

Case Report

Papillary Thyroid Carcinoma Mimicking Miliary Tuberculosis in a 14-year-old Boy

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Abstract

A 14-year-old boy was referred to our hospital because of the incidental finding of numerous nodular lesions in both lungs. He had been hospitalised at a local orthopaedic department for pin removal after fixation for ankle fracture. On chest radiography for regular check-up prior to the operation, multiple nodular lesions were observed. Physical examination revealed normal results. Chest computed tomography (CT) confirmed numerous tiny nodular lesions in both lungs. *Mycobacterium tuberculosis* was not detected in either the sputum or bronchoalveolar lavage samples. Neck CT showed a 1.1 cm ill-defined nodular lesion with calcification in the right thyroid gland. Fine needle aspiration of the thyroid gland and multiple metastatic neck lymph nodes was performed and the histopathologic finding yielded a diagnosis of metastatic papillary thyroid cancer. He was scheduled to undergo total thyroidectomy in combination with radioactive iodine treatment. If miliary infiltrates are found on chest radiography, metastatic tumours including papillary thyroid cancer as a differential disease mimicking miliary tuberculosis should be considered to avoid misdiagnosis and delayed diagnosis.

Key words

Children; Miliary tuberculosis; Papillary thyroid carcinoma

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Introduction

Miliary tuberculosis is a potentially lethal disease with high mortality. Miliary infiltrates on chest radiography indicate the possibility of miliary tuberculosis. However, other diseases mimicking miliary tuberculosis should also be considered. We report a case of metastatic papillary thyroid cancer mimicking miliary tuberculosis in a 14-year-old boy, whose lymph nodes were not palpable because of his obesity.

Case Report

In January 2018, a 14-year-old boy was referred to our clinic because of the incidental finding of numerous nodular lesions in both lungs. He had been hospitalised at

a local orthopedic clinic for pin removal after fixation for ankle fracture. On chest radiography performed during a regular check-up prior to the operation, multiple nodular lesions were observed (Figure 1A). He complained of intermittent cough without any cold sweating, weight loss, or fatigue. He was afebrile. He was obese with a height of 176.0 cm, a weight of 109.0 kg and a body mass index of 35.2 kg/m². Chest auscultation revealed no abnormal sounds. No palpable lymph nodes were present in the neck, axillary, or inguinal areas. Chest radiography and chest computed tomography (CT) revealed multiple nodular lesions in both lungs (Figure 1B and 1C). Arterial blood gas analysis revealed no hypoxemia or hypercapnia. His total white blood cell count was 8,700/ μ L with 66.8% neutrophils and 24.6% lymphocytes. His lactate dehydrogenase level was 840 U/L and C-reactive protein level was 0.67 mg/dL. Aspartate transaminase and alanine transaminase levels were both 21 U/L. The level of thyroid stimulating hormone was 2.12 μ IU/mL (reference range, 0.4-4.8 μ IU/mL) and that of free T4 was 1.07 ng/dL (reference range, 0.8-1.7 ng/dL). No respiratory virus was detected in the multiplex real-time polymerase chain reaction of nasopharyngeal aspirates. QuantiFERON and

tuberculin skin tests both yielded negative results. Acid-fast bacilli smear and culture for *Mycobacterium tuberculosis* from the sputum yield negative results. To rule out miliary tuberculosis, bronchoscopy was planned for bronchoalveolar lavage with trans-bronchial biopsy. However, bronchoalveolar lavage was impossible because of the irritability of the patient. Acid-fast bacilli smear, culture, and real-time polymerase chain reaction for tuberculosis bacilli in the transbronchial biopsy specimen also yielded negative results. A transbronchial lung biopsy revealed chronic inflammation without evidence of tuberculosis. Because of the lack of evidence of tuberculosis, the chest CT scan obtained at the local clinic was re-evaluated and tiny calcifications were observed on the thyroid (Figure 1D). Neck ultrasonography was performed to evaluate the thyroid gland, revealing an approximately 1.4 cm ill-defined mixed echoic mass with microcalcifications in the right thyroid gland, with a 0.4 cm hypoechoic lesion. Subsequently, neck CT was performed, revealing a 1.1 cm ill-defined nodular lesion with calcification in the right thyroid gland with several enlarged contrast-enhanced lymph nodes on the right at levels II-IV and VI.

