Tracheostomy with thyroidectomy: Indications, management and outcome: A prospective study

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ABSTRACT

Objectives: This study aims to determine the indications, course and outcome of pre-operative and post-thyroidectomy tracheostomy.

Subjects and methods: This is a prospective descriptive study conducted in Khartoum Teaching Hospital in the period between March 2000 and March 2005. Fifty-nine patients had tracheostomy out of 964 thyroidectomy patients, giving an incidence of 6%.

Results: The decision of doing tracheostomy was taken intra-operatively in 41 patients (69%), all presenting with strider. In 25 of those 41 patients there was intra-operative tracheal deformity with narrowing (>50% of tracheal circumference on radiology) and gland adherence to the tracheal wall; the remaining 16 patients had tracheomalacia. Of those 41 patients, 25 presented with severe strider and needed urgent surgery (5 with recurrent anaplastic carcinoma, 5 with intrathoracic goitres that necessitated median sternotomy and 15 with huge goitres (of whom 7 were recurrent goitres). In the remaining 18 patients (31%) emergency post-operative tracheostomy was done following endotracheal extubation up to 48 h post-operatively. There were 2 deaths (3.4%); one patient died due to tracheostomy care and the other from myocardial infarction.

Conclusion: Tracheostomy is a safe procedure and gives a good alternative to delayed endotracheal extubation in post-thyroidectomy patients expected to have respiratory failure in places where post-operative anaesthetic care is lacking.

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1. Introduction

Thyroidectomy for large endemic goitre compromising the airway is common in Khartoum and carries a relatively high risk of post-operative respiratory obstruction, which may necessitate tracheostomy. We previously reported 5 predictors of post-thyroidectomy respiratory obstruction: goitre for more than 5 years, pre-operative recurrent laryngeal nerve palsy, significant tracheal narrowing and/or deviation, retrosternal extension, difficult endotracheal intubation and thyroid cancer.1

Meticulous attention to operative technique is required alongside a flexible approach that balances the requirements of major resection against the risk of complications.2 Gyoh et al., in a Nigerian series, reported that thyroidectomy for giant goitres associated with a high incidence of post-operative asphyxia, tracheostomy may be a life-saving procedure in these circumstances, but delay may prove fatal when its need arises insidiously.3 With limited facilities and expertise to care for the remaining post-operative endotracheal tube, tracheostomy is a safe alternative in places with such limited resources. This study was conducted prospectively to see...
2. Patients and methods

This descriptive prospective study was conducted at the Khartoum Teaching Hospital between March 2000 and March 2005. The unit receives mostly difficult cases referred from other hospitals. The data were collected using a pre-designed questionnaire. Patients were interviewed pre-operatively and were informed about the possibility of doing a tracheostomy and the procedure was explained to them. The size of the goitre was assessed using Peres classification.4

Routine investigations included a thyroid function test, haemoglobin, urea and electrolytes including serum calcium. A chest x-ray and thoracic inlet x-ray in both antero-posterior and lateral views were taken. Tracheal narrowing equal to or more than 50% of its circumference was considered significant. CT scan was done when radiological retrosternal extension was seen to reach the upper margin of the aortic arch. Patients had fine needle aspiration cytology when malignancy was suspected. Patients were referred to the ENT Department for indirect laryngoscopy in order to document any pre-operative vocal cord dysfunction.

Tracheomalacia was determined intra-operatively by palpation to determine the degree of softness of the trachea after withdrawing the endotracheal tube.3 Median sternotomy for intrathoracic goitre was decided intra-operatively after a trial of neck delivery. The data were analyzed using SPSS version 11.

