

## Diagnosis and cellophane banding surgery for extrahepatic congenital portosystemic shunt in a domestic short hair cat

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**ABSTRACT:** Congenital portosystemic shunts (CPSS) in cats are significant vascular anomalies in which abnormal connections between the portal venous system and systemic circulation allow portal blood to bypass the liver, leading to clinical manifestations such as hepatic encephalopathy and growth retardation due to inadequate toxin filtration. This case study describes a four-month-old male domestic short-hair cat that presented with loss of appetite, weight loss, aggression, excessive drooling, and frequent vomiting. Diagnostic evaluations included physical examination, radiography showing a microhepatic condition with cranial displacement of the stomach, and ultrasonography with colour Doppler, revealing a shunt between the portal vein and the caudal vena cava. Following surgical correction using the cellophane banding method, the cat showed significant clinical improvement and normalisation of ammonia levels, emphasising the importance of precise diagnostic techniques and adequate surgical management in the treatment of CPSS in felines.

### Keywords:

extrahepatic congenital portosystemic shunt, domestic short-hair cat, radiography, ultrasonography

### ■ INTRODUCTION

Congenital Portosystemic Shunt (CPSS) is a rare vascular anomaly in which blood vessels forge an unusual connection between the portal system and the systemic circulation, bypassing the liver. This condition, meticulously described by Tobias (2009), involves rerouting blood from the gastrointestinal tract, pancreas, and spleen directly into systemic circulation, circumventing hepatic filtration. Based on the work of Alexandros et al. (2023) CPSS manifests in two forms based on the location of the shunt: extrahepatic, commonly found in small-breed dogs and cats, and intrahepatic, predominantly observed in large-breed dogs. The clinical symptoms associated with CPSS, mainly hepatic encephalopathy, encompass a range of neurological, gastrointestinal, and urinary disorders. While Kosim and Satriawan (2024) have reported the management of this condition in Maltese dogs, similar cases in cats have not yet been well documented in Indonesia. This case study focuses on a domestic cat diagnosed with extrahepatic CPSS, characterised by aberrant vessel branching from the portal vein before entering the liver. This study aimed to discuss the diagnostic approach and management of this complex condition in felines, adding a significant contribution to the veterinary literature in Indonesia.

### ■ CASE

**Anamnesis and Clinical Signs:** A four-month-old male domestic short-hair cat presented at the clinic with a constellation of symptoms, including refusal to eat, weight loss, increased aggression, excessive salivation, and vomiting. **Physical Examination:** Body weight of only 1.5 kg, rectal

temperature of 37.5°C, blood glucose level of 85 mg/dL, and Body Condition Score (BCS) of 3 out of 9, indicating the degree of undernourishment. The mucosa appeared as a healthy pink rose colour; however, abdominal palpation in the epigastric region did not reveal any discernible liver structure, and the cat exhibited a painful response to touch in this area.

**Diagnostic Tests:** Abdominal radiography (Figure 1), ultrasonography, complete blood count, and blood ammonia levels. **Diagnosis:** extrahepatic congenital portosystemic shunt. **Treatment:** Surgical correction using the cellophane banding method.

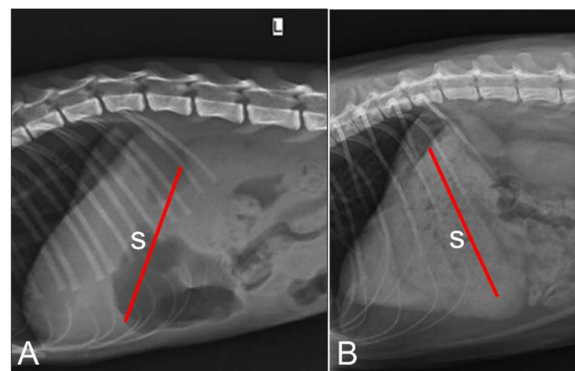


Figure 1. Abdominal radiography of cat. (A) Lateral view in a cat with congenital portosystemic shunt, demonstrating altered stomach orientation. (B) Normal lateral view of a cat's abdomen for comparison.

