香港獸醫專科服務

HONG KONG VETERINARY SPECIALTY SERVICES

Peritoneopericardial Diaphragmatic Hernia (PPDH) in Dogs and Cats

Quick Take

- **PPDH (Peritoneopericardial Diaphragmatic Hernia) is a congenital defect** in which the abdominal organs (such as the liver, gallbladder, small intestines, or omentum) pass through a gap in the diaphragm and into the pericardial sac — the membrane surrounding the heart.
- **Present from birth (not traumatic).**
- Found most commonly in cats, especially long-haired breeds (Maine Coons, Persians), but also in dogs (Weimaraners, Cocker Spaniels, Schnauzers).
- Some animals show no signs for years, while others develop breathing issues, GI signs, or heart compression.
- **Surgery is the treatment of choice for any moderate or symptomatic case**; elective **repair is often recommended even in asymptomatic pets to prevent life-threatening complications later.**

1) What's going on inside?

During **fetal development**, the diaphragm and pericardium form from the same embryologic tissue.

In PPDH:

- A failure of separation occurs.
- This leaves an opening that connects the abdominal cavity and the pericardial sac.
- Organs such as the liver, gallbladder, stomach, spleen, or intestine slip into the pericardial space.

This can cause:

- **Mechanical problems:**
  - Compression of the heart → impaired filling
  - Restricted lung expansion → difficulty breathing
  - GI obstruction → vomiting, pain, or bloating
- **Circulatory problems:**
  - Reduced blood return to the heart
  - Congestion or swelling in organs trapped in the pericardium
- **Long-term problems:**
  - Adhesions between heart, pericardium, and abdominal organs
  - Liver lobe atrophy or necrosis

- Risk of strangulation of trapped intestine

Although many animals with PPDH look normal for years, the **defect never closes and may worsen with age or trauma.**

2) What owners typically notice

Many pets show **no symptoms (up to 50%).**

Often discovered during:

- Routine X-rays
- Workup for unrelated problems
- Pre-anaesthetic screening

When symptoms appear:

- Respiratory signs
- Rapid or effortful breathing
- Exercise intolerance
- Panting at rest
- Gastrointestinal signs
- Vomiting, regurgitation
- Decreased appetite
- Weight loss
- Abdominal discomfort
- General signs
- Lethargy
- Mild coughing
- "Grunting" when resting
- Pale gums (rare, severe cases)

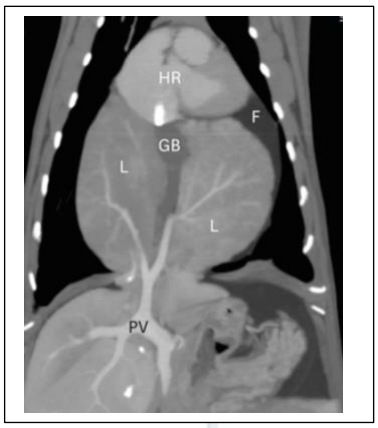
Cats often show vague, intermittent signs (quietness, hiding, low appetite) instead of obvious respiratory signs.

3) Diagnosis

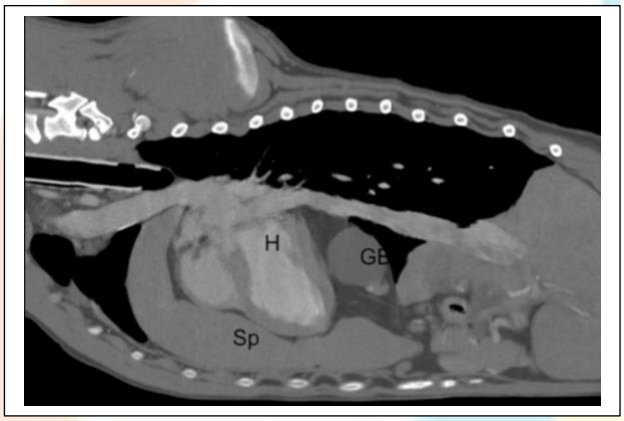
A) Physical exam

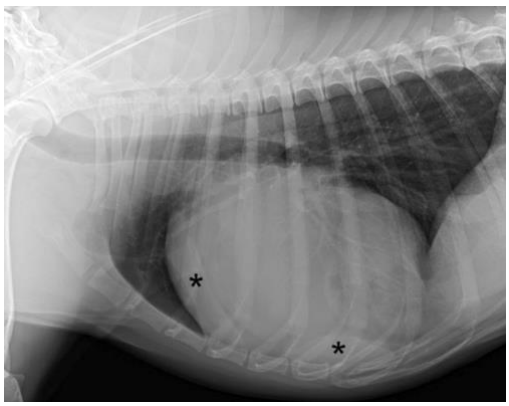
- Often normal, but vets may detect:
- Muffled heart sounds
- Soft abdominal feel ("empty abdomen")
- Mild breathing difficulty

