Kids Brain Doc

Dr. Laila Mohammad

Intraventricular Hemorrhage (IVH) of the Newborn

Patient Packet

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TYPES OF INTRAVENTRICULAR HEMORRHAGE (IVH)

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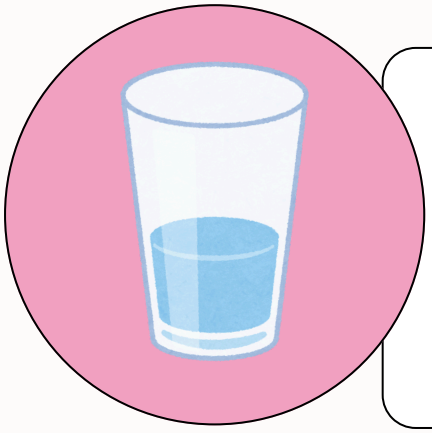
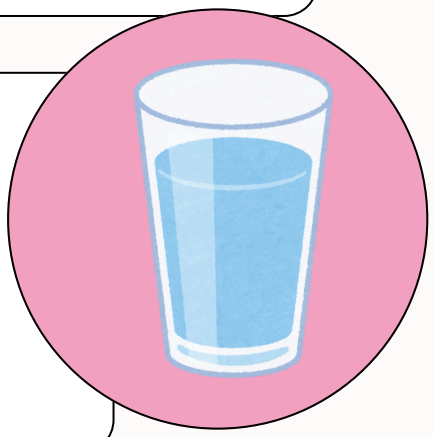


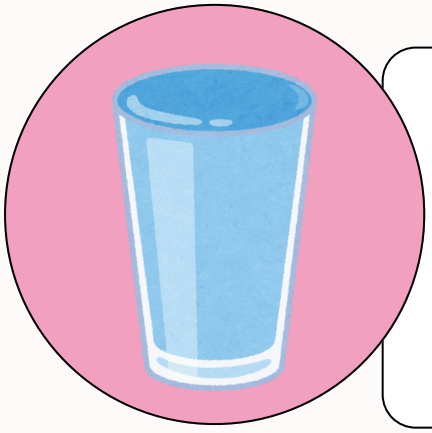
01. GRADE 1

A small amount of bleeding next to the brain's fluid spaces. Most babies will recover without any long-term effects.

02. GRADE 2

The bleeding has moved into the brain's fluid spaces (*ventricles*) but has not caused them to get bigger. These babies usually do very well and often only need regular monitoring.



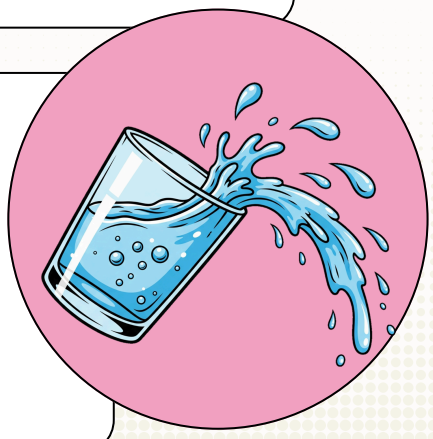


03. GRADE 3

There is more bleeding, and the ventricles have become larger from the extra fluid and blood. Some babies may develop fluid buildup (*hydrocephalus*) and need closer follow-up and treatment.

04. GRADE 4

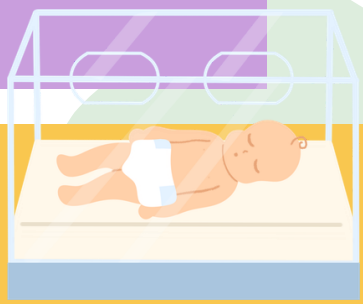
The bleeding has spread into the brain tissue around the ventricles. This is the most serious type and can sometimes affect development. These babies are closely followed by a pediatric neurosurgeon.



Diagnosis: IVH

What is it?

Bleeding can occur in the fluid-filled spaces of the brain, known as ventricles. "Intraventricular" means inside these ventricles, and "hemorrhage" refers to bleeding. This happens when small blood vessels in the brain burst and bleed.

