Case report

Posterior mediastinal goiters: Report of two cases and literature review

Alexander Samokhvalov,*, Norman Loberant, Nicola Makhoula

A Intensive Care Department, Western Galilee Hospital, P.O.B 21, Nahariya 22100, Israel
B Department of Radiology, Western Galilee Hospital, P.O.B 21, Nahariya 22100, Israel

Article info

Article history:
Received 29 July 2011
Accepted 1 August 2011

Keywords:
Intrathoracic goiters
Obstructive symptoms
Work-up

Abstract

Intrathoracic goiters represent substantial enlargement and descent of cervical thyroid tissue into the thoracic cavity, usually in the anterior mediastinum. Rarely, they extend posteriorly, causing obstructive symptoms, sometimes with acute onset. Posterior mediastinal goiters should be differentiated from other mediastinal masses by appropriate work-up, while computed tomography is the most valuable technique. We report two cases of such symptomatic goiters. First reported case was atypically presented with aspiration pneumonia and second was successfully operated. Our overview aims to increase awareness of this rare clinical entity due to possible respiratory compromise. Reasonable surgical management is mandatory.

1. Case report 1

An 85-year-old man presented to emergency room at our hospital because of several days of productive cough, fever, dyspnea and dysphagia. Past medical history included chronic obstructive pulmonary disease, heavy smoking, arterial hypertension, ischemic heart disease, diabetes mellitus and nontoxic goiter. Routine chest X-ray showed right upper lung opacity consistent with pneumonia, and right tracheal deviation with narrowing (Fig. 1).

On admission to the intensive care unit (ICU) the patient was intubated and ventilated due to acute respiratory failure.

Physical examination revealed no cervical mass or lymphadenopathy; there were diminished breath sounds in the right upper chest.

Laboratory finding were as follows: WBC 11000, Hb 13.5 g/dl, platelets 158,000, normal electrolytes, renal and liver functions. Thyroid function tests were mildly abnormal (repeated after two weeks): TSH- 0.18–0.04 μU/ml (normal 0.35–4.98 μU/dl), fT4 -1.2–1.1 ng/dl (0.7–1.48 ng/dl), T3- 45–44 ng/dl (58–159 ng/dl).

Antibiotics were administered intravenously as a treatment for community acquired right upper lobe pneumonia. Several days later the patient was successfully weaned from ventilation and extubated, but soon was reintubated and readmitted to ICU due to recurrent respiratory failure with a new right lung opacity/pneumonia. Fiberoptic bronchoscopy through endotracheal tube showed no bronchial tree obstruction. Cervical and chest computed tomography (CT) showed posterior mediastinal goiter causing tracheal deviation and compression (Figs. 2–5). Moreover, due to difficulty weaning the patient from the ventilator, percutaneous tracheostomy was performed, but thyroidectomy was not done because of poor general condition. Eventually, the patient died from severe gram-negative sepsis. Postmortem examination was not performed.

2. Case report 2

A 64-year-old female presented with the complaints of diffuse recurring chest pain, recently worsened, along with exertional dyspnea and dysphagia. Medical history was remarkable for partial thyroidectomy due to huge cervical euthyroid goiter two years prior to presentation, morbid obesity, diabetes mellitus and hypertension. Her postoperative medications included levothyroxin.

On physical examination there was no cervical swelling or lymphadenopathy; there were diminished breath sounds in the right upper chest.

Laboratory finding were as follows: WBC 11000, Hb 13.5 g/dl, platelets 158,000, normal electrolytes, renal and liver functions. Thyroid function tests were mildly abnormal (repeated after two weeks): TSH- 0.18–0.04 μU/ml (normal 0.35–4.98 μU/dl), fT4 -1.2–1.1 ng/dl (0.7–1.48 ng/dl), T3- 45–44 ng/dl (58–159 ng/dl).

Antibiotics were administered intravenously as a treatment for community acquired right upper lobe pneumonia. Several days later the patient was successfully weaned from ventilation and extubated, but soon was reintubated and readmitted to ICU due to recurrent respiratory failure with a new right lung opacity/pneumonia. Fiberoptic bronchoscopy through endotracheal tube showed no bronchial tree obstruction. Cervical and chest computed tomography (CT) showed posterior mediastinal goiter causing tracheal deviation and compression (Figs. 2–5). Moreover, due to difficulty weaning the patient from the ventilator, percutaneous tracheostomy was performed, but thyroidectomy was not done because of poor general condition. Eventually, the patient died from severe gram-negative sepsis. Postmortem examination was not performed.
3. Discussion

Intrathoracic goiters represent downward extension of cervical thyroid tissue into the thoracic cavity through the thoracic inlet. They are usually located anteriorly, in the superior or anterior mediastinum, and are termed substernal or retrosternal goiters.

Their incidence in the general population is about 1:5000, but among females older than 45 years the incidence rises to 1:2000.1 Substernal goiters are seen in 8–15% of all thyroidectomies.2,3 Most of them are benign, although thyroid cancer is identified in a small,
but definite number (2.5%–16%) of cases.\textsuperscript{3,4} Posterior mediastinal goiters are rare, comprising only about 10% of all intrathoracic goiters. In one review of 1300 patients from Brazil\textsuperscript{3} operated for retrosternal goiters during 40 years (1935–1975), only 128 had posterior mediastinal thyroid extension. All of the patients were over 50 years of age, and 80% were women.

