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# Title: Minimal Invasive Resection of Large Retrosternal Thyroid Goiter

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# Author Questionnaire

**1.** We have marked your project as author-provided footage, meaning you film the video yourself and provide JoVE with the footage to edit. JoVE will not send the videographer. Please confirm that this is correct.

√ Correct

**2. Microscopy**: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **No**

**3. Software:** Does the part of your protocol being filmed include step-by-step descriptions of software usage? **Yes**

We recommend using the screen capture program OBS. JoVE's tutorial for using OBS Studio is provided at this link: https://review.jove.com/v/5848/screen-capture-instructions-for-authors?status=a7854k

Please upload all screen-captured video files to your project page as soon as possible.

**4. Proposed filming date:** To help JoVE process and publish your video in a timely manner, please indicate the proposed date that your group will film here: **11/27/2024**

When you are ready to submit your video files, please contact our Content Manager, Utkarsh Khare.

**Current Protocol Length**
Number of Steps: 15
Number of Shots: 27

# Introduction

1.1. **Pauline Aeschbacher:** Retrosternal thyroid goiter is usually defined as an abnormal thyroid enlargement with the largest mass protruding through the thoracic inlet into the intrathoracic space. In most cases, it can be resected transcervically, but larger goiter may require thoracotomy or sternotomy, which is somewhat challenging and significantly increases postoperative morbidity **[1]**.

1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

What are the most recent developments in your field of research?

1.2. **Pauline Aeschbacher:** A thoracoscopic approach has been described as a good alternative to sternotomy or thoracotomy, but the morbidity associated with mediastinal dissection remains a concern **[1]**.

1.2.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B roll: 2.10.1*

What advantage does your protocol offer compared to other techniques?

1.3. **Pauline Aeschbacher:** We present an innovative technique for resection of retrosternal goiter: a thoracoscopic-assisted transcervical resection without mediastinal resection. This minimally invasive technique could reduce the morbidity of a sternotomy, thoracotomy, or thoracoscopic mediastinal resection **[1]**.

1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B roll: 2.10.2*

**Ethics Title Card**

This research follows the guidelines of Bern University Hospital's human research ethics committee. The patient provided both written and oral consent

# Protocol

## 2. Retrosternal Thyroid Goiter Resection via Transcervical Thyroidectomy and Thoracoscopic Assistance

**Demonstrators:** Reto M. Kaderli and Yves M.Borbély

### Protocol

2.1. To begin, position the anesthetized patient, with an endotracheal tube and neuromonitoring electrodes in place, in a supine position with the neck extended **[1]**. Perform a 6-centimeter Kocher *(/ˈkoʊʧər/)* incision at the base of the neck, two transverse fingers above the sternal notch **[2]**.

2.1.1. WIDE: Talent positioning the anesthetized patient with an endotracheal tube and neuromonitoring electrodes in place on the surgical table with the neck extended.

2.1.2. Talent making the incision at the base of the neck.

2.2. To gain access to the thyroid gland, dissect the platysma *(/pləˈtɪzmə/)* and expose the strap muscles up to the larynx *(/ˈlærɪŋks/)* and down to the posterior face of the manubrium sterni *(/məˈnuːbriəm ˈstɜrnaɪ/)* **[1]**. Then, from the midline, mobilize the strap muscles laterally to expose the left thyroid gland **[2]**.

2.2.1. Talent performing the dissection of the platysma and exposing the strap muscles up to the larynx and down to the posterior face of the manubrium sterni.

2.2.2. Talent mobilizing the strap muscles laterally to expose the left thyroid gland.

2.3. To perform a left thyroidectomy, divide the upper and inferior pole vessels between ligatures **[1],** dissect the left thyroid while visualizing and sparing the recurrent laryngeal nerve **[2]**.

2.3.1. Talent separating the upper and inferior pole vessels between ligatures.

2.3.2. Visualizing the recurrent laryngeal nerve

~~2.4. After identifying the parathyroid glands **[1],** perform an intermittent neuromonitoring of the recurrent laryngeal nerve during the dissection to avoid any nerve lesions **[2].** Remove the entire enlarged thyroid lobe, including the isthmus *(/ˈɪs.məs/),* ensuring thorough hemostasis **[3].**~~

~~2.4.1. Shot of identified parathyroid glands.~~

~~2.4.2. SCREEN: Visualizing the recurrent laryngeal nerve.~~

~~2.4.3. Talent removing the left thyroid lobe, including the isthmus.~~

2.4. ~~Next, perform a cervico-lateral *(/ˌsɜr.vɪ.koʊˈlæt.ə.rəl/)* lymphadenectomy *(/ˌlɪm.fæd.ɪˈnɛk.tə.mi/)* on the left side **[1]** with neuromonitoring of the vagal nerve **[2]**.~~ Neuromonitor the vagal nerve and recurrent laryngeal nerve **[1]** and document the presence of a strong, unaltered signal **[2]**.

