

## USE OF LAPROSCOPE AS MAGNIFICATION DEVICE IN THYROID SURGERY

## Surgery

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## KEYWORDS

## INTRODUCTION

Total thyroidectomy and unilateral thyroid lobectomy are common surgical procedures. However, they can lead to specific complications. The most common of them are related to laryngeal nerves (recurrent laryngeal nerve (RLN), external branch of superior laryngeal nerve (EBSLN)) and parathyroid glands<sup>1</sup>.

Two important risk factors of these complications are the extent of thyroidectomy and the surgeon's experience<sup>2</sup>. Therefore, a microsurgical approach in thyroid surgery by using magnifying loupes or surgical microscope is believed to enhance the surgeon's precision. Also, it was stated that the above anatomical structures could be identified in an easier way during the operation<sup>3</sup>.

The first microsurgical thyroidectomy was reported in 1975 by Atti et al<sup>4</sup>. Since then, the experience of some expertized centers in microsurgical approach of thyroidectomy have been presented in the literature. According to them, the surgical microscope is recommended in thyroid surgery due to a lower incidence of complications<sup>5-10</sup>.

The two most common early complications of thyroid surgery are hypocalcemia (20-30%) and recurrent laryngeal nerve injury (5-11%). The use of loupes and microsurgical technique helps in identify the thin branches of laryngeal nerve which is particularly exposed at risk and tertiary branches of inferior thyroid arteries. An excellent anatomical knowledge is necessary for the surgeon to identify and preserve every parathyroid gland and RLN<sup>11</sup>.

## Aims :-

- Use of laparoscope as magnification device in thyroid surgery to reduce the incidence of post operative hypocalcemia and laryngeal paralysis.

## OBJECTIVES:-

- To avoid the injuries to the tertiary branches of inferior thyroid arteries and laryngeal nerve at risk intra operatively.

## MATERIAL AND METHODS

## Study Site

Department of Surgery, Rajendra Institute of Medical Sciences, Ranchi.

## STUDY PERIOD

Dec 2018 - Jun 2019

**Materials :** All Patients of thyroid enlarged who underwent thyroid surgery were included in the Study.

## METHODOLOGY:

Over A Period of seven Months 15 Patients Treated for thyroid disease and underwent surgery were Included in this Prospective Randomised Study.

A zero degree 3-Dimensional (Karl Storz) laparoscope with 10x magnification was used. All the patients had Pre and post operative vocal cord assessment by Fibre Optic Nasolaryngoscopy. Calcium level were noted pre operatively and post operatively (day 1, 2 and 7).

Patients were Randomly Divided into Two Equal Groups.

Group I (Control Group) Were Subjected to thyroid surgery with Aided magnification device.

Group II (Study Group) were Subjected to conventional surgery (Unaided)

**Type of Study :** prospective observational study

**Sample Size :** 15

## INCLUSION CRITERIA:

- All the patients visited RIMS in whom there was thyroid enlargement and operated for that.
- Patients who gave consent for study.
- Age >18 yrs and <50 yrs

## EXCLUSION CRITERIA:

- Cases of proven (a) pre-op hypo/hyper parathyroidism & (b) previous vocal cord/nerve problem

**Type of analysis:** Clinical data analysis

## Statistical Analysis

Descriptive statistics was done for all data and suitable statistical tests of comparison were done. Continuous variables were analysed with the Unpaired test and categorical variables were analysed with Fisher Exact Test. Statistical significance was taken as  $P < 0.05$ . The data was analysed using SPSS Version 16. Microsoft Excel 2010 was used to generate charts

## OBSERVATION:

## AIDED VS CONVENTIONAL

The magnification can be achieved by using telescope (laparoscope)



**Fig-1: Magnified view of thyroid bed showing tertiary branches of inferior thyroid arteries, recurrent laryngeal nerve and inferior parathyroid gland**



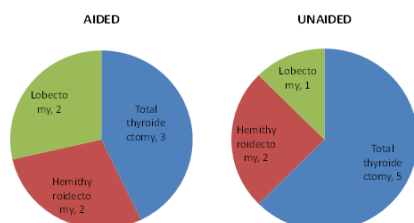
**Fig 2: Magnified view using laparoscope**

