

Thyroidectomy evaluation, used as the First-Line Treatment for Thyroid Cancer: A Retrospective Study

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Abstract

Aim: To evaluate the outcome of Thyroidectomy, used as the First-Line Treatment for Thyroid Cancer

Study design: A retrospective study

Place and Duration: This study was conducted at Liaquat University of Medical Health Sciences Jamshoro, Pakistan from June 2017 to June 2021.

Methodology: A total of 120 participants with differentiated thyroid carcinoma who had their thyroid removed completely were included in this study. The link between individual (gender and age) and tumor (size and histotype) attributes and clinical and pathological aspects (extra thyroid tumor development, bilaterality, nodal and distant metastases) was assessed. Furthermore, we documented postoperative problems such as hypoparathyroidism and injury to the laryngeal nerve.

Results: We observed a high prevalence of pathological characteristics that indicate cancer severity. In 54 (41 percent) of participants with pre - operatively confirmed lymph node metastases, unilateral or bilateral lymph node excision was done. On the premise of a fine-needle

aspiration cytology (FNAC) detection of cancer, complete thyroidectomy was performed in 95 participants as a primary therapy.

Conclusion: Our findings back up the idea that complete thyroidectomy is still the best therapeutic option for differentiated thyroid carcinoma. Total thyroidectomy, on the contrary, was linked to a reduced prevalence of postoperative complications.

Keywords: Thyroidectomy, postoperative complications, Thyroid Cancer

Introduction

In developed countries, carcinoma is the top cause of mortality, whereas in underdeveloped nations, it is the second highest cause of mortality. [1] The proportion of patients identified with thyroid cancer has risen dramatically in the last 30 years. [2] The cause of the global rise in thyroid carcinoma frequency is unknown. Some experts feel that the rise in numbers is related to alterations in the environment and in people's lifestyles. However, upward patterns were evidently associated with the emergence of fresh and advanced diagnostic methods, as well as enhanced clinical monitoring and availability to healthcare services, all of which can result in huge rises in the identification of tiny papillary tumors triggered by the huge reservoir of symptomless, nonlethal illness recognized to occur in the thyroid gland. Despite the significant occurrence of this neoplasia, general death for DTC is minimal, at about 0.5 instances per 100,000 people, although there is a large probability of local recurrence. [3]

Despite widespread lymph node invasion, the prevalence of differentiated thyroid carcinoma (DTC) has increased in recent decades without materially changing its "weak aggressive character." [4, 5] In reality, 20–50% of individuals had cervical lymph node metastasis, with lymph node micro metastases occurring in about 90% of instances. [6, 7] The first choice of medical treatment of DTC is still debatable. Periodic central neck incision is recommended by some researchers to avoid relapse, noting the significant probability of reactive lymph nodes, improved returns, and reduced mortality rates linked with the initial procedure, [8-10] others argue that having a technique raises the danger of parathyroid gland harm [11-13] and recurrent laryngeal nerves injuries, with lack of any evidence of long-term survival advantages.

Although there is considerable agreement on the need for an initial complete thyroidectomy in patients with higher risks, there is contradictory evidence in patients with reduced risk. It's debatable whether reduced-risk patients should have a whole thyroidectomy or just a lobectomy. Several breakthroughs have been made in the identification and treatment of DTC over the previous 15–20 years, yet clinical dispute still persists. Complete thyroidectomy is advised when the original thyroid cancer is >4 centimeters, if there exists extra thyroidal infiltration, or if local or remote metastases are apparent, pursuant to the most recent ATA recommendations. A bilateral or unilateral thyroidectomy may be appropriate as a therapy approach for tumors that are around 1 and 4 centimeters in size. A bilateral surgery may be recommended if the patient is over 45 years old, has contralateral thyroid nodules, has a previous experience of head and neck

radiation treatment, or has a family background of DTC. The goal of this retrospective study was to share our experiences with DTC patients who had thyroidectomy. Patients' clinical and pathological attributes, such as extra thyroid tumor development, bilaterality, nodal and remote metastases, and the recurrence of additional tumor foci in the opposite lobe, as well as any prevailing associations with participant (gender and age) and tumor features were assessed. Furthermore, we documented postoperative problems such as hypoparathyroidism and injury to the laryngeal nerve.

