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Incidence of vocal cords palsy and hypocalcaemia in reoperative thyroid surgery: A visit to an old friends

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Abstract

Introduction: Subtotal thyroidectomy although associated with less complications but also with increased risk of recurrent goiter in future. It was the procedure of choice for patients with goiter until 1980s.

Patients and Methods: 128 patients with recurrent goiter, in whom vocal cord palsy and hypocalcaemia were excluded preoperatively by examination and biochemical estimation of serum calcium, were operated upon in our institution from January 2016 to Apr2024 and examined postoperatively for vocal cord palsy and Hypocalcaemia and data reported.

Results: No vocal cord palsy reported. 1 case of hypocalcaemia (0.7%).

Discussion: Most of the studies in the last 20 years all over the world reported higher incidence of Complications in Reoperative thyroid surgery.

Conclusion: In experienced hands, Revision thyroid surgery is associated with very low incidence of vocal cord palsy and Hypocalcaemia and Patients with recurrent thyroid disease should not be denied from reoperation because of fears of these complications.

Keywords: Revision, reoperative, thyroid surgery, complications

Introduction

A recurrent goiter is the regrowth of thyroid tissues after thyroidectomy. This may occur after surgery for benign disease or malignancy of thyroid. While recurrence after surgery for benign disease should be preventable, recurrence after malignant disease depends on many factors. Recurrences of multinodular goiter (MNG) account for up to 12% of all thyroid operations [1] Surgery for recurrent goiter is associated with a higher complication rate.

From early times, thyroid surgery was embroiled in controversy. First, thyroidectomy was supposed to have been done by Albucasis (El Zahrawi) in 975 AD [2, 3]. The first credible reports of thyroid surgery came from the School of Salerno in the 13th century, and by 1850 only 14 successful partial or total thyroidectomies had been reported across Europe— results were appalling.2,3 In 1850, the French Academy of Medicine banned thyroidectomy due to the fear of complications and uncertainty in histological classification. Subtotal thyroidectomy (STT) was the main operation for goiters until the 1980s. The main issue with a subtotal surgery is recurrence [4-8]. One of the primary reasons why subtotal thyroidectomy fails can be attributed to the fact that STT does not treat the underlying generalized disease process adequately. Multinodular goiter and toxicity are the main indications for thyroidectomy in benign disease. Subtotal thyroidectomy does not offer a curative operation in either of these conditions. Hence, recurrence is to be expected after STT. The practice of offering STT continued for over 100 years due to the fear of complications alluded to the above. Multinodular goiter is thought to be the result of primarily two factors. The first factor is genetic heterogeneity of follicular cells with regard to function (i.e., thyroid hormone synthesis) and growth. Genetic analysis has identified two chromosomal regions (MNG-1 and Xp 22) in multinodular goiter [9]. The second factor is the acquisition of new qualities that were not present in mother cells and become inheritable during further replication. The pathological process of MNG disease affects the whole gland. If part of a MNG is removed, the remnant is likely to grow again.

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2. Patients and Methods

2.1 Description of the Study

This is a single center observational study at Al Dewania General Teaching Hospital -Iraq-Al Dewania Governorate, a total of 128 case of Structurally persistent or recurrent Thyroid Resection procedure done over the period January 2016 to April 2024 by one surgeon who is double Arab and Iraqi Board qualified Member in General Surgery with 20-year experience in Thyroid Surgery.

2.2 Inclusion and Exclusion Criteria

144 Patients visited or transferred to our Thyroid Clinic, seeking medical care and surgical Opinion about their Recurrent Goiter were assessed by the surgical Team and consented about the surgery and the study. Data of each patient were collected and reported in a predesigned Forma including patient age, Gender, Date of first operation, number of previous thyroid surgeries, indications of revision surgery, anatomy of Recurrence and TIRAD classification was estimated by Neck ultrasound.

All patients were examined by Indirect Laryngoscopy to assess the vocal cords, those who proved to have vocal cord palsy were excluded from the study.

All patients were examined for features of Hypocalcaemia and Serum Calcium was estimated, and Those who tested low were excluded from the study.

2.3 Procedure

Procedure was done via Anterior Approach, Scar revised and Superior and inferior Subplatysmal flaps were elevated, Ligasure Technology with Curved Jaw Disposable open handle was utilized in achieving excellent hemostasis and Bilateral carotid Sheaths were localized and bilateral paratracheal spaces and Tracheoesophageal grooves were entered and complete exploration of regions of superior and Inferior pedicles bilaterally was done. Frequent Saline Wash of the field aids in identification of vital structures including RLN and Parathyroid glands.