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## ■ RESULTS AND DISCUSSION

Upon physical examination, the cat demonstrated aggressive behaviour, a symptom Konke (2017) linked to the neural impact of toxins accumulated from the CPSS, which intermittently irritates the cortical layers of the brain. Hypersalivation, observed in 67-84% of cats with CPSS (Lipscomb et al., 2009), further underscores the secondary effects of hepatic encephalopathy (HE). HE manifests in cats with liver insufficiency arising from conditions such as hepatic lipidosis, end-stage liver disease, and congenital portosystemic shunts.

Gastrointestinal symptoms such as vomiting and diarrhoea also occur frequently, reported in 24-71% of cases with CPSS (Lipscomb et al., 2009). The reluctance to eat and weight loss are typical symptoms resulting from the compromised ability of the liver to store the vital nutrients necessary for growth and development. Radiographic findings revealed a microhepatic condition, with the liver appearing undersized, occupying less than two intercostal spaces, and the pylorus of the stomach displaced cranially, altering the gastric axis (Muhlbauer & Kneller, 2024). Ultrasonography showed reduced liver lobe size with homogeneous, hypoechoic textures (Figure 2A) and a visible shunt between the portal vein and caudal vena cava (Figure 2B). Colour Doppler imaging is pivotal for identifying turbulent blood flow abnormalities.

The complete blood count was normal, but a crucial finding was the elevated blood ammonia level of 469  $\mu\text{mol/L}$ , far exceeding the normal range for cats (0-95  $\mu\text{mol/L}$ ). This abnormality underscores how the shunt allows toxins that should be filtered by the liver to bypass it entirely, leading to systemic circulation and potential organ-system toxicity.

The treatment focused on managing symptoms and included antibiotics, lactulose, antiemetics, and a specialised low-fat diet. Once stabilised, the cat underwent cellophane banding surgery to correct the shunt. Postoperative improvements were significant, with normalisation of weight, resolution of hypersalivation and vomiting, and normal ammonia levels, confirming the effectiveness of the treatment approach.

## ■ CONCLUSION

Extrahepatic Congenital Portosystemic Shunt (CPSS) is notably common in male domestic short hair cats, reliably diagnosed with methods including physical examinations, radiography, and color Doppler ultrasonography. Surgical intervention, particularly the cellophane banding technique, provides a definitive treatment, effectively improving the health and longevity of affected cats. These strategies are critical for early detection and management, ensuring optimal outcomes for this serious condition.

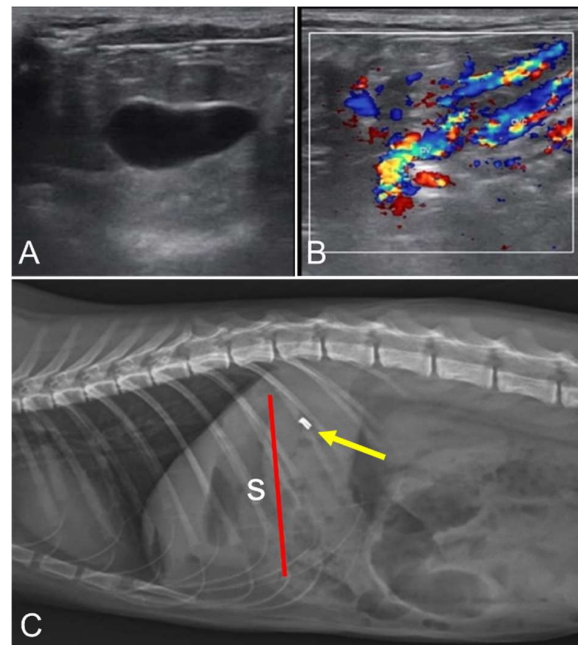


Figure 2. Ultrasonography and post-surgical radiography results. (A) Liver ultrasonography of a cat with an extrahepatic congenital portosystemic shunt. (B) A shunt is visible between the portal vein and caudal vena cava. (C) Post-surgery lateral view radiography of the abdomen (stomach (s) indicated by a red line) shows the cellophane banding site (yellow arrow).

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