OPEN ACCESS

GAVIN PUBLISHERS

Journal of Tropical Medicine and Health

Case Report

Maldonado Morán MA, et al. J Trop Med Health: JTMH-128.
DOI: 10.29011/JTMH-128. 000028

Complicated Meningococcical Meningitis with Pyogenic Ventriculitis in a Pediatric Patient: Case Report

Miguel Ángel Maldonado Morán[1], Juan Esteban Muñoz Montoya[1*], Esteban Ramírez Ferrer[2], Carlos Sayith Pérez Castaño[1], Leonardo Andrés Chacón Zambrano[1]

[1]Department of Neurosurgery, Universidad Militar Nueva Granada, Colombia

[2]Department of Neurosurgery, Universidad De Los Andes, Colombia

[*]**Corresponding author:** Juan Esteban Muñoz Montoya, Neurosurgery Department, Universidad Militar Nueva Granada, Colombia. Tel: +573155005849; Email: juanesteban1285@gmail.com; juanesteban13@hotmail.com

Citation: Maldonado Morán MA, Muñoz Montoya JE, Ferrer ER, Pérez Castaño CS, Chacón Zambrano LA (2018) Complicated Meningococcical Meningitis with Pyogenic Ventriculitis in a Pediatric Patient: Case Report. J Trop Med Health: JTMH-128. DOI: 10.29011/JTMH-128. 000028

Received Date: 06 July, 2018; **Accepted Date:** 25 July, 2018; **Published Date:** 31 July, 2018

Abstract

Meningitis is an inflammatory process of the meninges that usually is secondary to infectious etiology, being the bacterial of special interest because its frequency has been diminished by the vaccines. The responsible microorganisms are different according, not only with age, but also to patient comorbidities. The meningitis complications are ventriculitis, empyema and brain abscess. In this paper, we describe a rare case of meningitis caused by *Neisseria meningitides* that had a very rare complication: pyogenic ventriculitis.

Introduction

Acute bacterial meningitis is an infectious and inflammatory process that can be caused by a wide variety of infectious microorganisms [1]. It can be spontaneous (community acquired), after neurosurgical procedures or trauma. The community-acquired kind usually is more aggressive than the others, because it is related with microorganisms that have more virulence factors or with immunosuppressed patients [2]. The most common bacterial microorganisms are *Neisseria meningitides, Haemophilus influenzae, Streptococcus pneumoniae, Streptococcus agalactiae* and *Listeria monocytogenes* [2], and these etiologies depend not only at age, but also to patient comorbidities. The most common complications are subdural empyema and brain abscess and, with significantly lower rate, pyogenic ventriculitis [1-3], that is a very rare complication, which consists in ependymal inflammation of the ventricular system, with accumulation of pyogenic secretion within the brain ventricles [4].

Case Report

A 14-year-old male is brought to emergency room, his parents said the patient have had headache associated with multiple vomiting episodes, additionally, his mother said that the patient have been presented a yellow skin color. The patient is in bad general conditions, disorientated and his parents reported behavioral changes with aggressive predominance. A computerized tomography was performed, and no intracranial collection was visualized, however, there was some brain parenchyma changes possibly secondary to subdural collections and seems a little augmentation of ventricular size (Figure 1).

Afterwards, the patient presented clinical deterioration of conscience status, nuchal rigidity and fever, therefore, meningitis is suspected, so empirical antimicrobial management was initiated with cefepime, vancomicine and acyclovir. Tests were performed, as hemogram with leukocytes up to 17500 and normal liver function. Lumbar puncture was realized, and there was a high

opening pressure of Cerebrospinal Fluid (CSF), and the CSF macroscopically presented detritus and a turbid appearance.

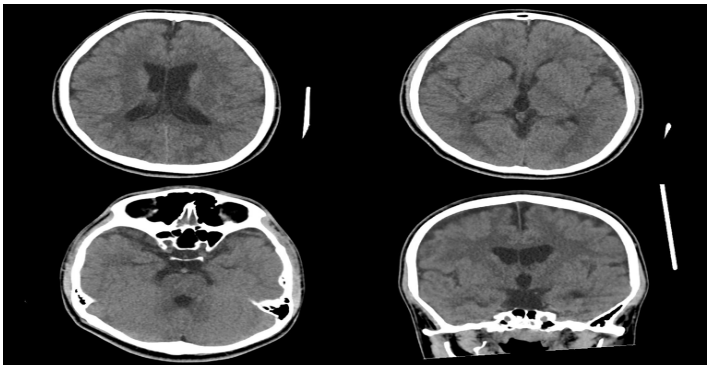

Figure 1: Simple head Computerized Tomography (CT): there are non-specific findings at ventricular level and subdural collections.

In addition to the CSF studies, a blood culture was performed. It showed growing at 12 hours of incubation of multisensitive *Neisseria meningitides*. A simple brain magnetic resonance plus diffusion and ADC (Apparent Diffusion Coefficient) sequences was solicited because the CT was no conclusive in relation with the patient status. In this resonance it was evidenced an occipital horn intraventricular collection showed in (Figure 2).

