

# Outcomes of trans-cervical surgical management for massive substernal Thyroid goiters; a community hospital experience

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## Abstract

**Background:** Massive substernal goiters are frequently noted in developing countries, but are not as frequently treated in developed countries. Management of massive Thyroid goiters is frequently referred to tertiary university hospitals. In the following study, we present our recent community hospital based experience managing such cases using a trans-cervical approach.

**Objective:** To assess a community hospital based experience managing massive substernal Thyroid goiters. To assess our clinical outcomes using a trans-cervical or a collar neck incision for accessing and surgically removing such massive tumors. Setting: Southern California Permanente Medical Group, community hospital setting.

**Method:** Retrospective review over the past 6 years (2006-2011) of all cases of massive substernal Thyroid goiters surgically treated. Chart review was performed and identified were age, sex, diagnosis, extent of goiter, treatment, disease status, survival (months), size of Thyroid (grams), complications (hypocalcemia, vocal cord injury) and estimated blood loss (ml). A comparison was made between pre- and post-operative function (breathing, speech and swallowing).

We retrospectively reviewed the case notes, imaging records, and operation records of all patients who had undergone thyroidectomy between 2000 and 2003 at the United Christian Hospital in Hong Kong. We defined SSG as either the lower extent of the goiter having transgressed the fourth thoracic vertebra<sup>2</sup> or at least 50% of the mass<sup>3</sup> residing within the thorax. Large thyroid masses with inferior borders at the thoracic inlet were not included in this study. Patients were investigated with a standard preoperative protocol that included routine thyroid function tests, chest X-ray, and computed tomographic (CT) scans of the neck and thorax. Thyrotoxic patients were rendered euthyroid prior to surgery. The possibility of sternotomy was explained, and informed consent was obtained. Computed tomographic scan delineated the extent of the SSG; the degree and level of tracheal compression or deviation provided by CT scan is imperative to the selection of optimal methods of intubation by the anesthetist. Fiberoptic endoscope guided tracheal intubation was performed when there was evidence of significant tracheal displacement or compression. Lung function tests were performed at the discretion of the anesthetist or pulmonary physician. Flow-volume loop studies were helpful in the diagnosis of extra thoracic airway compression, but they were not critical in the decision to proceed with surgery. Preoperative vocal cord examination was routinely evaluated by flexible laryngoscope and was repeated postoperatively in patients who experienced any degree of

voice change. If vocal cord palsy was discovered, out-patient endoscopic monitoring of vocal cord status was carried out regularly as flexible laryngoscopes were available.

After having been anaesthetized, the patients were placed in a supine position with the neck extended and were draped to expose the nipple line so that partial sternotomy could be employed at any time. A collar incision was used, and the strap muscle was transected when necessary to improve accessibility. The thyroid gland was mobilized by capsular dissection, with the superior thyroid vessels controlled individually. Parathyroid glands were either preserved or auto grafted into the sternomastoid muscle if devascularisation was suspected. The middle and inferior thyroid veins were also carefully ligated to avoid bleeding due to avulsion, as they were often distended and obstructed by the SSG. The thoracic component of the SSG was then manually retracted to the cervical region. The recurrent laryngeal nerve was often not identifiable until the SSG was liberated from the thorax. Manubrium resection or median sternotomy was rarely needed. Drainage was often employed to avert seroma formation in the resulting cavity.

**Results:** 9 cases were identified which met study criteria. The average age at diagnosis was 59.1 yrs. (43-86 yrs.). There were 2 males and 7 females. There were 6 multi-nodular goiters and 3 goiters with papillary Thyroid carcinoma present. With regard to extent of goiter – 4 cases extended under the arch of the aorta, 5 cases extended to the mid-arch, and all compressed the trachea to some extent. All surgically underwent total Thyroidectomy, mediastinal dissection via trans-cervical approach and neck dissections in 3 cases. All patients are alive and cancer free or disease free at 26.3 months. The average size of the gland was 184 grams (100-353 grams). With regard to complications there were 2 cases of vocal cord paralysis, 2 cases of vocal cord paresis and 6 cases requiring long term calcium supplementation. The average blood loss surgically was 167 ml (50-500 ml). All patients had returned to normal breathing, speech and swallowing function post-operatively.

**Conclusion:** Massive substernal goiters can be surgically removed via a trans-cervical approach, thus avoiding sternotomy. A thoracic surgeon was available at all times to assist with our cases. Our community hospital based series although not large is a good representation of what potential outcomes might be in a non-tertiary setting. All patients improved post-operatively with regard to breathing, speech and swallowing. A higher complication rate of recurrent laryngeal nerve was noted in cancer cases due to tumor invasion. Long term follow up of our patients is needed to fully confirm these studies findings.