B) Imaging



- **X-rays** — usually show:
  - Abdominal organs within the heart shadow
  - Loss of normal diaphragm outline
  - Enlarged, round "globoid" cardiac silhouette
- **Ultrasound** — excellent for identifying which organs are displaced.
- **Echocardiography** — checks heart compression, adhesions, and cardiac function.
- **CT scan** — best for complex cases or surgical planning





C) Bloodwork

Often normal; may show mild liver enzyme elevation if liver is trapped.

4) Treatment options

A) Conservative (non-surgical) management

Used only when:

- Herniation is small
- The pet is entirely asymptomatic
- The patient is extremely high-risk for anaesthesia
- Even then, most specialists recommend elective surgical repair because PPDH never resolves on its own.

Limitations:

- Risk of sudden deterioration
- Adhesions worsen with age, making future surgery more difficult

B) Surgical treatment — the definitive treatment

Surgical repair is called **herniorrhaphy,** and involves:

- Opening the abdomen
- Gently returning herniated organs to the abdomen
- Lysing adhesions between the heart, pericardium, and organs
- Closing the diaphragm defect
- Exhaling air from the chest to restore negative pressure
- Sometimes placing a temporary chest tube

Hospitalization: 1–3 days
Surgery duration: 1–2 hours

Why surgery works so well?

- Young animals tolerate the procedure extremely well.
- Most cases do not require opening the chest.
- Once repaired, the problem is permanently resolved.

5) Surgical outcomes and prognosis

Condition at time of surgery	Prognosis	Notes
Asymptomatic young animals	Excellent (>95%)	Long-term normal life
Mild GI/respiratory signs	Excellent (90–95%)	Full recovery expected
Chronic adhesions, older pets	Good (80–90%)	May require careful dissection
Severe organ compromise	Fair (60–80%)	Outcome depends on organ viability
Heart compression or shock	Guarded	Emergency repair needed

Cats generally do extremely well postoperatively.

6) Complications and realistic rates

During surgery

Complication	Approx. rate	Notes
Organ adhesions requiring careful separation	Common (~20–40%)	Especially liver
Bleeding from liver lobes	10–15%	Usually easily controlled
Need for chest tube placement	10–25%	Often removed within 24 hrs

After surgery

Complication	Approx. Rate	Notes
Seroma/swelling	5–10%	Self-limiting
Respiratory distress	5–10%	Usually transient; rare pneumothorax
Wound infection	<5%	Managed with antibiotics
Recurrence of hernia	<2%	Very rare if repaired correctly
Death/perioperative mortality	<5%	Mainly in emergency or elderly cases

Overall, PPDH is considered one of the safest major thoracoabdominal surgeries in small animals.

7) Recovery and aftercare

In hospital

- Pain medications
- Oxygen support if needed
- IV fluids
- Chest tube monitoring (if placed)
- Early feeding once stable

Home care (typically 2–4 weeks)

- Restrict activity (no jumping)

- Keep incision clean and dry
- Monitor breathing effort
- Feed small, frequent meals initially
- Use an e-collar to prevent licking

Most dogs and cats return to normal behaviour within 3–7 days after discharge.

8) Long-term expectations

After successful surgery:

- No long-term medications needed
- No lifestyle restrictions
- No expected recurrence
- Normal breathing, appetite, and energy
- Excellent long-term survival

Because **PPDH is congenital**, affected animals should not be bred, as there may be a hereditary component.

9) Veterinary References

- ACVS (American College of Veterinary Surgeons) — Peritoneopericardial Diaphragmatic Hernia
- VCA Hospitals — Diaphragmatic Hernias in Dogs and Cats
- Fossum, T. (Small Animal Surgery, 5th Ed.) — Chapter on congenital hernias
- Krahwinkel & Rochat, 1997, Vet Clin North Am SA Pract — Comprehensive review of diaphragmatic hernias
- Brockman et al., 2013, J Small Anim Pract — Surgical outcomes in canine and feline PPDH
- Wilson et al., 2020, Vet Surg — Adhesion rates and long-term prognosis in congenital hernias

Bottom Line

- PPDH is a congenital defect where abdominal organs herniate into the heart sac.
- Many animals appear normal for years, but the condition will not correct itself.
- **Surgery is safe and curative in >90–95% of pets**, even when significant organs are involved.
- Early elective surgery gives the best long-term outcome and avoids dangerous complications.
- Most dogs and cats completely normal lives after surgical repair.