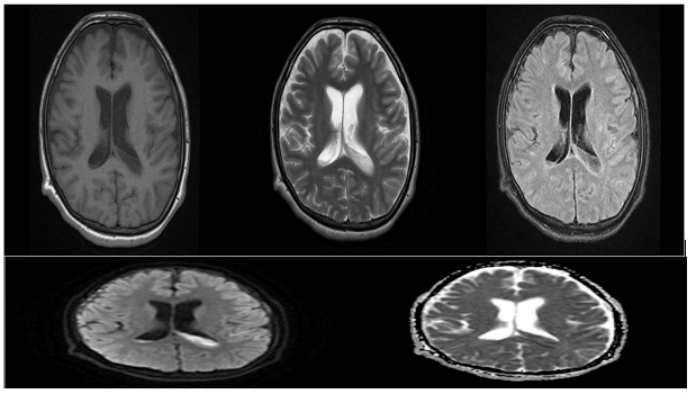

Figure 2: Simple brain magnetic resonance, axial T1, T2, FLAIR sequences, diffusion weighted imaging and Apparent Diffusion Coefficient (ADC): show an altered signal of intraventricular fluid, especially in FLAIR sequence.

The patient received 42 days of antibiotic as the treatment of the pyogenic ventriculitis and did not require brain surgery. After one month, the patient presented without headache or signs of intracranial hypertension neither any new focalization.

Discussion

Pyogenic ventriculitis is a low rate complication of acute pyogenic meningitis. Risk factors are the cranioencephalic trauma, neurosurgery, CSF fistula, brain abscess and infected brain arteriovenous malformation [5]. The most common microorganisms responsible of this condition are gram negative bacteria and *Staphylococcus* spp. [1,6]. The rate of bacterial meningitis secondary to gram negative bacillus have raised in the last 30 years, may be secondary to the augmentation of neurosurgical procedures [7]. In our case, the germ was a multisensible *Neisseria meningitides*, which is not a frequent cause of pyogenic ventriculitis. In the pyogenic ventriculitis, the ventricles walls are usually enlarged by ependymal inflammation. It can exist as ventricular loculation and hydrocephalus. Commonly, the periventricular edema causes a low density of the parenchyma. When a head CT is realized with contrast, usually show an enhancement of the ventricular walls and areas of cerebritis or brain abscess [4,6].

The most common sign of pyogenic ventriculitis are the detritus in the CSF. In T1 sequence, the pyogenic ventriculitis display no lineal CSF detritus. Different from the pus, this is shown as straight line as in the acute bleeding or ventricular blood accumulation in previous bleeding. It has been reported a marked restriction of the diffusion of the purulent ventricular fluid. In Apparent Diffusion Coefficient (ADC) sequence: the pus has lower signal than the white matter; in Diffusion Weighted Imaging (DWI) sequence can be useful for difference between pyogenic ventricular and the intraventricular hemorrhage, because in the first, it appears a higher signal; finally, the T1W sequence show a no-lineal interphase fluid-fluid [6,8,9]. This report demonstrated the importance of CT and MRI (with Diffussion and ADC sequences) in diagnosis and establish a direct antibiotic treatment.

In present, there is no established consensus for the management of pyogenic ventriculitis because the long-term results are extremely unfavorable [10]. Nevertheless, there has been an interest in the management of these patients through Neuroendoscopy, as recommended by the Fei Wang et al. study [11], with satisfactory results for patients, but there are no established criteria for surgery, unless patient develops hydrocephalus. In our case, the patient did not require surgery; he underwent conservative management with antibiotic treatment for 42 days, with favorable evolution and never developed a neurological deficit.

Conclusion

Pyogenic ventriculitis is a low rate complication of acute pyogenic meningitis, which has unfavorable neurological results. At present, the MRI with Apparent Diffusion Coefficient sequence and Diffusion Weighted Imaging, are non-invasive techniques that facilitate its diagnosis but there is no current consensus that addresses the surgical management of this pathology.

References

1. Tunkel A (2010) Acute Meningitis, en Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases 7th Edition. Churchill - Livingstone 1189-1229.

2. Greenberg MS (2010) Handbook of Neurosurgery, seventh ed. Thieme, New York 318-320.

3. Molina DGA, Armijo YE, Alvarado MA (2010) Absceso cerebral. Rev Mex Neurocienc 11: 63-70.

4. Thumner M (2013) Meningitis and Ventriculitis. In: Naidich T, Castillo M, Cha S, Smirniotopoulos J. Imaging of the Brain, Elsevier, Saunders Chap 40.

5. Bakshi R, Kinkel PR, Mechtler LL, Bates VE (1997) Cerebral ventricular empiema associated with severe adult pyogenic meningitis: compted tomography findings. Clin Neurol Neurosurg 99: 252-255.

6. Fukui MB, Williams RL, Mudigonda S (2001) CT and MR imaging features of pyogenic ventriculitis. AJNR Am J Neuroradiol 22: 1510-1516.

7. Durand ML, Calderwood SB, Weber DJ (1993) Acute bacterial meningitis in adults: a review of 493 episodes. N Engl J Med 328: 21-28.

8. Wormser GP, Strashun A (1980) Ventriculitis complicating Gram - Negative meningitis in an adult: diagnosos by radioisotope brain scanning and coputerized tomography. Mt Sinai J Med 47: 575-578.

9. Pezzullo JA, Tung GA, Mudigonda S, Rogg JM (2003) Diffusion-Weighted MR Imaging of Pyogenic Ventriculitis. American Journal of Roentgenology 180: 71-75.

10. Guanci MM (2013) Ventriculitis of the central nervous system. Crit Care Nurs Clin North Am 25: 399-406.

11. Wang F, Yao XY, Zou ZR, Yu HL, Sun T (2017) Management of Pyogenic Cerebral Ventriculitis by Neuroendoscopic Surgery. World Neurosurg 98: 6-13.