



Shunt independence in pediatric hydrocephalus

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Dear Editor:

We read eagerly the recent paper by Iglesias et al. [2] (Shunt independence in pediatric hydrocephalus: our 16-year experience and review, *Child's Nervous system*. 2019 Jun 27. doi: <https://doi.org/10.1007/s00381-019-04267-0>) regarding shunt independence in previously shunted children. The authors reviewed 212 children who were shunted between 2000 and 2016 with at least 1-year follow-up. They offered an algorithm to describe their approach to children with shunt malfunction or infection. According to this retrospective study, the incidence of successful shunt removal in pediatric patients was about 8.96% (19/212).

The protocol that the authors have described is the same as written or unwritten plans which are used in most pediatric centers for patients admitted with shunt malfunction or infection. In fact in such situation, this opportunity can be given to the patient to live without shunt, either with or without endoscopic third ventriculostomy (ETV) [1].

As the study is retrospective, no exact information has been given about the clinical status of patients specially the state of consciousness. The mentioned algorithm cannot be used in unstable patients and comatose children, as they are in short of time. In critical ill patients, there is no time to test for any trial and it seems more plausible to revise the shunt as a straightforward approach.

The rate of shunt independence among previously shunted patients has been very diverse in different series [2] that could be related to the different threshold of shunt implantation among neurosurgeons and probably different length of

follow-up period. In patients who were initially shunted with borderline ventriculomegaly, the chance of shunt independence is higher than those who underwent shunt insertion due to real hydrocephalus and high intracranial pressure.

The motto of once shunt then always shunt has been a common belief for a long time, but this concept has been gradually changing over the past decades. By commencing ETV procedure and its widespread use with acceptable success rate in most kinds of hydrocephalus, ETV has been considered as an alternative for shunt.

In fact, due to lifelong complications of shunt, most parents and patients are seeking a way to get rid of shunt. Some of them desire to test a shunt independence trial in an elective setting. This trial has several steps of shunt ligation, ICU admission, and ICP monitoring, and then if the patient could tolerate ligation for at least 1 week or more, then the shunt is removed. If ligation could not be tolerated, ETV is performed. Afterward, ICP monitoring continues and if ICP is controlled, the shunt is removed. Although this protocol could give the child an opportunity to be shunt independent, these steps are time taking and need several surgeries associated with long time admission in ICU. Consequently, most surgeons do not accept the risk of such trial for asymptomatic stable shunted patients. The chance of meningitis or intraventricular hemorrhage following shunt removal or manipulating an old-implanted shunt should be weighed against the benefits of shunt freedom. Potential risks of new neurological sequels due to ICP rising episodes, occasional seizures with lifelong consequences, and several anesthetic procedures in a child with a cerebral disease should be also considered.

Prospective studies with high number of patients and long-term follow-up can evaluate the algorithm and answer to the question of shunt independent rate in shunted children.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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