

Ventricular Empyema And Pyocephalus: A Case Report

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Abstract: Intracranial infections are among the complications of spinal dysraphism cases. Ventricular empyema and pyocephalus are those kinds of infections and are quite rare problems with limited reports in the literature.

In this report, we present the evolution and management of a pyocephalus case and discuss the pertinent literature
Key words: Computed tomography, magnetic resonance imaging, myeloschisis, pyocephalus, ventricular empyema.

INTRODUCTION

In central nervous system (CNS) infections like; meningitis, ventriculitis, cerebritis, cerebral abscess and ventricular empyema; one way of spread of the microorganisms is, spinal defects like meningocele or dermal sinuses (2).

Ventriculitis frequently presents with meningitis or as a result of a cerebral abscess opening into the ventricles and also may present as a shunt complication.

Ventricular empyema and pyocephalus, progressive phases of ventriculitis are rarely seen today because of the progress in medical and surgical treatment (1).

CASE REPORT

A 4- month old male infant was seen with hyperthermia, lethargy, paraplegia and increased head circumference. Physical examination revealed an increase in head circumference, a full and nonpulsatile anterior fontanel and an infected 25x35x35mm. thoracolumbar myeloschisis. There was no cerebrospinal fluid (CSF) leakage from the myeloschisis. CBC was : WBC 14500/mm³, Hgb 9,5g/dl and thrombocytes were normal. In his neurological examination; general condition was bad, neonatal reflexes were absent and the patient was paraplegic.

CT scan of the brain revealed bifrontal

hypodense multifocal regions, minimal ring- shaped contrast enhancement and asymmetry of both occipital horns. The density of the intraventricular region was calculated as pus. The third ventricle was of CSF density. Periventricular oedema and a porencephalic region were also detected in the left occipital region (Fig 1).

Magnetic resonance imaging (MRI) taken the same day showed that the occipital horns of lateral ventricles were isolated and their borders showed homogeneous, well defined, ring-shaped contrast enhancement. The bilateral frontal horns were not detectable and these regions were completely hypointense (Fig 2). With these findings, an initial diagnosis of ventricular empyema was made. Bilateral ventricular taps were performed, during which 45 cc. pus was drained from the right side and 35 cc. from the left side. CT scan taken after ventricular taps revealed intraventricular pneumocephalus (Fig 3).

Acinetobacterium Iwoffii was detected in the culture antibiogram from the pus. The patient was treated with a low dose anti oedema and specific antibiotics, and followed up with periodic CT scans. The patient's myeloschisis was treated with antiseptic and scatrising medications and healed completely.

Three months later a dynamic CT study was performed to distinguish porencephalic cysts from ventricular dilatation and to show the CSF dynamics.

First, contrast material was given into the left frontal horn of the lateral ventricle. It was observed that the contrast material was passing to the frontal horn of the right lateral ventricle and to the third ventricle; but none was observed in either of the occipital horns. A second tap was made from the right posterior parietal. Contrast material was observed in the occipital horn of the right lateral ventricle and cysts around it also filled (Fig 4). Therefore; two medium pressure ventriculoperitoneal shunts (one ventricular



Fig. 1: CT scan showing bifrontal hypodense multifocal regions and minimal ring shaped contrast enhancement of both occipital horns. Also, a porencephalic region and periventricular oedema were detected in the left occipital region.

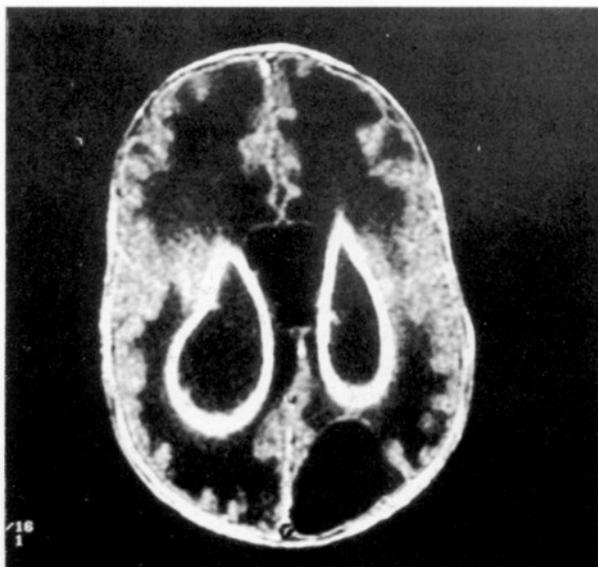


Fig. 2: Contrast enhanced MRI showing isolated occipital horns of the lateral ventricles and homogeneous, well marginated, ring shaped contrast enhancement of the borders of the third ventricle. Bilateral frontal horns were not detectable.



Fig. 3: CT scan taken after ventricular tapping showing air in lateral ventricles.

