



Extrahepatic Portosystemic Shunts (EHPSS) in Dogs & Cats

Quick Take

A portosystemic shunt is an **abnormal blood vessel** that **diverts blood around the liver instead of through it**. Because the liver never “sees” this blood, it **cannot detoxify waste, regulate nutrients, or mature properly**.

Toxins (especially ammonia) build up → neurologic signs (“**hepatic encephalopathy**”), poor growth, stomach/intestinal irritation, and urinary problems.

There are **two broad types**:

- **Extrahepatic** (outside the liver) — most common in small-breed dogs (Yorkshire Terriers, Maltese, Shih Tzu, Poodles) and many cats;
- **Intrahepatic** (inside the liver) — more common in large-breed dogs (not the focus of this guide). Surgery or minimally invasive attenuation gives the best chance at cure or major improvement for EHPSS. Medical management alone helps control symptoms but does not cure the disease.

1) What’s Going On Inside?

- **Normal**

Blood from the intestines should flow to the liver first, where toxins are cleared and nutrients processed before entering the body.

- **With a shunt**

A “shortcut” vessel sends blood **around the liver directly to the heart**.

This leads to:

- Toxin build-up (especially ammonia → neurologic signs)
- Underdeveloped liver
- Low blood sugar swings
- Stomach/intestinal ulcers
- Urinary stones (ammonium biurate)
- Delayed growth, poor muscle mass, low energy

Common Signs in Dogs & Cats: many pets show signs most after meals:

- **Neurologic**
 - Disorientation, staring, head pressing
 - Tremors, seizures
 - Wandering, pacing, dullness
- **Digestive**
 - Vomiting, diarrhoea
 - Poor appetite, weight loss or stunted growth



- **Hypersalivation** (especially cats)
- **Urinary**
 - Frequent urination
 - Straining or blood in urine
 - Bladder stones
- **General**
 - Poor weight/muscle development (“failure to thrive”)
 - Puppies/kittens that seem “quiet” or “slow”
 - Episodes after high-protein meals

2) Diagnosis & Staging

Diagnostic steps may include:

- **Bloodwork:** Low BUN, glucose, albumin; high bile acids or ammonia
- **Bile acid stimulation test:** this test can be run by your family veterinarian and takes a few days to come back. Two blood samples are taken, one following fasting, one a few hours after a meal. Not specific of portosystemic conditions as it gives more a general idea of the hepatic function yet the most reliable blood test to indicate a shunt.
- **Abdominal ultrasound:** an experienced ultrasonographer will typically be able to detect the abnormal vessel or even just see the secondary changes (small liver lobes, bladder uroliths).
- **CT angiography:** Best available tool to detect all the ramifications of the shunt;
- Nuclear scintigraphy (gold-standard mapping of shunt vessel): but practically inexistent in Hong Kong;
- **Urinalysis for crystals/stones:** bi-ammonium urate

A complete diagnosis allows surgeons to plan the best approach and estimate prognosis.

3) Treatment Overview

A) Medical Stabilization (pre-surgery or for non-surgical cases)

- Used **before surgery** and sometimes lifelong if surgery isn't possible (Late stage with acquired shunts or financial constraint):
- **Lactulose** (reduces toxin absorption)
- **Antibiotics** (reduce ammonia-producing gut bacteria — e.g., amoxicillin or metronidazole)
- **Special diet:**
 - Highly digestible protein, moderate protein restriction, enriched with omega-3 and antioxidants
 - Prescription liver diets often recommended
- Anti-seizure meds if needed
- IV fluids if hospitalized

Reduces symptoms

Does not fix the underlying physical problem

B) Surgery = recommended for most EHPSS

Goal: Gradual closure (attenuation) of the abnormal vessel so the liver learns to take over blood flow again.



Methods

- **Ameroid constrictor** (most common)
Ring placed around shunt vessel; slowly swells → gradual closure over weeks
- **Cellophane banding**
Causes slow scarring and closure
- **Suture ligation (partial or complete)**
Used in select cases; closure must be slow to avoid sudden portal hypertension
- **Interventional radiology methods**
Some centres use coil embolization or other minimally invasive techniques via blood vessels (more common for intrahepatic shunts but advancing)
- **Why gradual closure matters**
Rapid closure can cause portal hypertension → life-threatening complications.
Gradual attenuation allows the liver time to adapt and grow.

