

Minimally Invasive Endoscopic Thyroidectomy: A Case Report of the First Clinical Experience

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Introduction: Since 1996 with improvement of endoscopic instrumentation several novel minimally invasive techniques have been developed to perform thyroid operations. The advantages of endoscopic procedure includes better magnification of anatomy, improved illumination of the operation field, earlier recovery, better pain control, and better cosmetic results. Yet it's performed rarely and only by few surgeons around the world, as it has some limitations like the size of the nodule.

Case Presentation: We herein present a patient with right-sided thyroid cold nodule and follicular presentation on fine needle aspiration (FNA), which successfully underwent endoscopic thyroidectomy through an axillary incision in Hazrat Rasul Akram hospital and tolerated the procedure well without any complications and was discharged with a very good condition.

Conclusions: If the indications and contraindications of minimally invasive thyroidectomy are taken into account, it seems to be a safe procedure and regarding the benefits of this procedure, it's recommended that surgeons pay more attention to this newly developed technique.

Keywords: Minimally Invasive Surgery; Thyroidectomy; Thyroid Nodule

1. Introduction

Nowadays minimally invasive thyroidectomy and parathyroidectomy are performed rarely and only by few surgeons around the world. Traditional thyroid surgery, on the other hand, will leave a cosmetically unfavorable scar on the anterior surface of the neck. Moreover the open procedure, with a 6-12 cm incision on the neck, will be a very invasive procedure, causing the traumas to be serious, as far as many vital structures like recurrent laryngeal nerve (RLN) are adjacent to the thyroid gland. Therefore many researchers and surgeons have tried to introduce less invasive procedures in order to minimize the trauma, including minimally invasive nonendoscopic thyroidectomy (MINET) performed by a less than 3.5 cm incision on the neck plus retraction (1).

Since 1996 with introduction of cervical endoscopic parathyroidectomy by Gagner (2) and with the improvement of endoscopic instrumentation, several new minimally invasive endoscopic techniques (MIT) have been developed to perform thyroid operations (3). The minimally invasive procedure offers better magnification of the anatomy, improves illumination of the operative field, leads to faster recovery, is less painful, and has better cosmetic results (4). Patients with small thyroid nodules (less than 3 cm) are considered candidates of the minimally invasive approaches.

Ikeda et al. have introduced minimally invasive endoscopic thyroidectomy via axillary incision in 2001 (5). Recent studies have shown that it has good cosmetic results, shorter hospital stay, and less complication rate, compared with traditional open technique (6-8) but needs high surgical experience and skill in addition to carefully selection of patients (9). The major disadvantages consist of need for expensive equipment and longer procedure time (10). Small well-differentiated thyroid cancers are amenable to a minimally invasive approach as long as there is no clinical or radiographic evidence of gross invasion (11). We present our patient as the first clinical experience of minimally invasive thyroidectomy through axillary incision, with this size of the nodule without any intra-operative and postoperative complications.

2. Case Presentation

A 24 year-old female with a recent growth of a thyroid cold nodule referred to the department of minimally invasive surgery of Hazrat Rasul Akram hospital. Thyroid cold nodule in this patient, who had no other complaints or underlying disease, was diagnosed two years before. The patient had been treated with 100 mg oral levothyroxine once daily for four months due to a sus-

pected diagnosis of hypothyroidism. Nevertheless the medication was stopped one year prior to our operation. Thyroid function tests were normal. Ultrasound evaluation showed a solid-cystic structure in the right lobe of thyroid with diameters of 57 mm × 30 mm × 32 mm and septations in the cystic portion. Thyroid scan showed a cold nodule involving the right lobe. Fine needle aspiration revealed a follicular lesion.

Considering the patient's request due to cosmetic concerns and good condition of the patient, she was chosen for MIT procedure. Informed written consent was obtained from the patient. After normal pre-operational work-up, she was scheduled for the operation. Under general anesthesia she was placed in the supine position with a roll placed between scapulae to extend the neck and the arm was then extended and abducted above patient's head. We marked the sterno-cleido-mastoid (SCM) muscle and its sternal and clavicular heads, sternal notch, Adam's apple, thyroid gland, and the route from axillae towards thyroid. Working space was created by a 5-6 cm axillary incision in axillae posterior to lateral border of pectoralis major muscle to expose the area. Skin and subcutaneous flap dissection toward thyroid above the pectoralis major muscle was done with cardiac cautery pen. Claviculo-sternal junction and clavicular and sternal head of SCM was identified; between these heads we continued the dissection and thyroid and thyroid gland was visualized. For thyroid retraction one port was placed in mid-clavicular line 2-3cm below clavicle bone and instrument was tunneled towards thyroid through subcutaneous tissue. With great attention to carotid artery and internal jugular vein, inferior pole of thyroid was dissected and divided. Then middle thyroid vein was divided by harmonic scalpel. RLN was identified and dissection was continued towards upper pole of thyroid and with preservation of upper parathyroid gland, upper pole vessels were dissected and divided. Then thyroid lobe was dissected from trachea and isthmectomy was done. The specimen was removed and no drain was put in place.

Post-operative pain was controlled by 100 mg oral intake of indomethacin for two days each 8 hours after the procedure. The patient was discharged in a very good condition and without any visible scar.

