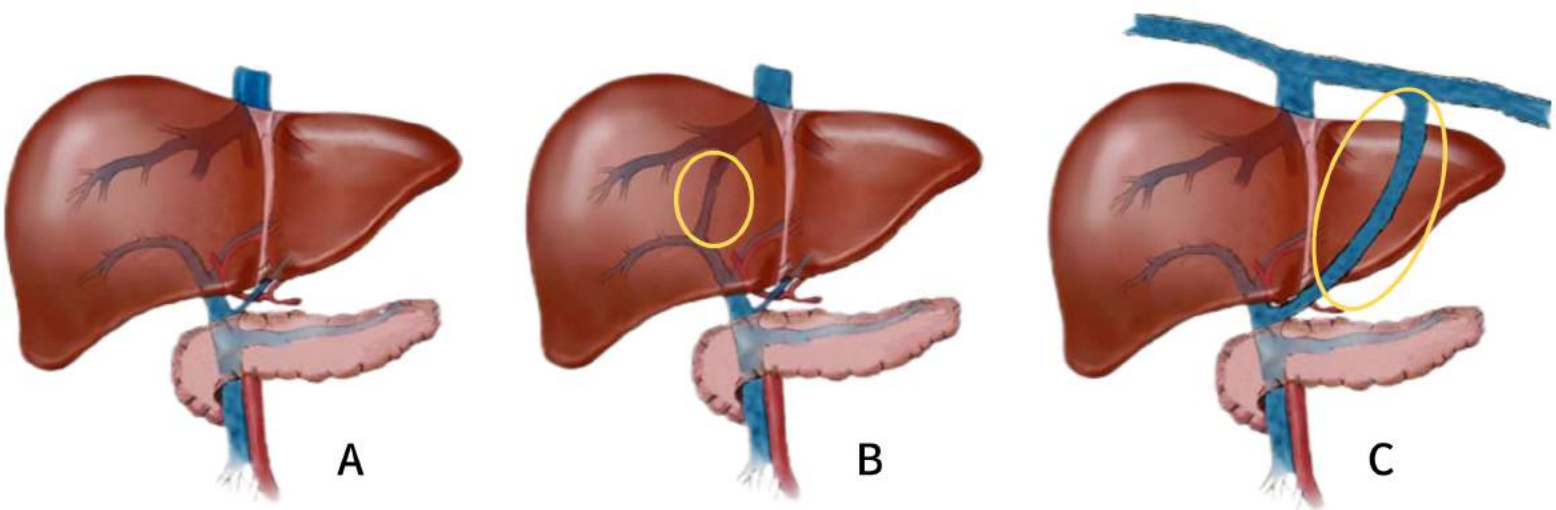
Congenital portosystemic shunts (CPSS) are abnormal vessels allowing communication between the splanchnic and systemic circulations. They are either intrahepatic (ICPSS)or extrahepatic (ECPSS) , single or multiple. ECPSS is most commonly diagnosed in small dogs and cats, while ICPSS is most commonly seen in large-breed dog. The most common anatomical types of ECPSS are splenophrenic, splenoazygos and splenocaval, right gastrocaval, right and left gastrophrenic in dogs. In contrast, in cats, the vast majority of ECPSS (92%) are spleno-caval, left gastro-phrenic and left gastro-caval. The morphology of ICPSS has been described in detail using Computed tomographic angiography (CTA) in recent studies, new classification schemes based on their morphology have been proposed. Typically, ICPSS shunt greater volumes of portal blood than ECPSS. In most cases, CPSS are usually single, although multiple concurrent CPSS have been reported.

▶ Figure 1: Overview of the anatomy of a normal liver and of livers with intra- and extra-hepatic portosystemic shunts.



A Normal Liver ICPSS ECPSS

Note: (A) No connection of blood vessels in the liver is seen within a normal liver resulting in a blood flow through the hepatic sinusoids. (B) In case of PSS, blood bypasses the liver sinusoids and is therefore not subjected to hepatic metabolism. The intrahepatic shunt represents an abnormal connection of the portal vein with the systemic circulation, which is seen inside the liver. (C) In the case of an extrahepatic shunt, the aberrant connection is located outside the liver. This figure is adapted from "Inherited liver shunts in dogs elucidate pathways regulating embryonic development and clinical disorders of the portal vein", by Frank G. van Steenbeek, Lindsay van den Bossche, Peter A. J. Leegwater & Jan Rothuizen, 2011, Mamm Genome 23, 76–84 (2012), p.77.

Pathophysiology and clinical presentation of CPSS

Most of the clinical signs seen in dogs and cats with CPSS are related to hepatic encephalopathy (HE). 3 types of hepatic disease in HE. Type A: Acute liver failure without pre-existing disease, type B (the most common): portosystemic shunting without intrinsic hepatocellular disease and Type C: cirrhosis, portal hypertension, and/or acquired shunt. Clinical signs with HE can vary from very mild to extremely severe, or wax and wane, range from subtle nonspecific signs, such as a mild decrease in motility or apathy, to severe signs such as seizures and coma. A scheme for grading the severity of HE in humans has been modified in veterinary medicine. (Table 1.). If the liver is unable to perform its vital function, the central nervous system, GI and urinary tract are mostly affected. Classic HE signs comprise seizures, behavioral changes, lethargy, ataxia, circling, head pressing, episodic central blindness, disorientation, pacing, seizure and coma.

▶ Figure 2

▶ Table 1

Grade	Clinical Signs
0	Asymptomatic
I	Mild decrease in mobility, apathy, or both
II	Severe apathy, mild ataxia
III	Hypersalivation, severe ataxia, head pressing, blindness, circling
IV	Seizures, stupors, or coma

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Diagnosis and Differential Diagnosis of CPSS

Clinical signs of CPSS are non-specific and may wax and wane, while laboratory findings can raise clinical suspicion for CPSS, but they are also not specific. Definitive diagnosis will be established by evaluation of liver function tests, such as determination of fasting plasma ammonia (FA) levels, and pre- and postprandial serum bile acids concentrations, and diagnostic imaging, such as US and/or CTA, will confirm the diagnosis of CPSS.

♦ Reference

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1. Konstantinidis, A.O.; Patsikas, M.N.; Papazoglou, L.G.; Adamama-Moraitou, K.K. Congenital Portosystemic Shunts in Dogs and Cats: Classification, Pathophysiology, Clinical Presentation and Diagnosis. Vet. Sci. 2023, 10, 160. https://doi.org/10.3390/vetsci10020160

AmiShield Bile Acid Disc

The AmiShield bile acid disc can quantitatively detect Bile acid in lithium heparinized plasma or serum to assist the veterinarian in diagnosing hepatobiliary disease, portosystemic vascular anomaly (PSVA), and extrahepatic shunting.

Here is the reference range table:

	Common Units (μmo/L)	SI Units (μmo/L)
Canine	1 - 25	1 - 25
Feline	1 - 11	1 - 11