

Feasibility of the Video-Assisted Thyroid Surgery Under Hypnosis Associated to local Anesthesia

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Abstract: *Background:* Video-assisted thyroidectomy (VAT) is feasible and safe compared to conventional surgery. Thyroidectomy under hypnosis associated to local anesthesia (HYLA) as an alternative to general anesthesia (GA) has been shown to be effective. However, its combination with VAT has not yet been reported. The aim of the study is to describe the feasibility of VAT under HYLA as a complete minimally invasive approach and evaluate its safety.

Methods: Out of 130 consecutive patients referred for thyroidectomy and selected for VAT, 50 patients opted voluntarily for HYLA. Safety and feasibility were considered primary endpoints.

Results: Twenty eight patients benefited from a total thyroidectomy (56%). The remaining patients underwent thyroid lobectomy. Median operating time was 102.5minutes (range 70-177) and 92.5minutes (range 51-143) for total thyroidectomy and lobectomy, respectively. Median time in operating room was 146.5minutes (range 101-222) and 133minutes (range 96-178) for total thyroidectomy and lobectomy, respectively. Conversion from VAT to a conventional surgical approach occurred in 4 patients (8%). No conversion to GA was required. Hemodynamic parameter measurements were stable during surgery. No permanent hypocalcemia or vocal cord palsy were observed. Ninety eight percent of the patients required just one overnight stay in hospital.

Conclusion: The current brief report demonstrates that the combination of VAT and HYLA is feasible without the risk of additional surgical morbidity.

Keywords: Video-assisted thyroidectomy, hypnosis.

INTRODUCTION

Thyroid surgery has seen many improvements over the last decades. These changes do not alleviate the need to adhere to surgical principles described by the pioneers in terms of good exposure of the thyroid gland and clear identification of the nerves and parathyroid glands as a cornerstone of surgical practice. In selected indications, numerous studies have shown not only the feasibility and safety of video-assisted thyroidectomy (VAT) compared to conventional thyroidectomy, but also a better aesthetic result and less pain [1-4]. Nowadays, VAT is a commonly used tool in the repertoire of high-volume thyroid surgeons, often under general anesthesia (GA). Nevertheless, the concept of a "minimally invasive" surgical procedure remains poorly coded and should go beyond esthetic considerations. Anesthesia is another important determinant of the invasiveness of the patient management. The safety and feasibility of thyroidectomy under hypnosis associated to local

anesthesia (HYLA) has already been described [5] and routinely proposed in our institution. However, the combination of VAT and HYLA has not yet been reported.

MATERIALS AND METHODS

Patients

From January 2010 to December 2011, 518 consecutive patients underwent thyroidectomy in our surgical unit. Out of this population, 130 patients were selected for VAT on basis of the size of the gland and nodules, provided that the craniocaudal axis of the lobes did not exceed 7cm and the largest transversal diameter was less than 3.5cm, as previously reported [3]. After extended consultation with the anesthetist about HYLA approach as an alternative to GA, patients were left free to choose the type of anesthesia they preferred for their surgical intervention. Fifty patients opted voluntarily for HYLA. The study was approved by the local ethics committee.

Surgery

All operations were performed according to a previously described technique [3]. A mixture of

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lidocaine 0.5%/ropivacaine 0.25% was administered by the surgeon along the incision line five minutes before making the skin incision.

Anesthesia

All patients underwent classic monitoring, including 3-lead ECG, noninvasive blood pressure measurement, blood oxygen saturation (SpO₂) assessment and capnography. Lorazepam 0.5mg was given one hour before surgery as premedication. At the beginning of the procedure, a facial mask supplying 40% oxygen was used. After obtaining a comfortable position on the operating table, a dedicated anesthetist induced hypnosis with a technique described by Milton Erickson [6]. The patient was invited to fix his eyes on a point in front of him and to concentrate on his body in order to achieve increasing muscle relaxation and closure of the eyes. Progressively, guided by the voice of the anesthetist, he was invited to focus his attention on a positive memory. Using a calm and monotonous voice, the anesthetist continually talked to the patient, guiding him with permissive and indirect suggestions of well-being to relive his dream or experience and remain detached from the reality surrounding him. A state of intense well-being may thus be reached and maintained during surgery. Continuous infusion of remifentanyl, a μ -opioid agonist, was started at a rate of 0.05 μ g/kg/min and modified as required. Midazolam was sometimes titrated at 0.1mg/0.1mg if needed as an anxiolytic. An eyebrow movement by the patient was established as a system of signaling between the patient and the anesthetist in case of discomfort to strengthen the hypnotic trance and ensure a consistent level of comfort.

