香港獸醫專科服務

HONG KONG VETERINARY SPECIALTY SERVICES

狗的脑积水（Hydrocephalus in Dogs）

脑积水意为“脑中积水”。它发生在脑脊液（CSF）—— 一种保护和滋养大脑的透明液体——在脑室（脑内液体腔）内积聚的速度快于排出或吸收的速度。

这导致脑室扩张、脑组织受压，并出现神经症状，如行为改变、视力丧失、转圈或癫痫发作。

脑积水可分为：

先天性（出生时就有）——常见于玩具犬和短头品种（吉娃娃、约克夏梗、博美、马尔济斯、波士顿梗、斗牛犬）

后天性——由肿瘤、感染、炎症或创伤引起

治疗重点是降低脑脊液压力，可通过药物或手术。

脑室-腹腔分流术（VP shunt）是适合病例的金标准外科治疗。

1. 内部发生了什么？（What’s going on inside?）

正常情况下，脑脊液在脑室内产生，通过细小通道流动，包裹大脑和脊髓，然后被循环系统重新吸收。

脑积水时：

流动受阻（阻塞性脑积水）或 大脑吸收脑脊液过少（交通性脑积水）

结果：脑脊液压力升高，脑室扩张，脑组织受压。

原因

先天性畸形（最常见）：

狭窄的中脑导水管（aqueductal stenosis）

Chiari样畸形

Dandy-Walker样囊肿

发育性脑室扩张

后天性：

脑肿瘤或囊肿

脑膜炎/脑炎

出血或创伤

寄生虫或病毒感染

2. 饲主通常观察到的症状（What owners notice）

症状常在<1岁的幼犬出现，或成年犬在创伤/感染后出现。

典型症状：

头部呈圆顶状增大（玩具犬尤其明显）

“日落眼”（眼球向下偏斜）

呆滞或嗜睡

转圈、无目的徘徊

失去室内如厕训练

癫痫发作

行走困难或共济失调步态

视力丧失（可能撞到物体）

头部抵压或颈部疼痛

症状可能间歇性或进行性加重。

3. 诊断（Diagnosis）

逐步进行：

体格检查和神经学检查

影像学检查（必不可少）

超声（通过幼犬/小型犬未闭合的囟门）

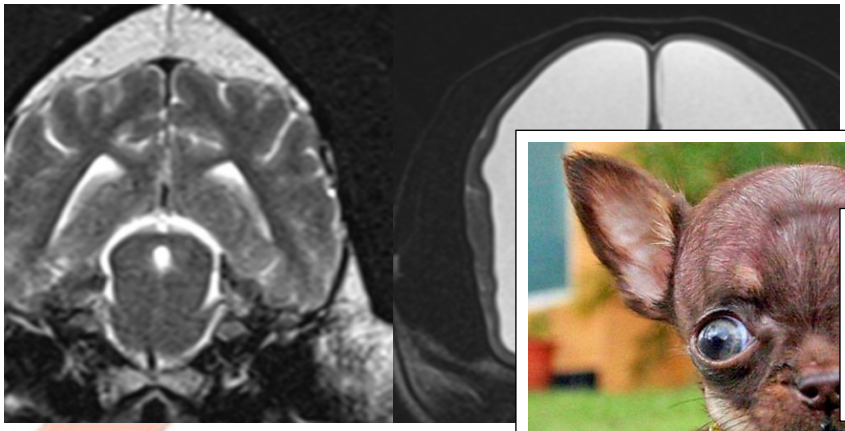
MR（最佳精度）：显示脑室扩张、脑组织受压、病因（阻塞、肿块、炎症）。但大多数先天性病例（尤其是幼犬，肿瘤可能性低）无需如此精细的定义

