

Laryngoscopy in patients undergoing thyroid surgery – is it mandatory or unnecessary routine?

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Abstract

Background: The objective of this study was to evaluate the effectiveness of screening laryngoscopic examination in evaluating vocal fold (VF) mobility before and after thyroid surgery.

Patients and methods: A prospective study of 112 patients underwent thyroid surgery at the Hilla teaching general Hospital and Al-Shafaa private hospital were undertaken in order to study the patterns of pre-operative and postoperative voice changes and Indirect laryngoscope (IDL) findings. Patients with pathologic findings at postoperative laryngoscopy underwent reassessment of voice and (VF) mobility for 6 months duration.

Results: A total of (9.8 %) of patients had pre-operative suspicion of VF Palsy, only (27.3 %) of this group had abnormalities detected on pre-operative IDL .Of 101 documented IDL, no vocal cord pathology in asymptomatic patients were detected.

Post operatively

Conclusions: Preoperative laryngoscopy is necessary in symptomatic patients and those who undergo re operation or in patients when malignancy is suspected. The necessity of a preoperative laryngoscopy in all other patients must be questioned. Postoperative laryngoscopy and additional diagnostic testing better to be reserved for symptomatic patients.

الخلاصة

الهدف من الدراسة هو تقييم فعالية فحص منظار الحنجرة الغير المباشر في غربلة المرضى عند تقييم حركة الحبال الصوتية قبل وبعد عملية استئصال الغدة الدرقية.

طريقة البحث: دراسة مستقبالية ل 112 مريض خضعوا لعمليات استئصال الغدة الدرقية في مستشفى الحله التعليمي العام ومستشفى الشفاء الخاص وذلك لدراسة تغيير الصوت ونتائج فحص منظار الحنجرة الغير المباشر قبل وبعد عملية استئصال الغدة الدرقية.

النتائج: قبل العملية 9.8% من المرضى كان هنالك شك بشلل الحبل الصوتي فقط 27.3% منهم تم تشخيصهم عن طريق فحص منظار الحنجرة الغير المباشر بشلل الحبل الصوتي أما باقي المرضى فلم يكن الفحص عن طريق منظار الحنجرة الغير المباشر غير طبيعياً.

الاستنتاجات: منظار الحنجرة الغير المباشر قبل العملية هو ضروري للمرضى الذين لديهم أعراض معينة والمرضى الذين يخضعون لعملية استئصال الغدة الدرقية المتكررة أو هنالك شك بإصابة المريض بسرطان الغدة الدرقية , أما ما بعد العملية فان منظار الحنجرة الغير المباشر هو ضروري أن يجرى للمرضى الذين لديهم أعراض فقط.

Introduction

Prevention of voice impairment is the primary goal of thyroid surgery. ^(1, 2) and recurrent laryngeal nerve (RLN) damage is a well-recognized morbidity and has been involved in most claims concerning complications of thyroidectomy. ^(3, 4) The

incidence of laryngeal nerve paralysis has been reported to range from 0% to 30% ^(5, 6) most prominent in reoperations. ^(7- 10)

IDL can be performed before surgery to confirm normal vocal cord movement, and to investigate any pre-operative voice abnormality, thus helping to clarify diagnosis in the event of postoperative voice changes. ^(11,12) CT and MRT were

shown to be insufficiently reliable for the preoperative diagnosis of invasion of the RLN.⁽¹³⁾ Preoperative recognition of disease extent, allowing for appropriate operative planning and central neck clearance at first operation.⁽¹⁴⁾ The finding of pre-operative asymptomatic paralysed vocal cord may be important to document if this will change surgical management or if a postoperative voice change occurs. It may also be important medico-legally.

Several studies have suggested that the majority of post thyroidectomy voice complaints result from trauma to the external branch of the superior laryngeal nerve (EBSLN), with reported rates ranging from 12 to 58%.^(5, 11, 12, 15)

Postoperatively, voice and cough were used to assess vocal cord function. If either the patient or examiner perceived any abnormality the cough or voice was recorded as abnormal and regarded as sensitive as laryngoscopy (but not videostroboscopy) for detecting postoperative vocal cord paralysis.⁽¹⁶⁻²³⁾

Thus, while it is simple and quick, IDL may not be adequate as a mean of documenting intact laryngeal function. We questioned the need for IDL in all patients, especially in the absence of voice symptoms. We have thus examined our experience in thyroid surgery to review the incidence of pre-operative and postoperative voice symptoms and abnormal IDL findings, to help determine the value or universal pre-operative IDL regardless of symptoms.

