CERVICAL CHYLOMA AFTER THYROIDECTOMY – TWO CASE REPORTS AND REVIEW OF THE LITERATURE

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Thoracic duct injuries are a rare complication of thyroid surgery. This report documents two cases of thoracic duct injury complicated by formation of chyloma following thyroid surgery. The injury was identified post-operatively and treated successfully. We review the diagnostic and therapeutic options and discuss their applicability to our patients.

Key words: thyroidectomy, chyle leak, chyloma, thyroid cancer, complication

Thyroid surgery is one of the most common procedures performed in endocrine surgery.

Complications of this procedure are rare, however, their frequency can increase in thyroid cancer patients. Detailed knowledge of both the common and rare complications allows a surgeon to adequately inform their patient about the risks of this surgery. Such knowledge also allows appropriate preventative measures to be undertaken. The complications include hypoparathyroidism (1.7%), recurrent laryngeal nerve injury causing vocal cord palsy (1%), superior laryngeal nerve injury with subsequent creation of a higher-pitched sound and swallowing disturbances (3.7%), haemorrhage with tracheal compression (1.2%), and wound infection (0.3%) (1). Case reports of rare complications, such as damage of the sympathetic trunk, thoracic duct or other structures in this area (such as large veins) are reported occasionally. These complications are often related to technical problems and neoplastic infiltration.

CASE REPORTS

1. A 63 year old lady presented to her general practitioner with pain in the neck radiating to both ears and associated with hoarseness. Physical examination revealed a hard nodule palpable in the left lobe of the thyroid. Ultrasound examination confirmed a 4 cm hypoechogenic nodule and a fine needle biopsy revealed papillary cancer. There was no significant past medical history and the patient, therefore, qualified for radical surgery in our department.

The operation was carried out under general anaesthesia. The superior and inferior thyroid poles of the left lobe were ligated following visualisation of recurrent laryngeal nerve and parathyroids. Both lobes were removed en-bloc. During exploration, enlarged lymph nodes were found in the region of the left inferior thyroid artery. An intraoperative frozen section confirmed the diagnosis of papillary cancer with metastatic spread to the ipsilateral lymph nodes. The jugular vein and carotid artery were carefully dissected out and selective neck dissection was performed. No metastatic lymph nodes were identified on the contralateral side. A single drain was placed into the thyroid bed. The specimen was sent for histopathological evaluation that revealed 10 lymph nodes ranging from 0.1 to 1 cm in diameter all with features of reactive lymphadenitis.
During the first post-operative day 150ml of bloodstained, straw coloured, fluid was drained. The following day the patient reported dyspnoea and examination revealed swelling on the left side of her neck. Over the course of the day a further 450 ml of fluid drained. This deteriorated and 200 ml of fluid was drained by 12 noon the next day. This was associated with increasing dyspnoea despite pharmacological treatment. An ultrasound showed a collection of fluid that was cystic in character. In response to the ultrasound a further drain was inserted, this time into the left supraclavicular region. Drainage of the collection led to immediate relief from dyspnoea. This drained more than 2000 ml of fluid in the first 24 hours with a significant increase in volume after enteral feeding.

Analysis of confirmed it to be chyle. On the fourth post-operative day it was decided to re-explore the neck under general anaesthesia. Intraoperatively the thoracic duct was identified and seen to be properly ligated. A small collateral, however, was found on the posterio-medial aspect that had been identified but not ligated during the original operation (fig. 1). At this time it had been simply coagulated with diathermy and had not shown any signs of leaking. During the second operation it was ligated with 3.0 Vicryl and an additional drain was left in-situ. Small volumes of bloody-serous fluid were drained during the subsequent two days. The drains were removed on the third day following re-exploration. The remainder of the post-operative period was uneventful and the patient was discharged after a further two days observation. Follow-up at six months revealed no complications.

2. 39 year old Korean woman presented to the department via her thyroid physician with a 7 year history of goitre. This had been present since the time of her last pregnancy and had gradually enlarged. A fine needle aspiration biopsy of the left upper lobe revealed features consistent with benign Multinodular Goitre. At the time of presentation this lady was euthyroid with minor obstructive symptoms. On examination she had a clinically obvious goitre which was larger on the left than right. Pemberton’s sign was positive. Given her early obstructive signs and general good health she was considered a candidate for elective total thyroidectomy.