Initially many patients are asymptomatic, but later obstructive symptoms and signs may develop, due to compression and displacement of trachea, bronchi, esophagus or large veins. Patients with retrosternal goiter usually have a visible or palpable cervical mass on presentation. In addition, tracheal deviation may be present. Exertional, nocturnal or positional dyspnea is the most common complaint, seen in 30–60% of cases.\textsuperscript{2,4,5} Stridor, wheezing, cough (sometimes positional), dysphonia or hoarseness as a result of recurrent laryngeal nerve compression are other common symptoms. A positive Pemberton’s sign, facial flushing and choking on recumbency, occurs primarily due to maneuvers that force the thyroid into the thoracic inlet. A variety of other symptoms can be induced by obstructive goiter. Dysphagia results from esophageal compression. Features of phrenic nerve paralysis, Horner’s syndrome due to compression of the cervical sympathetic chain may be present too. Occasionally, patients suffer acute hemorrhage into the goiter which may cause sudden potential fatal tracheal obstruction.\textsuperscript{5} Rarely, jugular vein thrombosis, cerebrovascular steal syndrome or even superior vena cava syndrome have also been reported.\textsuperscript{6}

The duration of symptoms may range from months to decades. As seen in our first case, the onset of obstructive symptoms may be more acute, and the patient’s dysphagia probably resulted in recurrent aspiration pneumonia.

The prevalence of hyperthyroidism (overt or subclinical, as seen in the first patient) ranges from 0% to nearly 50%.\textsuperscript{2,7} Posterior mediastinal goiters should be differentiated from other mediastinal masses by appropriate work-up. Laboratory thyroid function test must be measured in any patient with a goiter or mediastinal mass suspected to be enlarged thyroid. Substernal goiters can be seen on chest x-ray as a superior mediastinal widening, often unilateral, with/without tracheal deviation or narrowing.

Cervical and thoracic computed tomography is the most valuable imaging technique for evaluating mediastinal and cervical masses and diagnosing enlarged thyroid as the cause of that mass.\textsuperscript{6} On CT, mediastinal goiter should show high attenuation values due to iodine content, similar to normal thyroid. Nodular elements may show combinations of hypodensity and calcification. The mediastinal goiter is usually continuous with the thyroid tissue seen in the neck.

Iodinated contrast agents should not be given routinely due to probability of inducing or exacerbating hyperthyroidism in this category of patients. If contrast agent administration is required, a patient with subclinical or over hyperthyroidism should be prepared by antithyroid drug to prevent thyroidal iodine organification.

Thyroid ultrasound is not as accurate in the retrosternal region as in the anterior neck because of inaccessibility to the ultrasound transducer.
Although thyroid radionuclide imaging with 123-iodine may define areas of autonomous function in large cervical goiters, it is not so useful or even misleading in patients with intrathoracic goiter, because some of them take up radioiodine poorly, and the radioactivity is attenuated by interference from the sternum, clavicles, mediastinum tissue and blood pool.\(^7\)

Fine needle aspiration cytology has a less significant role compared to that in cervical goiter due to inaccessibility of the posterior mediastinal/retrosternal mass for needle.

Pulmonary function tests, namely spirometry with flow-volume loops, may be abnormal even when the patient is asymptomatic.\(^5\) Fixed upper airway obstruction from a substernal goiter, where flow is limited during both inspiration and expiration, results in a flattening of both limbs of the flow-volume loop.

A barium esophagogram may be helpful in confirming esophageal compression from a goiter as the cause of dysphagia.

Surgical selective approach for excision of posterior mediastinal goiters now is recommended by most surgeons for symptomatic obstructive goiters,\(^2\) that was done in our second patient. Observation rather than surgery is recommended for elderly asymptomatic patients who are poor candidates for surgery, with slow growth, especially if inferior edge of mass is above brachiocephalic vein.

4. Conclusion

In our experience, though posterior mediastinal goiter may cause nonspecific symptoms, such as dyspnea, dysphagia, cough, resulting from compression and displacement of the thoracic inlet structures, we should be aware about that rare clinical entity due to possible respiratory impairment. The onset of obstructive symptoms may be gradual or acute, causing respiratory failure, and making presentation atypical, as our case of aspiration pneumonia illustrates. Posterior mediastinal goiter can be differentiated from other posterior mediastinal masses by appropriate investigation, while computed tomography is the most valuable technique that may facilitate earlier diagnosis. In our case, certain investigations were not performed either because of low diagnostic value (sonography, radioisotope scan) or inappropriate physiological condition for performance (spirometry).

Reasonable surgical management is mandatory for such symptomatic goiters if no contraindications.

Conflict of interest

We have no conflict of interest among all authors.

References

1. Katlic MR, Wang CA, Grillo HC. Substernal goiter. Ann Thorac Surg 1985;39:391–9.
2. Katlic MR, Grillo HC, Wang CA. Substernal goiter. Analysis of 80 patients from Massachusetts General Hospital. Am J Surg 1985;149:283–7.
3. De Andrade MA. A review of 128 cases of posterior mediastinal goiter. World J Surg 1977;1:789–97.
4. Allo MD, Thompson NW. Rationale for the operative management of substernal goiters. Surgery 1983;94:969–77.
5. Torres A, Arroyo J, Kastanos N, et al. Acute respiratory failure and tracheal obstruction in patients with intrathoracic goiter. Crit Care Med 1983;11:265–6.
6. Ulreich S, Lowman RM, Stern H. Intrathoracic goitre: a cause of the superior vena cava syndrome. Clin Radiol 1977;28:663–5.
7. Dhaliwal RC, Puri D, Rana SS, Singh G. Posterior mediastinal goiters: literature review and report of three cases. Asian Cardiovasc Thorac Ann 1999;7:228–32.
8. Shameem M, Bargava M, Ahmad Z, Haq F, Ahmad T. Intrathoracic goiter presenting as posterior mediastinal mass. JACM 2005;6(4):343–4.
9. White ML, Doherty GM, Gauger PG. Evidence-based surgical management of substernal goiter. World J Surg; 2008. doi 10.1007.