Egyptian Journal of Surgery Vol. 29, No. 2, April, 2010

ORIGINAL ARTICLE

VIDEO ASSISTED NECK SURGERY: INDICATIONS AND OUTCOME

Tarik Abdel Azeez
Department of Surgery, Faculty of Medicine, El-Minia University, Egypt

Email: taahmad@yahoo.com

Abstract

Aim: To study indications and the outcome of video assisted neck surgery in treatment of thyroid and parathyroid diseases.

Methods: From Jan 2007 to June 2008; 30 cases of thyroid and parathyroid surgeries were carried out. All procedures were performed using video assisted neck surgery technique (VANS). Size of the gland was a determining factor in case selection. The study included three cases of parathyroid adenomas and twenty seven cases of thyroidectomies, one case underwent total thyroidectomy while 26 cases had thyroid lobectomy. The age of the patients ranged from 26 to 51 years with an average of 37.3+7.9 years and 70% were female. Twenty six cases were solitary thyroid nodule. One case was Graves' disease where medical treatment was contraindicated. Three cases were parathyroid adenomas.

Results: Operative time ranged from 80 to 200 minutes with an average of 123.3+66.6 minutes. Patients were discharged on second postoperative day. Postoperative complications included transient recurrent laryngeal nerve palsy and keloid formation. Postoperative pain score was recorded.

Conclusions: VANS technique provided a minimally invasive procedure that helped patients to rapidly recover a successful neck surgery with a minimal scar.

Keywords: Endoscopic, endocrine, minimally invasive.

INTRODUCTION

Video assisted neck surgery (VANS) was introduced in Europe in the 1990s in an attempt to decrease scar length and has recently compared favorably to the conventional approach in prospective randomized studies.[1–3] The indications for minimally invasive VANS are relatively limited because of the difficultly encountered during dissection when there is inflammation, such as in thyroiditis or Graves' disease; scar tissue, such as in recurrent cases; or disturbed anatomy, such as in large multinodular goiters. In selected patients, the minimally invasive gasless approach to thyroid surgery offers advantages in terms of postoperative pain and cosmetic outcome without any difference in safety when compared with the conventional approach.[4-6] Based on our experience with the first video assisted total thyroidectomy, we decided to perform a series of cases to assess the outcome of VANS.[7] The aim of this retrospective study was to assess the feasibility, safety, advantages, and disadvantages of VANS. We hypothesized that improvements in cosmetic results (incision length) and postoperative pain would be the most apparent benefits of the minimally invasive procedure.[8]

PATIENTS AND METHODS

From Jan 2007 to June 2008; 30 cases of video assisted neck surgery (VANS) were carried out. The cases varied

from solitary thyroid to multi-nodular goiter. Size of the gland was a determining factor in case selection. Three cases of parathyroid adenomas were included in the study.

Patients with thyroiditis, previous neck surgery, or a history of neck irradiation or thyroid cancer were excluded. Thyroiditis was diagnosed either by findings on FNA or by the presence of anti–thyroid peroxidase antibodies on preoperative blood work. Thyroid volume was estimated by preoperative ultrasound measurements of the thyroid length, width, and depth. The selection criteria included nodules ≤ 3 cm. Preoperative evaluation consisted of a history and physical examination, ultrasonography, and fine needle aspiration (FNA). Patients who met criteria were offered a VANS procedure. A 39 year old–man presented with a long history of Graves' disease with hypokalemic periodic paralysis as well as hepatitis B infection. He received medical treatment in the form of methimazole but he developed hepatic toxicity upon receiving the anti-thyroid drug. The treating physician referred him to our department and recommended a total excision of the thyroid gland to avoid any further relapses that may endanger his liver.

The main outcome measures of the study were cosmetic result and postoperative pain. Subjective pain appraisal was carried out by each patient with a 10-point visual analog scale on the first and second day after operation. Slight pain was defined as a score of 0 to 3, moderate pain was 4 to 6, and severe pain was 7 to 10.

Additional outcome measures were operating time, the incidence of intraoperative and postoperative complications (e.g., temporary or permanent recurrent nerve palsy), and duration of hospital stay.

Operative technique: Under general anesthesia and after obtaining a written consent, the patient was placed in supine position with slight neck extension. As a standard procedure for total thyroidectomy and large nodules, we followed the technique that was previously described by Maeda et al., 2001 as three incisions were made, the first one measuring 3.5 cm and located below in the right subclavicular region and a 3 cm incision was placed in the left subclavicular region. The third incision, 0.5 cm long, was placed just to the right of the midline. After injection of adrenalized saline, the skin flap was dissected at the subplatysma level and lifted using a pair of Kirschner wire fixed to an L-shaped pole (gasless) (7). The scope together with one instrument were introduced on the corresponding side while the middle incision was used for other instruments.

