Early Experience of Gasless Video-Assisted Neck Surgery (VANS) for Thyroid Nodules in Thailand

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Background: *Endoscopic thyroidectomy has increased in popularity because of the good cosmesis. In Thailand, most endoscopic thyroidectomy surgeries are done with a gas technique, using CO_2 insufflation to obtain a working space. The CO_2 pressure has to be kept under control to prevent gas-related complications. In contrast, there are no such complications in video assisted neck surgery (VANS), a gasless technique. The VANS technique could be an option of endoscopic thyroidectomy in Thailand.*

Objective: *This study reports the outcome of the initial experience of using gasless endoscopic thyroidectomy (VANS technique) in Thailand.*

Materials and Method: *From July to October 2015, five patients underwent thyroidectomy with the VANS technique at Thammasat University Hospital. Patient selection criteria consisted of non-malignant nodule diagnosed by FNA, nodule size $\leq$4 cm, no previous neck surgery and no neck irradiation.*

Results: *All five patients successfully underwent endoscopic thyroid lobectomy with the VANS technique. The mean operating time was 152 minutes and mean blood loss was 34 ml. There were no serious complications, and the patients were satisfied with the cosmetic outcomes. Pathologic results were nodular goiter in four cases and adenomatous goiter with occult papillary microcarcinoma in one case (in this case, the margins were free of malignancy).*

Conclusion: *The VANS technique is feasible and safe to be used in Thailand.*

Keywords: *Gasless endoscopic thyroidectomy, VANS*

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Recently, the detection of thyroid nodules has increased by the use of commonly-used neck ultrasonography. The nodules are more commonly found in women[1,2] and some of them need to be removed. The open thyroidectomy with a traditional collar incision had been used to remove thyroid nodules for a long time, however, it results in a noticeable scar on the neck. This might be unacceptable for some patients especially young women. Endoscopic thyroidectomy was first reported in 1997 by Huscher to improve cosmetic results[3]. Since then, a variety of endoscopic thyroidectomy techniques have been developed. In Thailand, most endoscopic thyroidectomy operations are gas technique, using CO_2 insufflation to create a working space. These could be performed in many ways such as axillary, axillo-breast and chest approaches[4-8]. Gas technique, CO_2 pressure should be kept under 4-6 mmHg to prevent complications such as hypercarbia, supraventricular tachycardia and severe subcutaneous emphysema[9-11].

The video-assisted neck surgery (VANS) method was originally proposed by Shimizu in 1998[12]. This technique approaches the thyroid through an infraclavicular incision and maintains the working space by a skin flap lifting retractor[13,14]. The well-designed holding system makes the operation easy to accomplish and, more importantly, gasless. The patient would be saved from the aforementioned complications of gas. This is an early report of the VANS technique in Thailand.

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Material and Method

From July to October 2015, five patients with thyroid nodules underwent thyroidectomy with gasless video-assisted neck surgery (VANS technique) at Thammasat University Hospital. All patients underwent pre-operative thyroid ultrasonographic evaluation and the nodules were examined with FNA (fine needle aspiration) under ultrasound guidance. The criteria for patient selection were non-malignant thyroid nodules

with a diameter less than 4 cm, no previous neck surgery and no previous neck irradiation. All candidates were informed about the different options of thyroidectomy, cost of each operation, and the risks and benefits of the endoscopic surgery. Then the patients made their own choice. The present study was approved by the Ethical Committee of the Faculty of Medicine, Thammasat University and all patients in the study completed an informed consent form before any operations. The preoperative FNA showed atypical of undetermined significance (AUS) in three patients and benign in two patients. All patients were female with a median age of 35 years (range 23 to 49 years).

During the intra-operative procedure, the patient was in a supine position with a neck extension similar to the conventional technique. The surgeon stood to the side of the nodules and an assistant stood on the same side cranially to the surgeon. After adequate general anesthesia, 1% xylocaine combined with 30 ml of adrenaline was infiltrated into the subcutaneous tissue over the dissecting area of the neck from the ipsilateral infraclavicular area to the level of cricoid cartilage. A 3.0 to 3.5 cm incision was made at three-finger breadths below the lower border of the clavicle, along the skin crease (Fig. 1). Then a wound protective device was applied to protect the skin trauma during dissection. A subplatysma plane dissection towards the thyroid gland was performed by a long monopolar dissecting device under direct vision until adequate space was obtained for a retractor blade insertion (Fig. 2). A special skin-flap lifting retractor was used to maintain the working space. A 0-degree, 5-mm endoscopic camera was inserted through a 5-mm incision with a camera port on the lateral aspect of the neck (Fig. 3). The thyroid gland was approached laterally through the plane between the medial border of sternocleidomastoid muscle and the lateral border of strap muscles. An ultrasonic shear instrument was used