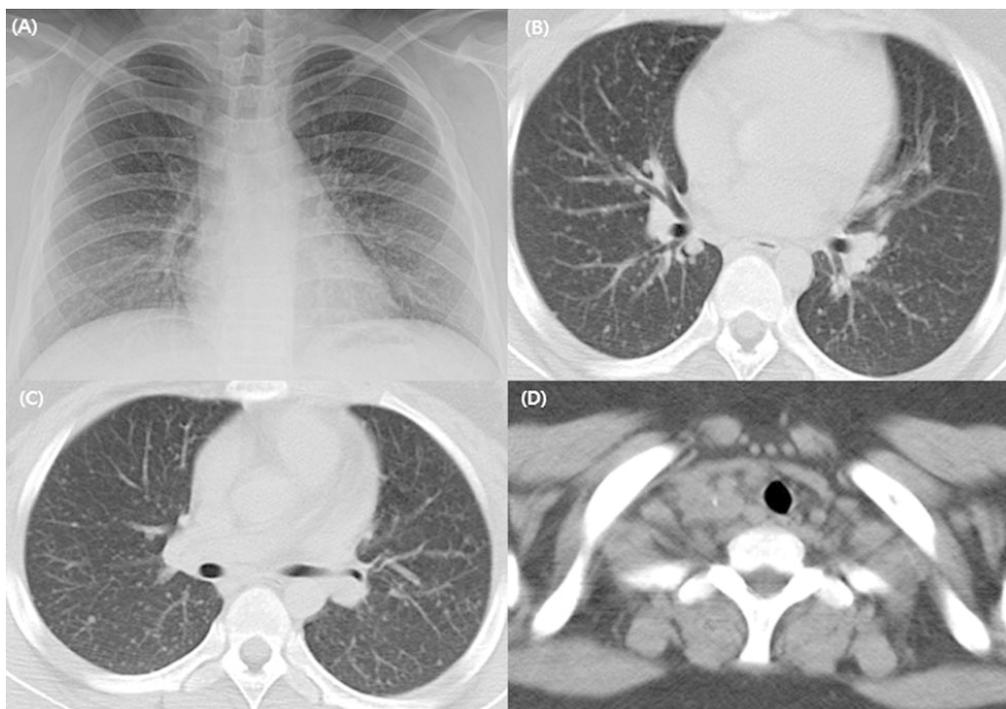


Figure 1 On the chest radiography, multiple tiny nodules were observed (A). His chest tomography showed small-sized calcifications in the right thyroid gland (B). Numerous tiny nodular lesions on both lungs were observed in both lungs (C and D).

The patient was referred to a haemato-oncology specialist. Fine needle aspiration of both the thyroid gland and lymph nodes in the neck was performed and the histopathologic findings yielded a diagnosis of papillary thyroid cancer with multiple metastatic neck lymph nodes (Figure 2). He was scheduled to undergo total thyroidectomy in combination with radioactive iodine treatment.

Discussion

Papillary thyroid cancer is a comparatively rare disease in children, particularly in boys and miliary tuberculosis is also rare in these days in South Korea. In the present report, we introduced a case of papillary thyroid cancer mimicking miliary tuberculosis in a boy whose lymph nodes were not palpable because of obesity.

The incidence of differentiated thyroid cancer, including papillary thyroid and follicular histologies, in children is 0.54/100,000 with an increasing trend with age,¹ particularly in young females. The prognosis of papillary thyroid cancer is favorable; however, papillary thyroid cancer in children tends to be diagnosed at more advanced stage and is associated with high rates of recurrence with lymph node or disseminated lung metastasis.¹ The prognosis in boys with papillary thyroid cancer is worse because of a more aggressive biological behaviour, such as larger tumour size and combined lymph node metastasis at diagnosis. Therefore, early diagnosis of papillary thyroid cancer, particularly in boys, is necessary to improve the overall

survival. Although there have been few reports of papillary thyroid cancer mimicking miliary tuberculosis in men, a girl, and a boy with cervical lymphadenopathy,² no previous study has reported papillary thyroid cancer mimicking miliary tuberculosis in a boy with only incidental findings of pulmonary infiltration.

