



# Minimally Invasive Video Assisted Thyroidectomy: Expanded Indications

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## Abstract:

**Background:** The advantages of minimally invasive video assisted thyroidectomy (MIVAT) include a smaller incision, less extensive surgical dissection, improved visualization secondary to rigid fiberoptics and decreased postoperative pain. As with any new technique, the indications for its application have been conservative while its safety and efficacy are being evaluated. It is most commonly carried out in patients who have no previous neck surgery and who have thyroid glands which are small, lack thyroiditis and relatively small nodules (<2cm). The aims of our study were to report our experience utilizing expanded indications of MIVAT.

**Study Design:** A retrospective chart review of a single surgeon's initial experience with MIVAT.

**Setting:** Tertiary academic medical center

**Results:** Fifty-three patients were identified, 40 underwent total thyroidectomy and 13 underwent hemithyroidectomy. Forty-three (81%) patients were female with an average age of 51 years. Average BMI was 27, including 13 obese patients. Average thyroid volume on preoperative ultrasound was 18.3 cm<sup>3</sup>. Nodule size ranged from 0.7 to 5.4 cm with an average nodule size of 3.2 cm. Three patients had undergone previous neck surgery. Incision length averaged 4.3 cm. Surgical time averaged 113 minutes for hemithyroidectomy and 149 minutes for total thyroidectomy. Eight cases (15.1%) necessitated an increased surgical incision but MIVAT technique continued to be employed in this setting. Parathyroid reimplantation was performed in 4 patients. Average hospital stay was 1.4 days. The average follow-up was 3 months post-op.

The most common finding on pathology was well-differentiated papillary thyroid cancer (69.8%) followed by follicular lesions (9.4%), goiter (9.4%) and benign hurthle lesions (7.5%). There was one patient with poorly differentiated cancer (1.9%). Forty-two percent of patients had evidence of thyroiditis found on pathology. The most common complication was temporary vocal cord paralysis (17%) with only one case of vocal cord paralysis persisting greater than 6 months (1.9%). Six patients (11%) experienced temporary hypocalcemia requiring postoperative calcium supplementation and no patients experienced permanent hypocalcemia. Eleven patients received postoperative radioactive iodine as part of management for their thyroid malignancy. On limited follow-up, there were no cases of recurrence.

### Conclusions:

The use of MIVAT with expanded indications shows comparable complication rates to traditional open thyroidectomy. The preliminary results of this study shows that MIVAT can be carried out in patients with prior neck surgery and can be carried out safely with thyroid glands which have thyroiditis, are larger in volume and have nodules up to 5cm in size. As with any new surgical procedure, a learning curve exists and improved efficiency should occur over time.

## Introduction:

The incidence of well differentiated thyroid cancer is increasing due to the number of incidental thyroid nodules being detected by the increasing use of imaging. [1] Minimally invasive video assisted thyroidectomy (MIVAT), first described by Miccoli in 1999 with a well reported safety record, is an ideal technique for managing patients with small thyroid glands and small nodules with benefits which include a smaller scar, less extensive surgical dissection, decreased postoperative pain, and shorter recovery time. [2, 3, 4] Early studies employed contraindications including large nodules (greater than 25-30mm), thyroiditis, an abnormal thyroid gland (greater than 20cm<sup>3</sup>), prior neck surgery, central compartment neck metastases and large malignant tumors with extrathyroidal extension. [4] With increasing experience it is now possible to carry out this technique with expanded indications. The objective of this retrospective study was to report the outcomes of patients undergoing MIVAT at a high volume academic tertiary care center using expanded indications including patients with prior neck surgery, larger thyroid glands, larger thyroid lesions, and the presence of thyroiditis.

## Methods :

After obtaining institutional review board approval for the study, we performed a retrospective review of patients who had undergone MIVAT for either hemithyroidectomy or total thyroidectomy. Patient data spanned from July 2008 to September 2009. Patient characteristics recorded included age, gender, BMI (weight in kg divided by height squared), and prior neck surgery. Tumor characteristics recorded included size of the thyroid gland, size of the nodule, final pathology, and thyroid volume. Volume was determined by multiplying the dimensions of the thyroid, width x breadth x depth, adding the left and right lobes, then multiplying by (p/6). [5] Treatment characteristics recorded included lobectomy or total thyroidectomy, length of incision, operation time, and hospital length of stay. Postoperative complications (infection, hematoma, recurrent laryngeal nerve palsy as seen on postoperative flexible fiberoptic examination, hypocalcemia defined as serum calcium of 7.8 or less on 2 consecutive measurements) were recorded and compared to reported figures for traditional open surgery.

