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## **Intraventricular Hemorrhage (IVH)**

### **What is IVH?**

Intraventricular hemorrhage is bleeding into the brain tissue or the ventricles (spaces of the brain filled with spinal fluid) of the brain. There are four grades of intraventricular hemorrhage (IVH):

- Grade I - Bleeding into a tiny area of the brain called the subependyma
- Grade II - Minor bleeding into the ventricles
- Grade III - Extensive bleeding into the ventricles
- Grade IV - Bleeding into the brain tissue itself

### **What causes IVH?**

IVH is much more common in preterm newborns than term newborns. The exact cause of IVH is not known, but is likely due to some combination of immature blood vessels, brain protection mechanisms, blood pressure changes, and others. The more premature and unstable (sick) the baby is, the higher the risk for IVH. In the premature infant, the hemorrhage does not occur at the time of the delivery, but tends to develop later, most commonly 24 to 48 hours after a major hypoxic insult.

### **How do we diagnose IVH?**

IVH is usually diagnosed during the first 72 hours after birth or later in the first week in very preterm infants. A newborn with IVH might be found to have subtle changes, either during the physical exam or in their behavior. Alternately, they might have more serious problems, such as seizures, apnea or sudden/unexplained anemia. A head ultrasound is a routine test that is used to screen most newborns born at less than 32 weeks, or other high-risk neonates for IVH.

### **How do we treat infants with IVH?**

There is no real treatment for IVH aside from keeping the baby as stable as possible and providing support to the systems in need. Anti-seizure medicines can be given for seizures.

### **What are the long-term effects associated with IVH?**

The outcome of IVH depends on the grade. Grades I and II IVH do not affect neurologic outcome. Grades III and IV can result in hydrocephalus and require shunt placement. Grades III and IV are also associated with a significant risk of long-term neurologic problems and, in some babies, can be fatal. Most of these babies are followed up by the developmental pediatrician or the neurologist.