

Possible risk factors for respiratory complications after thyroidectomy: An observational study

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Abstract

It is widely accepted that thyroid surgery is not without morbidity. One well known postoperative complication is respiratory distress. The aim of this prospective observational study was to determine the incidence of post-thyroidectomy respiratory complications and to identify possible predictive factors. The study population was made up of 262 patients who had undergone thyroidectomy for goiter at the University of Ilorin Teaching Hospital in Nigeria from January 1989 through December 2003. Information was collected on 8 possible predictive factors for respiratory complications: (1) the duration of the goiter, (2) the preoperative status of the recurrent laryngeal nerve, (3) the presence or absence of tracheal narrowing or deviation, (4) the presence or absence of retrosternal extension, (5) the ease or difficulty of endotracheal intubation, (6) the presence or absence of thyroid cancer, (7) the presence or absence of giant goiter, and (8) whether or not the goiter represented a recurrence. Respiratory complications occurred in 20 of the 262 patients (7.6%). Of these 20 patients, 16 (80%) had a goiter of at least 5 years' duration, 12 (60%) had a giant goiter, 5 (25%) had tracheal narrowing, 4 (20%) had a malignant goiter, 3 (15%) had palsy of the recurrent laryngeal nerve preoperatively, and 2 patients each (10%) had retrosternal extension, a difficult intubation, or a recurrent goiter. Twelve patients (60%) had at least 4 of the 8 possible risk factors, and 6 others (30%) had 3 factors. Postoperative tracheotomy was necessary for 4 patients. No deaths occurred. While the findings of this observational study can only suggest the possibility of causation, preoperative factors such as

long-standing goiter and giant goiter should be taken into consideration in postoperative management and the prevention of respiratory complications. In addition, the presence of at least 4 of the 8 factors studied should likewise alert the management team.

Introduction

In Nigeria, thyroid gland diseases are the second most common endocrine disorder, behind only diabetes.¹ The most common type of thyroid disorder in Nigeria is goiter.² In many cases, thyroidectomy is the treatment of choice. More than 80% of Nigerian patients with thyroid enlargement undergo surgery for cosmetic reasons.³

The first successful thyroidectomy on record appears to have been performed in about 952 A.D. by a Moorish physician, Albucasis, in El-Zahra, an Arab city in Spain.⁴ Thyroidectomy for goiter typifies, perhaps better than any operation, the triumph of the surgeon's art. Theodor Kocher, Theodor Billroth, and William S. Halsted were just a few of the men intimately associated with the development and refinement of thyroid surgery. Their contributions helped make thyroid surgery a less feared and better understood procedure. Even so, mortality from thyroid surgery in the 1800s was still approximately 40%.⁵ Most of those deaths were caused by infection and hemorrhage. Today, death secondary to thyroid surgery is extremely rare; the major concern is morbidity, such as that caused by hemorrhage, hypoparathyroidism, damage to the recurrent laryngeal nerve, and respiratory complications.

The aim of this study was to determine the incidence of post-thyroidectomy respiratory complications and to identify any variables that may be predictive of them.

Patients and methods

This prospective observational study initially involved all patients who had undergone thyroidectomy from

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January 1989 through December 2003 at the University of Ilorin Teaching Hospital, a tertiary care facility in Ilorin, Nigeria. Exclusion criteria included preoperative respiratory obstruction, emergency thyroidectomy, thyroidectomy under regional anesthesia, and the presence of obvious chest or cardiac diseases preoperatively.

A total of 262 patients met the inclusion criteria. In addition to each patient's age at presentation and sex, information was collected on 8 possible predictive factors for respiratory complications: (1) the duration of the goiter, (2) the preoperative status of the recurrent laryngeal nerve, (3) the presence or absence of tracheal narrowing or deviation, (4) the presence or absence of retrosternal extension, (5) the ease or difficulty of endotracheal intubation, (6) the presence or absence of thyroid cancer, (7) the presence or absence of giant goiter, and (8) whether or not the goiter represented a recurrence. Other relevant data included the type of respiratory distress (obstructive or nonobstructive), the type of operation, and the duration of hospital stay.

Recurrent laryngeal nerve palsy was diagnosed clinically by the presence of respiratory obstruction and/or hoarseness and confirmed by laryngoscopy. Goiters were considered giant if they weighed at least 10 g/kg of body weight and if they had been present for at least 10 years. In Nigeria, most giant goiters are seen in peasant women of about 41 to 50 years of age who live in rural areas where goiter is endemic.^{6,7} Respiratory distress characterized by dyspnea, stridor, tension hematoma, laryngeal edema, and/or tracheomalacia was considered to be evidence of respiratory obstruction. Nonobstructive respiratory complications included cough, excessive sputum, and chest signs of consolidation with or without fever.