Patients and Methods

The author conducted a prospective study of 112 patients who underwent thyroid surgery in Hilla teaching general hospital and Al-Shafaa private hospital from January 2006 till April, 2009 and all of those patients had preoperative reports for VF assessment from the same otorhinolaryngologist using IDL and in some indicated cases by fiberoptic examination. Reports of preoperative

symptoms suggestive of an impairment of vocal cord mobility, such as hoarseness or dyspnea were recorded. Preoperative diagnosis based on fine needle aspiration, and final postoperative histopathologic examination results were recorded. Findings at laryngoscopy were defined as normal, unilateral vocal fold palsy (VFP), or bilateral VFP.

Because different diseases might have different rates of postoperative RLNP, we analyzed benign thyroid disease, thyroid malignancy, and hyperthyroidism separately. Also patients underwent primary surgery (no prior thyroid surgery) and secondary interventions (previous thyroid operation before this intervention) were evaluated separately.

Postoperative voice changes were usually managed with interest, and referred to same ENT specialist if they were marked and/or prolonged. The records of these 112 cases were reviewed for voice complaints before and after surgery, and for IDL findings before and (if required) after thyroidectomy.

Postoperative cord palsy was defined as the presence of an immobile vocal cord or the decreased movement of the vocal cord during phonation. Patients with recurrent nerve palsy were followed up by an otorhinolaryngologist with a periodic vocal cord examination until full recovery was documented. Recurrent nerve palsy was regarded as permanent if it persisted for more than 6 months after the operation. Patients with a normal postoperative laryngoscopy were not scheduled for follow-up.

In this study, we conducted the patient to be symptomatic when he says "My voice changed" or if hoarseness was obvious or if the patient claims that he developed dyspnea within the last month, or such things.

Operative technique

RLN, or to its branches, might be better avoided by seeking, identifying, and exposing the nerve itself and by following

its course with care. In our practice, total extracapsular thyroidectomy, with systematic search for the nerve, is the best approach since it guarantees best therapeutic results and possibly prevents intraoperative injuries, even though some surgeons prefer the intracapsular thyroidectomy without exposure of the nerve as the best way of avoiding such nerve injuries.⁽²⁴⁾

When the RLN was not identified, iatrogenic injuries to the nerve were avoided through careful dissection of the goiter, associated with the tying of thyroid vessels to their distal branches (the use of electrocautery is not advisable), always in tight adhesion to the thyroid capsule. Before tying and sectioning, we have always tried to recognize all the structures and possibly save those that were not identified or that resembled the recurrent.⁽²⁵⁾

We also believe that the surgical strategy should focus on the ligation of the superior thyroid vasculature or their individual branches on the thyroid capsule and perform no further dissection unless External Branch of the Superior Laryngeal Nerve (EBSLN) could be readily identified.⁽⁵⁾

Obtaining informed consent of a patient who undergoes thyroid surgery, describing the dissection of the RLN in detail on either side within the operation record is essential and will help to protect the surgeon from subsequent litigation.

Results

From January 2006 until April 2009, 112 patients underwent thyroid surgery at Hilla teaching general hospital and Al-Shafaa private hospital for various thyroid diseases by one surgical team (Table 1). The mean ages of patients were 42 years (range, 17-73 years). In all, 89 patients were women and 23 patients were men; the sex ratio was 4:1.

Preoperative assessment:

Of 112 patients, 101 patients (90.2 %) were considered to be not suspicious of VFP based on history and examination taken such as voice changes, dyspnea and history of previous surgical intervention. Preoperative laryngoscopy revealed no VFP in all those patients. Of 112 patients, 11 patients (9.8 %) complained of symptoms and sign that suggested VFP (Table 2). Preoperative laryngoscopy confirmed the suspected nerve lesion in only 3 (27.3 %) of all suspicious patients and the other 8 (72.7%) patients whom had suspicion for VFP, had normal laryngoscopic examination.