## Results:

Table 1: Patient Demographic Characteristics

Demographic	n (percentage)
Total Surgeries	53
Thyroidectomy	40 (75)
Hemithyroidectomy	13 (25)
Average Age	51
Gender	
Female	43 (81)
Male	10 (19)
Race	
White	48 (91)
Hispanic	3 (6)
Asian	1 (2)
Median Nodule Size	3.15 cm (1.0-5.3)
Average Thyroid Lobe Volume	18.3 (2.9-50.7)

Table 2: Surgical and Post-surgical parameters

Hemithyroidectomy Average Surgical Time	113 mins
Total Thyroid Average Surgical Time	149 mins
Average Length of Stay	1.4 days
Average follow-up	16 weeks

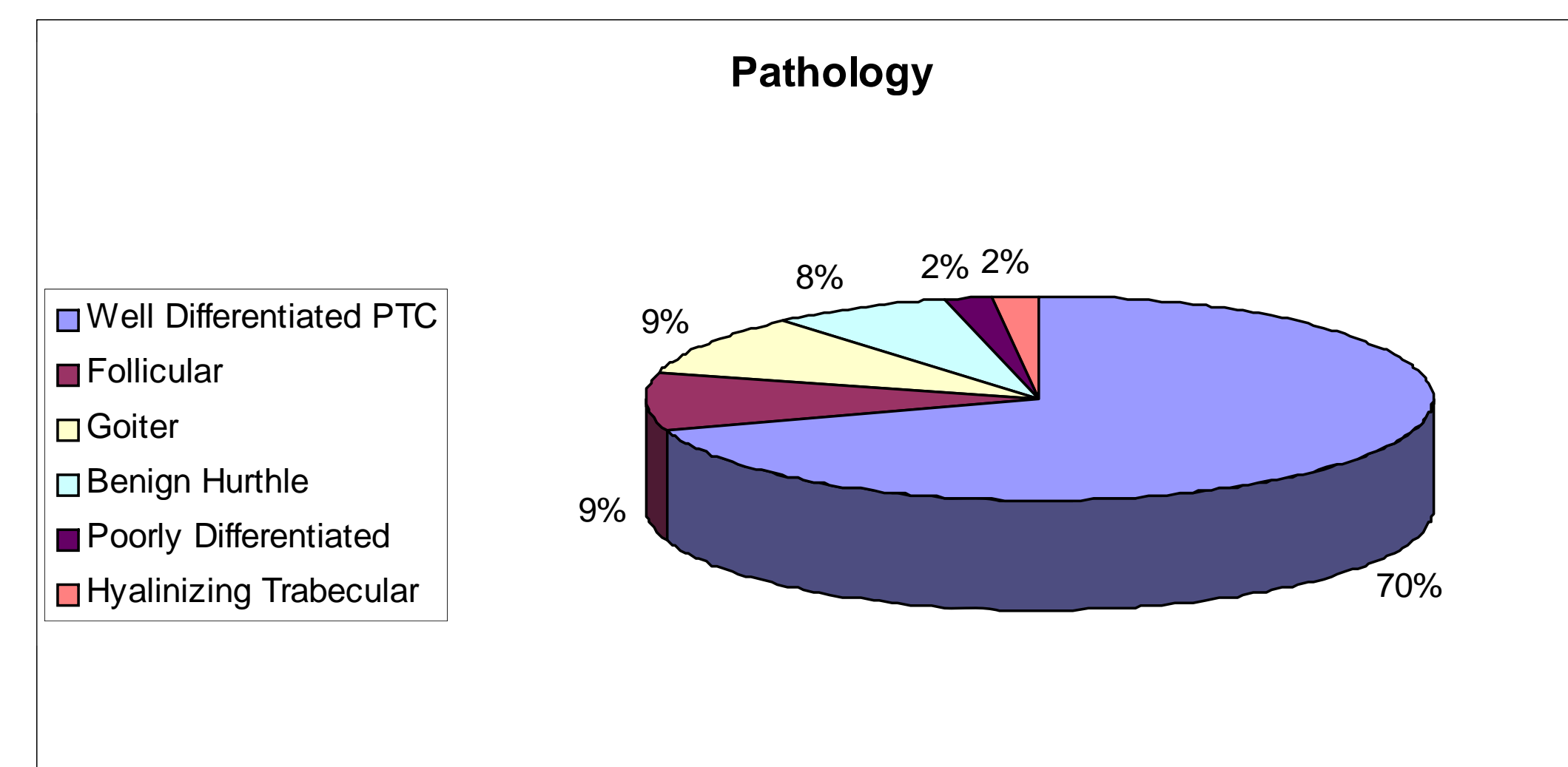


Figure 1. The most common finding on pathology was well-differentiated papillary thyroid carcinoma (70%) followed by follicular lesions (9%), goiter (9%), and benign hurthle lesions (8%). One patient had poorly differentiated cancer.

Table 3: Surgical Complications

Complication	Number (percentage)
Temporary Vocal Cord Paralysis	9 (17)
Vocal Cord Paralysis > 6 months	1 (1.9)
Temporary Hypocalcemia	6 (11.3)
Permanent Hypocalcemia	0 (0)
Hypertrophic Scar	1 (1.9)
Keloid	0 (0)
Wound Infection	1 (1.9)
Seroma	0 (0)
Hematoma	0 (0)

## Discussion

In this study we confirm that MIVAT can be used for expanded indications. Prior studies limited the technique to smaller thyroid nodules (2.5 to 3.0 cm), low volume thyroid lobes, patients without prior neck surgery, and predominantly benign disease. Thyroiditis was also a contraindication to the minimally invasive approach.

On average, patients in this study undergoing MIVAT had larger thyroid volumes, larger nodules, and higher rates of malignant disease than in previously published studies using this technique. We experienced an increased rate of temporary vocal cord paralysis with this technique when compared with traditional open thyroidectomy. The incidence of other complication rates such as hematoma, wound infection, hypocalcemia, and permanent vocal cord paralysis were comparable.