All patients provided a detailed history and underwent a thorough physical examination. Each underwent measurements of their complete blood count and serum levels of electrolytes, urea, creatinine, calcium, phosphate, and albumin. X-rays were taken of the neck, thoracic inlet, and chest. During the final 6 years of the study, all patients underwent preoperative ultrasonography and preoperative assessment of vocal fold function via indirect laryngoscopy. Not all patients were given thyroid function tests, and fine-needle aspiration cytology was performed only when necessary.

All operations were performed by Consultants and Senior Registrars with general anesthesia and endotracheal intubation. Access to the thyroid gland was achieved through a collar incision, and thyroidectomy was performed in the standard manner. Drains were left in situ postoperatively, and direct laryngoscopy was performed immediately after surgery. Patients without

complications were discharged on the third or fourth day postoperatively.

Data were analyzed with Statistical Package for the Social Sciences software (version 11; SPSS; Chicago).

Results

Of the 262 patients who qualified for inclusion in this study, postoperative respiratory complications occurred in 20 (7.6%)—18 women and 2 men, aged 26 to 63 years (mean: 47.8). The reason for the respiratory distress was airway obstruction in 16 patients (80%), nonobstructive causes in 3 (pulmonary collapse in 2 patients and aspiration pneumonia in 1), and an unknown cause in 1.

Among the 20 operations, the thyroidectomy was subtotal in 14 (70%), total in 4 (20%), and near-total in 2 (10%). Four patients required a postoperative tracheotomy. The duration of hospital stay in the 20 patients ranged from 10 to 28 days (mean: 14). There were no surgical deaths in this series.

The most common variables associated with respiratory complications were thyroid swelling for 5 years or more ($n = 16$ [80%]) and the presence of a giant goiter ($n = 12$ [60%]) (tables 1 and 2). Five patients (25%) had tracheal narrowing, but only 2 of them experienced a difficult intubation during initiation of anesthesia (table 3). No more than 4 patients (20%) experienced any of the other 5 possible risk factors (table 1). In all, 12 patients (60%) had at least 4 of the 8 possible risk factors, and 6 patients (30%) had 3 possible risk factors (table 4).

Discussion

The incidence of respiratory complications in this study (7.6%) is much less than the 31% reported by Abdel Rahim et al, although their series involved mainly giant goiters.⁸ The most common possible risk factors for respiratory complications in the present study were the

Table 1. Incidence of possible risk factors for respiratory complications (N = 20)

Possible risk factor	n (%)
Duration of thyroid swelling ≥ 5 yr	16 (80)
Giant goiter	12 (60)
Tracheal narrowing	5 (25)
Malignant goiter	4 (20)
Preoperative RLN* palsy	3 (15)
Retrosternal extension	2 (10)
Difficult endotracheal intubation	2 (10)
Recurrent goiter	2 (10)

* RLN = recurrent laryngeal nerve.

Table 2. Number of respiratory complications according to the duration of swelling (N = 20)

Duration of swelling	Respiratory complication n (%)
<5 yr	4 (20)
5 to 10 yr	8 (40)
>10 yr	8 (40)

presence of thyroid swelling for 5 years or more (80% incidence) and the presence of a giant goiter (60%). Although other authors⁸ have found that tracheal deviation/narrowing and retrosternal extension were each predictive of postoperative respiratory obstruction, the present study did not; only 5 patients (25%) had the former, and only 2 (10%) had the latter.

In the present study, no case of tracheomalacia or tracheal collapse was observed, a finding that is consistent with those seen in other studies.⁹⁻¹¹ On the other hand, Abdel Rahim et al did report tracheomalacia in 5 of their 32 patients (16%) who had long-standing giant goiters.⁸

Preoperative tracheotomy is no longer common in Nigeria, but postoperative tracheotomy is controversial. Gyoh and Emery have advised against it during the dust season in Nigeria.¹⁰ De Toma et al in Italy have recommended it.¹² In the present study, only 4 patients required postoperative tracheotomy.

Post-thyroidectomy respiratory complications can be challenging for both surgeons and anesthetists.¹³ While the findings of this observational study can only suggest the possibility of causation, preoperative factors such as long-standing goiter and giant goiter should be taken into consideration in postoperative management and the prevention of respiratory complications. In addition, the presence of at least 4 of the 8 factors studied should likewise alert the management team; in the present investigation, 60% of patients with postoperative respiratory distress had at least 4 of the 8 variables studied.

Table 3. Incidence of difficult intubation according to tracheal narrowing (N = 20)

Tracheal narrowing	Difficult intubation		Total
	Yes	No	
Yes	2	3	5
No	0	15	15
Total	2	18	20

Table 4. Distribution of multiple possible risk factors (N = 20)

No. risk factors	n (%)
≥4	12 (60)
3	6 (30)
2	1 (5)
1	1 (5)
0	0

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