Most children with papillary thyroid cancer usually present with persistently palpable lymph nodes in the neck or a growing thyroid nodule. However, no palpable lymph nodes were observed in his neck region of the patient in the present report because of obesity, and therefore the diagnosis of papillary thyroid cancer was delayed until regular work-up chest radiography was performed in preparation for surgery.

In a large-scale adult study, approximately 6.7% of patients with thyroid cancer exhibited metastatic lung cancer.³ However, information on the incidence of thyroid cancer with lung metastases is lacking. Lung metastasis of papillary thyroid cancer can appear as miliary patterns or multiple nodules within the lung parenchyma on chest radiography or chest CT, rarely in combination with bronchiolar involvement.⁴ In other cases, lung metastasis of papillary thyroid cancer can manifest as localised pulmonary infiltrations with lymphadenopathy and pleural effusion.⁵ As demonstrated by the present case of abnormal miliary infiltration without evidence of infection, metastatic cancer should be evaluated even in patients with age and sex distribution that are rare for this disease.

Tuberculosis is a critical infectious disease with a high global burden and high mortality. The incidence of miliary tuberculosis is 7.1-21% in developed countries.⁶ Among

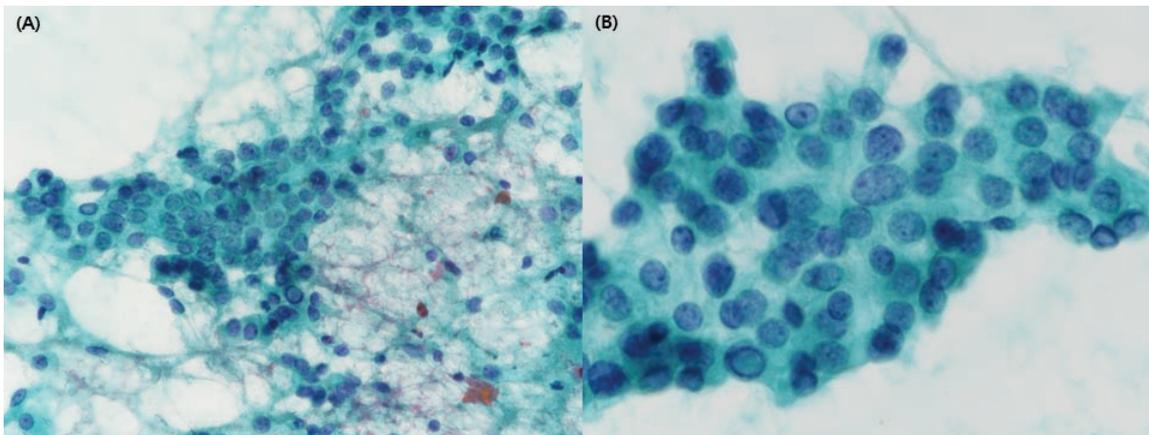


Figure 2 Papillary thyroid cancer cells were observed in the thyroid tissue (A) and metastatic cervical lymph nodes (B) obtained by fine needle aspiration.

South Korean children, the incidence of tuberculosis, including miliary tuberculosis, is decreasing.⁷ The most common symptoms of miliary tuberculosis are fever and fatigue, followed by weight loss,⁸ although children with miliary tuberculosis also less commonly complain of chills, night sweat, and productive cough. The patient in the present case denied fever in the preceding days and complained of intermittent cough with and without sputum. Patients with miliary tuberculosis frequently complain of fever,⁸ but can also, uncommonly, be afebrile.⁹ Instead, children with miliary tuberculosis present with peripheral lymphadenopathy and hepatosplenomegaly, although organomegaly could not be perceived in this case because of obesity.

Although some authors have denied the need for bronchoalveolar lavage in patients with lung metastasis of papillary thyroid cancer,¹⁰ atypical epithelial cells considered as metastasis can be observed in bronchoalveolar lavage specimens of children diagnosed with papillary thyroid carcinoma with miliary pulmonary metastases. In the present report, we could not detect abnormal cells in the transbronchial biopsy specimen.

In conclusion, if miliary infiltrates are found on chest radiography, metastatic tumours including papillary thyroid cancer should be considered as a differential disease mimicking miliary tuberculosis to avoid misdiagnosis and delayed diagnosis.

Declaration of Conflicts of Interest

The authors have no potential conflicts of interest to declare.

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