~~Talent performing cervical-lateral lymphadenectomy.~~

2.4.1. Visualizing the vagal nerve.

2.4.2. SCREEN: Neuromonitoring results showing a strong, unaltered signal after cervico-lateral lymphadenectomy.

2.5. Now, move to the right side and gradually mobilize the right thyroid lobe, noting that full mobilization may be restricted by the goiter's size and retrosternal extension **[1-TXT]**.

2.5.1. Talent mobilizing the right thyroid gland. **TXT: If necessary, continue the resection with thoracoscopic assistance**

**Thoracoscopic-Assisted Transcervical Resection**

2.6. Cover the transcervical wound with a sterile bandage and remove the sterile drapes **[1]**. Position the patient in a lateral decubitus position **[2]**. ~~Then, place a right bronchial blocker in a standard endotracheal tube **[3]**.~~ NOTE: VO is struck through for the removed shot.

2.6.1. Talent covering the transcervical wound with a sterile bandage and removing the sterile drapes.

2.6.2. Talent positioning the patient in a lateral decubitus position.

~~2.6.3. Talent placing a right bronchial blocker in the endotracheal tube.~~ NOTE: Shot removed.

2.7. Perform a new disinfection and sterile draping of the patient **[1]**.

2.7.1. Talent performing disinfection and applying new sterile drapes.

2.8. Next, perform a right thoracoscopy *(/ˌθɔr.əˈkɑː.skə.pi/)* by placing two 12-millimeter trocars *(/ˈtroʊ.kɑrz/)*, one in the subscapular region and one in the submammary

*(/sʌbˈmæm.ə.ri/)* region **[1]**. Desufflate *(/dɪˈsʌf.leɪt/)* the right lung after bronchial blocker placement to allow visualization of the large goiter extending to the azygos *(/əˈzɑɪ.gəs/)* arch **[2]**.

2.8.1. Talent placing trocars in the subscapular and submammary region.

2.8.2. Shot of the goiter extending to the azygos arch.

2.9. To perform a thoracoscopic-assisted transcervical right thyroidectomy, push the goiter cranially through the thoracic inlet **[1]**. Meanwhile, stepwise dissect and resect the right thyroid lobe, including the retrosternal *(/ˌrɛtroʊˈstɜrnəl/)* goiter **[2]**.

2.9.1. Talent/thoracic team pushing the goiter cranially through the thoracic inlet.

2.9.2. Talent/cervical team performing the dissection and resection of the right thyroid lobe and goiter.

2.10. At the end of the resection, repeat neuromonitoring of the vagal nerve and recurrent laryngeal nerve and document the presence of a strong, unaltered signal **[1]**.

2.10.1. SCREEN: Neuromonitoring results showing a strong, unaltered signal for the vagal nerve and recurrent laryngeal nerve.

2.11. Now, insert a Charrière *(/ʃæˈriɛr/)* 14 thoracic drainage with 10 millimeters of mercury suction **[1]**. ~~Close the thoracic access using a resorbable subcutaneous suture and a non-resorbable skin suture **[2]**, followed by the application of a sterile dressing **[3]**.~~ NOTE: VO is struck through for the removed shot and moved as a text overlay.

2.11.1. Talent inserting a Charrière 14 thoracic drainage and applying suction. **TXT: Close thoracic access with subcutaneous resorbable and the skin with non-resorbable sutures; Apply sterile dressing**

~~2.11.2. Talent closing the thoracic access using a resorbable subcutaneous suture and a non-resorbable skin suture.~~ NOTE: Shots 2.11.2 and 2.11.3 are removed.

~~2.11.3. Talent applying a sterile dressing over the sutures.~~

2.12. Insert negative pressure drainage into the thyroid bed on both sides **[1]**. Then, close the strap muscles and platysma with a continuous suture **[2]**.

2.12.1. Talent inserting negative pressure drainage into the thyroid bed.

2.12.2. Talent suturing the strap muscles and platysma with a continuous suture.

2.13. Finally, close the skin with a resorbable continuous intracutaneous suture **[1]** and apply

steri-strips **[2]**.

2.13.1. Talent closing the skin with a resorbable continuous intracutaneous suture.

2.13.2. Talent applying steri-strips on the skin.