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**Abstract**

Pleural perfusion due to cirrhosis isn't rare in adult, but in pediatrics, it's uncommon complication. We present a 9 months old girl with recurrent right pleural effusion. The formation of pleural fluid in this patient was a result of fluid movement from peritoneal to pleural space across diaphragmatic defects. This mechanism was proved.

**Keywords:** Hepatic Hydrothorax; Cirrhosis.

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**Received:** August 18, 2015

**Accepted:** November 24, 2015

**Published:** November 25, 2015

**Citation:** Tran NTN et al.,(2015) Hepatic Hydrothorax – Rare Complication in Pediatrics. *Int J Pediat Health Care Adv.* 2(2), 10-12.

**doi:** <http://dx.doi.org/10.19070/2572-7354-150004>

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**Case Presentation**

9 months old girl was detected right pleural effusion in a periodic examination.

**Pre-medical history**

Normal delivery, persistent jaundice after birth. When she was 4 months old, she was diagnosed hydrocephalus, and operated to place ventriculoperitoneal shunt. At 6 months of age, she was diagnosed CMV hepatitis/cholestatic jaundice and treated with Gancyclovir.

**Examine**

She had diminished breath sounds in lower lobar of right lung, no crackle rales, no dyspnea, no cough. A cardiovascular examination was normal. An infectious status was unremarkable. Edema wasn't noted. Liver was 2 cm and spleen was 1 cm under costal margin. She had cholestatic jaundice with yellow stool, no petechiae, no red spider-like blood vessels on the skin.

**Investigations**

Blood Cells Count	Results
White Blood Count (G/L)	10,12
Neutrophil (%)	29,4
Lymphocyte (%)	55,5
Monocyte (%)	11,2
Eosinophil (%)	3,3
Basophil	0,6
Red Blood Count (T/L)	3,26
Hemoglobin (g/l)	82
Hematocrite (%)	25
Platelet (G/L)	228

**Chest-Xray:** Right pleural effusion (Figure 1).

**Figure 1. Chest- Xray**



**Abdomen-Xray:** Ventriculoperitoneal shunt valve was too close to the right diaphragm (Figure 2).

**Figure 2: Abdomen-Xray**



**Cardiovascular ultrasound:** Mild tricuspid regurgitation, mild pulmonary hypertension. Cranial CT scan: Mild ventricular dilation.

**More investigation:** Injected <sup>99m</sup>Tc into patient's abdomen (Figure 5); 2 hours later, <sup>99m</sup>Tc was found in right pleural (Figure 6).

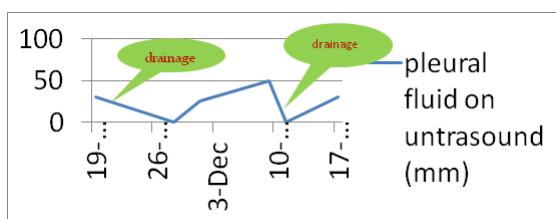
Pleural Fluid Test	Result
Colour	Yellow, clear (as bilirubin)
White Blood Cell Count (per mm <sup>3</sup> )	130
Neutrophil (%)	1
Lymphocyte (%)	19
Monocyte (%)	10
Retinal cells (%)	36
Epithelial cells (%)	34
Protein (g/l)	19,3
Glucose (mmol/l)	6,3
LDH (U/l)	200
Amylase (U/l)	9,7
Total Bilirubin (mmol/l)	61
Direct Bilirubin (mmol/l)	30,8
PCR Tuberculosis (3 times)	negative
PCR Mycoplasma	negative
Gram stain	negative
Bacterial Culture	negative

Serum protein: 67 g/l, Albumin: 35g/l. Amylase serum: 35 U/L. GOT: 428 U/L, GPT 256 U/L, total bilirubin: 209, direct: 104 mcmol/l. PT: 68%, Ure: 5,3 mmol/l, Creatinin: 80 mcmol/l, blood PCR CMV(-), CMV IgG(+), CMV IgM (-).

**Initial treatment**

The patient was treated with antibiotic, pleural effusion drainage (3 times because of recurrence) (Figure 3).

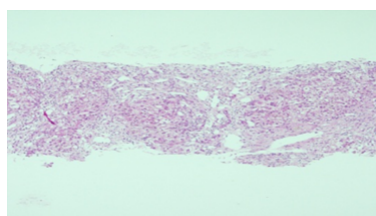
**Figure 3: Process of the right pleural effusion on ultrasound.**



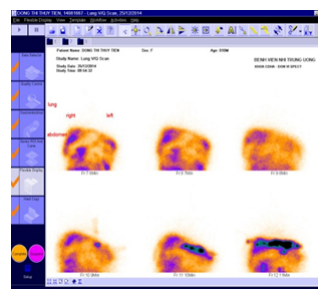
Then she was operated to replace AP shunt (because we suspected that ectopic position of AP valve might cause pleural effusion) and found nodes on the liver surface.

**Liver biopsy showed:** Grade IV cirrhosis (Figure 4).

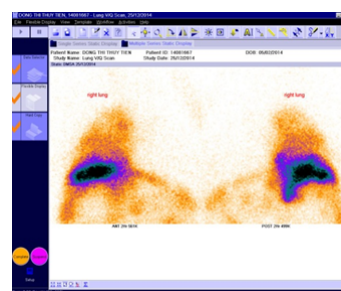
**Figure 4: Liver biopsy (grade IV cirrhosis).**



**Figure 5. After injection <sup>99m</sup>Tc into abdomen.**



**Figure 6. 2 hours later: <sup>99m</sup>Tc in right pleural capacity.**



**Final diagnosis:** Hepatic Hydrothorax Treatment with diuretic (furosemide and spironolactone, sandostatin, salt restrict diet) and she got better.

**Discussion**

Hepatic hydrothorax is defined as a pleural effusion, in patients with cirrhosis without any other underlying primary cardiopulmonary and pulmonary causes [1]. This complication occurs about 4-10% of patients with cirrhosis [2]. In most cases (85%) hepatic hydrothorax develops on the right side, with 13% of cases occurring on the left side and 2% bilateral [2]. Mechanism is the passage of a large amount of ascites from the peritoneal to the pleural cavity through diaphragmatic defects. Typically, the defects are smaller than 1 cm and tend to occur on the right side, and sometimes, just observed by microscopy [3]. Many studies using <sup>99m</sup>Tc-human Albumin or <sup>99m</sup>Tc-sulfur colloid and dye studies that show an unidirectional passage of these markers from the abdominal to the pleural cavity in the first 24 hours after administration [4, 5].

**Treatment**

Salt restrict diet, diuretics (furosemide and spironolactone). If not response to treatment, alternative treatment was octreotide, TIPS procedure, liver transplant [6].

**Conclusion**

In pediatrics, hepatic hydrothorax is a rare condition. In addition, in this patient, sign and symptoms of cirrhosis weren't clear. Diagnosis cirrhosis based on liver biopsy more than clinical finding. Therefore, she wasn't diagnosed and treated probably at the initial time. However, there were still some problem in this patient we haven't good understood, such as the cause of cirrhosis and relationship between hydrocephalus and hepatitis/cirrhosis.

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