Table 1 – Clinical presentation of patients who needed tracheostomy following thyroidectomy (n = 59)

<table>
<thead>
<tr>
<th>Symptom/sign</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocking at night</td>
<td>37</td>
<td>62.7</td>
</tr>
<tr>
<td>Sleeping using more than one pillow</td>
<td>32</td>
<td>54.2</td>
</tr>
<tr>
<td>Mild strider (audible breathing)</td>
<td>26</td>
<td>40.7</td>
</tr>
<tr>
<td>Severe strider (loud audible)</td>
<td>15</td>
<td>25.4</td>
</tr>
<tr>
<td>Visible congested neck veins</td>
<td>13</td>
<td>22.0</td>
</tr>
<tr>
<td>Prefer to sleep on right side</td>
<td>12</td>
<td>20.3</td>
</tr>
<tr>
<td>Visible congested upper chest veins</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Prefer to sleep on left side</td>
<td>3</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Indirect laryngoscopy was done as part of the routine pre-operative assessment in 56 patients to detect the mobility of the vocal cords. It was normal in 45 patients (76%), the left cord was affected in 7 patients (12%) and the right in 5 patients (9%). Both cords were sluggish in 2 patients (3%). Patients with cord affection were those either with recurrent goitre or malignant anaplastic carcinoma.

Near total thyroidectomy was the commonest operative procedure done in the studied population 58% (n = 34), followed by total thyroidectomy in 29% (n = 17). Total lobectomy plus isthmectomy was done in 5 patients and debulking in 3 patients with advanced anaplastic carcinoma (there were 5 patients with anaplastic carcinoma; in 3 patients only debulking was feasible due to advanced locally infiltrative carcinoma while in the other 2 total thyroidectomy was done). All 5 patients with anaplastic carcinoma died of recurrence within 2 months.

Intra-operative assessment showed adherence of the goitre to the trachea in 51% (n = 30), significant tracheomalacia in 27% (n = 16) and retrosternal extension in 32% (n = 19).

The decision to do a tracheostomy was taken intra-operatively in 41 patients (69%) all presenting with strider. In 25 of those 41 patients there was intra-operative tracheal deformity with narrowing (>50% of tracheal circumference) and gland adherence to the tracheal wall; the remaining 16 patients had tracheomalacia (of whom 9 had recurrent goitre). Of those 41 patients, 25 presented with severe strider and needed semi-urgent surgery (5 with recurrent anaplastic carcinoma, 5 with intrathoracic goitres that necessitated median sternotomy and 15 with huge goitres (of whom 7 were recurrent goitres). In 12 patients there was also a degree of recurrent laryngeal nerve affection.

The technique of tracheostomy included the following: the inferior curved cut tracheal flap was stitched to the lower edge of the strap muscles in 60% (n = 35), followed by a longitudinal incision in the trachea in 40% (n = 24). A plastic cuffed tracheostomy tube with inner tube was initially used in 60% (n = 35) and 2 days later changed to a metallic tube. In 40% (n = 24) a metallic tube was inserted from the start. The procedure was done by the surgeon in 73% (n = 43), and the rest were done by the senior resident.

Weaning (decannulation) was successful in most patients (76%, n = 45). Weaning was started on the 7th post-operative day. In 64% of patients (n = 38) weaning was completed within the first 2 weeks post-operatively, with a mean of 12 days (SD = 6). In 2 patients weaning took 6 and 12 weeks respectively.
Fourteen patients (24%) were not decanulated, 7 with malignant goitre of whom 5 died during follow up. Two patients with huge recurrent goitres were successfully decanulated 6 and 12 weeks later. In the remaining 5 patients, four were being followed in the ENT department but could not be traced as they left to their provinces and one patient died.

The most common complications were cough in 78% (n = 46), and wound infection in 34% (n = 20). Post-operative temporary change of voice occurred in 7 patients and it returned to semi-normal after an average duration of 1 month.

The mortality rate in this study population was 3% (n = 2). One death occurred while changing the tracheostomy tube on the 2nd post-operative day when the attending doctor failed to locate the tracheostomy opening (the inferior tracheal flap was not stitched to the strap muscles). The other death was due to myocardial infarction.

4. Discussion

This study defines the criteria of patients who underwent tracheostomy following thyroidectomy. It also describes the tracheostomy technique and reports on both morbidity and mortality of the procedure. We used Perez classification to describe the size of the goitre and all were large. In a Nigerian series they used the term giant for patients with goitres weighing between 500 and 1750 g. McHenery described the goitres as large when an excised goitre weighed 80 g or more. The WHO recommended the description that was put by Perez who defined large goitres as stage III.