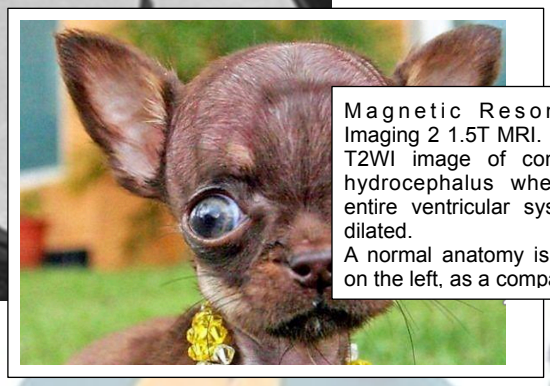
CT（若MRI不可用）：更快、更便宜，对大多数病例已非常准确

有时进行脑脊液分析（排除感染）

偶尔行脑电图（EEG）评估癫痫

兽医也可能进行眼科检查，检测视神经肿胀（视盘水肿）。





Magnetic Resonance Imaging 2 1.5T MRI. Sagittal T2WI image of congenital hydrocephalus where the entire ventricular system is dilated.
A normal anatomy is shown on the left, as a comparison

4) Treatment overview

A) Medical management

Used for:

- Mild or stable congenital hydrocephalus
- Poor surgical candidates
- Temporary stabilization before surgery

Goals: decrease CSF production, reduce brain swelling, control seizures.

Medications:

- Prednisolone (steroid): reduces CSF production & inflammation
- Omeprazole or acetazolamide: lower CSF formation rate
- Furosemide: diuretic; short-term use
- Anticonvulsants (phenobarbital, levetiracetam) for seizures
- Mannitol or hypertonic saline (in emergencies)

Can stabilize **mild** cases

Often **temporary** - disease may **progress over time**

B) Surgical treatment — Ventriculoperitoneal shunt (VP shunt)

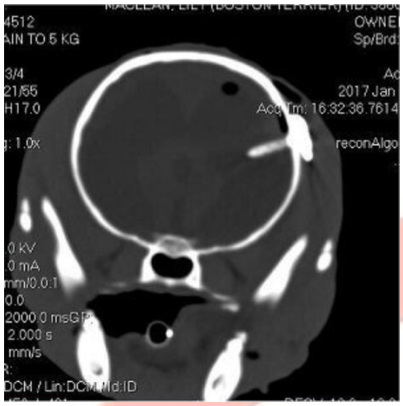
Gold-standard therapy for dogs with symptomatic or progressive hydrocephalus.

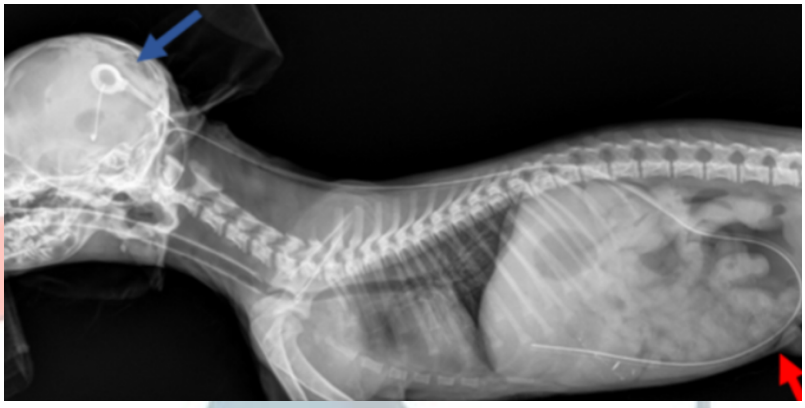
How it works:
A **small catheter (tube) is placed inside one of the brain ventricles** and connected via a valve system to tubing that **drains excess CSF** into the **abdomen**, where it is safely absorbed.

Shunt components:

1. **Ventricular catheter** (in brain)
2. **Pressure-regulating valve** (controls CSF flow)
3. **Peritoneal catheter** (to abdominal cavity)

This **bypasses the blockage**, normalizing brain pressure and allowing the ventricles to shrink.





5) Surgery and hospitalization

Performed by **specialist veterinary neurologists or surgeons** (yes, HKVSS does this procedure!). Requires MRI or CT to plan catheter placement.

Surgery time: ~1h; general anaesthesia used.

