Cervical bronchogenic cysts mimic metastatic lymph nodes during thyroid cancer surgery

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INTRODUCTION

Bronchogenic cysts are benign congenital anomalies related to the abnormal budding of the tracheobronchial tree during embryological development [1,2]. Most bronchogenic cysts occur in the mediastinum or within the pulmonary parenchyma, whereas cysts in the thyroid or perithyroidal area are rare [3]. Since many adults with bronchogenic cysts do not experience any symptoms, the cysts are often detected incidentally during the diagnosis of other diseases [4]. Although symptomatic bronchogenic cysts should be excised, the treatment of asymptomatic cervical bronchogenic cysts remains unclear [5]. Cystic lesions in the neck include branchial cleft cysts, thyroglossal duct cysts, bronchogenic cysts, thymic or thyroid cysts, and metastatic lymph nodes [6]. Cystic degeneration is also common in metastatic lymph nodes associated with thyroid cancer [7,8]. Metastatic lymph nodes affect the extent of lymph node dissection, especially in the lateral neck region.

Purpose: Although congenital bronchogenic cysts in the cervical region, especially in the thyroid or perithyroidal area, are rare, distinguishing them from other cervical cystic lesions (e.g., thyroglossal duct and branchial cleft cysts) and metastatic cervical lymph nodes is difficult preoperatively. Additionally, cystic degeneration of metastatic lymph nodes is common in patients with thyroid cancer. We investigated the clinical characteristics and proper treatment for individuals with cervical bronchogenic cysts.

Methods: Of the 18,900 patients treated for thyroid cancer, 18 patients with pathologically confirmed bronchogenic cysts were retrospectively reviewed. Bilateral total thyroidectomy or less than total thyroidectomy with central compartment node dissection, including cystic mass excision was done and cystic mass was confirmed by postoperative pathologic examination.

Results: All cervical bronchogenic cysts were asymptomatic. Their mean size was 1.2 cm (range, 0.3 to 3 cm). Of these 18 patients, 15 did not have any abnormal radiological findings, except for lymphadenopathy during preoperative evaluations. Most bronchogenic cysts were detected around the thyroid and paratracheal areas. On preoperative imaging and intraoperatively, most were indistinguishable from metastatic cervical lymph nodes or other cystic lesions.

Conclusion: Although cervical bronchogenic cysts are rare and benign, they should be distinguished from other cystic cervical masses, especially metastatic cervical lymph nodes associated with thyroid cancer. Possible cervical bronchogenic cysts found during thyroid cancer evaluation or surgery should be surgically excised.

Key Words: Bronchogenic cyst, Thyroid neoplasms

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Therefore, correctly diagnosing cystic lesions in the neck is important for thyroid cancer surgery. However, benign bronchogenic cysts appear similar to metastatic lymph nodes, both by preoperative imaging and intraoperative field findings. The aim of this study was to review the clinical characteristics and proper management for cervical bronchogenic cysts that mimic metastatic lymph nodes during thyroid cancer surgery.

**METHODS**

Of the 18,900 patients treated for thyroid cancer at the Thyroid Cancer Center, Gangnam Severance Hospital, Yonsei University College of Medicine, between January 2007 and April 2012, 18 patients (3 males, 15 females; mean age, 52.6 years) with bronchogenic cysts confirmed by postoperative pathologic examination were retrospectively reviewed in this study. Preoperative neck ultrasound and CT were performed for thyroid evaluation, and thyroid cancer was confirmed by fine needle aspiration cytology. Extent of thyroidectomy and lymph node dissection was determined using American Thyroid Association guidelines [9]. This retrospective study was approved by the Institutional Review Board of Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea.

**RESULTS**

Of the 18,900 patients who underwent thyroid cancer surgery, 18 (0.1%) were confirmed as having cervical bronchogenic cysts; their clinical characteristics are shown in Table 1. All cervical bronchogenic cysts were asymptomatic, and cystic lesions were found during either preoperative diagnostic evaluation or thyroid cancer surgery. The mean size of the cervical bronchogenic cysts was 1.2 cm (range, 0.3 to 3 cm). Eleven cysts were located in the right paratracheal area, 3 in the left paratracheal area, and 1 each in the left thyroid cartilage, left inferior thyroid, right level III region, and anterior mediastinum. Fifteen patients underwent bilateral total thyroidectomy, whereas three underwent less than total thyroidectomy. All patients underwent central compartment node dissection, including cystic mass removal. None of these patients had any postoperative complications. Metastatic lymph nodes associated with thyroid cancer were found in five patients. Patient 4 was a 55-year-old female with an asymptomatic soft mass in the neck (Table 1). CT showed a homogeneous cystic mass that measured 3 cm × 1.5 cm around the thyroid cartilage (Fig. 1A). Although it was initially diagnosed as either a thyroglossal duct cyst or a metastatic lymph node with cystic degeneration, postsurgical analysis determined that it was a cyst lined with