Level up to the suprahyoid spaces bilaterally were considered the superior margin of the procedure and Bilateral Carotid Sheaths were considered the lateral Margins of exploration, retro clavicular and retrosternal regions were explored routinely and considered the inferior margin of the procedure. Negative Pressure Drain was used in all cases. Wound was closed in layers.

2.4 Postoperative Assessment and Results Obtaining

We searched for Vocal Cords Palsy in the immediate postoperative period after Endotracheal extubation by the Anesthetist via Direct Laryngoscopy. Also Patients were frequently examined clinically for Strider and voice Changes in the early postoperative period. Hypocalcaemia was assessed clinically and Biochemically by serum Calcium estimations until Day 10 postoperatively.

2.5 Data were Reported accordingly

This study was conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was taken from all patients.

3. Results

3.1 Number: 144 patients who had previous thyroid surgery in our institutions and in other institutions, visited our clinic searched for medical care regarding their Neck swellings or follow up of their thyroid disease status. 128 patients were enrolled in our study. 14 patients were excluded due to

asymptomatic unilateral vocal cord palsy (3 cases) and Hypocalcaemia (11 case).

3.2 Gender: 78 (60.9 %) were female and 50 male (39.1%).

Table 1: gender distribution.

Gender	No.	Percent
Male	50	39.1%
Female	78	60.9%
Total	128	

3.3 Age: Age was ranging from 24 years old to 67.

3.4 date of first thyroid surgery: ranging from 3 yrs to 25 yrs.

3.5 number of previous thyroid surgeries: 118(92.1%) had one surgery and 9 (7.03 %) had two and 1 (0.78 %) case had three.

Table 2: previous surgeries

Number of previous Surgeries	No.	Percent
One	118	92.2%
Two	9	7.02%
Three	1	0.78%

3.6. Indications of surgery: were cosmetic concerns and Patient wishes (5 cases, 3.9 %), Suspicious Thyroid Nodules (114 case, 89.06 %) And Retrosternal and tracheal compression (9 cases, 7.03%)

Table 3: indication for surgery.

Indications of surgery	No.	Percent
Cosmetic	5	3.9%
Suspicious Thyroid Nodules	114	89.08
Retrosternal and tracheal compression	9	7.02%
Total	128	

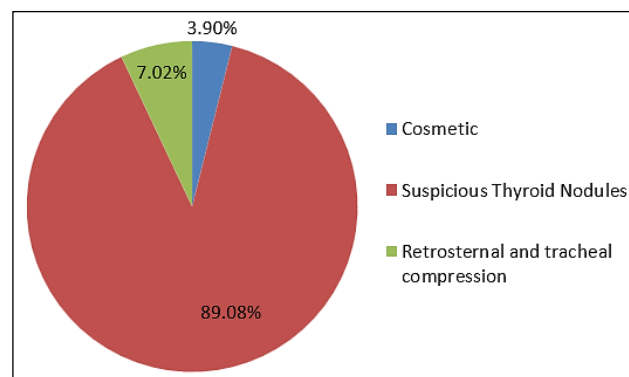


Fig 1: indication for surgery.

3.7 TIRAD Classification: Class I: 11 case (8.5%), Class II: 49 cases (38.2%) Class III: 38 cases (29.6%) Class IV: 40 cases (31.2%) Class V: 3 cases (2.3%). Note: different classes in the same patients of multinodular goiter was diagnosed.

Table 4: Reveal TIRAD Classification.

TIRAD Classification	No.	Percent
Class I	11	8.5%
Class II	49	38.2%
Class III	38	29.6%
Class IV	40	31.2%
Class V	3	2.3%