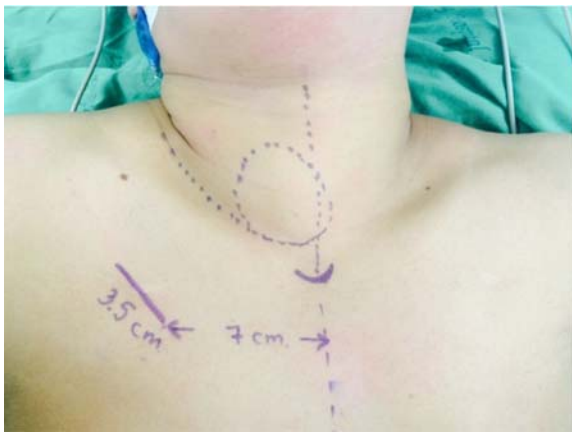


Fig. 1 The anatomical landmark of infraclavicular incision in VANS technique.

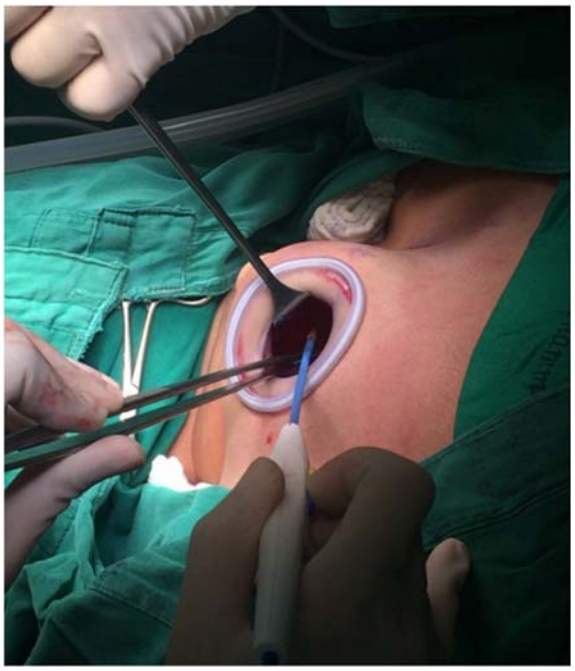
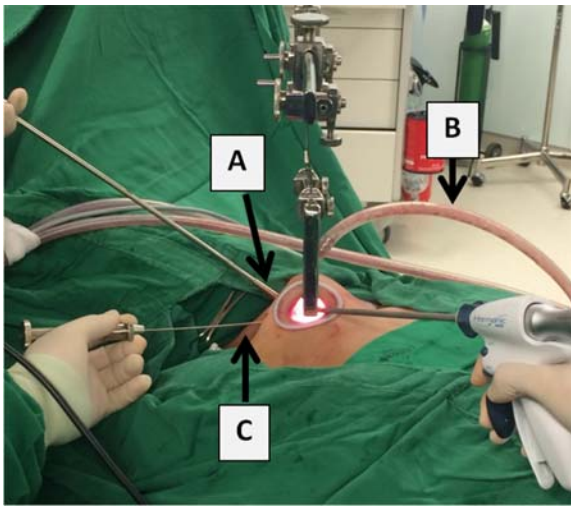


Fig. 2 Subplatysmal skin flap dissection under direct vision. The skin protector helped to protect skin from trauma.



A = camera port, B = suction tube, C = muscle retractor

Fig. 3 Position of the instruments during endoscopic operation.

to dissect and divide the thyroid gland freely from the surrounding structures. The thyroid dissection started from the superior pole, and the vessels were individually ligated close to the thyroid capsule. The parathyroid glands and ipsilateral recurrent laryngeal nerve were identified and preserved. The thyroid gland was retracted upwardly and medially, then the isthmus was divided by the ultrasonic shear device. The dissected specimen was removed through the skin incision and sent for pathologic examination (Fig. 4). After adequate hemostasis was verified, a vacuum drain tube (No. 9) was inserted through the skin incision up into the thyroid bed (Fig. 5). The drain was removed 24 hours after the completion of the operation.

