Large lipoma in the subglottic larynx: a case report

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Abstract
Lipomas are rare benign tumors in the larynx. We encountered a 70-year-old man with a large lipoma in the subglottic area. His chief symptom was a 3-month history of progressive dyspnea. Transnasal flexible endoscopy showed a large mass on the posterior wall of the subglottic region. A computed tomography scan revealed a lesion occupying 75% to 80% of the subglottic airway. In this article, we discuss the imaging changes, clinical evaluation, and treatment of this patient’s lipoma.

Keywords
Laryngeal lipoma, subglottic area, mesenchymal tumors, endoscope, operation, computed tomography

Introduction
Lipomas are relatively common, accounting for 4% to 5% of all benign tumors throughout the body. They usually occur in areas where subcutaneous fat is heavily deposited, the most common of which are the trunk and limbs. Fewer than 15% of lipomas occur in the head and neck. Lipomas are typically asymptomatic unless they compress nearby tissues. We herein present a case of a large lipoma arising from the subglottic area and review the relevant literature.

Case report
A 70-year-old man presented with a 3-month history of mild dysphagia and progressive dyspnea. The dyspnea occurred after physical activity and sometimes lasted for 10 days thereafter. Because the patient had a history of emphysema, he first sought medical treatment in the respiratory department. The respiratory physician found no obvious abnormalities in his lungs, and...
the patient was then recommended to visit the ear, nose, and throat department. Our physical examination revealed no stridor. Transnasal flexible endoscopy (Figure 1 (a)) showed a large, round, smooth mass on the posterior wall of the subglottic region. Approximately 75% to 80% of the subglottic area was obstructed. The lesion was about 1.5 × 1.0 cm in size, translucent in appearance, and covered by normal non-hemorrhagic mucosa. Both vocal cords were mobile and symmetrical. The aryepiglottic folds and pyriform sinuses showed no abnormalities. We recommended that the patient be immediately admitted to the hospital for computed tomography (CT), magnetic resonance imaging (MRI), pulmonary function testing, and other examinations. A neck CT scan showed an approximately 1.4 × 1.2 × 1.4-cm low-density area in the posterior wall of the subglottic region. The average attenuation was −84 Hounsfield units (Figure 2). MRI showed a nodular abnormal signal of about 1.1 × 1.7 cm in size, protruding into the tracheal cavity from the posterior wall of the subglottic area with clear boundaries. T1- and T2-weighted imaging showed high signal intensity, and fat suppression imaging showed low signal intensity. An enhanced scan showed no significant enhancement (Figure 2). Both CT and MRI suggested that the mass was a lipoma.

The patient underwent tracheotomy and endoscopic excision of the lipoma under general anesthesia. The mass accounted for 80% of the subglottic area and was completely resected with low-temperature plasma assisted by endoscopy (Figure 3). Bleeding was minimal during the operation, and no postoperative complications occurred.

Pathological examination revealed a 1.5-cm fleshy yellow lesion covered by pseudostratified ciliated columnar epithelium. Many mature fat cells were present in the lesion. Immunohistochemical staining showed a specific immune response of tumor cells to S-100 (Figure 4). We finally diagnosed the lesion as a subglottic lipoma.

The patient recovered well after the operation. During the 3-month follow-up, transnasal flexible endoscopy showed no recurrence, and the subglottic airway remained unobstructed (Figure 1(b)).

Ethics approval and patient consent were obtained for publication of this report.

Figure 1. Electronic laryngoscopy of the tumor and postoperative examination. (a) Endoscopic examination showed a large, round, smooth lesion located at the posterior wall of the subglottic region. Approximately 80% of the subglottic area was obstructed. (b) Transnasal flexible endoscopy at the 3-month follow-up visit showed no recurrence and an unobstructed subglottic airway.
Figure 2. Computed tomography (CT) and magnetic resonance imaging (MRI) of the tumor. A plain CT scan of the neck showed a well-circumscribed very-low-density mass located in the posterior wall of the subglottic region. (a) Transverse CT image. (b) Sagittal CT image. MRI showed a nodular abnormal signal of about 1.1 × 1.7 cm in size protruding into the tracheal cavity from the subglottic posterior wall with clear boundaries. The lesion had (c) high signal intensity on T2-weighted images and (d) low signal intensity on fat-suppression images. The arrow indicates the tumor in the subglottic region.