RESULTS

The demographic characteristics, type of surgery and final histological diagnoses are summarized in Table 1. Operating time and time spent in the operating room are summarized in Table 2. Conversion to a conventional surgical approach was required in 4 patients (8%) because of bleeding. No conversion to GA was required.

Hemodynamic parameter measurements including systolic, mean and diastolic blood pressure and heart rate values are reported in Table 3. They were obtained at the beginning, during surgery and at the end of the procedure and did not demonstrated changes.

Table 1: Patient Characteristics and Final Histological Diagnosis

	N=50
Age, years (mean \pm SD)	43.46 \pm 11.74
Male/Female	3/47
Lobectomy (%)	22 (44%)
Total thyroidectomy (%)	28 (56%)
Final diagnosis (n, %)	
MNG	22 (44%)
Follicular adenoma	10 (20%)
Hyperthyroidism	5 (10%)
PTC (pT1, pT2)	9 (18%)
Lymphocytic thyroiditis	4 (8%)

PTC, papillary thyroid carcinoma.

Table 2: Intraoperative Events

	N = 50
Operating time (minutes)	
Lobectomy	92.5 (51-143)
Tot. thyroidectomy	102.5 (70-177)
Time in operating room (minutes)	
Lobectomy	133 (96-178)
Tot. thyroidectomy	146.5 (101-222)
Thyroid weight (grams)	
Lobectomy	11.65 (6-18)
Tot. thyroidectomy	18.85 (9- 48)
Conversion to conventional	
surgical approach (n, %)	4 (8%)

Results are expressed as median and range.

Median local anesthesia volume administered was 15mL (range10-26mL). Drug consumption including remifentanyl and midazolam doses is shown on Table 4. Only 54.5% and 57.14% of the patients received midazolam as anxiolytic medication during lobectomy or total thyroidectomy, respectively. Piritramide and paracetamol were given in the recovery room.

Reduced vocal cord motility, documented by day-one laryngoscopy, was noted in one patient (2%). No permanent hypocalcemia or permanent vocal cord palsy were observed. One patient (2%) required more than one overnight hospital stay.

Table 3: Intraoperative Changes in Blood Pressure and Heart Rate

	N=50			
	BPs	BPm	BPd	HR
Baseline	130 (105-212)	98 (77-151)	77 (50-116)	70 (55-110)
Maximum	146 (110-254)	105 (53-166)	78 (55-126)	78 (55-145)
Minimum	124 (93-203)	90 (55-133)	71.5 (55-100)	70 (50-180)
End	134 (98-217)	95 (80-141)	75 (50-114)	75 (55-155)

BPs, BPm and BPd stand for systolic, mean and diastolic blood pressure measured in mmHg. HR stands for heart rate expressed as beats per minute (bpm). Results are expressed as median and range. Baseline refers to values obtained before initiation of hypnosis. Maximum and minimum refer to extreme values recorded during surgery. End refers to values obtained at the end of the procedure.

Table 4: Perioperative Drug Consumption

N = 50	
Midazolam (mg)	
[n, %]	
Lobectomy	.15 (0-2.5) [12/22, 54.5%]
Total thyroidectomy	0.5 (0-2.5) [16/28, 57.14%]
Remifentanyl	
(µg/kg/min)	
[n, %]	
Lobectomy	0.07 (0.02-0.10) [22/22, 100%]
Total thyroidectomy	0.07 (0.03-0.10) [27/28, 96.4%]
Piritramide (mg)	
[n, %]	
Lobectomy	2 (0-8) [17/22, 77.3%]
Total thyroidectomy	3 (0-10) [19/28, 67.9%]
Paracetamol (g)	
[n, %]	
Lobectomy	1 (0-1) [15/22, 68.2%]
Total thyroidectomy	1 (0-1) [18/28, 64.3%]

Drug doses are expressed as median and range. [n, %] refer to the number of patients and percentage of them receiving the indicated drug.

