



## Case Report

# Schwannoma of the Left Recurrent Laryngeal Nerve, Review of the Literature and Proposed Technique to Avoid the Nerve Injury

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## Abstract

Schwannomas are very rare, benign tumours origin from nerve sheath cells, with low possibility of malignant alteration. They can arise from cranial, spinal and peripheral nerves. Recurrent laryngeal nerve (RLN) schwannomas are extremely rare, and we found only eleven cases that have been described so far. It is a big differential diagnostic problem, and usually presented clinically as a thyroid tumour. We present 26-year-old woman with compressive symptoms that were present for six months. Clinically and by ultrasound a tumour in the left thyroid lobe was detected. Preoperatively, patient did not have voice changes or hoarseness, indirect laryngoscopy was normal and tracheal displacement to the right side recorded by X-ray. Patient had normal thyroid function, with normal levels of tumour markers and antibodies. The decision for surgery was made multidisciplinary. Intraoperatively, the left thyroid lobe presented with a cystic tumour in the lateral part of the lobe, about 4 cm in diameter, witch extending posteriorly and compressing surround structures but without infiltration. During the mobilization of the lobe together with tumour, which was considered as part of the lobe, the left RLN was accidentally cut. Nerve reconstruction was done immediately using anastomosis with the longest branch of the ipsilateral ansa cervicalis. Histopathological findings showed a schwannoma. In conclusion, in order to preserve the nerve, tumour should be mobilized, so it will clearly indicate its origin from RLN, by tightening the nerve ends. Nerve-sparing sub capsular resection should be performed with using intraoperative neuromonitoring probe, if available. When RLN is resected, end-to-end anastomosis should be made, or anastomosis with ansa cervical is, depending on the size of the nerve defect.

**Keywords:** Nerve Anastomosis; Recurrent Laryngeal Nerve; Schwannoma

## Introduction

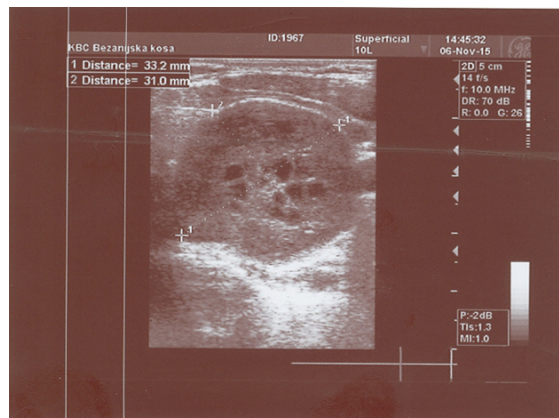
Schwannomas (synonym: neurilemmomas) are benign neoplasms originating from Schwann, nerve sheath cells, and with a possibility

of malignant alteration. They can arise from cranial, spinal and peripheral nerves. Generally, they are very rare tumours. Over than 40% of cases occur in the head and neck region [1]. Recurrent laryngeal nerve (RLN) schwannomas are extremely rare, and we found only eleven cases that have been described so far [2-12]. It is a big differential diagnostic problem. Most commonly, they

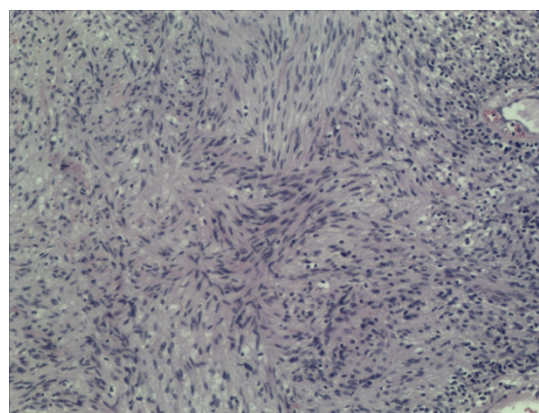
are presented clinically as a thyroid, parathyroid or oesophageal tumour, enlarged lymph node or lymphoma. We report a young women patient in whom RLN schwannoma simulated thyroid tumour.