Hospital stay: 2–5 days for post-op monitoring, anti-seizure therapy, and antibiotics.

Most dogs show **neurologic improvement within days to weeks**, though some take longer to adapt.

6) Expected outcomes

Category	Outcome after VP shunt	Notes
Congenital hydrocephalus (treated early)	Good–Excellent in 70–85%	Most regain alertness, mobility, normal behaviour
Acquired hydrocephalus (tumour/inflammatory)	Variable (40–70%)	Depends on underlying cause
Medical management only	Improvement in ~30–40%	Usually temporary; relapse common
Long-term survival	>2 years median; many live normal lives	Lifelong follow-up needed

Brain tissue that's already **severely damaged** won't regenerate, but **decompression** prevents further injury.

7) Complications and realistic rates

Complication	Approx. rate	Notes
Shunt blockage (ventricular or peritoneal)	20–30%	May require revision surgery
Shunt infection	5–15%	Managed with antibiotics ± replacement
Over-drainage (ventricular collapse)	10–15%	Causes lethargy or collapse; valve adjustment may help
Shunt migration/kinking	<10%	Mechanical issue, requires correction
Recurrence or incomplete response	10–20%	May need shunt revision or medical adjunct
Anaesthetic/ surgical mortality	<5% (experienced centres)	Varies by age and neurologic status

Modern shunt systems (adjustable or pressure-sensitive valves) have significantly improved safety and long-term success.

8) Recovery & aftercare

Short-term:

- Pain control, antibiotics, steroids tapered over time.
- Anti-seizure meds continued if needed.
- Avoid neck scratching, rough play, or collars near surgical site.
- E-collar for 2–3 weeks.

Long-term:

- Recheck at **2–4 weeks**, **3 months**, and then every **6–12 months**.
- Imaging (ultrasound or MRI) may be repeated to assess ventricular size.
- Owners monitor for:
    - Recurrence of neurologic signs
    - Lethargy or vomiting (possible blockage)
    - Swelling along shunt tract
    - Fever (infection)
- Dogs usually resume normal activity within **2–4 weeks**, with full adaptation by **2–3 months**.

9) Prognosis summary

Type	Prognosis	Key factors

Congenital (treated early)	Good to excellent	Early surgery, mild signs, small ventricles
Acquired (from tumours or meningitis)	Variable to guarded	Depends on cause and response to therapy
Medical management only	Fair to poor long-term	Temporary control, frequent relapse

Overall, surgery provides the **best long-term outcome** for most affected dogs.

10) Questions to ask your neurologist or surgeon

- Is my dog's hydrocephalus communicating or obstructive?
- Is my dog a candidate for VP shunt surgery?
- What are your clinic's shunt revision and infection rates?
- What long-term monitoring schedule should I follow?
- Are there lifestyle restrictions (exercise, collars, diet)?
- What should I watch for as signs of shunt blockage?

11) Trusted veterinary references (English)

- ACVS (American College of Veterinary Surgeons) — Hydrocephalus in Dogs
- VCA Hospitals — Hydrocephalus Overview and Treatment Options
- Bagley, R. S., et al., Vet Clin North Am Small Anim Pract, 1994 — Surgical outcomes for VP shunts in dogs
- Flegel, T., et al., J Vet Intern Med, 2011 — Long-term follow-up of VP shunted dogs
- Fossum, T. (2020). Small Animal Surgery, 5th Ed. — Hydrocephalus and VP shunt management
- Veterinary Evidence Review (2023): Outcomes and complication rates for canine hydrocephalus shunt surgery

Bottom line

- Hydrocephalus = **excessive brain fluid** that causes pressure and **neurologic dysfunction**.
- Medical management can stabilize some, but **surgery (VP shunt) gives the best long-term relief** and survival.
- About **70–85% of dogs improve significantly** after successful shunting.
- **Early diagnosis** and treatment prevent irreversible brain damage.
- **Lifelong follow-up** is needed, but many dogs go on to live happy, playful lives after recovery.