

## Idiopathic Exudative Hydropneumothorax and Spontaneous Pneumomediastinum in a Young Iranian Man: A Case Report

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### ABSTRACT

Hydropneumothorax denotes concurrent presence of pneumothorax and hydrothorax in the pleural space, which can be a fatal situation. In this study, we presented the case of a 35-year-old male with history of progressive pleuritic chest pain 30 days before admission with idiopathic hydropneumothorax and spontaneous pneumomediastinum.

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## Introduction

Hydropneumothorax is a term given to the concurrent presence of pneumothorax and hydrothorax (i.e., air and fluid) in the pleural space (1). An upright chest X-ray (CXR) can reveal air-fluid levels, which extend across the whole length of hemithorax (2). It may occur in different situations such as thoracentesis, broncho-pleural fistula, and oesophago-pleural fistula or due to the presence of gas forming organisms in the pleural space (1).

There are few case reports and series demonstrating the rare co-incidence of spontaneous (or idiopathic) hydropneumothorax (1) and pneumomediastinum (3-5). High index of suspicion should be considered for the diagnosis of this condition, especially in patients without any

underlying diseases, and it should be considered in differential diagnosis of acute chest pain (5).

## Case report

A 35-year-old male with history of progressive pleuritic chest pain 30 days before admission and history of unsuccessful outpatient treatment was referred to our emergency center. In clinical history, exertional dyspnea unrelated to eating and occasional dry cough were recorded. His vital signs, including blood pressure (123/74 mmHg), heart rate (78 bpm), temperature (37/6°C), and respiratory rate (29/min), were stated as normal. In auscultation of the lungs, rales and reduced respiratory sounds were mentioned at the base of the right lung. CXR revealed hydropneumothorax

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(Figure 1) with collapsed right lung and thoracic air-fluid level. There was no history of fever, weight loss, drug abuse, loss of consciousness, underlying lung diseases such as asthma, or systemic diseases (e.g., cirrhosis).



**Figure 1.** Chest X-ray which is diagnostic for right hydropneumothorax

Laboratory evaluation revealed thrombocytosis (577000/ $\mu$ l) with high C-reactive protein (CRP) level (50 mg/L) and slight reduction of serum albumin (3.2 g/dl). Other laboratory results such as white blood cell (WBC) count, liver function test, creatinine, erythrocyte sedimentation rate (ESR), total protein, serum lactate dehydrogenase (LDH), and amylase were normal. HIV antibody was negative.

Atrial blood gas (ABG) analysis showed pH=7.42, pCO<sub>2</sub>=47.3, and HCO<sub>3</sub>=30.7. Pleural effusion thoracentesis revealed lymphocytic dominant exudative effusion as follows: red blood cell (RBC) 5600 cell/mm<sup>2</sup>, WBC 4080 cell/mm<sup>2</sup> (1% neutrophil, 92% lymphocyte, and 7% eosinophil), protein 4.2 g/dL, sugar 71 mg/dL, LDH 804 U/Lit, and negative smear and culture. Chest tube was inserted, and on the following day, chest computerized tomography scan showed pneumomediastinum (Figure 2).

Pleuroscopy could not be applied due to pleural adhesion; therefore, the patient was candidate for right postero-lateral thoracotomy. Complete decortication was carried out to remove thick peels and pleural exudative effusion of the right lung during the thoracotomy.