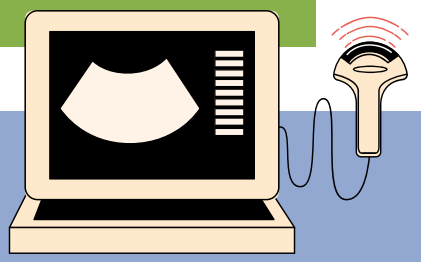


Who does it affect?

Babies born early, particularly before 32 weeks, often have delicate blood vessels in their brains. This can sometimes happen with full-term babies who are very ill at birth, though it's rare.

How did my child get it?

A premature baby's brain is still growing and delicate, which is why bleeding can happen. If blood flow, oxygen levels, or blood pressure change, the blood vessels might break more easily.



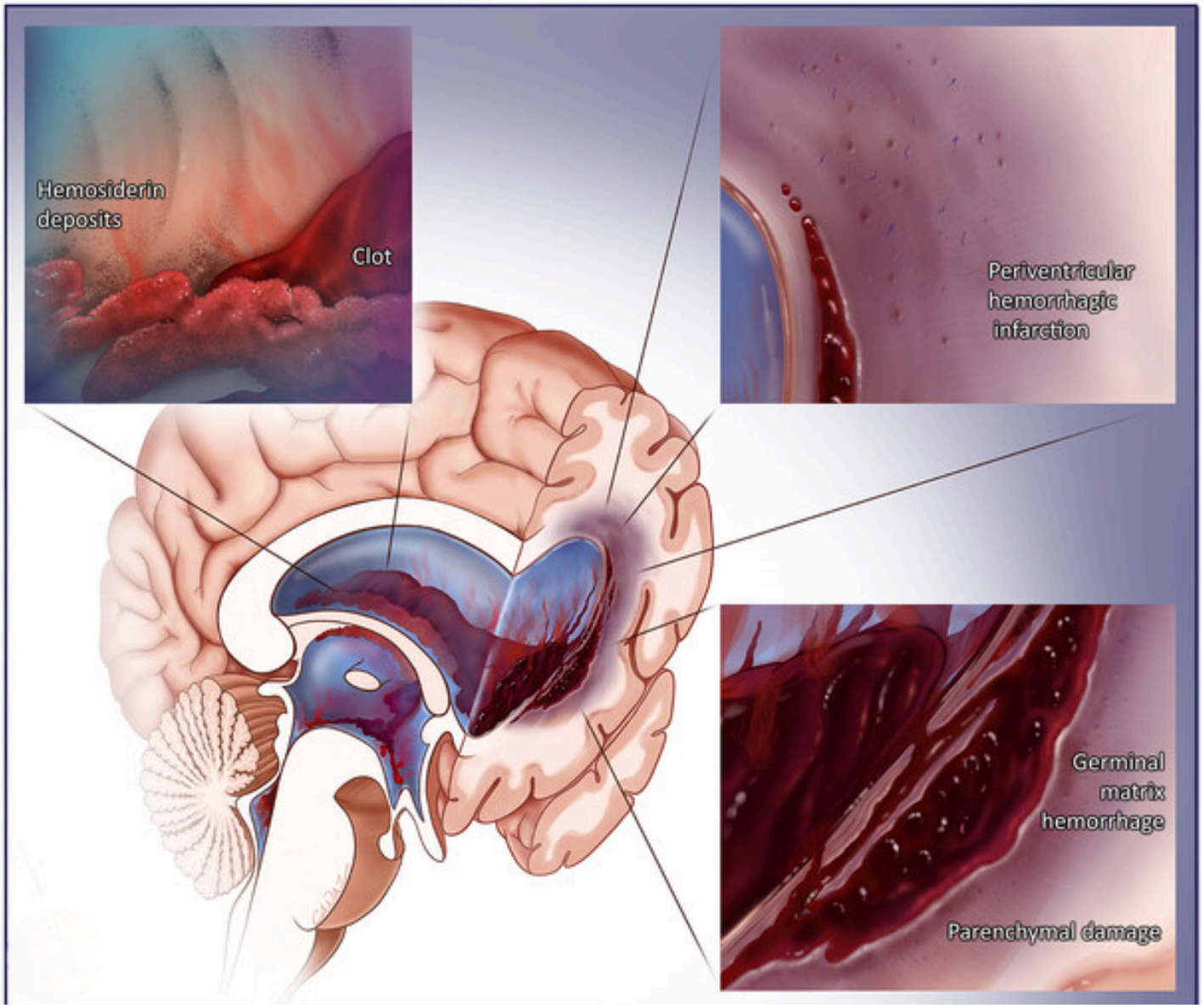
Is it Harmful?