DISCUSSION

This brief report clearly demonstrates the feasibility and safety of VAT under HYL A. Of various endoscopic techniques developed for thyroidectomy, VAT has gained the broadest acceptance among endocrine

surgeons for small nodules [7-9]. Nowadays, VAT is also successfully applied to small low-risk papillary carcinomas (pT1-pT2), with equivalent safety to conventional surgery [10-12]. Many advantages have been documented related to less extensive dissection, resulting in lower analgesic requirements and prompt postoperative recovery [13, 14]. The most important benefit is cosmetic, especially for young women who represent the majority of patients.

Although less invasive techniques of anesthesia have previously been successfully applied for thyroidectomy, including local/regional anesthesia associated with controlled sedation [15, 16], GA remains the preferred option of most surgeons, even teams routinely performing VAT. These alternatives to GA have several limitations. Patients can develop agitation and anxiety or laryngospasm and coughing because of tracheal pressure. If surgery lasts longer than 2 hours, it is frequently associated with deterioration in patient cooperation, as his/her ability to remain in an optimal position decreases. Surgeons also need to deal with operating field movements related to swallowing, coughing or neck motion [17, 18]. Some patients may develop seizures or cardiac arrhythmia, probably because of large doses of local anesthetic (40-60ml) or intra-arterial injection. Phrenic nerve infiltration has been described, leading to diaphragm paralysis when regional anesthesia is used [19]. Moreover, during surgery, the anesthetist has to provide conscious sedation with midazolam, opioids and/or propofol. This combination of drugs can lead to oversedation and respiratory depression, airway obstruction and hypoxia.

The successful combination of VAT and regional anesthesia was previously reported in a small number of patients with either superficial [20] or bilateral deep

cervical block [21] associated with controlled sedation. To the best of our knowledge, this is the first time that the feasibility and safety of VAT using a combination of hypnosis and local anesthesia have been described in a prospective design. The overall results are in line with those previously obtained, under GA, by our group [3] and by others [22] in terms of safety. The current results show also a perfect hemodynamic stability during surgery.

In our approach, hypnosis in combination with low dose local anesthesia was associated with low-dose intravenous analgesia and low-dose midazolam administered as an anxiolytic agent in only 56% of patients. Use of such minimal doses, different from those used for controlled sedation, aims to optimize patient comfort and enhance the effect of hypnosis, defined as the induction of a subjective state in which alterations of perception or memory can be elicited by suggestion. During hypnotic induction, the hypnotist typically guides patients through peaceful and relaxing memories with the goal of helping them feel more relaxed and detached from aversive stimuli. The patient relives a comfortable experience and can reorient his/her interpretation of nociceptive stimuli associated with the operation [23]. Thus, the duration of surgery is not a limiting factor [24]. Signs of hypnosis are immobility, and no swallowing, coughing, or reaction to tracheal pressure, so that the surgeon can operate under good conditions and the patient remains in an optimal position throughout the procedure. Published data are consistent with measurable effects of suggestion or hypnosis on the nervous system [25, 26]. Moreover, electrophysiological and imaging studies have demonstrated changes in spinal and supraspinal pain pathways [27], and elevation of the pain threshold [28]. Because suggestions and focused attention can measurably alter pain perception and pain pathways, a similar influence may be expected for the autonomous nervous system involved in modulating gastric mobility, regional blood perfusion, and humoral response to stress. Significant benefits were therefore reported in terms of greater hemodynamic stability and reduced postoperative pain, anxiety and nausea [5] suggesting that hypnosis may improve patient outcome [29].

The success of such combined approach relies on independent factors related to the patient, anesthetist and surgeon. The ability of the patient to cooperate with the anesthetist, and his/her motivation and degree of confidence play a key role in the hypnotic trance process. Patients more receptive to hypnosis reach a

deeper hypnotic trance and achieve a greater reduction in pain perception and operative stress than those who are less receptive [30, 31]. Consequently, patient selection is achieved only on a voluntary basis making a randomized design not feasible. Similarly, deaf subjects and those with psychiatric diseases should be considered ineligible. In addition, surgery under HYLTA requires a motivated surgeon able to work calmly with gentle motions and gestures and an anesthetist specially trained in hypnosis techniques.

Briefly, the combination of VAT and HYLTA is feasible without the risk of additional surgical morbidity. Further studies are mandatory to assess its benefit in terms of early revalidation and quality of life.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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