Figure 3. Removal of tumor. (a) Before the operation, the tumor occupied 80% of the subglottic area. (b) The tumor was completely resected with low-temperature plasma under the assistance of endoscopy. (c) Removed mass.
Discussion

Lipomas are mesenchymal-derived benign tumors that grow slowly. They are usually asymptomatic unless they impinge or compress surrounding structures. Lipomas commonly occur on the trunk and limbs because these are areas that have high subcutaneous fat content, and they account for 4% to 5% of all of benign tumors of the human body. Lipomas are usually found in people aged 50 to 60 years, when fat begins to accumulate in inactive individuals. Head and neck tumors account for 13% to 15% of all lipomas. The most common site in the head and neck region is the posterior triangle of the neck. However, lipomas appear to be very uncommon in the larynx, accounting for only 0.6% of all benign laryngeal lesions. To date, 115 laryngeal lipomas have been reported in the literature, and almost all of these occurred in the supraglottic region.

The cause of laryngeal lipomas is unclear. Multipotential fibroblasts can differentiate into adipocytes through unknown mechanisms. Grossly, lipomas are variable in size. They tend to appear smooth or lobulated, are often well demarcated or encapsulated, and show a yellowish color. The appearance of a lipoma under endoscopy varies from a submucosal mass to a pedunculated intraluminal projection; thus, a clinical lipoma can be confused with other benign lesions such as a retention cyst or laryngocele. Microscopically, lipomas are composed of mature adipocytes. They vary only slightly in size and shape and have a large central vacuole that often displaces the nucleus peripherally. In the present case, we observed many vacuolar lipoma cells located below the pseudostratified ciliated columnar epithelium (hematoxylin and eosin staining, ×40). Immunohistochemically, the tumor cells were positive for S-100 (×40; ×200).

We searched MEDLINE using the keywords “laryngeal lipoma” and “subglottic area,” but no relevant literature was found.

Histologically, lipomas can be classified as either simple ordinary lipomas or their
variants, which include spindle cell lipomas, fibrolipomas, intramuscular lipomas, angiolipomas, myxolipomas, salivary gland lipomas, pleomorphic lipomas, and atypical lipomas. Based on the tumor’s location and characteristics in the present case, the preoperative radiologic differential diagnoses included a hemangioma, liposarcoma, hemangiopericytoma, paraganglioma, and, less likely, adenoid cystic carcinoma and adenocarcinoma. Initially, the diagnosis was rather elusive, and the differential diagnoses became somewhat broader until the CT and MRI examinations were performed. Preoperative imaging (either by CT or MRI) can often suggest the pathology.

CT and MRI provide essential information for the management of lipomas. CT scans help mainly in assessing the size and extent of the tumor. Laryngeal lipomas frequently appear as pedunculated, single, and straight-surfaced lesions. Adipose tissue is typically homogeneous on CT scans with a low attenuation value and a density lower than that of water (<0 Hounsfield units), often with homogenous low-density areas (ranging from −64 to −123 Hounsfield units). MRI provides better tumor delineation because it has superior soft tissue contrast and clear definition of the location and extent of the mass. According to the fat-based signal characteristics, a hyperintense area is produced on the T1-weighted image and an intermediate-intensity area is produced on the T2-weighted image. When a lipoma is suspected, an additional sagittal-view fat-suppression sequence is performed (R4-R5-R6-R7). If the mass is pedunculated, sagittal images can accurately indicate the origin of the peduncle. The mean attenuation of the large lesion in the present case was −84 Hounsfield units, both T1- and T2-weighted images showed high signal intensity, the fat-suppression images showed low signal intensity, and no obvious enhancement was seen in the enhanced scan. These findings are consistent with previous cases.

Treatment of a laryngeal lipoma involves surgical excision to reduce the risk of recurrence. Depending on the size and extent of the tumor, some authors recommended endoscopic removal of the lesion. This approach is useful for pedunculated tumors. Submucosal tumors should be removed via an external approach. Large non-pedunculated tumors require an external approach using thyrotomy, transhyoid pharyngotomy, or lateral pharyngotomy for good exposure. In the present case, the lesion was located in the subglottic area and blocked 80% of the subglottic lumen, causing great difficulty in endotracheal intubation. For our patient’s safety, we performed tracheotomy under local and general anesthesia through tracheal intubation. After establishment of satisfactory anesthesia, we performed endoscopically assisted low-temperature plasma tumor resection. This procedure avoids the occlusion of the operative field caused by orotracheal intubation. It also provides good exposure to the edge of the tumor.

Conclusion

Although pharyngeal lipomas are extremely rare and usually asymptomatic, a subglottic laryngeal lipoma can cause dyspnea by blocking the airway. Special attention should always be paid to patients with unexplained dyspnea.

Abbreviations

CT, computed tomography; MRI, magnetic resonance imaging

Authors’ contributions

All authors read and approved the final manuscript.
Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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