4) Surgical Outcome Expectations

Dogs

Excellent outcomes in ~80–95% of dogs
Many dogs are **cured** or **dramatically improved**
Liver function typically improves over months

Cats

Good to excellent outcomes in **~70–90%**
Cats can be **more sensitive neurologically**, but long-term improvement is still very common:
Unpredictable side-effects can occur in the initial 72h of recovery, with depression, blinking, facial twitching and seizuring. Feline patients need to be particularly closely monitored in order to detect any early neurological sign.

Not all pets become “normal”

Some pets retain mild liver compromise and need ongoing diet or meds, but quality of life is usually excellent.

5) Complications & Realistic Rates

Complication	Approx. frequency	Notes
Portal hypertension (dangerous)	5–10%	Usually peri-operative; minimized with experience & gradual methods
Seizures peri- or post-op	5–10%	Higher risk in cats; pre-op meds may help
GI ulceration/bleeding	<5%	Medical therapy reduces risk
Shunt not fully closing	~10–30%	Some may need revision or continued medical care



Acquired multiple shunts (rare)	small %	If portal pressure gets too high; can limit full cure
Urinary stone recurrence	Variable	Managed with diet/monitoring. Residual stone formation could indicate incomplete closure.

Mortality in experienced hands is generally <5–10%, depending on severity and species.

Experience matters. Specialists (board-certified surgeons or interventional radiologists) and advanced imaging improve success rates.

6) Recovery & Home Care

Hospital

- 3-4 days ideally: feline patients would develop most episodes of neurological deterioration (Seizures, blindness, depression) with the first 72h.
- Pain control, anti-nausea meds
- Monitoring for seizures and portal hypertension

Home

- Avoid exercise for 2–4 weeks
- Continue **medical therapy** initially (diet, lactulose, antibiotics)
- Slowly transition toward normal diet if permitted by your vet, after 6 weeks of optimal recovery.
- Watch for:
 - o Disorientation
 - o Vomiting/diarrhea
 - o Lethargy
 - o Seizures
 - o Poor appetite

Follow-ups

- Blood tests at ~1, 3, and 6 months
- Bile acids or ammonia check to confirm liver improvement
- Imaging can be done to confirm the complete occlusion of the shunt. Although many surgeons will not reassess and rely on the improvement of the clinical signs instead, confirmation of a complete closure will help anticipating whether production of uroliths will be ongoing or not. If a residual shunt is present, a small surgery can be done to ligate the patent vessel and completely CURE the patient. If symptoms persists, reassessment with imaging should always be considered.

Many pets gradually gain weight, muscle, and energy as their liver develops.

7) Long-Term Prognosis

Best outcomes:

- Extrahepatic shunts
- Early surgery
- Good pre-operative stabilization

Most treated pets live normal or near-normal lifespans.



Lifelong dietary/medical needs?

Some will require:

- Continued liver-friendly diet
- Lactulose or antibiotics during flare-ups
- Monitoring for urinary crystals

But many eventually eat a normal balanced diet and live happy, active lives. Those with a need for ongoing medical treatment likely have a residual shunting and would benefit of complete ligation.

8) Lifestyle & Home Tips

Avoid high-protein treats until cleared (no jerky, organ meats)
Puzzle feeders to slow eating
Soft flooring during recovery
Regular urine checks for stones
Low-stress environment — anxiety can worsen neurologic signs

9) Trusted Owner-Friendly Veterinary Resources

- American College of Veterinary Surgeons (ACVS) — Portosystemic Shunts
- VCA Hospitals — Liver Shunts in Dogs & Cats
- Veterinary teaching hospitals (e.g., UC Davis, Cornell, Ohio State, Royal Veterinary College)
- Liver-support nutrition guides from veterinary nutritionists
- These explain surgery, symptoms, and long-term management clearly.

Bottom Line

- Extrahepatic portosystemic shunts are common in small-breed dogs and cats.
- Medical therapy helps control symptoms, but surgery offers the best chance at cure.
- Success rates are 80–95% in dogs and 70–90% in cats with experienced teams.
- Side-effects in cats are rare, but cannot be prevented or anticipated and can be life-changing. The one who do not die, may never fully recover.
- Gradual vessel closure (ameroid or cellophane banding) is standard.
- With proper care, most pets go on to live happy, normal lives.
- Those who do not fully recover and require ongoing treatment likely have residual shunting and would definitely benefit from a quick revision surgery for complete occlusion in order to be cured.