Surgery was carried out under general anaesthesia. Total thyroidectomy was performed by capsular dissection with identification and preservation of the recurrent laryngeal nerves and parathyroid glands. Haemostasis was achieved using ligatures and bi-polar diathermy. Drains were left in the left and right paratracheal spaces. The specimen was sent for pathological examination that confirmed benign multinodular goitre.

Following surgery the patient was returned to the ward. She was commenced on a light diet the morning after surgery. During the first 24 hours the right sided drain remained essentially dry and was removed. The left sided drain produced 170 ml of fluid and was left in for observation. By the morning of the second postoperative day there was a further 150 ml of cloudy straw coloured fluid in the drain. The possibility that it might be chylous was raised at this time and a sample was sent for laboratory analysis. Laboratory results, available the next day, revealed a triglyceride of 2.00 mmol/L (177.4 mg/dL) which fulfilled local criteria for pleural chyle. This was treated conservatively with a low fat diet with medium chain fatty acids. From this point on the left paratracheal drain ceased to produce further chyle. After 5 days a light diet was cautiously introduced. As there was no further drainage normal diet was given the following day and after a further 24 hours of observation the drain was removed. The patient was discharged that evening. She was seen by the consultant surgeon 9 days later at clinic where she was asymptomatic and well.

Fig. 1. Ligated thoracic duct with an unligated collateral on the postero-medial aspect (case 1)
Review of literature

Veslingus first described the thoracic duct in humans in 1634 (2). Since then its anatomy and function has been carefully studied and in 1948, Lampson discovered that ligation of the thoracic duct was not lethal (2). Chyle leaks are an uncommon complication of neck surgery. This report documents this rare complication and reviews diagnostic, and therapeutic options.

Anatomy

The thoracic duct drains chyle from most of the body (and the entire intestinal tract) and is essential in maintaining fluid balance. It enables the return of proteins and T-lymphocytes to venous circulation. Its course lies alongside the medial aspect of internal jugular vein entering the venous system at the junction of left internal jugular and left subclavian vein (3). As Kinaert described, termination of the thoracic duct is extremely variable and it can have multiple end-points opening separately in 10-40.6% of subjects (4). A further 5% of cases see the duct divide in to a left and right branch each draining in their respective hemithoraces (5). Daily lymph flow oscillates between 2 and 4 litres depending on the intake of long chain triglycerides. The lymph itself is a milky fluid consisting of fat, triglycerides, proteins (mostly albumins) and glucose.

Injury

The thin wall and tortuous course of the thoracic duct make it prone to injury during surgery, especially during dissection of the left side of the neck (1-6%) (5, 7). In the presence of bulky nodal metastases this incidence can be increased further (8). Thoracic duct injuries can arise from blunt or penetrating trauma, thoracic surgery (including removal of cervical ribs) and from subclavian and vertebral artery vascular surgery (9). Injuries are also possible from diagnostic procedures such as left internal jugular vein catheterisation and cervical lymph node biopsy (6). Injuries of thoracic duct inevitably lead to a chyle leak. These leaks present with the formation of either chyle fistulas, chylothorax or, least commonly, chylomas (lymphocele). A chylous fistula is diagnosed when chyle drains spontaneously transcutaneously. Chylothorax is an accumulation of chyle in pleural cavity, while a chyloma (lymphocele) is formed by a persistent leak in a confined space without epithelial lining (10). Uncontrolled chyle leaks can cause severe fluid, electrolyte and proteins loss, lymphocytopenia, fistula formation, skin-flap necrosis or carotid artery blowout.

Diagnosis

Any supraclavicular cystic mass causing pain and compressive symptoms should undergo careful investigation. The probable pathologies are listed in tab. 1. The diagnosis of chyloma can be quickly and precisely confirmed with ultrasound examination that can differentiate between cystic and solid masses. This can be followed by fine needle aspiration of the cystic mass and subsequent laboratory analysis of the aspirate (6). Chylous origin of a milky, straw-coloured fluid is confirmed by

| Table 1. Differential diagnosis of cervical chylomas |
|---------------------------------|---------------------------------|
| **Supraclavicular cystic mass** | **Clinical situation**          |
| Brachial cleft cyst              | different period and dynamics of onset |
| Cystic hygroma                   |                                  |
| Thyroglossal duct cyst           |                                  |
| Cystic metastatic lesion         |                                  |
| Cervical lymphatic cyst          |                                  |
| Supraclavicular thoracic duct cyst |                                |
| Hamartoma                        |                                  |
| Seroma                           |                                  |
| Chyloma                          | sudden onset with variable dynamics, mostly following neck region surgeries, diagnostic procedures or trauma – can be spontaneous |
the presence of triglycerides >100 mg/dl, and Chylomicron >4%. Additionally CT or MRI scans can be performed to evaluate the extent of any cyst.