Suspected malignant versus benign thyroid disease

Overall, 5 of the 112 patients underwent operation for a suspected malignant disease, Three of them had suspicion of malignancy depending on symptoms, two of those patients were diagnosed as RLNP pre operatively by IDL ; the other two patients had no symptoms but their FNA cytology were suspicious and their IDL examination pre operatively were normal .

Primary surgery versus secondary interventions

Overall, 108 (96.4%) of the 112 patients underwent initial thyroid surgery and 4(3.6%) patients underwent reoperative thyroid surgery. Preoperative laryngoscopy revealed 2 (1.8 %) VFP in patients underwent initial thyroid surgery, while Preoperative laryngoscopic finding revealed a unilateral VFP in 1 (25%) of the patients whom underwent reoperative thyroid surgery.

Post operative assessment:

Those patients whom had very big goiter and were symptomatic pre operatively became symptoms free post operatively. All patients whom had previous thyroid surgery including the patient who had RLNP pre operatively were asymptomatic and remain asymptomatic post operatively.

Table 1. Types of operations which were done for various thyroid diseases.

Underlying thyroid diseases	No. of Patients	No .of TT	No .of NTT	No .of STT	No .of TL
Primary benign diseases	92	14	53	18	7
Graves' diseases	11	3	5	3	-----
Recurrent goiter	4	2	1	-----	1
Thyroid cancers	5	2	3	-----	-----
Total	112	21	62	21	8

Total Thyroidectomy (TT); Subtotal Thyroidectomy (STT); Near Total Thyroidectomy (NTT); Total Lobectomy (TL).

Table 2. Pre operative suspicion of VFP. (11 patients).

Abnormality	N	Symptomatic*	Documented VFP by IDL
Suspicion of malignancy**	5	3	2 (40%)
Secondary surgical intervention	4	0	1 (25%)
History of very big goiter with dyspnea	2	2	0 (0%)

*Symptomatic patients; voice change or if hoarseness was obvious or if the patient claims that he developed dyspnea

** Hoarseness of the voice, strong suspicion on examination and FNA cytology

Post operatively, 10 patients considered to be symptomatic (voice changes), only 2 had transient RLNP and the others had normal laryngoscopic examination which were done first by the anesthetist and followed regularly by an otorinolaryngologist later on, all of them became symptoms free after few days to few weeks (mean :17 days) from their operations.

Concerning postoperative RLN injuries other than those which were diagnosed preoperatively by IDL , we observed 2 (1.8%) patients of the remaining 109 with recurrent laryngeal nerve injury ,One of them due to neoplastic infiltration of its branch .In this case the patient suffering hoarseness of the voice pre operatively but VF motility had appeared to be normal at preoperative IDL. This patient had a papillary thyroid carcinoma; we had to dissect an extralaryngeal branch of the RLN, since neoplasia had grown beyond the thyroid capsule and infiltrated a branch of the nerve, which in turn presented a rather unusual shape consisting of multiple divisions at the superior third of its course. In the second case, a 32-year-old patient suffering from Grave's disease was

asymptomatic and her vocal cord motility had appeared to be normal at preoperative IDL. Both recurrent laryngeal nerves were intraoperatively identified. They ran behind the inferior thyroid artery, taking the shape of a trunk, and the left lobe of the thyroid showed strong adhesions to the esophagus. During surgery, an abnormal vascularization of the thyroid, typical of hyperthyroidism which rendered the separation of the struma from perithyroid tissues was highly difficult. After surgery patient showed moderate voice change and at postoperative laryngoscopy, a left cordal hypomotility appeared. The voice change totally regressed after 5 days, while the cord regained its regular motility after a month.

