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Video-Assisted Thyroidectomy

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OBJECTIVE: In 1998, we developed a technique for video-assisted thyroidectomy (VAT). In this paper, we report on the entire series of patients who underwent VAT and discuss the results obtained.

METHODS: Seventy-three patients were selected for VAT. Eligibility criteria were: thyroid nodules ≤ 35 mm in maximum diameter; estimated thyroid volume within normal range or slightly enlarged; small, low-risk papillary carcinomas; no previous neck surgery or irradiation and no thyroiditis. The VAT procedure was totally gasless. It was performed under endoscopic vision through a single 1.5 to 2.0-cm skin incision, using a technique very similar to conventional surgery.

RESULTS: Eighty-one VATs were attempted on 73 patients. Forty-five lobectomies, 24 total thyroidectomies and eight completion thyroidectomies were successfully performed. Mean operative time was 82 minutes for lobectomy, 100 minutes for total thyroidectomy and 77 minutes for completion thyroidectomy. The conversion rate was 4.9%. Postoperative complications included two transient recurrent nerve palsies, five transient symptomatic postoperative hypocalcaemias and one wound infection. The cosmetic result was considered excellent by most of the patients.

CONCLUSION: VAT is a feasible and and safe procedure that allows for excellent cosmetic results. In selected cases, it can be a valid option for the surgical treatment of thyroid diseases. (*Asian J Surg* 2002;25(4):315–8)

Introduction

In 1996, Gagner first described endoscopic parathyroidectomy.[1] After this report, various endoscopic and/or video-assisted techniques for the surgical treatment of primary hyperparathyroidism were developed.[2–5] The same approaches were also proposed for thyroid surgery.[6–16] Although different techniques have been described, only very small case numbers have been published.

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In June 1998, we developed the technique of minimally-invasive, completely gasless, video-assisted thyroidectomy (VAT).[9] A similar approach had already been used by Miccoli and coworkers[2] for parathyroidectomy and also successively adapted for thyroid surgery.[10] In this paper, we report on the entire series of patients who underwent VAT in our department and discuss the results.

Methods

From June 1998 to February 2001, we selected 73 patients for VAT. Eligibility criteria were: 1) thyroid nodules less than 35 mm in diameter and estimated thyroid volume within the normal range (< 20 ml); 2) no previous neck surgery and/or radiation therapy; and 3) no thyroiditis. Small (T1-small T2), low risk[17] papillary carcinomas were considered eligible for VAT. After an adequate learning period (first 30 cases), selection criteria were slightly widened. Patients who underwent

video-assisted thyroid lobectomy and were found to have malignancy on histology were selected for video-assisted completion thyroidectomy. Nodules with maximum longitudinal axis of up to 45 mm and a transverse diameter of 15–20 mm were considered eligible for VAT.

All patients gave informed consent for the procedure. A complete preoperative evaluation, consisting of a biochemical assessment, ultrasonography and fine needle aspiration biopsy was made in all patients.

The operative technique was the same as that previously described.[9] The patient, under general anaesthesia, was placed in a supine position, with slight extension of the neck. A 15–20-mm, midline incision was made at about 2 cm above the sternal notch. The cervical linea alba was then opened as far as possible and the thyroid lobe carefully dissected from the strap muscles. Operative space was maintained by small, conventional retractors, which were used to retract the thyroid medially and the strap muscles laterally. The endoscope (5-mm 30°) and the surgical instruments were inserted through the single skin incision, without the insertion of a trocar. Endoscopic magnification allowed for easy identification and careful dissection of neck structures. Small (2–3 mm in diameter), conventional forceps and dedicated instrumentation derived from ear, nose and throat, and plastic surgery (forceps, scissors, spatulae, spatula-shaped aspirator) were used for dissection. Haemostasis was achieved with the use of small (3 mm in diameter) conventional clips or 5-mm,14 cm-in-length Harmonic Scalpel® scissors (HS) (Ethicon endo-surgery, Inc., Cincinnati, Ohio, USA). After sectioning the middle thyroid vein, the thyroid lobe was retracted downward in order to expose the upper pole vessels and, in most of the procedure, the external branch of the superior laryngeal nerve. After sectioning the vessels of the superior pole, the traction over the lobe was oriented medially so as to expose the tracheo-oesophageal groove. The recurrent laryngeal nerve was usually identified where it crosses the inferior thyroid artery and then dissected away from the thyroid lobe under endoscopic guidance. The parathyroid glands were well indentified and preserved. After removing the retractors, the thyroid lobe was extracted through the skin incision, with care taken to avoid any rupture. The dissection of the lobe was then completed under direct vision. In cases of total thyroidectomy, the same procedure was repeated on the opposite side.

