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The myth of tracheomalacia and difficult intubation in cases of retrosternal goitre

A. M. D. Bennett, M.R.C.S, D.L.O., S. M. Hashmi, F.R.C.S., D. J. Premachandra, F.R.C.S., D.L.O., M. M. Wright, F.R.C.A.

Abstract
Although it is widely believed that management of the airway is difficult in surgery for retrosternal goitre, a review of the literature, revealing management of 1969 patients with retrosternal goitre, provided scant evidence of difficult intubation or post-operative tracheomalacia resulting in tracheal collapse. This was reflected in our own series of 18 thyroidectomies for retrosternal goitre performed at our hospitals.

Key Words: Goitre; Thyroid Gland; Trachea; Respiratory System; Signs and Symptoms

Introduction

A retrosternal goitre is defined as a thyroid gland which has grown greater than twice its normal size and of which greater than 50 per cent lies inferior to the level of the supra-sternal notch.[1] Retrosternal goitres are relatively uncommon, but when the presentation is with acute airway obstruction, re-establishment of the airway is a challenge, with a mortality rate of around 3 per cent.[2]

Extension of the enlarged thyroid gland into the retrosternal space can cause respiratory distress, dysphagia and vascular compression. In the early stages this condition usually remains asymptomatic, but it can present as a life-threatening emergency if there is sudden enlargement of the goitre secondary to haemorrhage, cystic degeneration or malignant change. Airway compression may precipitate a life-threatening situation, as in certain cases intubation or tracheostomy will not relieve pressure over the bronchial tree.

Despite the possible airway complications of retrosternal goitres, little evidence exists to support the widely held belief that elective pre-operative intubation will be fraught with difficulties, during the intubation itself and owing to post-operative tracheal collapse due to tracheomalacia.

Methods and materials

We carried out a Medline/PubMed literature search for retrosternal goitre case series (using the key words 'substernal goitre', 'tracheomalacia', 'retrosternal goitre' and 'respiratory, peroperative and postoperative complications') to look for evidence of difficulty managing the airway. To this data base we added our own series of 18 thyroidectomy operations for retrosternal goitre performed at the Norfolk & Norwich and James Paget Hospitals between 1993 and 2003.

Results and analysis

We reviewed 12 papers[3–14] with a total of 1969 patients (see Table), six of whom were reported as difficult to intubate or extubate, and only 19 of whom required tracheostomies. Of these, 14 were end-tracheostomies for malignant spread, one (mediastinal) tracheostomy was for airway compression and only five were for tracheomalacia.

- **Series of 18 patients, plus Medline and PubMed searches, assessing whether tracheomalacia is common in cases of retrosternal goitre**
- **Evidence suggests that this problem is uncommon, contrary to popular belief; in most cases the airway can be managed by careful pre-assessment and intubation under direct vision**

In our hospital elective intubation was carried out by direct visualization of the larynx using a fibreoptic laryngoscope. The computed tomography (CT) scan invariably exaggerated the narrowing of the airway. An endotracheal tube reinforced with steel wire was used to prevent kinking or twisting of the tube during retrosternal goitre delivery or handling. Even

From the Norfolk & Norwich Hospital, Norwich, UK, and the James Paget Hospital, Great Yarmouth, UK.
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TABLE

LITERATURE REPORTING AIRWAY COMPLICATIONS IN ELECTIVE SURGERY FOR RETROSTERNAL GOITRE

Reference	Cases (*n*)	Difficult intubations or extubations / evidence of tracheomalacia (*n*)	Tracheostomies (*n*)
Cho *et al.*[3]	70	0	0
Torre *et al.*[4]	237	0	2 (malignant involvement)
Michel & Bradpiece[5]	34	0	1 (mediastinal tracheostomy for airway compression)
Shai *et al.*[6]	56	0	0
Lahey & Swinton[7]	1086	0	8 (malignant involvement)
Arici *et al.*[8]	52 0 0		
Ozdemir *et al.*[9]	30	0	0
Rodriguez *et al.*[10]	72	0	0
Vadasz & Kotsis[11]	175	0	4 (malignant involvement)
DeSouza & Smith[12]	12	0	0
Wax & Briant[13]	24	0	0
Rahim *et al.*[14]	103	6	5
Our series	18	0	0
Total	1969	6	19

in patients with large retrosternal goitres in whom the glottic aperture was distorted, intubation could be carried out safely. Although there was tracheal compression from the goitre in almost all cases, passing the endotracheal tube through the narrow area was always uneventful. We did not come across tracheomalacia, tracheal compression or airway obstruction in any case.

Discussion

Despite a general belief among anaesthetists that elective operation for retrosternal goitre implies airway difficulties, we found little evidence of this in either our own series or those reported elsewhere.

Although our study looked specifically at retrosternal goitre series, there is a huge overlap with large goitres, to which these findings must also apply.

A CT scan is the investigation of choice for assessment of retrosternal goitres and large goitres but in our opinion often exaggerates the narrowing of the airway (Figure 1). Anaesthetists should not prevent patients from receiving an anaesthetic based on CT scan findings alone, especially as there is evidence, in these same series, that all retrosternal goitres will continue to grow and eventually cause emergency airway compression.[1–8,15]

FIG. 1

CT showing tracheal compression by a retrosternal goitre.

These findings do not imply that patients should not have a thorough anaesthetic pre-assessment and careful intubation under direct vision. Although rare, tracheal collapse can be anticipated with fibreoptic-guided intubations, and as this technology is freely available in most operating theatres this practice should continue.

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Address for correspondence:
Mr A. M. D. Bennett,
Norfolk and Norwich University Hospital,
Colney Lane,
Norwich NR4 7UY
UK.

E-mail: a.bennett@doctors.org.uk

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