| No. | Age (yr) | Sex | Bronchogenic cyst location | Bronchogenic cyst size (cm) | Thyroid cancer size (cm) | Harvest LN (positive malignancy) | Preoperative radiologic finding |
|-----|----------|-----|---------------------------|---------------------------|-------------------------|-------------------------------|--------------------------------|
| 1   | 69       | F   | Lt. paratracheal          | 2.0                       | 0.6                     | 3 (0)                         | Lymphadenopathy                |
| 2   | 47       | F   | Lt. paratracheal          | 1.2                       | 1.6                     | 12 (0)                        | Lymphadenopathy                |
| 3   | 62       | F   | Rt. paratracheal          | 1.4                       | 1.0                     | 7 (0)                         | Lymphadenopathy                |
| 4   | 55       | F   | Lt. thyroid cartilage     | 3.0                       | 0.8                     | 4 (0)                         | 3-cm-sized cystic mass around the thyroid cartilage, most likely a thyroglossal duct cyst |
| 5   | 53       | F   | Anterior mediastinum      | 2.5                       | 0.6                     | 12 (0)                        | About 2.5- × 1.7-cm-sized homogenously enhancing mass at anterior mediastinum, r/o thymoma |
| 6   | 60       | F   | Lt. paratracheal          | 0.6                       | 0.7                     | 5 (2)                         | No abnormal finding            |
| 7   | 51       | F   | Rt. paratracheal          | 1.1                       | 0.6                     | 5 (2)                         | No abnormal finding            |
| 8   | 48       | M   | Rt. paratracheal          | 1.0                       | 1.2                     | 20 (0)                        | Lymphadenopathy                |
| 9   | 45       | F   | Rt. paratracheal          | 1.3                       | 0.2                     | 2 (0)                         | Lymphadenopathy                |
| 10  | 47       | F   | Rt. paratracheal          | 0.3                       | 0.8                     | 2 (0)                         | No abnormal finding            |
| 11  | 65       | M   | Lt. inferior thyroid      | 0.3                       | 2.5                     | 4 (0)                         | No abnormal finding            |
| 12  | 55       | F   | Rt. paratracheal          | 1.4                       | 0.6                     | 9 (0)                         | Lymphadenopathy                |
| 13  | 37       | F   | Rt. paratracheal          | 0.9                       | 1.6                     | 12 (11)                       | Lymphadenopathy                |
| 14  | 47       | F   | Rt. paratracheal          | 0.5                       | 0.4                     | 17 (4)                        | Lymphadenopathy                |
| 15  | 41       | F   | Rt. level III region      | 1.5                       | 0.8                     | 6 (0)                         | 1.5 cm-sized cystic mass at Rt. upper central portion |
| 16  | 50       | F   | Rt. paratracheal          | 1.2                       | 1.2                     | 9 (1)                         | Lymphadenopathy                |
| 17  | 56       | M   | Rt. paratracheal          | 1.0                       | 0.5                     | 2 (0)                         | Lymphadenopathy                |
| 18  | 59       | F   | Rt. paratracheal          | 1.0                       | 1.5                     | 4 (0)                         | No abnormal finding            |

LN, lymph node; r/o, rule out.
pseudostratified, ciliated, columnar epithelium containing underlying seromucinous glands. CT of patient 15 showed a 1.5-cm-sized cystic mass at the right level III region in the neck (Fig. 1B). The cystic mass was excised during thyroidectomy and was identified as a bronchogenic cyst (Fig. 2). Of these 18 patients, 15 did not have any abnormal radiological findings, except for lymphadenopathy during preoperative evaluations. Cervical bronchogenic cysts were less than 1.5 cm in size and were detected around the paratracheal area. Although these cysts resembled central lymph nodes in operative field analyses, final pathologic examinations identified them as bronchogenic cysts.

DISCUSSION

The tracheobronchial tree, which consists of the ventral trachea and the dorsal esophagus, is formed during the fifth week of embryogenesis. Bronchogenic cysts are often caused by an abnormal budding of the primitive foregut’s tracheobronchial tree. When the connection with the tracheobronchial tree is lost, the bronchial buds may migrate to an aberrant position [1,10]. Bronchogenic cysts have been classified according to their site of origin: paratracheal, carinal, hilar, paraesophageal, and atypical (such as diaphragmatic, abdominal, intracutaneous, or subcutaneous, or in the supraclavicular neck area) [11].

Abnormal budding during tracheal development can cause bronchogenic cysts to form on the midline of the upper neck. However, cysts may also develop in the lower and lateral portions of the neck, if abnormal budding occurs during bronchial system development [12]. The thyroid and paratracheal regions are more frequently affected than the supraclavicular region and suprasternal notch, and the majority
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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.
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