Many babies with small bleeds recover fully. Larger bleeds might lead to fluid buildup (*hydrocephalus*) or affect development, so we'll keep a close eye on your baby with head ultrasounds, track their head size, and check how soft the soft spot (*anterior fontanelle*) is.

What is the Treatment?

Most babies with IVH are treated with careful monitoring and supportive care in the NICU. If fluid builds up in the brain (*hydrocephalus*), your baby may need a procedure to drain the fluid by placing a temporary shunt (*reservoir*) or a permanent shunt (*VP shunt*) to relieve the pressure.

Primary and Secondary Brain Injury



Follow-Up
(if no surgery needed)

ACTIVITY RESTRICTIONS

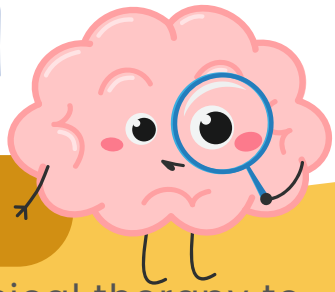
- No special activity restrictions are needed once your baby is home and stable.
- Encourage normal development through tummy time and gentle play, as recommended by your pediatrician.

HOME CARE

Feed your baby as usual and monitor for any changes in alertness, feeding, bulging of the soft spot, or rapidly increasing head size.

FOLLOW-UP

Your doctor may recommend follow-up visits and, in some cases, repeat imaging to make sure there is no fluid build-up causing pressure on the brain.



LONG-TERM CARE

- Some babies might benefit from early intervention or physical therapy to aid their development.
- Many infants with mild IVH grow and develop just fine, but regular developmental check-ups help catch and tackle any issues early.
- In more serious IVH cases, babies might face higher risks of developmental delays and cerebral palsy.
  - Regular visits with a pediatric neurologist can offer helpful therapies and resources.

CEREBROSPINAL FLUID (CSF)

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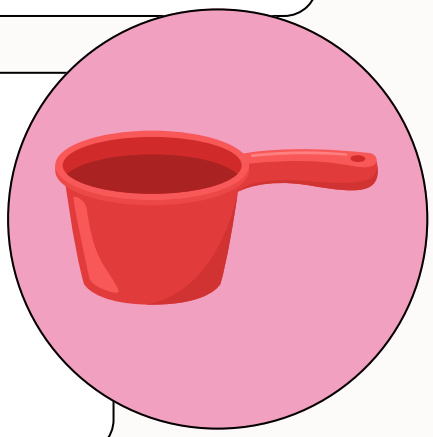
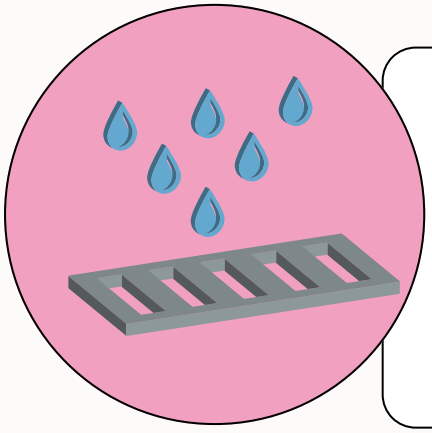
01. WHAT IS IT

A clear liquid that surrounds the brain and spinal cord. It cushions the brain, protects it from injury, and helps move nutrients and waste in and out.

02. HOW MUCH DO WE HAVE

You produce about 15-20 mL (1 tablespoon) every hour. Over a whole day, that's about 500 mL (or 2 cups). However, at any one time, there's only about 150 mL (or 1/2 cup) around the brain and spinal cord.