Methodology

We evaluated 120 individuals who had complete thyroidectomy for invasive illness performed by two distinct medical teams with equivalent operative skills. Permission was taken from the ethical review committee of the institute. Complete thyroidectomy was performed in all participants. In 54 (41 percent) of participants with pre - operatively confirmed lymph node metastases, unilateral or bilateral lymph node excision was done. On the premise of a fine-needle aspiration cytology (FNAC) detection of cancer, complete thyroidectomy was performed in 95 participants as a primary therapy. In the remainder of 25 patients, where FNAC was inconclusive, a lobectomy with isthmectomy was conducted first, followed by the excision of the contralateral lobe (complete thyroidectomy) once the conclusive histopathologic assessment was obtainable. Participants were divided into groups based on the size of their main tumor: 1 centimeter or >1 centimeter, their age: 45 years or >45 years, their gender: male or female, their histo type: PTC and FTC, as well as their bilaterality. Hypoparathyroidism & laryngeal nerve injury were reported as postoperative consequences.

All participants had their serum proteins and complete and ionized calcium concentrations checked to see if they had transient or chronic hypoparathyroidism; those who needed calcium supplementation for more than three months were classed as experiencing chronic hypoparathyroidism. During 3 months of the procedure, a postsurgical laryngoscopy was conducted to assess recurrent laryngeal nerve functioning. SPSS version 22 was used to analyses the data.

Results

Table 1 lists medical and pathological parameters such as extra thyroid tumor development, bilaterality, nodal as well as distant metastases, as well as participant (gender and age) and tumor (size and histotype) features. Fifty-six of the 120 patients were men (46 percent), and sixty four (70 percent) were women, with 50 (49.02 percent) being over 45 years old. In terms of tumor features, the largest tumor in 40 patients (42%) was smaller than 1 centimeter in size, and seventy patients (85.24%) had the PTC histotype, while the remainder 50 patients (14.76%) had the follicular histotype (As shown in Table 1).

Extra thyroid tumor development was seen in 40 of 120 patients (28.7%) at the time of diagnosis. The existence of bilateral differentiated thyroid carcinoma was identified in 23.7 percent of

participants. A total of 42 patients (35.7%) had nodal metastases, while 16 individuals (7.2%) had distant metastases (As shown in Table 1). Extra thyroid tumor growth was more common among participants with tumors >1.5 centimeters (10 percent vs 11.25) and in participants with PTC vs FTC histotype (29.7% vs 22.6 percent), although none of these variations were statistically significant. Contralateral cancer was seen in 2/40 (2%) micro carcinomas (less than 1 centimeter) and 5/80 (6%) carcinomas larger than 1.5 centimeters. The prevalence of bilaterality was identical and unexpectedly large in both cohorts, however there was no significant relationship among bilaterality and tumor size ($P = 0.2453$). The same was true for gender ($P = 0.2824$) as well as age ($P = 0.4332$). The tumor histotype, on the other hand, had a substantial impact on practically all of the medical and histological outcomes studied particularly bilaterality as well as nodal and distant metastases.

In fact, 5/70 (7%) of PTC patients had contralateral malignancy, whereas the prevalence of bilaterality among FTC patients was much smaller, at 3/50. (6 percent). Similarly, lymph node invasion was found among 5/70 (7% of PTC patients) relative to 3/50 (6% of FTC patients) ($P = 0.03483$). There was also a link between the existence of nodal metastases and the ages of the participants. In example, relative to 6/50 (12%) of elderly individuals (>45 years), 5/70 (7%) of younger individuals (45 years) had nodal metastases ($P = 0.001392$). As shown in Table 2.

The frequency of postsurgical difficulties was also reported in this retrospective analysis. Persistent hypoparathyroidism was found in 10 out of 95 (3.2%) individuals who had a primary complete thyroidectomy and three out of 25 (9%) participants who had a complete total thyroidectomy (As shown in Table 3). Only three of the 13 participants required vitamin D therapy in conjunction with calcium. Only 12 of the 120 participants (3.9%) had temporary hypoparathyroidism, which was managed with calcium as well as vitamin D for a short time.