The rate of EBSLN injury in this study was 0%

Discussion

Of our 112patients, 101 patients had no symptoms and signs that suggest a VFP, no former neck explorations, and no suspected or proven malignancy and in those patients no preoperative laryngoscopy detected a VFP. Studies show there

were no abnormal findings on laryngoscopy among the patients with normal voice.⁽²⁶⁻²⁸⁾

If there is a patient who is asymptomatic, that means with really no hoarseness, really no dyspnea, what can you do? You cannot make an asymptomatic patient better. So I think there is no need to further examine these patients and if we had been unaware of the preoperative VFP in this patient, we would have performed a careful dissection on either side as usual and thus would have preserved the non paralyzed RLN in all likelihood. So that universal screening of asymptomatic patients with IDL prior to thyroidectomy seems to be of minimal value. Its routine use is therefore a clinical and medico legal issue for the individual surgeon.⁽¹⁵⁾

In the 9.8 % of patients with pre-operative suspicion of RLN palsies only 27.3 % had pathology identified on IDL. Laryngeal mirror examination remains the mainstay in clinical practice, but more sophisticated techniques of VSL (video-strobolaryngoscopy) and rigid telescopic laryngoscopy offer superior magnification and illumination, as well as providing a permanent record for review, this make diagnostic accuracy is significantly superior to IDL. In two recent series, 14% and 18% of diagnoses by mirror examination were changed following VSL.^(29,30) while additional diagnoses (e.g. vocal polyps) were made in up to 47% of VSL procedures. In the series of Sataloff *et al.* of 352 patients, 10 cases of RLN paresis and 16 cases of EBSLN paralysis/paresis were detected by VSL following normal mirror examination.⁽²⁹⁾

Regarding the patient who was symptomatic pre operatively and falsely negative his VF motility had appeared to be normal at preoperative IDL, operatively diagnosed as neoplastic infiltration of one of the RLN branches, this can be explained by an invasion to a small branch may contribute to the changes in voice without significant changes in vocal fold motion, so that couldn't be detected by IDL⁽³¹⁾ or

diagnostic accuracy can be made pre operatively if we used more sophisticated techniques such as VSL^(16,29-310)

Accordingly the low yield of RLN pathology detected on pre-operative IDL, one may question its necessity when no voice symptoms or signs are obvious. An exception would be patients with a history of past neck surgery, who may have previously undetected lesions (compensated, asymptomatic RLN lesion). On the other hand, pre-operative voice changes should be investigated before surgery in order to document other pathology, such as reflux laryngitis, that may be amenable to treatment before thyroidectomy.

Post operatively, 10 patients considered to be symptomatic (voice changes), only 2 of them had transient RLNP and the others had normal laryngoscopic examination and all of them became symptoms free within a (mean: 17 days) from their operations. So that, most of the voice alterations that occur following thyroidectomy are self-limited and not related to impaired nerve function.^(22,31-36)

Although the mechanism of post-thyroidectomy voice disturbances in patients with preserved nerve functions is not yet fully understood, it can be attributed to surgical trauma, laryngotracheal fixation of the prelaryngeal strap muscles⁽¹¹⁾ endotracheal intubation⁽²²⁾ trauma to the arytenoids during intubation or removal of the thyroid gland modifies the vascular supply and venous drainage of the larynx, this could cause alterations of the mucosa as a slight congestion that may help to explain the lower pitch⁽³⁵⁾. Voice parameters also may be affected by emotional and behavioral conditions⁽³⁷⁾

Finally, there is no effective substitute for a thorough knowledge of neck anatomy and meticulous surgical techniques to identify and protect laryngeal nerves during thyroidectomy.^(2,38)

Conclusion

IDL is quick, simple and reasonable initial investigation to perform both before and after surgery on the symptomatic patient. The necessity of a preoperative laryngoscopy in all other patients could be questioned. Preoperative laryngoscopy is necessary in those who undergo reoperation or in patients when malignancy is suspected. This helps warning appropriately about the risks of surgery and helps outline a plan for the extent of surgery while minimizing the medico legal consequences of iatrogenic RLN injury. Whenever the RLN is visualized and is preserved intact on the affected side, the patient should be reassured that a transient VFP is the most likely explanation, and that an increased likelihood of recovery exists. Asymptomatic patients do not require additional therapy. Most voice alterations that occur after thyroid are self-limiting and of short duration.

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