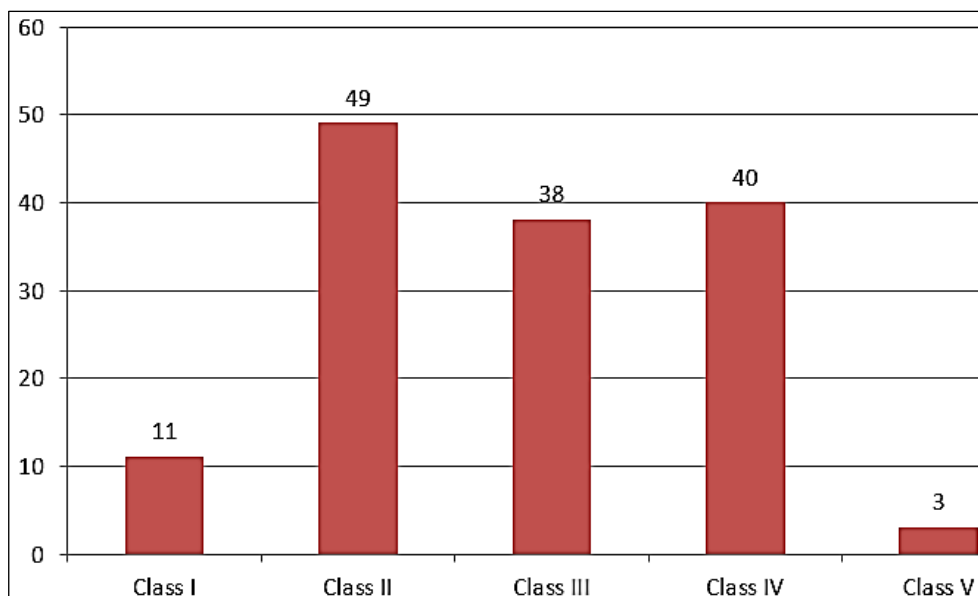


Fig 2: show TIRAD Classification

3.8. Anatomy of recurrence: 7 regions were noticed to be sites of recurrence and these are

Right Superior pedicle: 33(25.7 %) Left superior Pedicle: 92(71.8%) Left Zucker Kandle region: 91(71 %)

Right Inferior pedicle: 37 (28.9%) right ZuckerKandle region: 128(100%) left inferior pedicle: 9(7.03%)

Retrosternal/Retroclavicular: 9(7.03%)

101 patients were having combined recurrence in more than one region.

Table 5: show anatomy of recurrence.

Anatomy of recurrence	No.	Percent
Right Superior pedicle	33	25.7%
Left superior Pedicle	92	71.8%
Left ZuckerKandle region	91	71%
Right Inferior pedicle	37	28.9%
ZuckerKandle region	128	100%
left inferior pedicle	9	7.02%
Retrosternal/Retroclavicular	9	7.02%

3.8 No cases of vocal cord palsy were reported (0%). One case of hypocalcaemia was reported (0.7%)

Discussion

Over the years, revision thyroid surgery was associated with increased risk of complications in regard of vocal cord palsy and Hypocalcaemia. (R) Incidence of RLN injury and Hypoparathyroidism in the revision thyroid surgery was reported to be 1.5-5 % and 0-5.6 % respectively [10-23].

Revision thyroid surgery for recurrent goiter or thyroid nodule disease is considered to be very challenging procedure to the surgeons, that's because they may encounter significant difficulty in identification and preservation of vital structures including RLN and Parathyroid glands because of scarring and distortion of anatomy caused by prior surgery [15-24].

The crucial part of the revision surgery understanding is knowing that the carotid sheaths, following the prior surgery, medialize and narrow the paratracheal spaces and tracheoesophageal grooves bilaterally where RLN may be buried inside. Fig 1, Fig 2

With careful meticulous dissection and good hemostasis achieved with Ligasure and wash out of dissection tiny

debris by saline, Tracheoesophageal groove can be opened, Once it is opened the identification of RLN and parathyroid glands was achieved or at least, the course of the nerve is recognized and can be avoided while respecting the recurrent thyroid tissue. Additional care was given to the preservation of parathyroid glands and its blood supply by minimizing dissection far from the recurrent tissue as this may result in cutting off the blood supply of the glands in the fields from superior and inferior thyroid arteries. It's worth mentioning that frequent saline wash aids also in the recognition of the parathyroid glands by showing its standard color that's typically light brown to reddish tan [25]. Fig 3 and 4.

In our study, we reported incidence of vocal cord palsy of 0 % and Hypocalcaemia of 0.7 %.

This study documents that in the experienced hands, revision thyroid surgery can be performed with very low Morbidity.

We achieved a complication rate lower than most of studies published in the last 20 years in different parts of the worlds [16-24]. The latest two studies on 2023 and 2024 showed incidence of hypocalcaemia and vocal cord palsy of 4 % and 5% [26,27]. We believe we achieved less incidence of such complications due to our meticulous approach in dissection and good hemostasis that aids greatly in improved surgical vision and perception of anatomy.

Conclusion

In experienced hands, Revision thyroid surgery is associated with very low incidence of vocal cord palsy and Hypocalcaemia and Patients with recurrent thyroid disease should not be denied from reoperation because of fears of these complications.

Limitations of the study: Single center study done by one surgical team. Most of the patients were operated upon the initial surgery in some other institutions and a long time ago and it wasn't possible to obtain complete exact information about that operation. We studied only two major complications which are Vocal cord palsy and Hypocalcaemia, other complications like Seroma,

Aneasthetic complications and complications associated with patient comorbidities like DM or CVS disease were not included in this study.

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