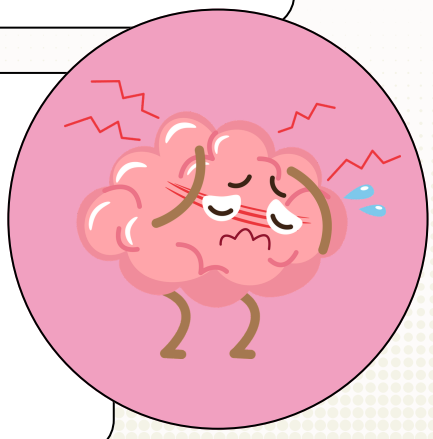


03. WHERE DOES THE EXTRA GO?

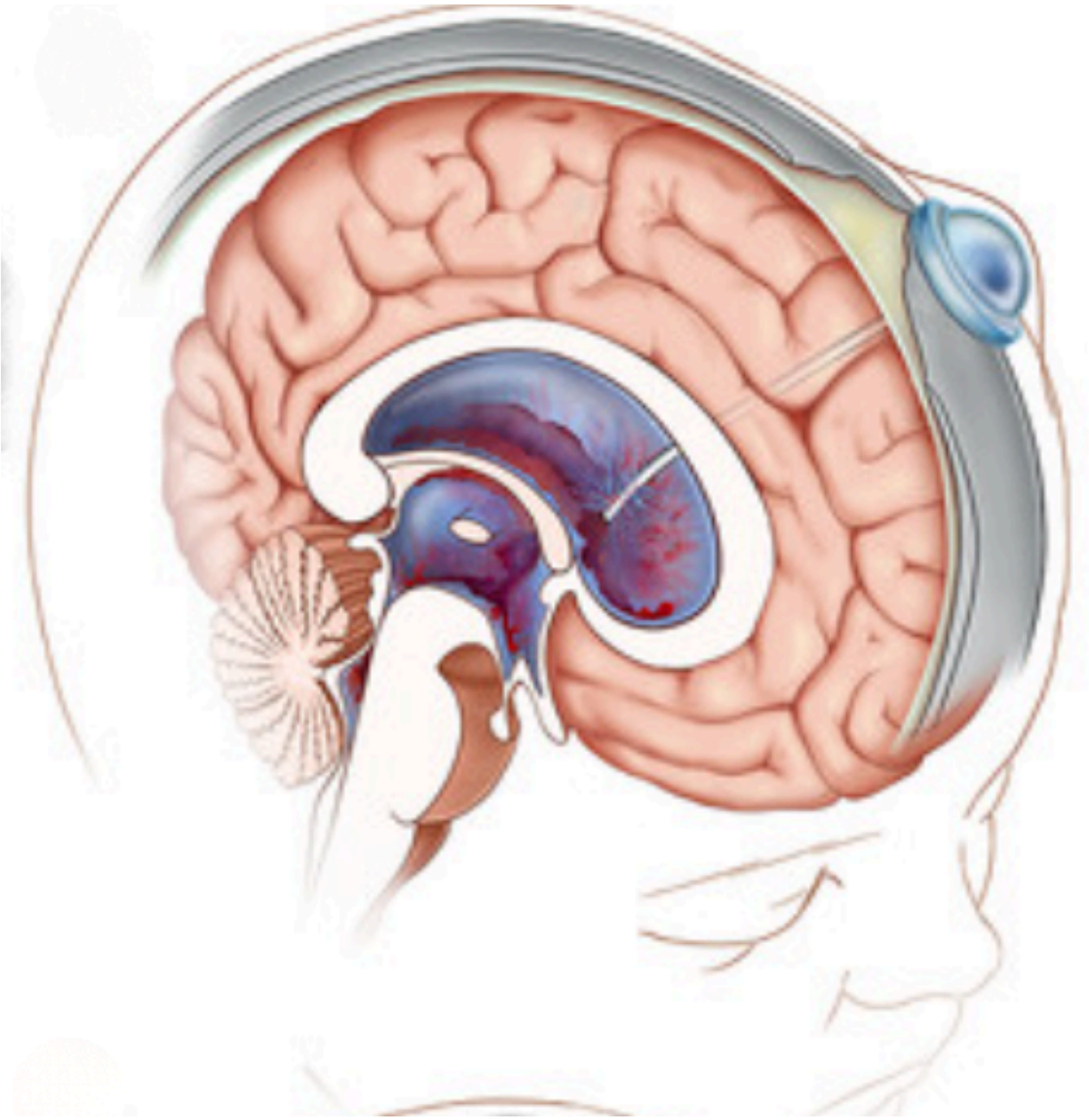
Since your body only needs a set amount, the "extra" drains away through the brain's natural gutters (arachnoid granulations), which carry the fluid back into the bloodstream to keep everything in balance.