Results

All five patients successfully underwent gasless endoscopic thyroid lobectomy. The mean operating time was 152 minutes (range 136 to 175 minutes), mean blood loss was 34 ml (range 10-80 ml). There was no conversion to open thyroidectomy. Post operative complications, such as hoarseness, hematoma or wound infection, were not found. The post operative pain was only mild to moderate. All patients can move their necks well and appreciated the cosmetic results with the surgical scar covered by their clothes (Fig. 6 and 7). Pathologic results were nodular goiter in four cases and, surprisingly, adenomatous goiter with occult papillary microcarcinoma (size 5 mm) in 1 case. The margins were free of malignancy in the occult cancer case. This patient will be followed-up closely with a physical examination and neck ultrasonography every 6-12 months, there is no need to perform immediate complete thyroidectomy.

Discussion

Since the first report of endoscopic thyroidectomy by Huscher et al in 1997[3], there have

Fig. 4 The gross specimen of the thyroid lobectomy was removed through the incision.

Fig. 5 After skin closure.

Fig. 6 Surgical scar at 2 months after operation.

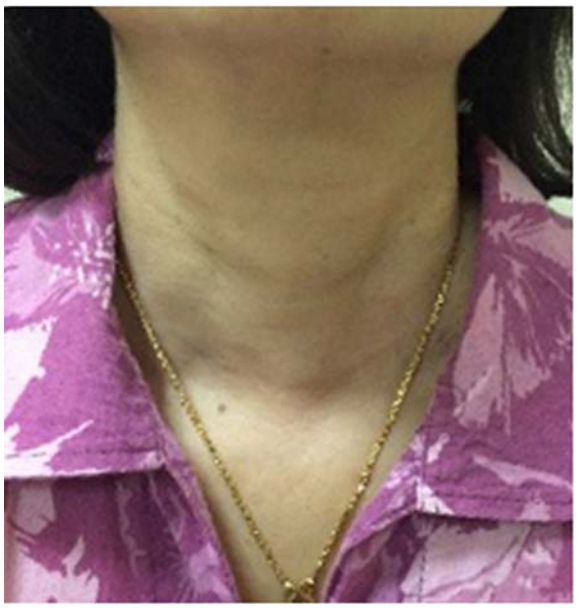


Fig. 7 Cosmetic result of the VANS technique.

been various methods of endoscopic thyroidectomy developed. The main advantage of endoscopic thyroidectomy is an excellent cosmesis. In addition, through the highly magnified vision of the camera, it is easy to identify the recurrent laryngeal nerve and parathyroid glands. On the other hand, endoscopic thyroidectomy has some disadvantages such as a longer operative time, and a higher learning curve to be an expert and higher surgery costs[14].

VANS is a gasless endoscopic technique using a special retractor to maintain a working space, so there are no gas–insufflation–related complications and no problems with gas leakage during dissection. In addition, the VANS method is so attractive to thyroid surgeons because of three more reasons. Firstly, surgeons can apply open-surgery instruments which they are familiar with, to assist dissection and create a surgical plane. Secondly, because of the short distance from incision to the surgical site in the thyroid gland, the surgeons can palpate the lesion with their own fingers, taking a more precise tactile reading because their fingers can touch closer to the problem. Finally, this technique seems to be less invasive compared with the axillary or axillo-breast approach due to a lesser area of skin flap dissection. In comparison, the results of VANS technique were comparable to the previous report of endoscopic thyroidectomy in Thailand[4], such as mean operative time (152 vs. 131.2 minutes) and mean blood loss (34 vs. 51.6 ml). So the VANS technique is feasible and easily learnt by beginners of endoscopic thyroid surgery. These specific results and observations are based solely on the author's experience. With additional experience, the operating time could be significantly reduced, and updates on this subject will be forthcoming.

Conclusion

Currently, there is no evidence suggesting that one particular endoscopic approach is better than another. The choice of approach depends on the surgeon's own experience and the patient's preference. Important factors to get optimal outcomes are carefully selecting suitable patients and experienced surgeons in endoscopic thyroidectomy. This study showed the early experience of VANS technique in Thailand in all 5 cases of solitary thyroid nodules were operated with this technique without any complications. All patients appreciated the cosmetic results. The VANS technique could be an acceptable new option of gasless endoscopic thyroid surgery in Thailand.

What is already known on this topic?

