Case Report

Application of Sonography in the Diagnosis and Follow-Up of Trapped Temporal Horn of Lateral Ventricle: Two Case Reports

Jia-Yun Huang1, Nan-Chang Chiu1,2, Muh-Lii Liang3, Hui-Ju Chen1,2, Yi-Jie Lin1, Che-Sheng Ho1,2*

1Division of Pediatric Neurology, Department of Pediatrics, MacKay Children’s Hospital, Taipei, Taiwan, 2Department of Medicine, Mackay Medical College, New Taipei City, Taiwan, 3Department of Neurosurgery, Neurological Institute, Taipei Veterans General Hospital, Taipei, Taiwan

Abstract

Trapped temporal horn of lateral ventricle (TTHLV) is a rare condition of isolated focal hydrocephalus. We report two cases with different presentations, etiologies, and surgical managements. The first case involved an extremely preterm male baby with a history of ventriculitis and intraventricular hemorrhage; he received external ventricle drainage twice due to obstructive hydrocephalus. TTHLV was detected by sonography. He received a ventriculoperitoneal shunt involving two catheters to bypass the adhesion site. There was no ventricular dilatation during 2 years of follow-up. The second case involved a term baby with an enlarged head; brain sonography revealed left focal hydrocephalus with TTHLV and mild midline shift. Neuroendoscopic cystoventriculostomy with fenestration from the left trigone to the frontal horn was performed and serial follow-up brain sonography for 3 months showed decreased ventricle size. The suitable surgical techniques for the management of TTHLV should be adjusted according to the patients’ condition to obtain more favorable outcomes. Brain sonography can be a useful tool for the diagnosis and for following up the surgical outcomes in infants with TTHLV.

Keywords: Brain sonography, cystoventriculostomy, focal hydrocephalus, trapped temporal horn, ventriculoperitoneal shunt

INTRODUCTION

Trapped temporal horn of lateral ventricle (TTHLV) is a rare type of isolated focal hydrocephalus, with a limited number of reported cases. Documented etiologies include postventriculitis or choroid plexitis, central nervous system tuberculosis, hemorrhage obstructing exit pathway, intracranial masses/neoplasms, intraventricular cysts, and complications after lateral ventricular shunting.[1] A case of idiopathic huge temporal horn has also been reported.[2] We report two cases of TTHLV with different presentations and etiologies diagnosed by sonography. They were treated with different surgical approaches and were followed up by sonography.

CASE REPORTS

Case 1

A preterm male baby born at a gestational age (GA) of 27 weeks with birth weight of 890 g via cesarean section due to fetal distress and maternal chorioamnionitis. The maternal cervical culture showed Listeria monocytogenes positivity. Brain sonography on the 1st day of life revealed some floating material and septum formation in the lateral ventricles, and ventriculitis was diagnosed. He received a ventriculoperitoneal shunt involving two catheters to bypass the adhesion site. There was no ventricular dilatation during 2 years of follow-up. The second case involved a term baby with an enlarged head; brain sonography revealed left focal hydrocephalus with TTHLV and mild midline shift. Neuroendoscopic cystoventriculostomy with fenestration from the left trigone to the frontal horn was performed and serial follow-up brain sonography for 3 months showed decreased ventricle size. The suitable surgical techniques for the management of TTHLV should be adjusted according to the patients’ condition to obtain more favorable outcomes. Brain sonography can be a useful tool for the diagnosis and for following up the surgical outcomes in infants with TTHLV.

Keywords: Brain sonography, cystoventriculostomy, focal hydrocephalus, trapped temporal horn, ventriculoperitoneal shunt

Address for correspondence: Dr. Che-Sheng Ho, Division of Pediatric Neurology, Department of Pediatrics, Mackay Children’s Hospital, #92, Sec. 2, Chung-Shan N. Road, Taipei 10449, Taiwan. E-mail: pedcsho@mmh.org.tw

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Huang JY, Chiu NC, Liang ML, Chen HJ, Lin YJ, Ho CS. Application of sonography in the diagnosis and follow-up of trapped temporal horn of lateral ventricle: Two case reports. J Med Ultrasound 2019;27:154-7.
level, and increased protein level. Brain sonography on the 32nd day revealed obstructive hydrocephalus with high RI (1.0); external ventricular drainage (EVD) was performed. EVD tube was removed 6 days later due to decreased EVD drainage with wound oozing; brain sonography revealed decreased ventricle size. However, follow-up brain sonography showed obstructive hydrocephalus in progression with elevated RI (0.89). A second EVD drainage tube was inserted on the 46th day [Figure 1a], and postoperative brain sonography showed improvement of hydrocephalus.

No drainage of CSF from the EVD tube was noted again 11 days later, and brain sonography showed left-side TTHLV with a previous EVD tract at the left frontal region [Figure 1b and c]. EVD was removed on the 63rd day of life. Brain magnetic resonance imaging (MRI) [Figure 2] on the 71st day showed dilatation of bilateral ventricles with prominent left temporal horn and trigone of the left lateral ventricle. Ventriculoperitoneal shunt with two catheters was connected to the reservoir and the peritoneal catheter. Postoperation brain sonography showed the absence of ventricular dilatation with normal RI [Figure 1d]. Ventricle enlargement was not observed during 2 years’ follow-up.

