Neurosurgery in Children with Bacterial Meningitis

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Bacterial meningitis can be associated with life threatening neurological complications that require urgent neurosurgical treatment.

The aim of the study was to analyze neurosurgical treatment of children with bacterial meningitis. **Methods:** This prospective study enrolled pediatric bacterial meningitis cases in two study periods: 277 children treated during years 1997–2002 and 77 during years 2009–2010. Of the 277 vs. 77 children treated for bacterial meningitis (BM), 60 (22 %) vs. 33 (43 %) patients developed early neurological complications (NC), while there were 15 (5.4 %) vs. 2 deaths (2.6 %).

Figure 1. Etiologic agents in first study period

Figure 2. Etiologic agents in second study period

The etiology of BM was confirmed in 45 % (124/277) vs 74 % of children (55/77).

In both study periods, the majority of pediatric BM cases were caused by three most common meningeal pathogens, *meningococcus*, *H. influenzae type B* and *pneumococcus* (89% vs. 79%), while *gram-negative bacilli* caused around 10% of cases (8.9% vs. 10.5%)(Figure 1 and 2).

Figure 3. Neuroimages of cases with NC (Obstructive Hydrocephalus with subdural effusion, Subdural empyema)

Neuroimaging was performed in 39% (n=109) and 58% (n=45) of children with BM. Evident structural changes were recorded in 43% (n=47) vs 75% (n=34) of brain images. In both study periods, the most common NC confirmed by neuroimaging were: subdural effusions (35 vs 22); hydrocephalus (7 vs 2); cerebritis (1 vs 3); intracerebral bleeding (1 vs 3); subdural empyema (2 vs 1), spinal /cerebral abscess (1 vs 1), subdural hematoma (1 vs 1) and ventriculitis (0% vs 1) (Figure 3).

Urgent neurosurgery was required in 5% vs. 4% of cases (9/38 vs. 2/24 cases with subdural collections, 5/7 vs. 1/2 of cases with hydrocephalus and 1 case of spinal abscess).

Because subdural collections exerted a mass effect on the brain, (24 % vs. 8 %) underwent surgical treatment due to worsening clinical presentation with space-occupying symptoms and signs: progression of altered mental state to coma, recurrence of seizures, and worsening of neurological deficit.

The surgical techniques applied were surgical bur hole drainage in ten cases and the placement of a subduroperitoneal shunt in one case. None of the cases had any complications from the surgery.

All children with subdural collections were followed for 3 vs 2 years, and none of whom had later recurrences of meningitis.

Conclusions: The neurosurgical treatment of children with bacterial meningitis was required almost equally in both study periods, with subdural effusions being the most common.