### Case Presentation

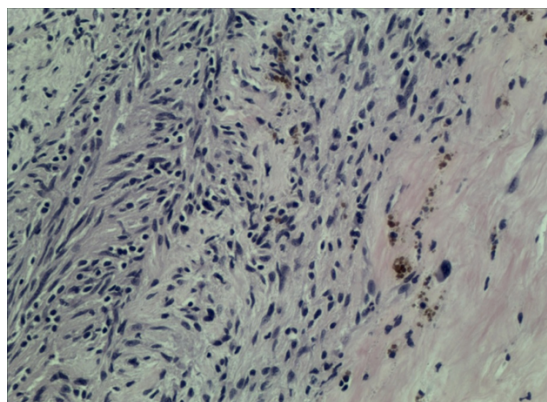
We present 26-year-old woman with dyspnoea, dry cough and difficulty swallowing for six months. Clinically a tumour in the left lobe of the thyroid gland about 4 cm in diameter was detected. Ultrasonically tumour was heterogenic and hypo echogenic with intranodal vascularization, cystic degeneration and in some places, it was trabecular, 33 mm of the longest diameter (Figure 1). Considering to tumour size and clinical presentation, surgery was indicated, and the decision for surgery was made multidisciplinary. As a standard, within the preoperative examination, tracheal displacement to the right side was recorded by X-ray, while the finding of indirect laryngoscopy was normal. The patient did not have voice changes or hoarseness preoperatively. Chest X-ray and abdominal ultrasonography was normal. Thyroid function was normal and the patient was norm metabolic. Levels of antibodies (thyroid peroxidase and thyroglobulin antibodies) were normal, as well as tumour markers (thyroglobulin and calcitonin). Intraoperatively, left lobe was polynodal with dominant cystic node in the lateral part of thyroid lobe about 4 cm in diameter, extending posteriorly and compressing esophagus and trachea but without infiltration. During the preparation and mobilization of the lobe together with tumour, which was considered as part of the lobe, the left RLN was accidentally cut. Nerve was positioned partially over the cystic tumour and partially through the sulcus between the tumour and the left lobe. With the neuromonitor probe we checked the transacted left RLN as well as left vague nerve, and confirmed the complete lesion of the left RLN. The tumour together with left thyroid lobe was removed and sent for histopathological analysis. In the same act, the reconstruction of the left RLN was done, using anastomosis with the longest branch of the ipsilateral ansa cervicalis with single vascular suture 6.0. The histopathological findings showed a schwannoma with a low proliferative index (Ki67 was 2%) (Figure 2), and with areas of old haemorrhage (Figure 3). Immunohistochemically tumour showed activity on Vimentin and S100 protein (Figure 4). In the immediate postoperative course, the patient had hoarseness with difficulty swallowing liquids thus suggesting injury of RLN and outer branch of upper laryngeal nerve (neuropraxia), while respiratory function was normal. A control indirect laryngoscopy examination confirmed immobility of the left vocal cord. After being discharged from the hospital, the patient began phoniatric rehabilitation. Four years after surgery she had a normal voice without difficulty swallowing and without dyspnea, although the left vocal cord was still in medial position.



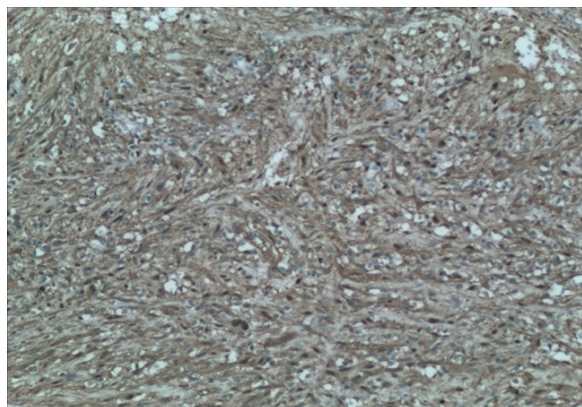
**Figure 1:** Preoperative ultrasound of thyroid gland.



