

## Neurodevelopmental outcomes after ventriculoperitoneal shunt placement in children with non-infectious hydrocephalus: a meta-analysis

Sobana M, Halim D, Aviani JK, Gamayani U, Achmad H. Child's Nervous System (2021) 37:1055–1065

**Background:** Based on etiology, hydrocephalus is classified into infectious and non-infectious hydrocephalus. In children, non-infectious hydrocephalus includes congenital hydrocephalus, post hemorrhagic hydrocephalus, neural tube defect-related hydrocephalus, and tumor-related hydrocephalus. VP shunt is most commonly used CSF diversion device.

**Objective:** To evaluate neurodevelopmental outcomes in children with non-infectious hydrocephalus who had VP shunt placement

**Materials and methods:** Meta-analysis using PubMed, Google Scholar, Scopus databases, and reference lists

# ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet



## Pediatric non-infectious hydrocephalus

**Results:**  
N=1929 studies identified, 12 publications fulfilled inclusion criteria (1) reported neurodevelopmental outcome in children with non-infectious hydrocephalus, (2) reported surgical treatment, (3) reported control from children without CNS anomalies with the same baseline condition  
Results from meta-analysis showed that children with non-infectious hydrocephalus who already had VP shunt placement have

- Significantly higher risks of cerebral palsy, visual and hearing impairment, epilepsy, or seizures Have lower IQ scores and higher risk of mental development delay
- Lower motoric score and significantly higher risk of motor development delay
- Risk of behavioral abnormalities are similar compared to healthy control

### Risk of neurological function disorders in children with VP shunt compared to normal children

Cerebral palsy	RR 8.08 (6.87, 9.50), z =25.22, p=0.000)
Visual impairment	RR 3.89 (3.09, 4.91), z=11.49, p=0.000)
Hearing impairment	RR 4.08 (2.50, 6.67), z=5.62, p=0.000)
Epilepsy or seizures	RR 15.75 (5.08, 48.77), z=4.78, p=0.000)

**Conclusions:**

- Children with ventriculoperitoneal shunt have significantly higher risks of disabilities and mental and motoric development delays
- Planning on continuous rehabilitation is important to acquire their optimum potentials and quality of life.

**Key message:** Children with ventriculoperitoneal shunt placement have significant neurodevelopment problems.

### EXPERT COMMENT

"Neurodevelopmental problems in children with hydrocephalous, with or without CSF diversion are under-recognized. The current study systematically analyzes the problems in children treated with VP shunts. The effect of additional risk factors such as the underlying etiology, pre-existing brain insult, chronic brain injury due to hydrocephalous, and delay in CSF diversion needs assessment to ascertain the exact measure of neurodisability."

**Dr Arushi Gahlot Saini,**  
MD, DM (Pediatric Neurology), MNAMS  
Assistant Professor, Department of Pediatrics,  
PGIMER, Chandigarh

With warm regards,

**DR MANINDER S  
DHALIWAL**

**DR. PIYUSH GUPTA**  
IAP NATIONAL  
PRESIDENT 2021

**DR REMESH KUMAR**  
IAP PRESIDENT ELECT  
2022

**DR G.V. BASAVARAJA**  
HON. SECRETARY GEN.  
2021 - 22

### Reference

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