**Case 2**

A term male baby was found to have increased head girth (41.2 cm, 95 percentile) without other symptoms at 2 months of age. Brain sonography revealed prominent dilated temporal and occipital horns of the left lateral ventricle with pressure effect on the left side, as a mild midline shift to the right hemisphere was observed. TTHLV was suspected [Figure 3a and b]. Brain MRI showed marked focal dilatation of the left lateral ventricle causing displacement of the left thalamus [Figure 3c and d]. Although it might be due to a porencephalic cyst caused by encephalomalacic process around the ventricle, the pressure effect of the markedly dilated ventricle suggested CSF trapping and the presence of TTHLV. Neuroendoscopic cystoventriculostomy with fenestration from the left trigone to the frontal horn of the lateral ventricle was performed. Follow-up brain sonography at 5 months of age showed decreased ventricle size with normal RI [Figure 3e and f].

**DISCUSSION**

Trapped ventricle condition involves the obstruction of a ventricle outlet with continuous CSF production that results in cystic dilation of certain parts of the ventricle.[3] The term “entrapment of temporal horn” was first introduced by Maurice-Williams and Choksey in 1986,[4] to describe a form of noncommunicating hydrocephalus, which presents as focal ventricular dilation of the temporal horn caused by occlusion of the CSF pathway at the foramen of Monro of the lateral ventricle. Indications for surgical intervention include persistent headache with or without increased intracranial pressure[5] and midline shift findings, which may due to the increased risk of cerebral herniation and/or collapse of the frontal horn.[2] Ventriculoperitoneal shunt was most frequently used to manage this condition.[6-8] Other procedures, such as temporal to frontal horn shunt,[9] temporal to prepontine cistern shunt, temporal horn ventriculocisternostomy, and microscopic or endoscopic reconnection to the CSF pathway, have been reported.[9,10]

Here, we reported two patients with TTHLV with different GAs and etiologies who were treated by different surgical
approaches. The first case involved an extremely preterm baby whose TTHLV occurred after the second EVD removal. We choose ventriculoperitoneal shunt insertion instead of septum fenestration to avoid the risk of bleeding, recurrence of adhesion, and previous posthemorrhagic hydrocephalus. The second case involved a term baby who had focal hydrocephalus with TTHLV and mild midline shift at 2 months of age without an apparent etiology. No obvious symptoms of increased intracranial pressure were noted. However, surgical intervention was still recommended due to the possible mass effect with thinning of the surrounding brain mantle and the high risk of progression. He received neuroendoscopic cystoventriculostomy with fenestration. For the management of TTHLV, a suitable surgical technique for the treatment of TTHLV should be adapted according to the patient’s underlying condition for more favorable outcome.

A review of the literature revealed that 78 cases of TTHLV were detected during 1947–2017; only 5 cases were reported involving patients <1 year of age, with youngest patient being 4 months old.[2] We speculate that TTHLV may be underdiagnosed and reported. Our experience with the patients showed that TTHLV can be easily diagnosed in infancy by brain sonography. Brain sonography can also be performed frequently for following up the surgical outcomes.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Ali K, Nannapaneni R, Hamandi K. The isolated fourth ventricle. BMJ Case Rep 2013;2013. pii: bcr2013008791.
2. Sharifi G, Gahdiri T, Vakilzadeh G, Nasi D. An idiopathic huge trapped temporal horn: surgical strategy and review of literature. J Neurol Neurosci 2017;8:229.
3. Zimmerman RA, Bilaniuk LT, Gallo E. Computed tomography of the trapped fourth ventricle. AJR Am J Roentgenol 1978;130:503-6.
4. Maurice-Williams RS, Choksey M. Entrapment of the temporal horn: A form of focal obstructive hydrocephalus. J Neurol Neurosurg Psychiatry 1986;49:238-42.
5. Manet R, Fabre N, Moyse E, Laurent B, Schmidt EA. Intracranial hypertension is painless! Acta Neurochir Suppl 2016;122:275-7.
6. Bohl MA, Almefty KK, Nakaji P. Defining a standardized approach.
for the bedside insertion of temporal horn external ventricular drains: Procedure development and case series. Neurosurgery 2016;79:296-304.

7. Hana T, Tanaka S, Shin M, Mukasa A, Kugasawa K, Saito N. Neuroendoscopic ventriculocisternostomy with stent placement for trapped temporal horn after the resection of glioblastoma. World Neurosurg 2015;84:2078.e5-8.

8. Hervey-Jumper SL, Ziewacz JE, Heth JA, Sullivan SE. Frontal-to-temporal horn shunt as treatment for temporal horn entrapment. J Neurosurg 2010;112:410-3.

9. Ofori-Kwakye SK, Wang AM, Morris JH, O’Reilly GV, Fischer EG, Rumbaugh CL. Septation and focal dilatation of ventricles associated with cryptococcal meningoencephalitis. Surg Neurol 1986;25:253-60.

10. Yamamoto H, Matsukado Y, Nagahiro S. Entrapment of the temporal horn which developed during antibiotic therapy for multiple brain abscess. Shoni No Noshinkei 1987;12:415-21.