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Editorial

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Total Thyroidectomy as Primary Surgical Management for Nonmalignant Thyroid Disorders

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Editorial

Theodore Billroth introduced the era of current surgery of the thyroid gland. Initially, He commenced with high mortality (40%) in Zurich, for that he abandoned this operation until the complication of post-operative sepsis was eliminated, he moved to Vienna by 1877 and. There he decreased the post thyroidectomy mortality to only 5%. Although Billroth approach was conservative 'subtotal' operations; he faced significant complications especially Recurrent Laryngeal Nerve (RLN) damage; whereas others as hypothyroidism and hypocalcemia rarely encountered. Yet, inviolable and efficient thyroidectmy done by his contemporary outstanding surgeon Emil Theodore Kocher, a Swiss surgeon who succeeded to decline the mortality of thyroidectomies below 5%. He pioneered the approach of extra capsular dissection for thyroidectomy and by 1883 had done a report for more than 101 thyroidectomy cases and detailed 18 total thyroidectomies with complication termed at that time 'cachexia strumipriva' which means non thriving [1,2], which occurs due to chronic asphyxia. Actually he conveyed the description of hypothyroidism; nonetheless, he quit total thyroidectomy at that time. Few years later he had he approached 1000 thyroidectomy with a reduced mortality of only 1% and minimal morbidity. For this exceptional work he got Nobel Prize in 1909 [3].

With the help of innovation of exogenous thyroxin by George Murray and Fox, et al. [1,2]; the problem of post thyroidectomy hypothyroidism was overcome. This invention revived the interest of total thyroidectomy among the thyroid surgeons. Another era came with the contribution from surgeons like Halsted who introduced the importance of preservation of parathyroid gland's survival by keeping its arterial branches through ligating the terminal branches of inferior thyroid artery terminal branches so close to the thyroid capsule. Furthermore, preservation of external branch of superior laryngeal nerve by individual ligation of superior thyroid vessels branches, after mobilizing the potential space between the cricothyroid muscle and the medial part of the superior pole of the thyroid was advocated by Coller and Boyden. Over and above; Thompson proposed the total extracapsular lobectomy, by dissecting the plane between thyroid capsule and thyroid artery [4].

Total thyroidectomies were only performed occasionally for indications other than malignancy until the last quarter of the twentieth century [5] and the type of thyroidectomy in the management of benign thyroid enlargement continues to be debatable and shows variable management strategies [6].

The current approach technique of extracapsular dissection for total thyroidectomy was described by Delbridge, et al. [4]. They reported their experience of 825 cases with total thyroidectomy using the same technique with permanent hypoparathyroidism in 0.6% and permanent RLN palsy in 0.5% cases [7]. After them, many surgeons all over the world had initially attempted in some cases and gradually advocated this approach for bilateral thyroid disorders opposite non total thyroidectomy procedures [8,9]. Thyroid gland diseases are important and challenging in diagnosis and treatment. The surgically important diseases are goitre, hyperthyroidism, thyroiditis, and neoplasms [10]. Goiter affects 6 % of population, and is the second principal neck endocrine disease in the world [11]. Total thyroidectomy is well advised as the usual surgical procedure to treat thyroid diseases especially thyroid cancer, multinodular goiter, and Graves' disease Theoretically, this approach is a plausible and ideal for surgically related non malignant thyroid disorders affecting the entire thyroid gland as it has the advantage of instantaneous and long-lasting cure without recurrence. It should also be considered in cases of nodular thyroid disease with history of previous head and neck irradiation. Primary toxic goiter where total gland removal can be a suitable treatment, especially huge goiters, Graves disease related ophthalmopathy, children, pregnant women, or mentally disabled patients with risky long-term follow-up [12, 13].

Another related disease of clinical importance is Hashimoto's thyroiditis which is the most common cause of autoimmune primary

hypothyroidism. It is suspected by blood tests, and confirmed by ultrasound which usually shows an enlarged heterogonous consistency, with pseudonodules. However, in several cases; it displays well- defined nodules. Treatment is clinically based; but it may have association with thyroid carcinoma. It is another controversial issue that shows ranged incidence ranging from zero to more than 30%, this may be reflected on considering total thyroidectomy as line of treatment in selected cases [14]. Practically, surgeons avoid doing total thyroidectomy and stick to subtotal thyroidectomy to avoid the risky damage RLN and hypoparathyroidism [15]. Now, there is a change in a surgical practice from all non-total thyroidectomy for non-malignant goiter [16]. This was facilitated with use of recent vessel sealing systems and intraoperative neuromonitoring [17].