After ensuring haemostasis, the cervical linea alba and the platysma were sutured. The wound was closed with a subcuticular suture or a skin sealant. No drain was used.

Laryngoscopy was performed in all patients postoperatively to check vocal cord motility. In those who underwent total thyroidectomy, serum calcium and phosphorus were measured. Hypocalcaemia was defined as a serum calcium level of less than 8.0 mg/dl.

In case of malignancy (papillary carcinoma), postoperative serum thyroglobulin was measured and postoperative ultrasonography and iodine scintiscanning were performed.

All patients were asked to evaluate the cosmetic result of the procedure by means of a numeric scale (ranging from 0 to 10) 1 to 6 months after surgery.

RESULTS

Eighty-one VAT procedures were attempted on 73 patients. There were 68 women (93.2%) and five men (6.8%) with a mean age (± SD) of 43 (±12) years (range, 10–73 yr). Preoperative diagnoses included follicular lesions in 48 cases (65.7%), toxic adenoma in seven cases (9.6%), benign multinodular goitre in 15 cases (20.6%) and low-risk T1 papillary carcinoma in three cases (4.1%). Follicular lesions showed nuclear atypia or oxyphilic changes in 20 cases (44.7%). The mean maximum diameter (± SD) of the nodules was 20.9 (± 9.6) mm (range, 9–45 mm).

The procedure was successfully performed in 77 cases (95.1%). Conversion to the conventional procedure was only necessary four times (4.9%); one case due to difficult dissection and the remaining three cases due to large nodule size and thyroid volume, which had been underestimated by preoperative ultrasonography. In these cases, final histology showed three benign goitres and one follicular carcinoma.

Video-assisted thyroid lobectomy was successfully performed in 45 cases, total thyroidectomy in 24 cases and completion thyroidectomy of previous video-assisted lobectomy in eight cases. The mean operative time (± SD) was 82 (± 28) minutes (range, 30–150 min) for thyroid lobectomy, 100 (± 15) minutes (range, 70–220 min) for total thyroidectomy and 77 (± 24) minutes (range, 30–100 min) for completion thyroidectomy.

Final histology showed benign lesions in 50 cases (goitre, follicular adenoma), papillary carcinoma in 22,

and follicular carcinoma in one case. Twelve out of the 23 patients with malignancy underwent total thyroidectomy at the first operation, while the remaining 11 underwent thyroid lobectomy. At the beginning of our experience, completion thyroidectomy was performed in three cases by conventional procedure, because we were concerned about the feasibility of such an operation by a video-assisted approach. The remaining eight patients underwent video-assisted completion thyroidectomy. Seven of the patients with papillary carcinoma had central compartment lymph nodes removed due to the finding of macroscopically enlarged nodes during surgery. In two cases, final histology showed lymph node metastases from papillary carcinoma.

Postoperative complications included two cases of transient RLN palsy (which lasted 2 months, as documented by laryngoscopy), five cases of transient postoperative hypocalcaemia (which required calcium and vitamin D administration for less than 6 months) and one case of wound infection. One patient among those who underwent conversion to the open procedure developed a postoperative wound haematoma.

