

Malfunction is most often caused by mechanical obstruction either within the ventricles from particulate matter (tissue or exudate) or at the distal end from thrombosis or displacement as a result of growth. Functional obstruction of a shunt's anti-siphon device remains a common complication. Revisions are needed when signs of malfunction appear. The child with a shunt obstruction is often first seen in an emergency visit with clinical manifestations of increased ICP, which is frequently accompanied by worsening neurologic status.

The most serious complication, shunt infection, can occur at any time, but the period of greatest risk is within the first 6 months after placement ([Sivaganesan, Krishnamurthy, Sahni, et al, 2012](#)). The infection is generally a result of intercurrent infections at the time of shunt placement. Infections include sepsis, bacterial endocarditis, wound infection, shunt nephritis, meningitis, and ventriculitis. Meningitis and ventriculitis are of greatest concern because any complicating CNS infection is a significant predictor of subnormal intellectual outcome. Infection is treated with antibiotics administered intravenously or intrathecally for a minimum of 7 to 10 days. A persistent infection may require removal of the shunt until the infection is controlled. External ventricular drainage (EVD) is used until CSF is sterile. The EVD allows for removal of CSF through a tube that is placed in the child's ventricle and flows by gravity into a collection device.

The primary reasons for inserting an EVD include unstable status, increased ICP that is difficult to stabilize, or infection from an existing VP shunt. The EVD may drain CSF intermittently or continuously according to need. Accurate and frequent documentation of the incision site; amount, color, and consistency of drainage into the device; and the child's vital and neurologic signs are an important part of the nursing care.

Prognosis

The prognosis of children with treated hydrocephalus depends largely on the cause of the dilated ventricles before shunt placement and the amount of irreversible brain damage before shunting ([Kinsman and Johnston, 2016](#)). For example, malignant tumors have a high mortality rate regardless of other complicating factors.

Surgically treated hydrocephalus in patients with little or no