04. WHY IS THIS IMPORTANT

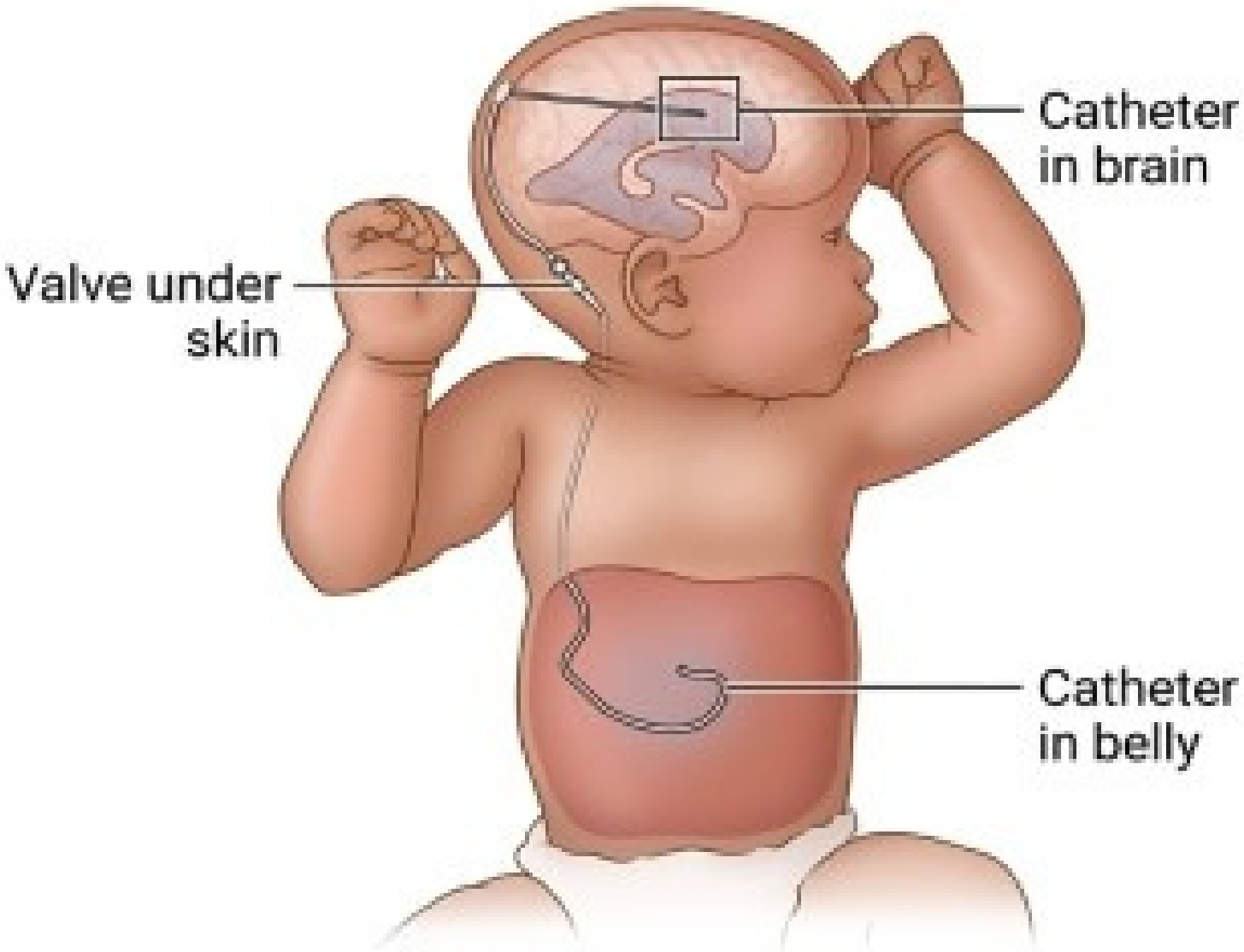
If too much CSF builds up or doesn't drain well, it can put pressure on the brain. This might show up as headaches, vomiting, sleepiness, irritability, a bulging soft spot, or a quickly growing head size. This would need treatment.



Ventricular Access Device (VAD)



Ventriculoperitoneal Shunt (VPS)



Surgery: VPS Insertion

1 Goals of Surgery

- Relieve fluid buildup and pressure in the brain
- This is done by moving extra fluid to another part of the body, where it can be safely absorbed.