The intra-operative tracheostomy decision is based on several factors: huge size goitres, presentation with strider in recurrent and malignant goitres, recurrent laryngeal nerve palsy, radiological evidence of tracheal compromise in addition to the intra-operative findings of tracheal deformity and adherence or invasion by thyroid tissues. An alternative option of leaving the endotracheal tube in the post-operative period as adopted in some centres needs the care of trained anaesthetic nurses which is lacking in most of the developing countries.

Recurrent simple multi-nodular goitre was the clinical diagnosis in 27% of this study population. Muller studied the complications and risk factors of surgery for recurrent goitres and reported 3% permanent and 5% temporary recurrent laryngeal nerve palsy. He stated that because of the high risk of complications, operations for recurrent goitres should be done only if the patient cannot be treated in any other way. Pisello and his colleagues reported that thyroid carcinoma, recurrent goitre, total thyroidectomy operations and duration of the operation are factors which increase the risk of post-operative recurrent laryngeal nerve palsy. Significant tracheomalacia was detected in 16 patients, mainly in those with longstanding and/or recurrent goitres. Marked collapse of the tracheal rings following partial withdrawal of the endotracheal tube is considered an indication for doing tracheostomy. Tracheal collapse following thyroidectomy resulting from prolonged compression of the trachea by a large neglected goitre, particularly within the confines of the thoracic inlet, might be due to change in blood supply and ischaemic changes in recurrent goitre. McHenery studied 91 patients with marked thyroid enlargement and reported no incidence of tracheomalacia. This marked difference might be due to differences in population background and disease process where most of our patients presented with strider in addition to the different criteria used to diagnose tracheomalacia.

Tracheostomy was done post-operatively as an emergency procedure in 31% (n = 18). The main indication for this was post-operative strider. This is a hurried procedure which is done by the attending junior staff. This emergency occurred up to 48 h later when the patient being transferred to the general ward. The alternative of leaving an endotracheal tube during the post-operative period is even more risky in the absence of highly qualified anaesthetic services.

Gyoh reported that thyroidectomy for giant goitres in Northern Nigeria is associated with a high incidence of post-operative asphyxia. He recommended that tracheostomy is better established prophylactically in patients who are more than likely to develop asphyxia.3

Pre-operative indirect laryngoscopy detected recurrent laryngeal nerve palsy (RLNP) in 12 patients in our series, mainly in those with recurrent and malignant goitre. Operations for thyroid cancer, Grave’s disease and recurrent goitre demonstrated significantly higher recurrent laryngeal nerve palsy rates.10 Jamski et al. reported that the frequency of RLNP ranges from 0.5 to 5% in different thyroid surgery centres and increases in cases of both recurrent goitre and complete thyroidectomy due to thyroid cancer.11 Recurrent laryngeal nerve identification is recommended as a basic procedure in thyroid surgery to reduce the risk of injury.12,13 This was not always possible when dealing with a huge vascular gland where careful dissection in the facial planes leaving the posterior thyroid capsule intact will ensure nerve safety.

Anaplastic carcinoma is the commonest malignancy requiring tracheostomy. The disease is reported to be invariably fatal with no survival at 19 months and a mean survival of only 9 months.14

The use of a cuffed plastic tracheostomy tube is preferable to the metallic tube because in the immediate post-operative period, bleeding and tracheal secretions will irritate the airways and induce coughing and aspiration. The mean time for doing this change of tube was the 3rd or 4th post-operative day (SD = 2). Stitching the tracheostomy lower flap to the strap muscles ensure a safe change of tubes by nurses.

Percutaneous tracheostomy has become routine practice in many hospitals,15 however, we have not practiced such a procedure in our hospital.

In conclusion, tracheostomy is safe when performed as a planned elective procedure. Patients presenting with strider in the presence of large and/or malignant goitre, recurrent goitre, patients with long standing goitre for more than 5 years and patients with severe tracheal stenosis and deviation, and those with intra-thoracic goitre that needs median sternotomy are at higher risk of having tracheostomy after thyroidectomy.16

Conflict of interest
None to declare.

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Ethical approval
Approved by the Ethical Committee of the Medical School University of Khartoum.

REFERENCES