Since 1997, endoscopic thyroidectomy techniques has been developed to improve cosmetic results of thyroid surgery. Currently, there are two techniques for creating the working space in endoscopic thyroid operations. First is gas technique using CO2 insufflation, the gas pressure should be under control to prevent gas-related complications such as hypercarbia and severe subcutaneous emphysema. In contrast, the gasless technique, there is no risk of aforementioned complications. In Thailand, most of endoscopic thyroidectomy operations are gas technique and there were several reports of successful operations from other institutes.

What this study adds?

Video-assisted neck surgery (VANS), a gasless endoscopic thyroidectomy technique was originally proposed by Shimizu from Japan since 1998. The VANS technique has not been used in Thailand, so this could be a new option for Thai endoscopic thyroid surgeons. This study is an early report of the results of the VANS method in Thailand.

Acknowledgments

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Potential conflicts of interest

None.

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รายงานการผ่าตัดต่อมไทรอยด์แบบส่องกล้องโดยไม่ใช้แก๊สด้วยเทคนิค video assisted neck surgery (VANS) ในประเทศไทย

วิไลรัตน์ ประเสริฐ

ภูมิหลัง: การผ่าตัดต่อมไทรอยด์แบบส่องกล้องได้รับความนิยมเพิ่มขึ้นเนื่องจากมีข้อดีด้านความสวยงาม การผ่าตัดต่อมไทรอยด์แบบส่องกล้องในประเทศไทยส่วนใหญ่ใช้วิธีเป่าแก๊สคาร์บอนไดออกไซด์ช่วยสร้างพื้นที่ในการผ่าตัด ซึ่งต้องควบคุมความดันของแก๊สเพื่อป้องกันภาวะแทรกซ้อนที่เกิดจากความดันแก๊สสูงเกินไปในขณะที่การผ่าตัดส่องกล้องด้วยเทคนิค video assisted neck surgery (VANS) ซึ่งเป็นวิธีที่ไม่ใช้แก๊สจะไม่มีความเสี่ยงต่อภาวะแทรกซ้อนดังกล่าวเลย การผ่าตัดด้วยเทคนิค VANS จึงน่าจะเป็นทางเลือกหนึ่งของการผ่าตัดต่อมไทรอยด์แบบส่องกล้องในประเทศไทย

วัตถุประสงค์: รายงานผลการผ่าตัดต่อมไทรอยด์แบบส่องกล้องด้วยเทคนิค VANS

วัสดุและวิธีการ: รวบรวมข้อมูลผู้ป่วย 5 รายที่ได้รับการผ่าตัดต่อมไทรอยด์ด้วยเทคนิค VANS ในช่วงเดือนกรกฎาคม ถึง ตุลาคม พ.ศ. 2558 ที่โรงพยาบาลธรรมศาสตร์ เฉลิมพระเกียรติ เกณฑ์การคัดเลือกผู้ป่วยก่อนผ่าตัดคือผล FNA ของก้อนไทรอยด์ไม่ใช่มะเร็ง, ก้อนขนาดไม่เกิน 4 เซนติเมตร, ไม่เคยผ่าตัดบริเวณคอและไม่เคยได้รับรังสีรักษาบริเวณคอ

ผลการศึกษา: ผู้ป่วยทั้ง 5 รายได้รับการผ่าตัดต่อมไทรอยด์ออกหนึ่งข้าง (lobectomy) ด้วยเทคนิค VANS มีระยะเวลาผ่าตัดเฉลี่ย 152 นาที และเสียเลือดเฉลี่ย 34 มิลลิลิตรโดยไม่มีภาวะแทรกซ้อนที่รุนแรง ผู้ป่วยทุกรายพอใจผลการผ่าตัดโดยเฉพาะด้านความสวยงามที่ไม่มีแผลเป็นบริเวณคอ ผลชิ้นเนื้อเป็น adenomatous goiter 4 ราย และอีก 1 รายเป็น adenomatous goiter ที่มีมะเร็งชนิด papillary ขนาดเล็กกว่า 1 เซนติเมตรซ่อนอยู่และสามารถตัดเอามะเร็งออกได้หมดจากผลชิ้นเนื้อ

สรุป: การผ่าตัดด้วยเทคนิค VANS นั้นปลอดภัยสามารถเป็นทางเลือกหนึ่งของการผ่าตัดต่อมไทรอยด์แบบส่องกล้องในประเทศไทย