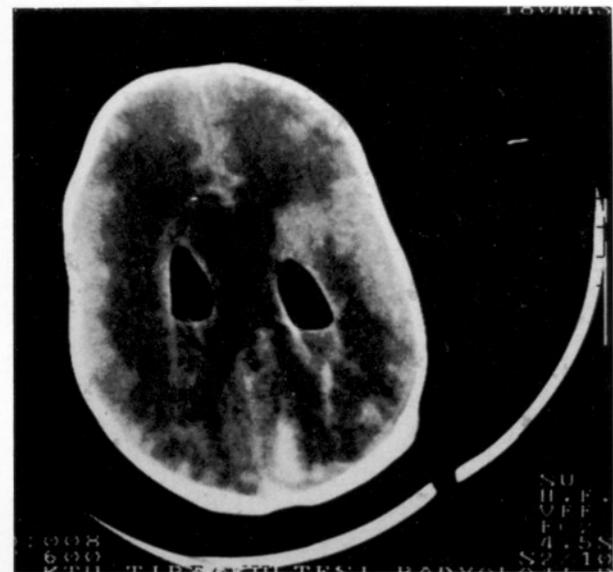


Fig. 4: Dynamic CT study made for distinguishing porencephalic cysts from ventricular dilatations. The two air bubbles are related with the left frontal and right posterior parietal tappings.

end into the left frontal horn and the other into the right occipital horn) were installed and connected with a "Y" connector (Fig 5,6).

When the patient was discharged, he was active, coping with his environment, the fontanel was pulsating and head circumference was not increasing quickly.

DISCUSSION

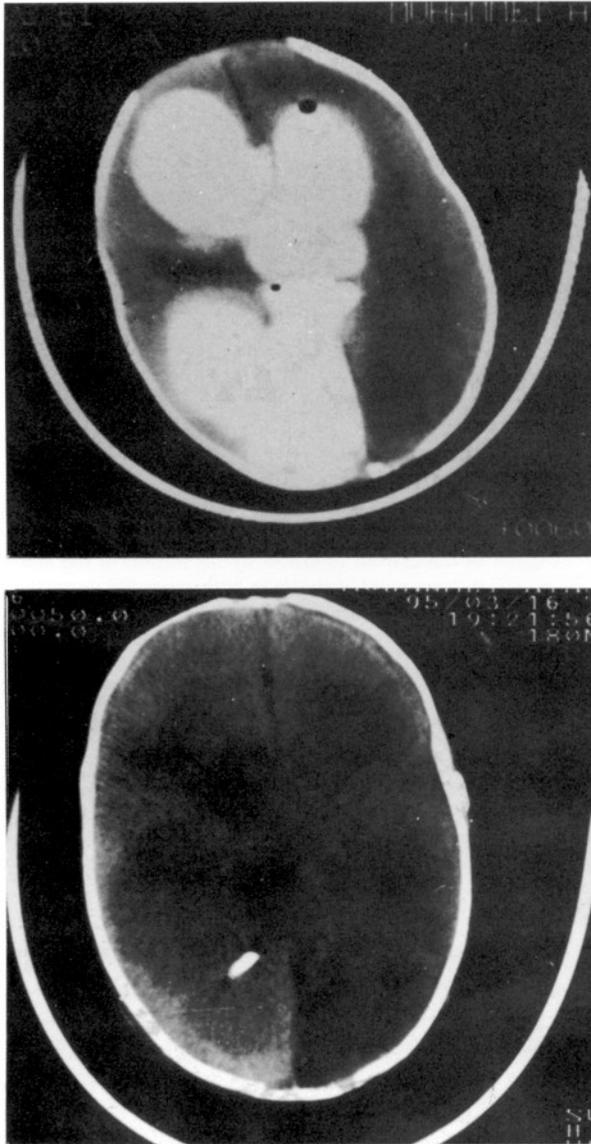


Fig. 5-6: Postoperative CT scans showing the ventricular ends of the shunts; one in the left frontal and the other in the right occipital horn of the lateral ventricles.

In CNS infections secondary to spinal dysraphism cases; micro-organisms (2, 3) reach the intracranial region by haematogeneous ways or subarachnoid CSF routes because of a contaminated spinal defect or CSF leakage (4). Infection starts with acute meningitis and the resultant ventriculitis may be seen frequently in the newborn (2, 3, 5). Ventriculitis causes obstruction by foraminal attachments (5). Then, ventricles become isolated from the surroundings, and become completely filled with pus. This is called ventricular empyema. After a while, empyema organises and a certain gliomesenchymal reaction develops in the surrounding cerebral tissue. This event ends with

fusion of the anterior horns of the ventricles which is not seen macroscopically (Fig 2). This condition is termed pyocephalus internus (4).

The time course between ventriculitis and pyocephalus may be related with the patient's immune system, pathogenicity of microorganisms, early diagnosis; sufficient and appropriate antibiotics and ventricular drainage (1, 4). In our case; because the patient had no radiological evaluation (CT or MRI) before he was seen by us, radiological evaluation of the stages between ventriculitis and pyocephalus could not be made.

Although ventricular drainage and antibiotic treatment are the principles of ventriculitis treatment (6), ventricular tapping to drain the infection, parenteral antibiotics and control CT scans are necessary in ventricular empyema cases.

After the treatment of ventriculitis, ventricular empyema or pyocephalus; multiple porencephalic cysts with obstructive and/or communicated hydrocephalus may develop. In this situation ventriculography can be very helpful in showing the ventriculoventricular and cysto-ventricular communications. In conclusion, 1) Spinal defects must be kept sterile. In CNS infections treated with antibiotics and extraventricular drainage, antibiotics must be used in sufficient doses and for a sufficient period of time, and the patient must be followed up with periodic CT scans 2) Ventricular empyema and pyocephalus are important but rare complications which can be seen after inefficient or insufficient antibiotic treatment and in patients who are not treated with extra ventricular drainage.

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