

Application of hemostatic matrix in retrosternal goiter surgery

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ABSTRACT:

Introduction: Thyroid surgery, especially in the case of a retrosternal goiter poses a challenge due to technical difficulties. Proper surgical technique and effective atraumatic hemostasis are very important due to the possibility of developing complications such as: hypoparathyroidism, recurrent laryngeal nerve paralysis, hemorrhage, tracheomalacia. It is often necessary to use additional methods or medical preparations to reduce the risk of postoperative complications. One of such methods involves the use of local hemostatic drugs.

Case report: Below, we present a case report of retrosternal goiter resection with intraoperative use of the TachoSil matrix.

KEYWORDS:

hemostasis, retrosternal goiter, TachoSil, thyroid surgery

ABBREVIATIONS

CT – computed tomography

CXR – chest radiograph, chest X-ray

RATS – robotic assisted thoracic surgery

VATS – video-assisted thoracoscopic surgery

INTRODUCTION

Surgical treatment of retrosternal goiter poses a major challenge for surgeons due to technical difficulties, which often necessitate sternotomy or thoracotomy, as well as an increased risk of complications such as hypoparathyroidism (13%), recurrent laryngeal nerve paralysis (12%), hemorrhage (1.2%), and tracheomalacia (1.5%) [1, 2]. Another element to be taken into account is the difficulty intubating a patient with retrosternal goiter occurring in up to 10% of patients when compression and displacement of the trachea is present [1]. In most cases, retrosternal goiter can be excised via cervical access. Sternotomy or thoracotomy may be necessary in up to 3% of patients, only in the case of a large retrosternal goiter reaching below the carina [1]. Minimally-invasive techniques, such as VATS and RATS are also used, but to a very limited extent due to the high cost [2].

In the material from the Department of Thoracic and Oncological Surgery of the JPII Specialist Hospital in Cracow retrosternal goiter surgeries account for more than 70% of all cases of thyroid surgery.

Retrosternal goiter occurs in 0.02% of the general population. Among women over 40 years of age, the proportion is higher and amounts to 0.05%. The incidence of retrosternal goiter increases with age and reaches up to 60% in individuals over the age of 60 years. According to some authors, 2–8% of patients require sternotomy [1, 3]. In the material obtained at the Department of Thoracic and Oncological Surgery of the JP II Specialist Hospital in Cracow, it was needed in about 1.5% of patients. Although most surgeries for retrosternal goiter can be performed via cervical access, it is important that these procedures are carried out in specialized centers, where thoracoscopic intervention is possible.

CASE REPORT

An 81-year-old patient was referred to the Department of Thoracic and Oncological Surgery, with a diagnosis of a nodular, toxic retrosternal goiter. Patient began experiencing exertional dyspnea and difficulty swallowing 6 months prior. She has been under care of an endocrinologist for more than 20 years and was recently treated with radioiodine (I131) with short-term improvement.

Patient's background included hypertension, diabetes mellitus and paroxysmal atrial fibrillation – she required short-term hospitalization in order to be prepared for surgery.

Imaging tests were performed: chest X-ray (CXR), ultrasound of the neck and computed tomography of the neck (CT, CXR) (Fig. 1.). It revealed a thyroid gland reaching up to the right angle of the mandible and the lower pole of the right lobe of the thyroid gland descending behind the right sternoclavicular joint. On the left,

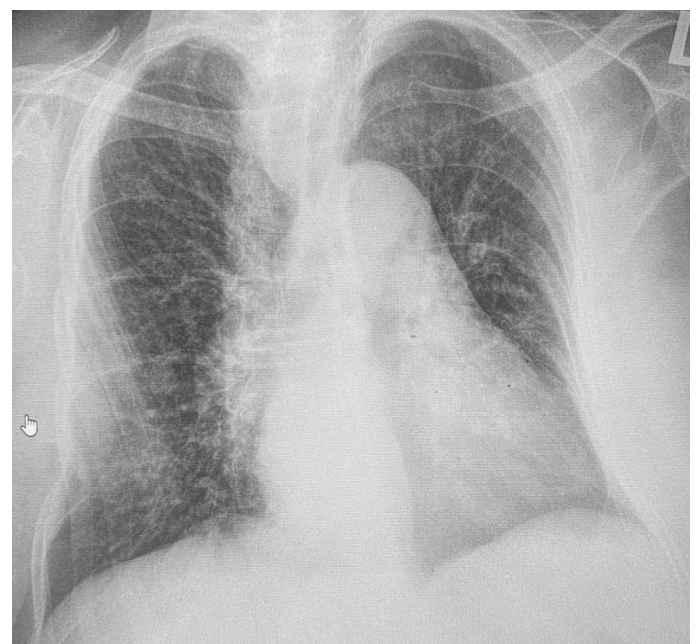


Fig. 1. Chest X-ray.

the upper pole of the lobe was lower, while the lower pole also penetrated into the mediastinum. Moreover, pressure and low-grade narrowing of the trachea were noted.