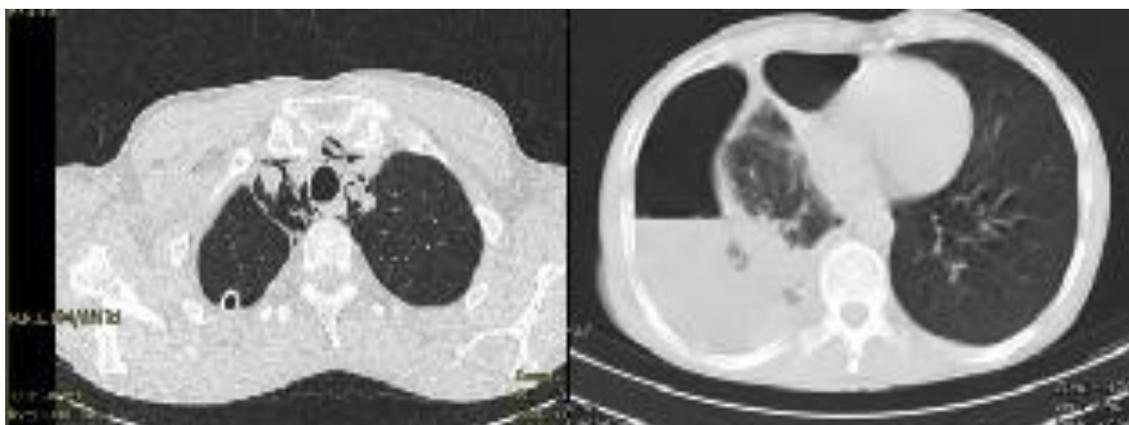
Histopathological findings revealed micro inflammation, granulation tissue formation with no evidence of granuloma of malignancy or tuberculosis (TB)-induced changes. Tuberculin skin test and sample of sputum were negative for TB. Echocardiographic evaluation revealed ejection fraction of 55% with normal heart structure and no pericarditis. The chest drain was removed one week later, after re-expansion of the lung, and everything was normal at the one month follow-up.

## Discussion

Hydro or hemopneumothorax is an uncommon but potentially fatal situation causing unexpandable lung following chest pain and dyspnea (1, 6). High index of suspicion is required to diagnose this complication, especially in patients without any underlying diseases, and it should be considered in differential diagnosis of acute chest pain (5).

In this condition, an upright chest X-ray reveals air-fluid levels that usually extend across the whole length of hemithorax (2). It may happen in various situations including thoracentesis, broncho-pleural fistula, and oesophago-pleural fistula or due to the presence of gas forming organisms in the pleural space (1).

There is a scarcity of case reports of hydro or hemopneumothorax and pneumomediastinum concomitant with other diseases or in idiopathic situations. Yamauchi reported the case of a 39-year-old man, who was a heavy drinker, presenting with chest pain, dyspnea, and lumbago (7). CXR revealed right hydropneumothorax and right lower lobe atelectasis due to fistula connecting pancreas to the right pleural cavity. Hydropneumothorax was described as an unusual complication of lung lavage in the patient



**Figure 2.** Chest CT scan with hydropneumothorax and pneumomediastinum

undergoing positive pressure ventilation (8). Chen reported a 47-year-old man with alcoholic cirrhosis presenting with a 2-day history of dyspnea, absent breath sound, succussion splash in clinical evaluation and air-fluid level in CXR (1). Konobo presented the case of a 44-year-old man with increasing dyspnea and chest pain, collapsed lung, and air-fluid level in the left hemithorax (9).

In all the similar case reports, patients presented with progressive dyspnea, exertional dyspnea, and acute chest pain. We could not find any idiopathic hydropneumothorax in our review (without any systemic or underlying lung diseases). In the case presented in this study, we could not find any underlying diseases, history of chest or abdominal trauma, or any medical or illegal procedure to explain exudative right hydropneumothorax.

We have introduced this probable idiopathic right hydropneumothorax and spontaneous pneumomediastinum case to emphasize on high index of clinical suspicion required for the diagnosis of hydropneumothorax.

Our patient had idiopathic right hydropneumothorax at first, and spontaneous pneumomediastinum was visible after chest tube insertion, which could be due to resolved pleural effusion and lung expansion or new spontaneous pneumomediastinum. We did not find any clinical or laboratory evidence or history of secondary hydropneumothorax. Pathologic findings of micro-inflammation can be due to repeated paracentesis, which were performed for the patient. Empyema was ruled out because of negative smear and culture of pleural fluid and its characteristics such as normal sugar and dominance of lymphocyte, afebrile situation, and no underlying diseases; thus, his presentation was compatible with idiopathic hydropneumothorax and spontaneous pneumomediastinum.

Various approaches are used to restore the lung volume to prevent the recurrence of hydropneumothorax based on its severity and etiology. The range of therapeutic options includes watchful waiting, oxygen supplementation, simple aspiration, chest tube placement, and diuretics, vacuum-assisted thoracostomy with pleurodesis, closure of leaks, and bullectomy. In unresponsive patients, open surgery such as thoracotomy, pneumolysis, and complete decortication for removing peels and pleural effusion drainage were considered to

complete re-expansion of the lung (10, 11). In all the cases, the pleural fluid needs complete hematological, biochemical, cytological, and bacteriological analyses (11).

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## Conflict of Interest

The authors declare no conflict of interest.

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