Case Report

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

CME Credits

Jia-Yun Huang[1], Nan-Chang Chiu[1,2], Muh-Lii Liang[3], Hui-Ju Chen[1,2], Yi-Jie Lin[1], Che-Sheng Ho[1,2]*

[1]Division of Pediatric Neurology, Department of Pediatrics, MacKay Children's Hospital, Taipei, Taiwan, [2]Department of Medicine, Mackay Medical College, New Taipei City, Taiwan, [3]Department 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. Intestinal perforation with segmental necrosis occurred on the 4th day of life, and a 7-cm long ileum was excised.

Seizure was noted on the 5th day of life; phenobarbital was administered with favorable control. Brain sonography on the 13th day showed Grade II left intraventricular hemorrhage with normal resistance index (RI, 0.76). Cerebrospinal fluid (CSF) analysis on the 23rd day showed pleocytosis, decreased glucose

Received: 26-02-2019 **Accepted:** 14-03-2019 **Available Online:** 10-05-2019

Access this article online

Quick Response Code:

Website: www.jmuonline.org

DOI: 10.4103/JMU.JMU_17_19

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

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 inserted in the left ventricle, one tip in the left anterior horn and the other tip in the left temporal horn. The ventricular catheters were 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].

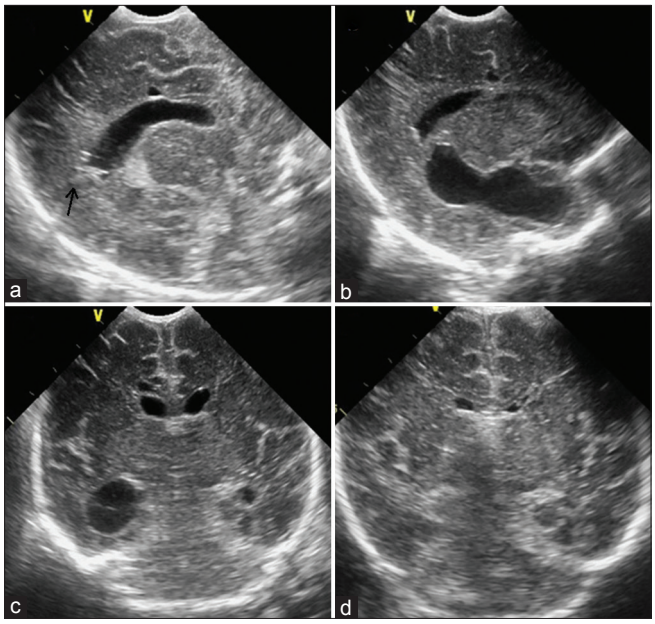

Figure 1: Sonography image of case 1 after the insertion of the second external ventricular drainage tube showing external ventricular drainage (arrow) in the trigone of the left ventricle, and a previous removed external ventricular drainage tract in the left frontal periventricular region (a). Trapped temporal horn of the left lateral ventricle (b and c) was detected 11 days later. Follow-up sonography after the third external ventricular drainage tube insertion revealed normal-sized ventricles (d)

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

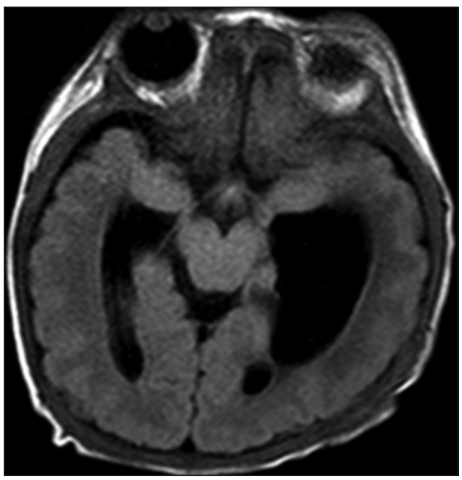

Figure 2: Brain T2 fluid-attenuated inversion recovery magnetic resonance imaging image revealing trapped temporal horn of the left lateral ventricle

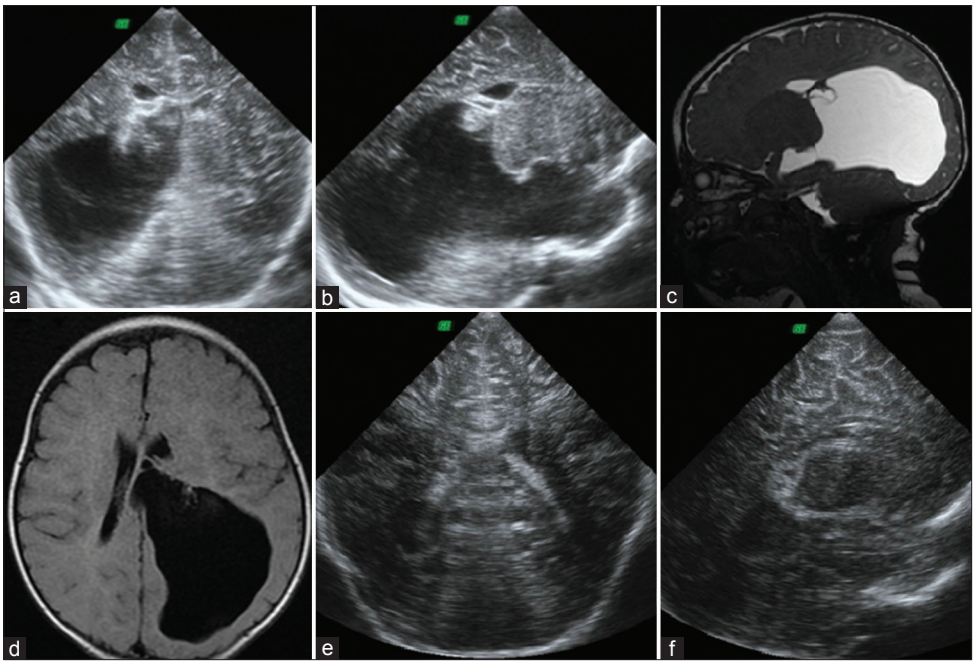

Figure 3: Trapped temporal horn with marked dilatation of the left ventricle detected in case 2 by brain sonography in the coronal view (a) and left parasagittal view (b). The same findings were noted in brain magnetic resonance imaging sagittal view image (T2 image) (c) and axial view image (T2 fluid-attenuated inversion recovery image) (d). Follow-up brain sonography after neuroendoscopic cystoventriculostomy showed significantly decreased size of the left lateral ventricle (e and f)

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.

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