**Figure 2:** Haematoxylin-eosin stain; original magnification x 20; low proliferative index.



**Figure 3:** Haematoxylin-eosin stain; original magnification x 40; areas of old haemorrhage.



**Figure 4:** Immunohistochemically testing on S100 protein.

## Discussion

Schwannomas in the neck can originate from the sympathetic chain, cervical and brachial plexus, vagus nerve, as well as from RLN. In addition, the primary tumour site may affect different organs: thyroid, larynx, esophagus, large salivary glands [13], and then it is not possible to detect the exact origin of the tumour. In such cases, it is believed that they arise from sensory nerve of certain organ. Due to infiltrative character especially of plexiform type of schwannomas, sometimes it is difficult to locate the primary tumour site in regard to the infiltrated organ [14]. Schwannomas from RLN are extremely rare, and except in the neck, they can occur in mediastinum. Clinically RLN schwannomas in the neck are often presented as thyroid nodule. Rarely, they can be incidentally found during thyroid or parathyroid surgery. Xu XQ et al described incidental RLN schwannoma during surgery for thyroid cancer [12], and Lajud S. found incidental schwannoma during Para thyroidectomy [8]. In our case, the preoperative diagnosis showed a tumour of the left thyroid lobe, while intraoperative and histopathological findings showed that it was schwannoma origin from RLN. Schwannomas of RLN can also be induced by nerve trauma after thyroid surgery, and this condition is extremely rare [15]. To our knowledge, eleven cases of RLN schwannomas described so far, which are certainly proven to originate from RLN [2-12]. Five of them were localized in the neck [2,6,8,9,12], while the others were localized in superior mediastinum on the left side [3-5,7,11]. It is possible that they, by its growth, descended from the neck into the mediastinum. Most of them were localized on the left side [3-5,7-12], while only two of them originated from right RLN [2,6]. There was no difference in incidence between genders. Average age was 53. The youngest patient was 28 [2], and the oldest was 67 years old [10]. Our patient was 26, and she was youngest than all of patients with RLN schwannoma described so far. Average size of RLN schwannoma was about 5 cm. The smallest measured 1 cm [12], and the largest was 14 cm in diameter, and it was localized in mediastinum [5]. Preoperative diagnosis

of these tumours is difficult. FNAB is nonspecific and with low accuracy, so diagnosis based entirely on cytology is not able to prove the origin of these tumours [13]. FNAB can also cause vocal cords palsy and pain, which may indicate the neural origin of the tumour. The presence of tumours as well as surgical intervention can be complicated with vocal cord paralysis [6,10]. Computed tomography and magnetic resonance imaging (MRI) can help in making diagnosis, but we do not routinely use them in preoperative work-up of thyroid nodule without retrosternal propagation and without compression and/or suspected infiltration of surrounding neck structures. MRI clearly shows the tumour and its capsule, and in case of schwannomas, it can indicate the nerve tumour origins [7]. In our case neck ultrasound was the only diagnostic method, used in accordance with the clinical findings, based on which the decision on surgical treatment was made. Treatment of schwannoma is surgical and implies tumour enucleation with attempt to preserve the nerve. With technique of meticulous sub capsular dissection, it is possible to enucleate the tumour with nerve preservation. Using intraoperative neuromonitoring probe, nerve identification may be facilitated. In this way, it is possible to avoid a functional deficit of the affected nerve [2], but not always. Even in cases when the nerve is preserved, hoarseness can occur postoperatively [7,8]. Valardo E preserved the nerve and postoperatively there was a recovery of the voice since the patient was preoperatively dysphonic [6]. Before resection, tumour should be mobilized. That can cause nerve tightens, which may indicate that tumour originates from RLN. In our case, the RLN was not identified at the beginning, before the thyroid lobe mobilization, so that caused his injury. After accidentally cutting the RLN, it is not always possible to perform end-to-end anastomosis, except for tumour less than 1 cm. In larger tumours, it might be necessary to perform reconstruction with ansa cervicalis [16], with the aim to improve the voice quality and quality of life. Since no direct anastomosis could be made, we performed nerve reconstruction with ansa cervicalis. After RLN resection due to schwannoma, apart from us, only Xu XQ performed nerve reconstruction by direct, end-to-end anastomosis. Since the schwannoma, measured 1 cm that type of nerve reconstruction was feasible [12].

## Conclusion

In conclusion, in order to preserve the nerve, at first, tumour should be mobilized. That will clearly indicate its origin from RLN, by tightening the nerve ends. In this way nerve-sparing sub capsular resection can be performed. When RLN is resected, end-to-end anastomosis should be made, or anastomosis with ansa cervicalis, depending on the size of the defect.

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