Prior reported rates of temporary recurrent laryngeal nerve paralysis with open thyroidectomy range from 0.5 to 8.9%. [1, 2] Rates of permanent recurrent laryngeal nerve paralysis, or paralysis lasting longer than 6 months, range from 1.2 to 5.2% of cases. [3] Our study showed a high rate of temporary recurrent laryngeal nerve paralysis (17%), which may be a consequence of immediate routine postoperative evaluation of all patients by flexible laryngoscopy. With increased experience we anticipate a reduction in the incidence of temporary vocal cord dysfunction. Our rate of permanent recurrent laryngeal nerve paralysis (1.9%) was within the range reported for open thyroidectomy. Temporary hypocalcemia occurred in 11% of patients, also within the reported averages of 3 to 25%. [1, 4, 5]

## Conclusions:

Conclusions:

We establish the safety of MIVAT with expanded indications and add further support for the safety and adaptability of the procedure to other centers. MIVAT can be applied to patients with expanded indications with comparable rates of hematoma, wound infection, hypocalcemia and permanent vocal cord paralysis.

## References:

- Runkel, N., et al., *Surgical training and vocal-cord paralysis in benign thyroid disease.* Langenbecks Arch Surg, 1998. 383(3-4): p. 240-2.
- Shaha, A. and B.M. Jaffe, *Complications of thyroid surgery performed by residents.* Surgery, 1988. 104(6): p. 1109-14.
- Manolidis, S., et al., *Thyroid surgery: a comparison of outcomes between experts and surgeons in training.* Otolaryngol Head Neck Surg, 2001. 125(1): p. 30-3.
- Cummings CW, ed. *Otolaryngology: Head & Neck Surgery.* 4th ed. 2005, Mosby.
- Foster, R.S., Jr., *Morbidity and mortality after thyroidectomy.* Surg Gynecol Obstet, 1978. 146(3): p. 423-9.