

## COMMENTARY

## Multiloculated hydrocephalus

Multiloculated hydrocephalus is a complicated form of hydrocephalus that is found mostly following an intracranial infection or hemorrhage. Normal ventricular anatomy disrupts and changes to an abnormal shape containing multiple chambers that are usually separated from each other with variable thickness webs. Regarding the number, size, location, and proximity of these cavities to each other and to the suspicious ventricular system the management is different.

Most patients with multiloculated hydrocephalus are infants with a severe disability who present with high intracranial pressure. The rationale for treatment should be diminishing intracranial hypertension and decreasing the pressure inside the cavities that compress the adjacent brain. There is no standard treatment for this serious kind of hydrocephalus. Multiple shunting was a routine practice so far to normalize the intracranial pressure. But, this approach was associated with more shunt complications including shunt infection, malposition and malfunction which needed more shunt revision surgeries.<sup>[1-3]</sup>

Neuroendoscopy has changed the treatment options for complex multiloculated hydrocephalus with using fenestration in one or several stages to combine multiple cavities into the least number cavities. Fenestration can be done after or before the first shunt which avoids multiple shunting procedures and decreases the number of ventricular catheters inside the cranium to the least number.

In these patients with distorted ventricular anatomy, neuroendoscopy might be complicated and unifying the multiple cavities may be impossible. On the other hand, cerebrospinal fluid loss with the introduction of neuroendoscope to the cavity makes the anatomical points change and fenestration of predicted locations become unsuccessful. Therefore, using preoperative neuroimaging and neuroendoscope is not enough for a successful operation. Gradually navigation came to the operation room and was used for complicated cases of hydrocephalus. Its role for the best direction that

the endoscope can successfully arrive at the first cavities and be applied for more effective fenestration is crucial. Still in complicated patients with multiple cavities all of these facilities are not good enough to unify the cavities, and, therefore, more help are needed. Combining navigation and intraoperative imaging with endoscopic surgery have been considered in recent studies to decrease the failure rate of fenestration in multiloculated hydrocephalus.<sup>[2]</sup> This approach helps successful fenestration, decreases the number of shunt surgeries and provides better results for the patients.

**Farideh Nejat**

Department of Neurosurgery, Children's Hospital Medical Center, Tehran University of Medical Science, Tehran, Iran

**Address for correspondence:**

Prof. Farideh Nejat,  
Department of Neurosurgery, Children's Hospital Medical Center,  
Gharib Street, Postal Code 141557854, Tehran, Iran.  
E-mail: nejat@sina.tums.ac.ir

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