

**Case report:**

**Various outcomes of Idiopathic Grade IV Intraventricular Haemorrhage in term newborns at two years of age.**

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**Introduction:**

Intraventricular Haemorrhage (IVH) generally occurs in infants <32 weeks and/or <1500 grams. Incidence of IVH in term neonates is 3.5-5%<sup>1,2</sup>. 50% of IVH in term neonates is primarily caused by trauma and asphyxia; a minority of haemorrhages is caused by extension of bleed from Subdural, Subarachnoid and Intraparenchymal haemorrhage or caused by vascular lesions, coagulopathies or tumours. 25% of cases have no significant risk factors. Most of the germinal matrix has regressed by term, so most haemorrhages (35%) arise from the posterior tufts at the glomus in choroid plexus, 24% from Thalamus, 17% from residual Germinal Matrix near the thalamocaudate groove (17%), 14% from Periventricular cerebral parenchyma, and 10% from unclear source. We present the different outcomes of 3 term babies with Grade IV IVH, when followed upto 2 years of age. All of them were delivered vaginally following uncomplicated pregnancies. Intrapartum periods were uneventful, Apgars at 1 and 5 minutes were 9-10. After a normal transition periods, the neonates had become symptomatic (tonic seizures, refusal to suck, depressed level of consciousness) between 12-24 hours of age requiring admission in Neonatal Intensive Care Unit. Post Haemorrhagic Hydrocephalus developed in all of them and were managed conservatively resulting in arrested Hydrocephalus. Haematological profile (platelet counts, Prothrombin Time and Activated Partial Prothrombin Time) were normal. Average

duration of NICU stay was 15 days.

**Case1** (corresponds to Figure1) - At 2 years of age, he was developing right sided spastic hemiparetic cerebral palsy. Right sided limbs exhibited hypertonia, brisk deep tendon reflexes, ankle clonus and persistence of cortical thumb. The child showed early hand preference, dwarfing and dyspraxia of affected limbs. Electroencephalogram (EEG), Visual Evoked Potential (VEP), Brainstem Auditory Evoked Response (BAER) and Fundoscopy were normal at 2 years of age. Developmental assesment was done by Developmental Assesment Scale For Indian Infants (DASII) which is based on Bayley Scale of Infant Development (BSID) II norms. The Motor and Mental Developmental quotients i.e MoDQ and MeDQ were 65% and 68% respectively at 2 years, thereby signifying moderate developmental delay.

**Case2** (corresponds to Figure 2) - The child at 2 years of age was developing features of spastic quadriparetic cerebral palsy with feeding difficulties due to pseudobulbar palsy, intractable seizures, growth failure and recurrent chest infections. BAER showed profound bilateral Sensorineural hearing loss, VEP showed prolonged P100 latencies, Fundoscopy showed bilateral optic atrophy, EEG showed generalised high amplitude spikes and slow waves. MoDQ and MeDQ scores were 30% and 20%, thereby signifying severe developmental delay

**Case3** (corresponds to Figure 3)- At 2 years of age, he was developing features of Mixed spastic dyskinetic cerebral palsy. He had spastic quadriparesis with

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dystonia and choreo-athetoid movements involving all the limbs – the child occasionally adopting primitive obligatory extensor postures. EEG showed cortical dysrhythmia; BAER showed bilateral moderate sensorineural hearing loss; VEP and fundoscopy were normal. MoDQ and MeDQ scores were 45% and 48% respectively, thereby signifying severe developmental delay. He also had growth failure.

The infant's ability to autoregulate blood flow to the brain in response to blood pressure is limited (pressure passive). Hence IVH can occur due to overperfusion of periventricular region during delivery, crying, feeding, and coughing. The U shaped venous drainage of caudate nucleus and large venous channels of the thalamus are prone to stasis and thrombosis during intermittent episodes of increased blood flow<sup>3</sup>. The outcome of IVH usually depends on the cause and grade of IVH along with associated complications – Post Haemorrhagic hydrocephalus, Periventricular Haemorrhagic Infarcts and Periventricular Leucomalacia<sup>4</sup>. In term neonates severe neurologic deficit occurs in 40% of survivors and the outcome is universally poor in case of associated deep gray matter (basal ganglia or thalamus) injury<sup>5</sup>.



Figure1- Shows bilateral IVH (affecting left side more than right side), with periventricular haemorrhagic infarcts i.e Grade IV IVH, associated with Post haemorrhagic hydrocephalus.

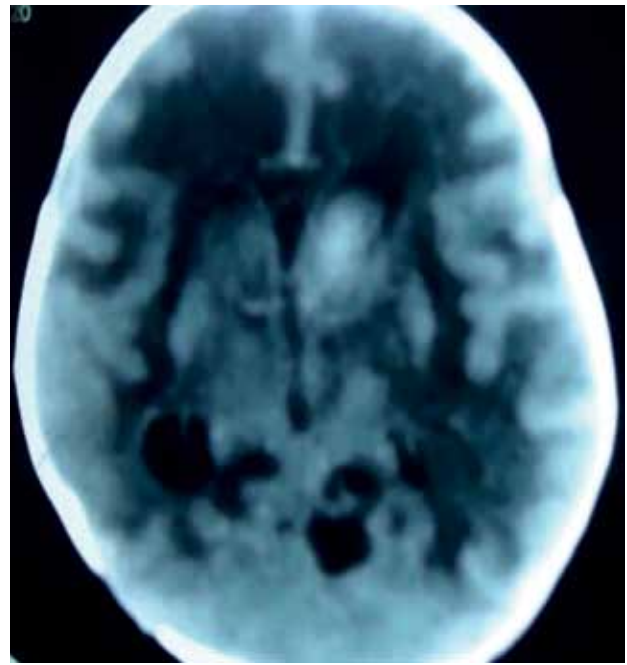


Figure2- Shows IVH with massive periventricular haemorrhagic infarcts and post haemorrhagic hydrocephalus.

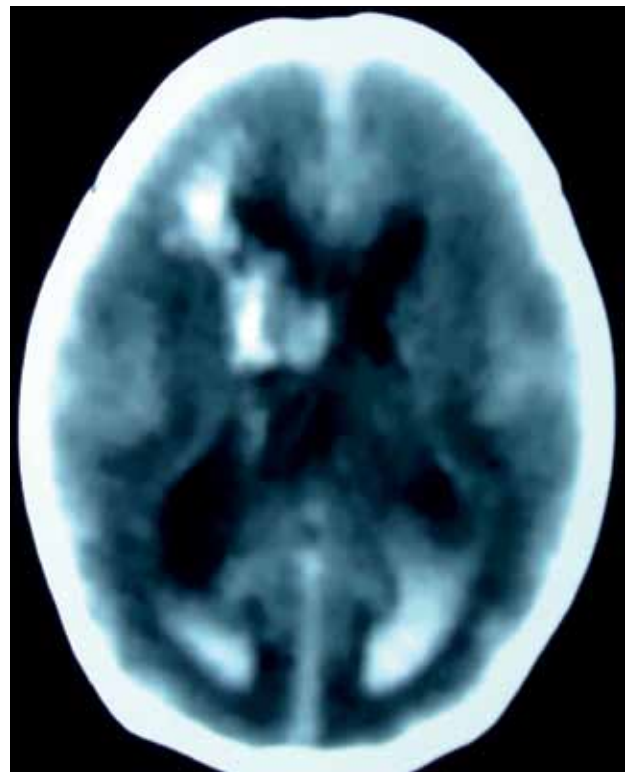


Figure 3- Shows IVH with Thalamic and basal ganglia bleed, periventricular hypodensities and post haemorrhagic hydrocephalus.

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