Treatment

Adequate attention should be paid to identifying the anatomy during surgery. In most cases this can prevent injury to the thoracic duct. It is strongly recommended that all structures are doubly ligated instead of coagulating them. If, however, an injury of thoracic duct is noted intraoperatively the chyle leak should be controlled by oversewing or ligation of the leaking structure. Thin and near-transparent walls can make this technically difficult to achieve. In those cases where it is not possible to stop the leak other methods should be instituted. These include Gelfoam, surgicell, oxycell and ivalon which can all be used to seal the site (10). Biological glue and fibrin sealant has been shown to give good results as described by Velegrakis et al. (11). Other authors have suggested collagen or vicryl mesh to be of use in such a situation (12). Muscle or far flaps have been described to help control a chyle leak and Kassel et al. described topical application of tetracycline powder to sclerotize the leak (5, 13). Sclerosants should be reserved for minor leaks only. There have been no large studies assessing the methods of controlling chyle leaks listed above.

In some cases an apparent leak is noted only when full enteric feeding is instituted. Chyle triglycerides provoke an inflammatory skin response causing pain. It is often this, as much as the compressive symptoms, that causes patients to complain. Once a chyle leak has been identified there are two main options, namely conservative or surgical treatment. Conservative treatment is based on bed rest with head elevation, aspiration drainage and compressive dressing of any non-infected wound. An adequate diet to stabilise protein and electrolyte levels should be commenced. It should comprise short and medium chain triglycerides that by-pass the thoracic duct (6, 10). Total parenteral nutrition can be considered but is not definite (5). Percutaneous octreotide and somatostatin have proved to be effective in dogs, while povidone-iodine two times a day via the drain was described to be successful in 1 case by Seelig et al (14, 15).

If these methods fail within 30 days it is recommended to proceed to surgical re-exploration of the neck and for the thoracic duct leak to be managed surgically as described above (5). Delayed surgery can be however complicated by the granulation, adhesion and make the identification of the structures very difficult. Crumley and Smith recommended 500 ml/24h for more than 4 days to be an indication for surgery (16) while Spiro set the borderline at 600 ml (17). Recently thoracoscopic management of cervical thoracic duct injuries has been suggested though its role is still to be evaluated (9).

DISCUSSION

The authors advocate immediate re-exploration for any significant leak. Significance should be based on the patient’s lab results and general health rather than an absolute number. Milk or cream can be given orally before the surgery to facilitate the identification of the leak (10). In our opinion 30-days of conservative therapy can not be accepted as this complication can be immediately resolved, with low morbidity, in any patient who is otherwise fit for surgery.

To conclude, thoracic duct injuries can be treated either conservatively or surgically. Considering the possible protein and electrolyte decompensation associated with chyle loss, the authors’ favour surgical in those patients suffering a significant chyle leak, i.e. exceeding 500 ml / 24 hrs and not resolving or showing a dynamic tendency to decrease after conservative treatment within 4 days. Conservative treatment should be instituted in those where there is a small leak with high probability of spontaneous resolution or when surgery is indicated but not possible. Secondly, the authors emphasise the need of meticulous ligation of any collaterals originating from the thoracic duct as using diathermy is only temporarily sufficient in preventing chylous leak.
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REFERENCES


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COMMENTARY

Based on the experience of two patients with lymphorrhagia after goiter surgery and the analysis of seventeen publications concerning the above-mentioned complication, the Authors presented management guidelines in case of thoracic duct injury following thyroidectomy.

The above-mentioned complication is rarely observed and most often passed over when discussing thyroid surgery complications. Thus, the presented study contributes significant clinical data necessary for surgeons performing thyroidectomies.

Considering our material of more than 40 thousand thyroidectomies we observed lymphorrhagia in 34 cases (<1 mil). Lymphorrhagia was only observed in case of patients after thyroidectomy with lymphadenectomy, due to thyroid carcinoma and mediastinal goiter. Surgical wound revision was necessary in case of five patients, followed by injury localization and underpinning or ligature. One must underline the difficulties in localizing the severed thoracic duct, which usually shrinks and is found in the upper mediastinum. In the remaining patients lymphorrhagia was inhibited by means of a low-fat diet, Sandostatin injections, and effective drainage with compression therapy during the period of 14 to 21 days after the thyroidectomy.

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