In case of solitary thyroid nodule, a less invasive technique was used where one small incision was made in suprasternal notch (MIVAT or Minimally Invasive Video Assisted Thyroidectomy) and both the scope and instruments (two) were introduced through the incision (Figs. 1a,b).

Fig 1a. The wound in the anterior chest wall after total thyroidectomy.

Fig 1b. The wound in the suprasternal notch after thyroid lobectomy.

For total thyroidectomy, the sternomastoid muscle was identified and dissected laterally from the strap muscles. The strap muscles were lifted and transected using ultrasonically activated shear (Harmonic scalpel, Ethicon) to expose the thyroid gland. The thyroid lobe was retracted medially and the middle thyroid vein was coagulated and cut using the harmonic scalpel then the superior and inferior thyroid vessels were also divided using the same instrument (Fig. 2). The right thyroid lobe was totally freed and the isthmus was divided and the right lobe was delivered out of the right wound. Similarly, the left thyroid lobe was approached and after complete devascularization, it was delivered through the right wound (Fig. 3). The recurrent nerve and the parathyroid glands were identified on both sides and protected throughout the operation. After securing hemostasis, two tubal drains attached to suction pumps were inserted on both sides.[7]

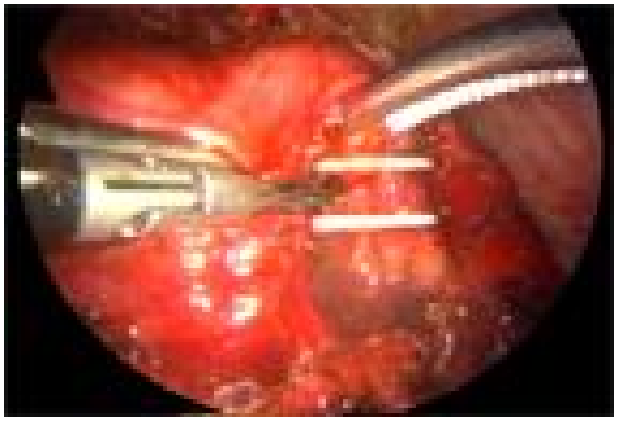

Fig 2. The harmonic scalpel while dividing the inferior thyroid vessels.

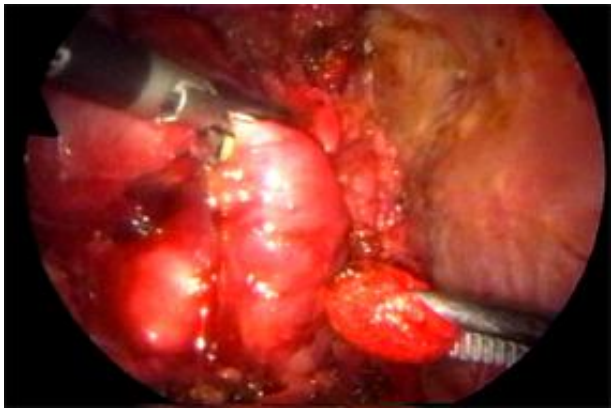

Fig 3. The harmonic scalpel while dividing the thyroid lobe at the isthmus after devascularization.

Removal of a parathyroid adenoma (MIVAP or Minimally Invasive Video Assisted Parathyroidectomy) or single thyroid lobe (MIVAT or Minimally Invasive Video Assisted Thyroidectomy) was carried out with the same technique but with smaller incision on suprasternal notch.

Statistical analysis: Data were expressed as mean ± SD. Statistical analysis was made by SPSS 11.5.

RESULTS

The study included thirty patients, 27 cases of thyroid surgery and three cases of parathyroid adenoma excision, 70% of them were females (21 cases). The average of age was 37.3+7.9 years ranging from 26 to 51 years. The weight of the excised masses ranged from 10 to 20 gm an average of 13.9+2.8 gm Table 1. The drains were removed 24 hours postoperatively. The patients had a normal calcium level after the operation. The patient with total thyroidectomy suffered from hoarseness of voice that disappeared within one month after surgery. Five patients suffered hypertrophic scars that were treated conservatively by dermatologists and only one case developed keloid formation on the chest wall. Most of the patients had very cosmetic scars that were almost invisible two months after surgery.

