

# A Case of Pleural Effusion Caused by Hypothyroidism

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## Abstract

A case of primary hypothyroidism caused by pleural effusion was reported in order to improve the understanding of hypothyroidism and avoid or reduce misdiagnosis and treatment.

## Keywords

Hypothyroidism, Pleural Effusion

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## 1. Introduction

Hypothyroidism (hypothyroidism) is a group of endocrine diseases caused by insufficient synthesis, secretion or biological effects of thyroxine, with occult onset and diverse manifestations, and most of the manifestations are non-specific symptoms, with a high rate of misdiagnosis and missed diagnosis. Pleural effusion is one of the common diseases seen in the respiratory department. The common causes heart failure, hypoproteinemia, liver cirrhosis, nephrotic syndrome, tuberculosis and tumor [1] [2]. Hypothyroidism and pleural effusion can be seen clinically, but simple pleural effusion caused by hypothyroidism is relatively rare. Therefore, many clinicians do not pay enough attention to pleural effusion caused by hypothyroidism, leading to a high rate of clinical missed diagnosis and misdiagnosis. This paper reports the diagnosis and treatment of a case of primary hypothyroidism that was admitted to our hospital due to examination and “bilateral pleural effusion” and was finally diagnosed as primary hypothyroidism, in order to remind clinicians to pay attention to it and avoid or reduce misdiagnosis and mistreatment.

## 2. Case Presentation

A 25 year female presented with repeated chest and back pain for more than 1

year, aggravated for 4 days and paroxysmal swelling and pain, most obvious in the subscapular area. There was no cough, fever, night sweat. No chest tightness, shortness of breath, no palpitation, precordial pain. No nausea, vomiting, abdominal pain, abdominal distension, diarrhea, and no edema of lower limbs.

Local hospitals performed colour to exceed chest: “pleural effusion on both sides,” to “drainage” symptoms after hospital discharge. patients with symptoms of chest pain back again after half a month with aggravating, again in a hospital do colour to exceed chest: “double pleural effusion audio-visual (on the left side of the depth is about 2.9 cm, the depth is about 6.2 cm) on the right side”, September 11, 2018 in our hospital. Physical examination: T: 36.6°C, P: 72 times/min, R: 21 times/min, BP: 121/82 MMHG.

The thoracic cage was basically symmetrical, with the presence of thoracic breathing and decreased right chest movement. Left side was normal, right side was weakened, and no pleural friction or subcutaneous twisting sensation was touched. there was bilateral dull note on percussion. Breath sounds were significantly reduced bilaterally. Rales, wheezing could not be heard. Bilateral lung voice conduction was reduced, no pleural friction sound. HR: 72 beats/min, regular, no pathological murmurs, no pericardial friction sounds in each valve area, no edema in both lower limbs. Laboratory data showed the following urine leukocyte +++, urine occlusive blood +-, TC 6.13 mmol/L, TG 1.24 mmol/L, LDH 251 U/L, CRP 11.56 mg/L, blood routine, liver and kidney function, blood glucose, fecal routine, coagulation function, tumor markers were not abnormal. Results: FT3 2.72 pmol/L, TT3 1.05 nmol/L, FT4 4.66 pmol/L, TT4 36.5 nmol/L, TSH > 100.000 mIU/L. Sinus arrhythmia was observed in the electrocardiogram (ECG). No abnormal lung function was reported. Color doppler ultrasound of abdomen and urinary system showed no abnormality. Ultrasonography of chest showed pleural effusion on the right side (6.5 cm). Chest CT showed stripe shadow of middle lobe of right lung; Left pleural effusion. Routine pleural fluid examination: reddish turbidity, li fan he test (Rivalt) +, Total number of cells of  $126,078 \times 10^6/L$ , neutrophils 0.23,  $6078 \times 10^6/L$  nucleated cell count, 0.14 mononuclear cells, skin cells between 0.19, chest water Total protein (TP) 59.6 g/L, adenosine deaminase (ADA) 10 U/L, glucose (GLUC) tendency for 4.84 mmol/L, lactate dehydrogenase (LDH) 924 U/L, Acid-resistant bacilli and tumor cells were not found, and pleural effusion was consistent with exudate. Pleural effusion caused by tuberculosis and tumor was not considered in combination with the patient's medical history and relevant examination results. If the thyroid function of the patient is abnormal, pleural effusion caused by hypothyroidism should be considered, i.e, thyroid color ultrasonography showed diffuse thyroid lesions on both sides. Combined with the patient's thyroid function examination, the following provisional diagnosis was considered: pleural effusion secondary to primary hypothyroidism. The patient was managed with oral levothyroxine tablets 50 µg once a day. Thyroid function and chest color doppler ultrasound examination was repeated on October 8, 2018 which showed the fol-

lowing results: FT3 3.87 pmol/L, FT4 10.08 pmol/L, TSH 44.18 mIU/L; Bilateral pleural effusion was not detected.

### 3. Discussion

Hypothyroidism is a group of endocrine diseases caused by the insufficient synthesis, secretion or biological effects of thyroxine, the thyroid hormone [3]. It is also considered a hidden disease. The clinical manifestations are diverse. Most patients present with nonspecific symptoms. Typical clinical manifestations are: increased sensitivity to cold, indifference, lethargy, fatigue, slow speech, forgetfulness, poor concentration, depression, memory impairment, decreased appetite, abdominal distension, dry and rough skin, constipation, hair loss and thinning, weight gain, anemia, bradycardia, edema etc. [4]. However, there are only few literature reports of cases with pleural effusion as first presentation, and similar cases are also very rare. This leads to easy missed diagnosis and misdiagnosis. Hypothyroidism may cause either exudative or transudative effusion [5]. Therefore, for patients with exudative pleural effusion, it is often easy to misdiagnose the case as tuberculosis or malignant pleural effusion based on common diseases. At present, there are few studies on the pathogenesis of pleural effusion caused by hypothyroidism, which may be related to increased capillary permeability caused by decreased thyroxine levels. Studies have found that thyroid function can affect the organization vascular endothelial growth Factor (vascular endothelial growth Factor, VEGF) expression [6], and hypothyroidism led to significantly increased VEGF level in pleural effusion [7], rapid and reversible increase in capillary permeability [8]. However, oral thyroxine tablets can gradually decrease the level of local VEGF and reduce pleural effusion, suggesting that VEGF plays an important role in the regulation of capillary permeability by hypothyroidism. To sum up, clinicians should strengthen the study of basic theoretical knowledge, enhance the diagnostic awareness of pleural effusion caused by hypothyroidism, and pay enough attention to pleural effusion caused by hypothyroidism.

### 4. Conclusion

Hypothyroidism can involve multiple systems and symptoms may be varied. Typical cases are easy to diagnose, but not all cases present with typical clinical symptoms or characterized by single system symptoms. Such cases can easily be misdiagnosed or the diagnosis can be missed. Although pleural effusion caused by hypothyroidism and that caused by other causes have similarities, they require careful history and physical examination in clinical work, a comprehensive analysis of characteristics of patients with pleural effusion and need to rule out other causes of discrepancies. Considering the direct correlation between pleural effusion and hypothyroidism, diagnosis can be made and corresponding treatment can be given. Therefore, clinically, for patients with pleural effusion waiting to be diagnosed at different ages, clinicians should conduct thyroid function

screening, but the priority is still to exclude common diseases such as tuberculosis, tumor and heart failure to reduce or avoid misdiagnosis and treatment.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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