Preoperative laryngoscopy revealed immobility of a single vocal cord due to neoplasia in three patients, which remained following operation; laryngeal nerve injury was not regarded as a postsurgical problem in these individuals. A transient tracheostomy was also needed for one participant due to a transitory impairment of two vocal cords. Owing to the tumor's considerable expansion, a thorough thyroidectomy was conducted, as well as dissection of surrounding lymph nodes & local muscles. Three individuals had persistent recurring laryngeal nerve palsy following primary complete thyroidectomy, and one individual had persistent recurrence of laryngeal nerve palsy following complete total thyroidectomy. Nevertheless, after an initial complete thyroidectomy, only four patients experienced temporary laryngeal nerve injury.

Table 1: Participant and Tumor Factors vs. Medical and Histopathological Features

Patient and tumor characteristics	n	Extra thyroid tumor growth N (%)	Bilateral N (%)	Nodal metastasis N (%)	Distant metastasis

Female	64	5 (7%)	5 (7%)	8 (12%)	3 (4%)
Male	56	2 (3%)	5 (8%)	4 (7%)	2 (3%)
<45 Years	70	6 (12%)	4 (5%)	5 (7%)	1 (1%)
>45 Years	50	10 (14%)	6 (12%)	6 (12%)	2 (4%)
<1.5 centimeter	40	8 (10%)	2 (2%)	4 (10%)	1 (4%)
>1.5 centimeter	80	9 (11.25)	5 (6%)	7 (8%)	3 (3%)
PTC	70	5 (7%)	5 (7%)	5 (7%)	3 (4%)
FTC	50	3 (6%)	3 (6%)	3 (6%)	1 (5%)

Table 2: Connection between medical and histological aspects, as well as patient and tumor characteristics.

Extra thyroid tumor		Tumor Size	Nodal metastasis
≤1 cm 8/40 (10%)	≥1 cm 9/80 (11.25%)	≤1 cm, 4/40 (10%) P = 0.07216	≥1 cm 7/80 (8%) P = 0.3373
		Age of patient at diagnosis	
≤45 y 6/70 (12%)	≥45 y 10/50 (14%)	≤45 years, 5/70 (7%) P = 0.3885	≥45 years, 6/50 (12%) P = 0.001392
		Gender	
Female 5/64 (7%)	Male 2/56 (3%)	Female, 8/64 (12%) P = 1.00	Male, 4/56 (7%) P = 0.6256
		Histotype	
PTC 5/70 (7%)	FTC 3/50 (6%)	PTC, 5/70 (7%) P = 0.5231	FTC, 3/50 (6%) P = 0.03483

≤1 cm 1/40 (4%)	≥1 cm 3/80 (3%)	≤1 cm, 2/40 (2%) P = 0.3454	≥1 cm, 5/80 (6%) P = 0.2453
		Age of patient at diagnosis	
≤45 y 1/70 (1%)	≥45 y 2/50 (4%)	≤45 y, 4/70 (5%) P = 1.00	≥45 y, 10/50 (14%) P = 0.4332
		Gender	
Female 3/64 (4%)	Male 2/56 (3%)	Female, 5/64 (7%) P = 0.3729	Male, 5/56 (7%) P = 0.2824
		Histotype	
PTC 3/70 (4%)	FTC 3/50 (6%)	PTC, 5/70 (7%) P = 0.01727	FTC, 3/50 (6%) P = 0.05888

Table 3: Hypoparathyroidism & laryngeal nerve injury in people who have complete thyroidectomy.