Table 1. Patients' characteristics.

Female %	70% (21 cases)
Age (in years)	26-51 (37.3)
Nodule size (in grams)	10-20 (13.98)
Lobectomy / thyroidectomy	26 / 1
Parathyroid adenoma	3

The operative time for total thyroidectomy was 200 minutes while the average time for thyroid lobectomy was 89.9+12.8 minutes and for parathyroid adenoma excision the average time was 80 + 5 minutes with an overall average of 123.3+66.6 minutes (Fig. 4).

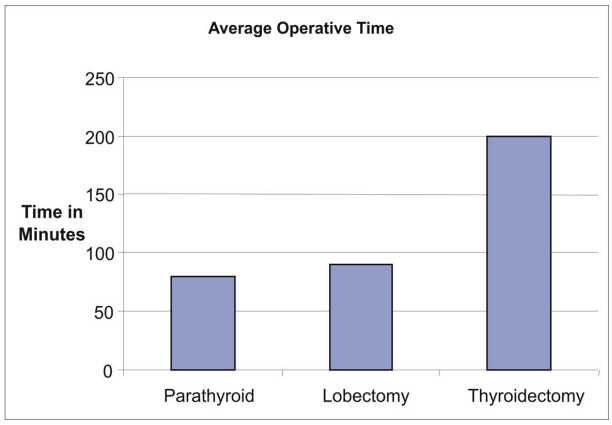

Fig 4. The operative time.

Postoperative pain ranged from slight to moderate pain that was controlled by NSAIDs Table 2. The patients were discharged on the second postoperative day.

Table 2. Severity of postoperative pain.

Slight	Moderate	Severe
23 cases	7 cases	Nil

DISCUSSION

Since 1998, when Gagner first reported endoscopic parathyroidectomy,[9] many experimental and clinical

trials have been carried out to deal with parathyroid and thyroid diseases through an endoscopic approach. Many reports have described extirpation of a thyroid nodule, thyroid lobectomy or subtotal thyroidectomy.[10-12]

Most experts use the same selection criteria.[13] According to the present standards of surgical oncology, thyroid specimens containing neoplastic growth should be extracted intact which stands as an obstacle for using this technique in thyroid cancer. Extending the wound to retrieve large specimen after successful dissection through a small wound makes the procedure absurd. Previous neck surgery, radiotherapy, major infection and trauma are also contraindications as they render the already challenging dissection more difficult. In the light of the previous, proper selection of patients stood behind the success of our procedures but on the other hand it limited its use for certain group of patients.

At present, there are three main endoscopic approaches to mobilize the thyroid gland via different anatomical routes: cervical, anterior and axillary. All techniques aim at creating a working room in the anterior neck for mobilizing the thyroid lobes. The initial construction and subsequent maintenance of the working cavity is maintained either by gasless custom engineered device or low pressure CO2 insufflation.[14] The use of insufflation technique may result in two main problems: surgical emphysema and rise of intracranial pressure and that was the reason for using the gasless technique in our study.[15] Based on our previous experience,[7] we chose the anterior chest approach for large lesions and the cervical for small lesions. The cervical approach is a mini incision compared with classic thyroidectomy wound and the size and site were customized according to the site, size of lesion and cosmetic preference of the patient. The chest approach was found to give more dissecting space in case of large lesions and bilateral lobe mobilization. The other advantage of this approach is the covered scar as all the wounds are in the chest wall and can be easily covered by the patient; however, some cases had keloid formation. Recently we prefer the cervical approach because of keloid formation and some cutaneous nerve injury besides flap necrosis as reported by some authors after extensive dissection.[16,17] The axillae represent a more acceptable scar site and it is anatomically suitable for instrument insertion.[18,19] This technique was done only using insufflation and never tried as gasless. The distance between wound and working field was too far and the viewing angle was almost 90°; for these reasons the technique did not gain much popularity among surgeons.

All the cases were done using gasless lifting technique. The previously described technique for endoscopic neck surgery using carbon dioxide insufflation has been accused of causing some troubles like surgical emphysema, air embolism and acid-base disturbance.[20] Comparing gasless technique with low pressure insufflation the authors found that the attempt to control bleeding with insufflation is more difficult and the use of suction device is challenging.[21]

One possible disadvantage of our approach was that the operative time was longer than that of conventional surgery and even the other reports of video assisted thyroid surgery.[22] We assume that with growing experience and improving skills, we will be able to shorten the operative time.