The great advantage of endorsement of total thyroidectomy is due to almost zero percent recurrence rate so avoid further revisional surgery but this should have weighed against the risk of post-operative morbidity and complications [18]. So the rationale that total thyroidectomy is advocated as the safest and best choice for non-neoplastic thyroid diseases can be summarized in the following hints: Incidental carcinoma was detected in up to 27.4% as pathological surprise in non-neoplastic thyroid diseases [19,20]. Despite its reported high specificity and sensitivity rates of Fine Needle Aspiration Biopsy (FNAB) it is insufficient for detection [21]. This occurs since FNAB is not accurate in cancer detection for multicoated cancer foci, not suitable in cases of multinodular thyroid disease due to the difficulty sampling each nodule [22]. Furthermore, FNAB is not adequate for revealing angioinvasion or capsular invasion to diagnose follicular neoplasm [23]. For that the follicular neoplasm is considered the distressing preoperative diagnosis for the surgeon. The pathological surprise post non total thyroidectomy diagnosis of follicular carcinoma almost always leads to redo total thyroidectomy. Almost about one third of follicular neoplasms may be malignant likewise Hashimoto's thyroiditis, hence total thyroidectomy is a logic, yet riskier, option for those with multinodular goiter and those who do not accept the challenge of reoperation possibility [24,25]. Post operative complications may push the tendency for the type of the surgical approach choices in non-neoplastic thyroid diseases. Notably hypocalcemia which is a consequence of hypoparathyroidism is an important one. It occurs from 0.9-45% and 0-24.2%, respectively [26,27]. Permenant hypoparathyoidism does not differ between different thyroidectomy procedures, but transient hypoparathyroidism may be marked after total thyroidectomy [28]. To avoid it the surgeon should identify all parathyroid glands during thyroidectomy, doubtlessly. For recurrent cases and redo thyroidectomy the technique of Capsular dissection and close ligation of the terminal branches of the inferior thyroid arteries of great value to keep intact parathyroids.

Immediately reimplantation of devascularised or inadvertently removed parathyroid glands in sternocleidomastoid muscle. Oral calcium and vitamin D are important during the early post-operative period; calcium Gluconate injection may be needed to control Tetany in some cases [29]. RLN injury is affecting the life of the patient significantly. The rate of transient RLN palsy is reported up to 13.6% in some literature and permanent RLNP from 0- 5.9% [30,31], with greater potential risk is reported in reoperations. Albeit the frequency of temporary and permanent RLNP did not differ between procedures. This complication, even low, may be tragic. However, some cases of unilateral paralysis may go a symptomatic without interfering with voice or breathing due to contralateral compensation. Preoperative screening laryngoscopy should be performed not only before a reoperation, but also in some complicated cases post operatively. Vocal cord paralysis may occur after nerve transection, thermal heat radiation by cautery, compression by hematoma or by nerve entrapment by the suture. It may also be secondary to neuropraxia or the formation of perineural fibrous tissue arising from the exposure. Another nerve of special interest during thyroidectomy is the External Branch of Superior Laryngeal Nerve (EBSLN), whose injury leads to loss of high pitched voice. It is related to superior thyroid artey, may be difficult to expose, detect its actual anatomical identification and hence damage may occur. It is saved by ligation of individual branches of the superior thyroid artery near the upper pole. One of the complications of total thyroidectomy that needs immediate interference is neck hematoma, which is a serious complication that may require post-operative neck exploration, it occurs sporadically at a rate up to 2% at the early postoperative period and is easier to prevent and treat [32]. Recurrence disease was reported as 0.5-14% in the long-term follow-up in patients operated due to benign nodular goiter especially after subtotal thyroidectomy or Dunhill procedure. There is also 30% risk of secondary thyrotoxicosis and 10% risk of follicular carcinoma of the thyroid [33,34]. Not only that but also subtotal thyroidectomy leaves behind limited diseased thyroid tissue is in most cases cannot prevent the need of long-term thyroxine replacement therapy, with non-guaranteed prevention of regrowth and recurrence and if occurs it will extend into the retrotracheal and retroesophageal areas [35]. Leading to complex reoperative surgery, resulting in higher complication rates [36]. Total thyroidectomy is desired as the reoperation in a scarred thyroid bed due to previous surgery is a nightmare to any surgeon and it is associated with more chances of RLN injury and permanent hypoparathyroidism which may reach 20% than the surgery performed in primary setting both for benign or malignant thyroid disorders [37-39]. High volume centers has complications rate after total thyroidectomy comparable to non-total thyroidectomy. Permanent post total thyroidectomy complications vary of its incidence according to the center volume and experience and its incidence is acceptably low in experienced hands. After taking care of vital structures, practically total thyroidectomy is easier than sub-total thyroidectomy in which we will do effort to leave

thyroid tissue [40,41]. In conclusion, total thyroidectomy for non-neoplastic thyroid diseases is a good choice with low surgical morbidities, low post operative complications, that can avoid reopative thyroidectomy for recurrences with all its risks and complications

Conflict of interest: none

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