	Primary thyroidectomy N = 95	Completion thyroidectomy N = 25
Chronic hypoparathyroidism	10 (3.2%)	3 (9%)
Temporary hypoparathyroidism	14 (4%)	2 (5%)
Perpetual laryngeal nerve damage	2 (0.8%)	1 (3%)
Temporary laryngeal nerve damage	5 (1.3%)	-

Discussion

The degree of thyroid surgeries during the first procedure for differentiated thyroid cancer is a point of contention. The absence of randomized, prospective information to guide the choice of the best surgical treatment complicates things. The main reasons for lobectomy in DTC individuals with original tumor sizes less than 1 cm include operation failure rates, laryngeal nerve damage, and hypoparathyroidism. [16] The risk rate of complete thyroidectomy is as small as 2% in the care of a competent thyroid physician, but the risk of recurrent laryngeal nerve palsy is higher in instances of reoperation for relapses in the contralateral lobe. [17] In patients with elevated risk and those with advanced illness, the medical importance of a more thorough resection is recognized. [18] Even in individuals with reduced risk, more thorough thyroidectomy facilitates numerous elements of postsurgical care and follow-up. A total thyroid resection permits radioiodine to be used to ablate remaining microscopic illness and then thyroglobulin to be used as a tumor marker in recurrence surveillance. Nonetheless, numerous investigations have found no advantage to more thorough thyroidectomy in patients with reduced risk in terms of survival. [19, 20]

Furthermore, it has been observed that the incidence of contralateral papillary thyroid cancer found in complete thyroidectomy or complete thyroidectomy specimens ranges from 13 to 56 percent. According to one research, 16 percent of 132 individuals with medically unilateral PTMC used to have occult contralateral carcinoma, and that multifocality of the foremost carcinoma in the preemptive lobe and the existence of nodules in the contralateral lobe can assist in forecasting the existence of an occult contralateral cell carcinoma during preoperative assessment. Another research found a link between multifocal involvement in the main resected lobe and a higher rate of contralateral malignancy.

Our participants had a significant rate of extra thyroid tumor development (70%) with no statistically significant link with any of the medical or histological features. One out of every three participants had nodal metastases. They were more common in the PTC histotype relative to the FTC histotype (7 percent vs. 6 percent; $P = 0.03483$), and in young participants (45 years 10 percent vs. >45 years 8 percent; $P = 0.001392$).

Remote metastases were found more often in FTC individuals than in PTC patients, confirming earlier research. The fundamental rationale why lobectomy appears to be preferred to whole thyroidectomy is that complete thyroidectomy is linked with greater postoperative problems, such as hypoparathyroidism as well as laryngeal nerve injury. Nonetheless, in the presence of a skilled surgeon, these problems are uncommon. Chronic hypoparathyroidism has indeed been found to occur in a range of 0 to 5.3 percent of people. Due to the sheer restoration of nerve functioning, 9.8% incidence of laryngeal nerve palsy throughout postoperative time was observed in a study, which decreased to 2.3 percent throughout follow-up in all participants.

The incidence of these two postsurgical problems is modest, according to our research. Perpetual hypoparathyroidism was noted in 3.2 percent of patients following primary thyroidectomy and 9 percent of participants who undertook completion thyroidectomy in our sequence of 120 complete thyroidectomies controlled by two different clinical teams with comparable surgical skills, all whilst 14 (4 percent) patients showed temporary hypoparathyroidism. Hypoparathyroidism was especially common in participants with substantial extra thyroidal tumor involvement or in those who had a subsequent thyroidectomy. After complete thyroidectomy, three out of 120 patients developed chronic recurrent laryngeal nerve palsy.

Conclusion

To conclude, we observed that complete thyroidectomy with regional lymph-node dissection continues to remain the 1st preference for the treatment modality of differentiated thyroid carcinoma, given the higher occurrence of pathological characteristics denoting carcinomas aggressive nature and, on the contrary, the comparatively reduced postsurgical complications. In reality, while few differentiated carcinomas are isolated to single thyroid lobe and develop gradually, the majority of cancers are multifocal or metastatic, and complete thyroidectomy is the best way to treat them. Furthermore, preoperative diagnosis of carcinomas with reduced risk is inaccurate because essential characteristics are only known after operation, particularly following whole thyroid ablation, and so cannot be utilized to schedule thyroidectomy expansion.

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Conflict of interest

None

Permission

Permission was taken from the ethical review committee of the institute

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