3. Discussion

Our case had no intra-operative or postoperative complications and the procedure was done flawlessly, although it has been proposed that MIT should be only used for nodules of less than 3 cm. Some studies have reported cases that needed to be reversed to open procedure and some others have reported peri-operative complications.

Cavicchi reported 46 MINET procedures with one case of laryngeal nerve palsy and two conversions to open procedure (12). But they declared the technique as a safe method with quite fast learning curve. Fik et al compared MINET with minimally invasive video-assisted approach

(MIVAT) and announced benefits for both techniques with less analgesic consumption for MIVAT (13).

Considering the admirable advantages of the endoscopic minimally invasive thyroidectomy (eMIT), such as minimized pain, shorter hospital stay, less blood loss, and improved cosmetics, various studies have proven MIVAT to be a good choice. Yet many considerations have to be undertaken to minimize the complications, the most important of which is carefully selection of the candidate (11). Relative contraindications for eMIT include thyroid nodules greater than 3 cm, large goiters, morbid obesity, severe graves' disease, previous neck surgery, and history of radiation (6, 7, 14).

As studies suggest, MIVAT procedure has a slower learning curve; 20 cases as Del Rio states (15). As we have also experienced in this study, the procedure takes longer than open procedure and requires more surgeon's experience to handle the instruments and is considered a more difficult surgery for the surgical team. On the other hand many considerations have to be taken for exact choice of the patient, such as general condition of the patient and the mass features, including size, pathology and invasion. We have reported this case as case report, as we have used eMIT although the nodule size was as gross as 57 mm, which has been suggested to be operated by open procedure. As far as we had no complications during the procedure, the authors suggest that MIT could be used for larger nodules in selected patients.

Although there exists general agreement that eMIT is a valid and feasible option for carefully selected patients, superiority of endoscopic to other methods of MIT has to be demonstrated by further detailed investigations.

Authors' Contributions

The surgery was performed by Dr. Pazouki, Safamanesh, Eydi and the manuscript was drafted by Dr. Tamannaie and Jesmi and critically revised by Dr. Pazouki.

References

1. Park CS, Chung WY, Chang HS. Minimally invasive open thyroidectomy. *Surg Today*. 2001;31(8):665-9.
2. Gagner M. Endoscopic subtotal parathyroidectomy in patients with primary hyperparathyroidism. *Br J Surg*. 1996;83(6):875.
3. Landry CS, Grubbs EG, Morris GS, Turner NS, Holsinger FC, Lee JE, et al. Robot assisted transaxillary surgery (RATS) for the removal of thyroid and parathyroid glands. *Surgery*. 2011;149(4):549-55.
4. Gagner M, Inabnet WB, 3rd. Endoscopic thyroidectomy for solitary thyroid nodules. *Thyroid*. 2001;11(2):161-3.
5. Ikeda Y, Takami H, Niimi M, Kan S, Sasaki Y, Takayama J. Endoscopic thyroidectomy by the axillary approach. *Surg Endosc*. 2001;15(11):1362-4.
6. Slotema ET, Sebag F, Henry JF. What is the evidence for endoscopic thyroidectomy in the management of benign thyroid disease? *World J Surg*. 2008;32(7):1325-32.
7. Ivarado R, McMullen T, Sidhu SB, Delbridge LW, Sywak MS. Minimally invasive thyroid surgery for single nodules: an evidence-based review of the lateral mini-incision technique. *World J Surg*. 2008;32(7):1341-8.
8. Radford PD, Ferguson MS, Magill JC, Karthikesalingham AP, Alusi G. Meta-analysis of minimally invasive video-assisted thyroidectomy. *The Laryngoscope*. 2011;121(8):1675-81.

9. Wilhelm T, Metzig A. Video Endoscopic minimally invasive thyroidectomy: first clinical experience. *Surgical Endoscopy*. 2010;**24**(7):1757-8.
10. Liu J, Song T, Xu M. Minimally invasive video-assisted versus conventional open thyroidectomy: a systematic review of available data. *Surgery Today*. 2012;**42**(9):848-56.
11. Minuto MN, Berti P, Miccoli M, Ugolini C, Matteucci V, Moretti M, et al. Minimally invasive video-assisted thyroidectomy: an analysis of results and a revision of indications. *Surgical Endoscopy*. 2012;**26**(3):818-22.
12. Cavicch IO, Piccin O, Ceroni AR, Caliceti U. Minimally invasive nonendoscopic thyroidectomy. *J Am Academy Otolaryngol-Head Neck Surg*. 2006;**135**(5):744-7.
13. Fik Z, Astl J, Zabrodsky M, Lukes P, Merunka I, Betka J, et al. Minimally invasive video-assisted versus minimally invasive nonendoscopic thyroidectomy. *BioMed Res Int*. 2014:450170.
14. Miccoli P, Berti P, Frustaci GL, Ambrosini CE, Materazzi GV. Video-assisted thyroidectomy: indications and results. *Langenbeck's Arch Surg*. 2006;**391**(2):68-71.
15. Del Rio P, Sommaruga L, Cataldo S, Robuschi G, Arcuri MF, Sianesi M. Minimally invasive video-assisted thyroidectomy: the learning curve. *Eur Surg res*. 2008;**41**(1):33-6.