Mediastinal Parathyroid Cyst: Treatment with Thoracoscopic Surgery — A Case Report —

Tsunehiro OYAMA1, Hideyuki IMOTO1, Kosei YASUMOTO1, Satoshi TOYISHIMA2 and Akira NAGASHIMA3

1Department of Surgery 2, School of Medicine, University of Occupational and Environmental Health, Japan. Yahatanishi-ku, Kitakyushu 807-8555, Japan
2Division of Pathology,
3Division of Chest Surgery, Kitakyushu Medical Center. Kokurakita-ku, kitakyushu 802-0077, Japan

Abstract: Parathyroid cysts are rarely located in the mediastinum. This report describes a 45-year-old man with a mediastinal parathyroid cyst. Video-assisted thoracic surgery was successfully performed to remove the cyst.

Key words: mediastinal parathyroid cyst, mediastinum, thoracoscopic surgery, video-assisted thoracic surgery.

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Introduction

The first case of a cervical parathyroid cyst was described in 1905 by Goris; however, the histogenesis of this cyst remains uncertain [1]. DeQuervain reported the first case of a mediastinal parathyroid cyst [2]. Mediastinal parathyroid cysts (MPTC) are rare and only 19 cases have been reported in the literature. The purpose of this report is to present a MPTC treated with video-assisted thoracic surgery.

Case Report

A 45-year-old man was admitted to our institution with an asymptomatic mediastinal tumor. A tumor had been detected in the right superior mediastinum 7 years earlier on a chest roentgenogram. The patient was then referred to our hospital for further evaluation of interval change and treatment.

Physical examination on admission was unremarkable. A chest roentgenogram showed
Laboratory data included a normal blood count and normal coagulation studies. The serum calcium level was 4.4 mEq/L (normal: 4.1–5.0 mEq/L). Arterial blood gas analysis showed the following: pH 7.40, PaO₂ 77, PaCO₂ 31, and an oxygen saturation of 96 percent. Spirometry was interpreted as normal. Computed tomography (CT) and magnetic resonance imaging (MRI) films demonstrated a cystic lesion adjacent to the trachea. Following administration of gadolinium contrast, MRI of a cystic lesion displayed no enhancement (Fig. 1).

Video-assisted thoracic surgery was performed. A double-lumen endotracheal tube was placed for selective ventilation to remove the mediastinal cystic lesion. The patient was then positioned for a right standard posterolateral thoracotomy. The first trocar was placed through the seventh intercostal space in the midaxillary line. During the preoperative thoracoscopic examination, the 8 cm cyst was detected in the posterosuperior mediastinum at the back of the superior vena cava along the vagus nerve. A 5 cm minithoracotomy (axillary) incision was also performed in order to remove the cyst. The cyst was unilocular and the wall was gray-white in appearance. The cyst was exposed with sharp dissection; there were dense adhesions between the cyst and adjacent tissues (trachea and vagus nerve). During the dissection, the cyst was inadvertently ruptured. The fluid that filled within the cyst was straw-colored. Following rupture of the cyst, it was easier to grasp and complete resection of the cyst was easily performed.

Histologic examination revealed the cyst wall to be made of fibrous tissue with islands of parathyroid tissue composed of chief cells and oxyphil cells. The cyst wall was partially

Fig. 1. Axial image of MRI following administration of gadolinium contrast demonstrated no enhancement of the cystic lesion.
Fig. 2. The cyst wall consisted of fibrous tissue with islands of parathyroid tissue composed of chief cells and oxyphil cells (arrow; oxyphil cells). (hematoxylin and eosin, bar; 100μm) lined by a single layer of chief cells (Fig. 2). Four months after surgery, the patient has remained well without signs of recurrence.

Discussion

Parathyroid cysts are classified based on their functional characteristics as functional or nonfunctional [3]. This parathyroid cyst was treated as nonfunctional MPTC from normal serum calcium level. Since Noble and Borg first described functional MPTC [4], there have been only 4 cases of functional MPTC reported with clinical or biochemical supportive data. Thus, functional MPTC accounts for 21% of all MPTC [5].

The pathogenesis of parathyroid cysts is not well understood. There are at least two theories. First, the coalescence of parathyroid microcysts or the progressive enlargement of a single microcyst in the normal parathyroid may lead to the formation of a macroscopic cyst [5]. Second, acute cystic degeneration of parathyroid adenomas may lead to cyst formation [6]. Ectopic parathyroid cysts are remnants of the third or fourth branchial pouch along the normal pathway of migration [5]. In this case, the MPTC was located in the right posteromedian mediastinum with the pedicle arising from the right side of the neck or superior mediastinum. There were no lesions consistent with parathyroid adenomas in our patients. Therefore, consistent with Guvendik et al. [5], the ectopic cyst from the normal parathyroid gland enlarged and descended into the posterior mediastinum.

Biopsy is not helpful for the diagnosis of parathyroid cyst, because the wall does not
contain a homogeneous layer of parathyroid cells [5]. Aspiration cytology or investigation of parathyroid hormones in the cyst fluid is not always useful to diagnose parathyroid cysts [6, 7]. An exploratory operation should be performed on clinical grounds when investigations fail to show functioning parathyroid tissue.

Thoracoscopic techniques are appropriate for diagnosing and resecting masses in all of the mediastinal compartments [8]. Mediastinal cysts are often benign, usually asymptomatic, discovered incidentally, and easy to resect, although there is a possibility of malignancy. For these reasons, a minimally invasive approach is appropriate to resect a mediastinal cyst. Thus, resection of mediastinal cysts seem to be an ideal setting for the use of the video-assisted thoracic surgical technique [9].

This is the first report of removal of a MPTC with video-assisted thoracic surgery. In this patient, the cyst was large and located in the posterosuperior mediastinum. A thoracic surgical approach, such as the minithoracotomy, was necessary to remove the cyst because of both the large size of the cyst and the dense adhesions to the trachea and vagus nerve. It is important to remove cystic lesions of the mediastinum for diagnostic and therapeutic purposes and video-assisted thoracic surgery may be useful to resect the MPTC.

References

胸腔鏡下手術による縦隔副甲状腺囊腫の一切除例

小山 倫浩1，井本 秀幸1，安元 公正1，
豊島 里志2，永島 明3

1産業医科大学医学部 第二外科学教室
2北九州市立医療センター 病理
3北九州市立医療センター 呼吸器外科

要旨：45歳男性の右上縦隔腫瘍を胸腔鏡下に摘出した。腫瘍は上縦隔後方に位置し、上大静脈後方、迷走神経内側に表面平滑な囊腫として認められた。灰白色調の囊腫は長径8cmで水溶性の内容を有し、囊腫壁にchief cellとoxypill cellよりなる副甲状腺組織を認めた。縦隔副甲状腺囊腫は現在までに19例報告され、本例は胸腔鏡下に切除された最初の例として報告した。

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