**RESULTS:****Table-1:Sex Incidence**

Sex	No. of Patients
Male	• 2
Female	• 13

**Table-2:Indications for Surgery**

Indications	Surgery	No. of Patients
Multinodular goitre	Hemithyroidectomy	4
	-Lobectomy	2
Follicular neoplasia	Total thyroidectomy	4
Papillary carcinoma	Total thyroidectomy	2
Colloid goitre	Total thyroidectomy	2
Thyroid cyst	Lobectomy	1

**Total Surgery Done****Table-3:Preoperative vocal status:**

Pre op vocal cord	No. of patients
Bilateral vocal cord moving equally	15
Unilateral vocal cord palsy	None

Signs of hypocalcemia (Perioral numbness, Chevstek's sign and Trousseau's sign) in post operative day

**Table-4:**

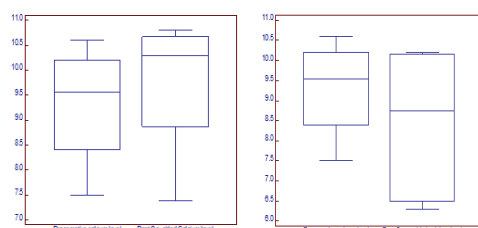
Signs of hypocalcemia in post op	No. of cases	Cases observed in
Present	3	Total thyroidectomy done in 2 -follicular neoplasia 1- papillary carcinoma
Absent	12	

**Table-5: Preoperative Calcium Level:**

Grading	Calcium level
Maximum	10.5meq/ml
Minimum	7.5meq/ml
Mean	8.6meq/ml

**Table-6: Post Op. calcium levels after thyroid surgery.**

Post op calcium level	Inaided patients (n=7)	Inunaided patients (n=8)	pvalue
Maximum	10.7	10.2	0.0127(S)
Minimum	7.4	6.3	
Mean calcium level	9.75±1.30	8.41±1.83	

**Table-7: Post Op. calcium levels after thyroid surgery:**

Procedure	Signs of Hypocalcemia	Calcium Supplementation	Biochemical recovery
Unaided	3	3	1
Aided	0	-	-

**Table-8: Post-operative vocal cord status following surgery:**

Vocal Cord Status	Number	Speech Therapy	Recovery after 8 weeks
AIDED			

B/L Vocal Cord equally moving	7	-	-
U/L Vocal Cord Palsy	0	-	-
<b>UNAIDED</b>			
B/L Vocal Cord equally moving	5	-	-
U/L Vocal Cord Palsy	3	3	1

**DISCUSSION**

In our prospective study of 15 cases that underwent Thyroid surgery out of which 8-total thyroidectomy done, 4-Hemithyroidectomy done, 3-Lobectomy done. 2 were male patients and 13 were female patients.

In our study the incidence of recurrent laryngeal nerve injury and post operative hypocalcemia was found more with cases of total thyroidectomy.

The incidence of transient vocal cord palsy in aided surgery was 0.76% in Orazi et al study<sup>5</sup>, 0.6% in Nielessen et al<sup>12</sup> and 0.1% in Doikov et al study<sup>7</sup> which remains consistent with our study. While post operative hypocalcemia was observed in 10.7% in Orazi et al<sup>5</sup>, 6.5% in Nielessen<sup>12</sup> et al study, compared to 3 cases in our study.

In addition, magnification techniques could be combined with intraoperative neuromonitoring (IONM) regarding the identification of laryngeal nerves<sup>13</sup>.

However, a steep learning curve is necessary for IONM implementation. Otherwise, the risk of RLN injury may be increased<sup>14</sup>.

Finally, because thyroid surgery and magnification techniques require expertise, the surgeon's experience is a risk factor that should always be taken seriously into account<sup>15</sup>.

**CONCLUSION**

- The use of laparoscope as magnification device in the thyroid surgery is safe and effective procedure.
- It requires short learning curve and is accessible to all trainee/assistant in operation theatre.
- Use of laparoscope as magnification as an aid to conventional thyroid surgery has proved to reduce postoperative complications and helpful in image storage and medicolegal standpoint.

**Limitations**

- This is a study of short duration and small sample size.
- Efficacy in revision surgery was not included.
- Identification of at risk nerves was unexplored.
- Achievement of real total thyroidectomy was debated.

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