Mini-sternotomy for retrosternal thyroidectomy – how we do it and potential advantages for patients

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Introduction:

Retrosternal thyroid goitre (RTG), particularly those extending to the aortic arch and into the posterior mediastinum, can sometimes be challenging to remove trans-cervically alone. Traditionally a multidisciplinary approach with cardiothoracics is advocated with full length sternotomy being used for access. The use of mini-sternotomy in routine cardiothoracic practice for aortic valve replacement is well documented. Our team have been undertaking routine mini-sternotomy for removal of large RTG with good patient outcomes. Here we present our technical approach to mini-sternotomy and outcome data for patients treated in a UK tertiary single centre (2004-2018) with a multidisciplinary joint approach undergoing either full or mini-sternotomy.

Aims & Objectives:

1. To describe the combined inter-specialty technique of retrosternal thyroidectomy with mini-sternotomy
2. To retrospectively audit the outcomes of these patients to show tangible differences and benefits compared to full length sternotomy

Methods:

- Position supine with shoulder roll and head ring. Draping aims to leave the central thorax and neck exposed from xiphisternum to lower border of the mandible.
- Marking is as per Fig 1. Midline skin incision with number 10 blade. Caudal extension as far as second intercostal space. Midline dissection down to periosteum of the sternum, commonly with monopolar diathermy.
- Midline sternotomy with powered saw and perpendicular relieving osteotomy on the thyroid resection side (with lungs deflated momentarily to avoid breach of the pleural spaces). Haemostasis with diathermy and bone wax.
- Self retaining retractor inserted. Thymus remnant divided. Innominate vein identified and preserved.
- Midline tissues incised down to the thyroid capsule.
- Transverse skin crease neck incision (forming a "T" shaped incision)
- Midline dissection down to thyroid capsule.
- Inferior extent of goitre is released and delivered medially. Remaining thyroidectomy is performed as per regular technique.
- Layered closure, with usually only a small Redivac neck drain required.

Results:

- 28 total cases (M:F = 16:12)
- Average age at time of surgery = 64 years old
- Full sternotomy n = 17
- Mini-sternotomy n = 11
- Average goitre weight 213.45 grams
- Length of hospital stay = 6 days (mean), 5 days (median)
- Days in ITU/HDU = 2 days (mean & median), 20% had no stay in ITU/HDU
- No return to theatre. No wound breakdown. All survived.
- Persistent hypocalcaemia = 14% of cases
- 5 cases involved thyroid malignancy

Comparing full sternotomy vs mini-sternotomy

- No cases required conversion from mini to full sternotomy
- Length of hospital stay was reduced by 3 days (p = 0.02)
- No difference between groups with infection rates, RLN palsy and persistent hypoparathyroidism
- Chest drain requirement is reduced by 30% in mini-sternotomy

Discussion:

- Mini-sternotomy has outcome data that is as good or better than full sternotomy.
- Most significant improved outcome is length of stay, which is on average 3 days shorter for mini-sternotomy patients.
- We were unable to demonstrate that pain scores or blood loss was significantly better, but mini-sternotomy leaves a smaller wound and of the data recorded, the larger blood loss volumes were in the full sternotomy group.
- There does not seem to be increased risk of complications for patients undergoing mini-sternotomy.
- Comments from lead operating surgeons (SC and AW) describe no increased difficulty in goitre removal with mini-sternotomy access compared to full sternotomy.

Conclusion:

In appropriate centres with cardiac HDU support, mini-sternotomy access for the removal of large, symptomatic retrosternal goitres is safe and increases recovery time for patients.