Mean postoperative hospital stay was 1.5 days (range, 1–5 d). The cosmetic results were considered excellent by most patients who successfully underwent VAT. The mean score (± SD) for cosmetic results was 9.5 ± 0.5.

All patients with papillary carcinoma had undetectable postoperative serum thyroglobulin levels under levothyroxine treatment. Postoperative ultrasonography showed no residual thyroid tissue or evidence of recurrence. Postoperative iodine scintiscan showed no pathological uptake in the 10 patients in whom it was performed.

Discussion

Several techniques for VAT and/or endoscopic thyroidectomy have been described in the last 4 years.[6–16] Minimally-invasive techniques for thyroid surgery were mainly applied in an attempt to improve the cosmetic result of this operation. Nonetheless, minimally-invasive surgery should also guarantee a better postoperative outcome. Recently published papers demonstrated that endoscopic[16] and video-assisted[18–20] procedures for thyroid and parathyroid surgery have some advantages over conventional operations not only in terms of cosmetic result, but also of analgesic requirements and postoperative recovery.

These procedures are not feasible in all clinical settings. They are technically demanding and require a surgical team skilled both in endocrine and endoscopic surgery. This is particularly true for some endoscopic techniques in which the access is completely different from that of conventional surgery, as in endoscopic thyroidectomy via the axillary[13] or breast approach.[8,15]

The technique that we propose is slightly different from the purely endoscopic ones. Through a "mini-cervicotomy" under endoscopic vision, it is possible to carry out an operation substantially identical to conventional thyroidectomy. The endoscope is only a tool that allows the same operation to be carried out but with a smaller skin incision. Theoretically, it could be easily learned by skilled endocrine surgeons. This could also explain why the operative time of VAT in our as well as in other experiences,[10] is shorter than that of the other endoscopic techniques so far described.[6–8,11–16] In the more recent cases, the operative time has been shorter and comparable to that registered for conventional surgery.

The complication rate in our study was similar to that reported for conventional surgery.[21] VAT is a procedure that can be safely performed and allows for an excellent cosmetic result.

This procedure is currently indicated in a minority of patients with thyroid diseases. Nodule size as well as thyroid volume are the most important limiting factors for VAT. Only small thyroid nodules in small or normal thyroid glands can be approached by VAT. However, with the increasing use of ultrasound-guided fine needle aspiration biopsy, the diagnosis of small nodules with suspicious and indeterminate cytology is relatively frequent in clinical practice. They, as well as small toxic and pre-toxic adenomas, undoubtedly are the best indications for VAT.

Despite the fact that not all authors agree with us regarding the use of video-assisted techniques in cases of thyroid malignancy,[16] we safely performed VAT in small papillary carcinoma and the results obtained in these patients were comparable to those of conventional surgery. Therefore, even if the results need to be validated by larger studies and longer follow-up, we believe that patients with small (T1 to small T2) low-risk papillary carcinomas[17] can be selected for VAT. We demonstrated that removal of enlarged central neck nodes is also feasible, with no additional morbidity.

After an adequate learning period (first 30 cases), we chose to widen the selection criteria for VAT, because we felt more comfortable with the procedure and because of the good results obtained. VAT was feasible in selected nodules (2 cases) with a maximum longitudinal axis greater than 35 mm (up to 45 mm). The main limiting factor in these cases was the transverse diameter of the nodule. The lobe cannot by removed by the video-assisted approach if it is greater than 15–20 mm. Moreover, previous conventional neck surgery is considered a contraindication for VAT. Yet, patients who underwent video-assisted thyroid lobectomy were selected for video-assisted completion thyroidectomy if malignancy was found at final histology.

In conclusion, the results of this study indicate that VAT is a feasible and safe procedure. Its role in the management of thyroid nodular diseases is still to be completely clarified. Nonetheless, the results obtained are encouraging. Thus, we believe that it can be a valid option in selected patients for the surgical treatment of thyroid diseases.

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