REFERENCES

1. Huscher CS, Recher A, Napolitano G, Chiodini S. Endoscopic right thyroid lobectomy. Surg Endosc. 1997;11:877.

2. Yeung CH, Ng WT, Kong CK. Endoscopic surgery of the neck: a new frontier. Surg Laparosc Endosc. 1998;8:227–32.

3. Miccoli P, Berti P, Raffaelli M, Materazzi G, Baldacci S, Rossi G. Comparison between minimally invasive video-assisted thyroidectomy and conventional thyroidectomy: a prospective randomized study. Surgery. 2001;130:1039–43.

4. Bellantone R, Lombardi CP, Raffaelli M, Rubino F, Boscherini M, Perilli W. Minimally invasive, totally gasless videoassisted thyroid lobectomy. Am J Surg. 1999;177:342–3.

5. Miccoli P, Berti P, Raffaelli M, Conte M, Materazzi G, Galleri D. Minimally invasive video-assisted thyroidectomy. Am J Surg. 2001;181:567–70.

6. Beaver WT. Management of cancer pain with parenteral medication. JAMA. 1980;244:2653–7.

7. Maeda S, Ahmad T. A., Minami S, Furui J, Kanematsu T. Video-assisted total thyroidectomy. Int Surg. 2001;86:195-7.

8. Haugen BR, Woodmansee WW, McDermott MT. Towards improving the utility of fine-needle aspiration biopsy for the diagnosis of thyroid tumors. Clin Endocrinol. 2002; 56:281–90.

9. Naitoh T, Gagner M, Garcia-Ruiz A, Heniford BT. Endoscopic endocrine surgery in the neck An initial report of endoscopic subtotal thyroidectomy. Surg. Endosc. 1998;12:202-5.

10. Miccoli P, Berti P, Raffaelli M, Conte M, Materazzi G, Galleri D. Minimally videoassisted thyroidectomy. Am J Surg. 2001;181:567-70.

11. Miccoli P, Bellantone R, Mourad M,Walz M, Berti P, Raffaelli M. Minimally invasive video assisted thyroidectomy: amulti istitutional experience. World J Surg. 2002;26:972-5.

12. Barczynski M, Cichon S, Konturek A, Cichon W. Preliminary experience with minimally invasive video assisted thyroidectomy. Surg Laparosc Endosc Percutan Tech. 2004;14:14-5.

13. Paolo Del Rio, Lucia Sommaruga, Giovanni Ferreri, Maria Francesca Arcuri, Mario Sianesi. Preliminary experience in minimally invasive videoassisted thyroidectomy (MIVAT). ACTA BIOMED. 2006;77:27-29.

14. Gustus H.C. Yeung, Hedwig W.Y. Wong. Videoscopic thyroidectomy: The uncertain path to practicality. Asian J Surg. 2003;26:133-8.

15. Rubino F, Pamoukian VN, Zhu JF. Endoscopic endocrine neck surgery with carbon dioxide insufflation: The effect on intracranial pressure in a large animal model. Surgery. 2000;128:1035-42.

16. Yamamoto M, Sasaki A, Asahi H. Endoscopic subtotal thyroidectomy for patients with Graves' disease. Surgery Today. 2001;31:1-4.

17. Shimizu K, Kitagawa W, Akasu H, Tanaka S. Endoscopic hemithyroidectomy and prophylactic lymph node dissection for micropapillary carcinoma of the thyroid by using a totally gasless anterior neck skin lifting method. J Surg Oncol. 2001;77:217-20.

18. Ikeda Y, Takami H, Sasaki Y. Endoscopic resection of thyroid tumors by the axillary approach. J Cardiovasc Surg (Torino). 2000;41:791-2.

19. Ikeda Y, Takami H, Sasaki Y. Endoscopic neck surgery by the axillary approach. J Am Coll Surg. 2000;191:336- 40.

20. Bellantone R, Pio Lombardi C, Bossola M, Boscherini M, De Crea C, Alesina P, et al. Video-Assisted vs Conventional Thyroid Lobectomy A Randomized Trial. Arch Surg. 2002;137:301-304.

21. Schabram J, Vorlander C, Wahl RA. Differentiated operative strategy in minimally invasive, video-assisted thyroid surgery results in 196 patients. World J Surg. 2004;28:1282–6.

22. Barczynski M, Cichon S, Konturek A, Cichon W. Preliminary experience with minimally invasive video assisted thyroidectomy. Surg Laparosc Endosc Percutan Tech. 2004;14:14-5.