2 Risks of Surgery

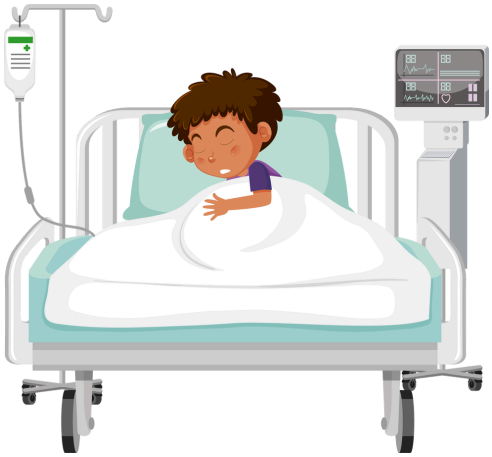
- Infection (give antibiotics before surgery), bleeding, headache, brain fluid leak, damage to the brain, injury to bowels
- Long-term: the VPS may need to be replaced over time, especially in children as they grow

3 Alternatives

- ETV - effectiveness depends on your child's anatomy and why there's fluid buildup (ETV Success Score).
- Observe - only if no signs of pressure

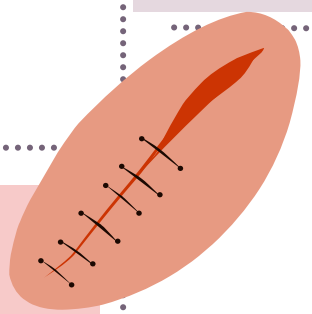
4 Right after Surgery

- Sitting with the head up to help the incision heal
- Pain medications: IV Tylenol, IV Toradol
- Antibiotics: 24 hours
- Check labs



5 Hospital Recovery

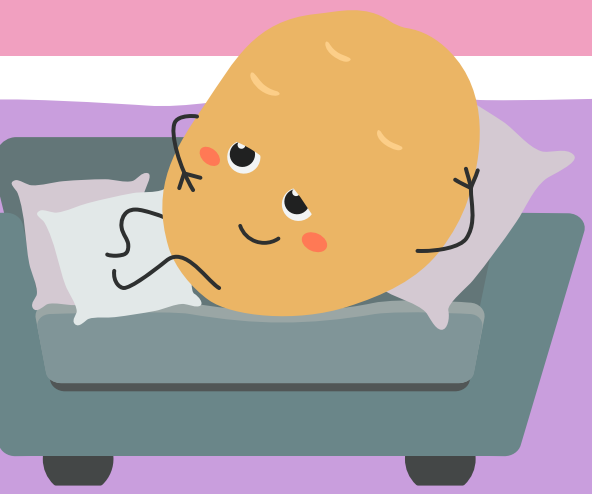
- Once your child is taking all their medicine by mouth, eating/drinking, peeing, and moving okay, your child can go home.



6 Incision Care

- Ok to shower 2 days after surgery. Wash daily.
- No bathing or soaking incision in tub for 4 weeks after surgery.
- Incision will fall off on its own in 3-4 weeks.
- No need to cover the incision.

Recovery & Follow-Up



ACTIVITY RESTRICTIONS

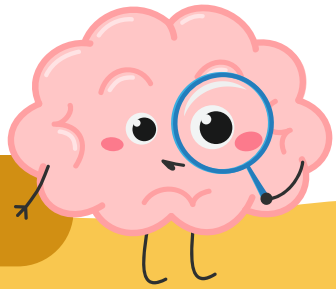
- Week 0-2: Couch potato
- Week 0-4: Light activity
- 1-3 months: Regular activity (keeping two feet on the ground - avoid jumping)
- At 3-months: Clear for all activities

HOME CARE

Will see in clinic for incision check at 2 weeks. Can return to school or daycare after this appointment.

FOLLOW-UP

- 2-week: incision check
- 6-weeks
- 3 months
- Annual check-up



LONG-TERM CARE

- Return to sports: After 3 months, it's okay to return to non-contact sports.
  - At 6 months, it's okay to return to contact sports.
- Schedule annual eye exams to rule out pressure buildup in the optic nerve (*papilledema*) that could indicate increased pressure in the brain.
- Most children will live normal, active lives once fully healed.