Surgery was performed via cervical access using Focus+ harmonic knife. Recurrent laryngeal nerve neuromonitoring system by Medtronic was used during the operation.

After dissecting skin flaps without sparing of the platysma, but with preservation of the anterior cervical veins, infrahyoid muscles were exposed. They were separated in the midline using a harmonic knife. It is important to identify the exact location of muscle confluence and separate them. This allows avoiding cutting of the muscles transversely in order to better expose the thyroid gland.

Subsequently, the upper poles of the thyroid gland were dissected (Fig. 2.). Dissection began with the smaller lobe in order to obtain additional space and facilitate subsequent stages of the procedure. Tertiary branches of thyroid vessels were ligated, exposing the plane of the thyroid capsule. After releasing the upper pole and the lateral surface of the lobe, the recurrent laryngeal lateral nerve was located. After being exposed, it was dissected from the thyroid capsule to the place where it enters the larynx.

Subsequently, while pulling on the upper pole of the lobe, vessels around the lower pole in the plane of the capsule were cut off, the lobe was gradually extracted from behind the sternum (Fig. 3.). The parathyroid glands were spared with this technique. Without cutting the isthmus, the second lobe was extracted in a similar way.

Careful hemostasis was obtained after removing the gland from the operating field. The procedure was completed by applying the hemostatic TachoSil matrix to the sites where nerves enter into the larynx and into a large space where the right lobe of the thyroid gland had been in order to stop slight bleeding and to prevent secondary bleeding (Fig. 4., 5.). Following application of TachoSil, gentle pressure was applied for about 5 minutes, achieving effective hemostasis and tight adhesion of the matrix to the tissues. CH 14 Redon drain was left in the surgical space, exiting the site through a separate incision below the surgical wound.

No complications were seen during the postoperative period. Redon was removed on day 1, after draining 40 mL of serous-bloody content. Patient was discharged home from hospital on the second day after surgery in good clinical condition.

DISCUSSION

In thyroid surgery, especially in cases of retrosternal goiter, we try to avoid three main complications: damage to the recurrent laryngeal nerves, hypoparathyroidism, and postoperative bleeding [4].

Knowledge of the anatomy, repeatability of the procedure as well as the use of modern equipment and hemostatic materials allowing effective control of bleeding without using traumatic methods, such as electrocoagulation or clips, are the key to preventing complications [5, 6].

TachoSil matrix has been utilized in thyroid surgery at the Department of Thoracic and Oncological Surgery for several years

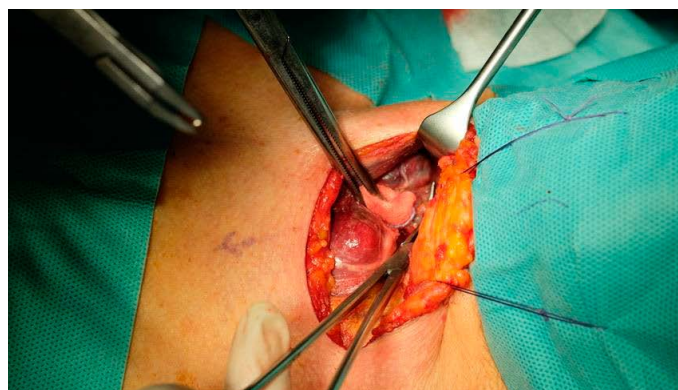


Fig. 2. Dissection of the upper lobe of the right thyroid gland.



Fig. 3. Extraction of the lower lobe of the right thyroid gland from behind the sternum.



Fig. 4. Application of TachoSil.



Fig. 5. TachoSil after application in the postoperative space – right side of the neck.

now. Thanks to its application, the number of adverse events has decreased with regard to all of the above types of complications.

TachoSil constitutes an alternative to achieving precise hemostasis in the area where nerves enter the larynx obtained by tying, clipping or coagulation of very fine vessels.

The TachoSil matrix effectively protects the parathyroid glands from possible thermal damage and, above all, ensures good hemostasis in the case of a large postoperative space.

This results in fewer wound revisions due to postoperative bleeding, which is particularly important for elderly patients and those with retrosternal goiter.

Smaller postoperative drainage allows removal of a drain on the first day, thus shortening the period of hospitalization. The use of TachoSil matrix in the described case shortened the procedure time and allowed for an effective control of bleeding from the surgical site after resection of the right thyroid lobe, which is in line with the observations made by other authors [5, 6].

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