Appropriate management of cervical lymph nodes in patients with papillary thyroid cancer

Essay

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توطئة للحصول علي درجة الماجستير في جراحة الأورام

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Once the diagnosis is established, surgical thyroidectomy is the next step, which is usually a near-total to total thyroidectomy with exploration for enlarged lymph nodes, especially on the side ipsilateral to the nodule. Total thyroidectomy is associated with greater risk of complications (recurrent laryngeal nerve trauma with subsequent hoarseness or temporary to permanent hypoparathyroidism) but is more likely to result in a lower rate of recurrence, presumably from the removal of bilateral or multifocal foci of tumor (98).

Modeling for life expectancy and quality- adjusted life years indicates that total thyroidectomy is the preferred procedure in both low- and high-risk patients with PTC (99).

Patients with tumors of 1.5-cm diameter or less usually have an excellent prognosis after only a lobectomy with isthmusectomy, without postoperative radioiodine ablation of the residual contralateral thyroid lobe (100).

Following thyroidectomy for papillary lesions more than 1.5 cm, most physicians employ radioiodine to ablate residual tissue and facilitate follow-up monitoring (101).

Highly predictive insights into the risk of residual or recurrent tumors are provided by assays for Tg postoperatively(102).

Detection of significantly measurable serum Tg or residual uptake with isotopic imaging generally leads to a search to better delineate the presence of tumors e.g. additional imaging, to determine whether additional therapy is needed and the appropriate approach to further therapy (103).

Detection of residual or recurrent tumor prompts consideration for additional radioactive iodine therapy (104).

Unfortunately too often, tumor is identified but found not to trap tracer radioiodine, although empiric therapy with radioiodine may be attempted. The negative scans and iodine uptake in these patients is presumed to be the result of dedifferentiation and loss of the sodium iodide symporter (NIS). An active area of current research involves attempts to restore NIS and thus enable therapy in these patients (105).

External radiation therapy has been used with variable success for tumors that do not trap radioiodine or are resistant to such therapy (106). Chemotherapy is another alternative in such patients (107).

Surgical treatment

Primary surgical considerations regarding extent of thyroid resection

Three primary surgical strategies exist for the treatment of differentiated thyroid cancer: total thyroidectomy, near-total thyroidectomy, and lobectomy with isthmusectomy(108).

Total thyroidectomy involves removal of the entire thyroid gland and its capsule, near-total thyroidectomy preserves the posterior capsule of the thyroid contralateral to the neoplasm, unilateral lobectomy and isthmusectomy is removal of the lobe ipsilateral to the lesion, and removal of the thyroid isthmus. This approach allows preservation of normal thyroid tissue, thereby obviating the need for lifelong thyroid hormone supplementation. In addition, unilateral lobectomy with isthmusectomy essentially eliminates the risk for hypoparathyroidism and bilateral vocal cord paralysis. Subtotal thyroidectomy is a procedure in which preservation of several grams of thyroid tissue is involved. Due to higher complication rates encountered when subsequent surgery is indicated, subtotal thyroidectomy is not a recommended option for patients with differentiated thyroid cancer (108).

Recommendations for extent of surgery

Despite the reported complications following total thyroidectomy, complication rates are minimal in the hands of experienced surgeons furthermore, the high incidence of bilateral foci in patients with PTC indicates that these patients are best treated initially with total thyroidectomy, rather than undergoing a follow-up completion thyroidectomy for recurrent or residual disease that was not appreciated at the primary evaluation. Moreover, total thyroidectomy allows for more accurate follow-up using thyroglobulin as a marker of residual or recurrent disease. Postoperative radioactive iodine scanning and ablation is also more effective in patients after total thyroidectomy compared with more conservative procedures. Finally, studies show that a lower recurrence rate and mortality are associated with total or near-total thyroidectomy in patients with even low-risk PTC. Thus, in virtually all patients, excluding those with the very best prognosis (tumor size less than 1 cm, confinement to the thyroid without metastases, in an otherwise healthy woman under 45 years of age), total thyroidectomy is the treatment of choice for papillary thyroid carcinoma(109).

Primary surgical considerations regarding extent of lymph node resection

Approximately 80% of patients with PTC also have microscopic regional lymph node metastases. The optimal diagnostic and therapeutic approaches for this have not been entirely clear (110).

The central compartment (level VI) is involved in approximately 90% of cases (111). The lateral lymph node involvement varies between 51 and 100% in different series with the caudal compartments involved more frequently than the cranial compartments (112). Supra-clavicular lymph nodes are the third site involved in terms of frequency, with a reported rate ranging from 10 to 52%, contralateral lymph node involvement is not rare with an incidence of up to 18.4% for PTC (111).

Mediastinal lymph node involvement, mostly the antero-superior mediastinal nodes, is less frequent at 1.9e15%. The distribution of loco-regional lymph node involvement is poorly related to the site of the primary thyroid tumour (113).

Surgical neck node levels is shown in Table.5 and types of neck dissection is shown in Table.6 (114).

Table.5 Surgical neck node levels (114).

Node level	Clinical landmarks	Surgical landmarks
Level 1	1A submental L.Ns	Superior-lower border of body of mandible.posterior- posterior belly of digastrics inferior-hyoid bone
	1B submandibular L.Ns	
Level 2 upper jugular L.Ns	2A L.Ns below accessory nerve	Superior-base of skull posterior-posterior border of sternomastoid anterior-lateral limit of sternohyoid inferior-hyoid bone
	2B L.Ns above accessory nerve	
Level 3	middle jugular L.Ns	Superior- hyoid bone posterior-posterior border of sternomastoid anterior-lateral limit of sternohyoid inferior-cricothyroid membrane
Level 4	lower jugular L.Ns	Superior- cricothyroid membrane posterior- posterior border of sternomastoid anterior-lateral limit of sternohyoid inferior-clavicle
Level 5	posterior triangle L.Ns. accessory nerve divides it into 5A and 5B	posterior- anterior border of trapezius anterior- posterior border of sternomastoid inferior-clavicle
Level 6	Anterior compartment of neck	Superior- hyoid bone inferior-suprasteral notch lateral-medial border of carotid sheath on either sides
Level 7	Superior mediastinal L.Ns	Superior- suprasteral notch inferior-innominate artery

Table.6 Types of neck dissection (114).

Type of neck dissection	Nodal levels removed	Structures preserved
Comprehensive:		
1-Radical neck dissection	Levels1-5	none
2-modified Radical neck dissection type 1	Levels1-5	SAN
3-modified Radical neck dissection type 2	Levels1-5	SAN,SCM
4-modified Radical neck dissection type 3	Levels1-5	SAN,SCM,IJV
Selective:		
1-supraomohyoid neck dissection	Levels1-3	SAN,SCM,IJV
2-extended supraomohyoid neck dissection	Levels1-4	SAN,SCM,IJV
3-lateral neck dissection	Levels2-4	SAN,SCM,IJV
4-posterolateral neck dissection	Levels2-5, suboccipital, RetroauricularL.Ns	SAN,SCM,IJV

SAN spinal accessory nerve.SCM sternomastoid muscle.IJV internal jugular vein

Microscopic occult metastases may often be ablated by adjuvant radioactive iodine therapy, but they may also be a site of persistent disease that would have easily been removed at the initial operation. While patients with PTC and matted

lymph nodes or tumor extending through the lymph node capsule have a worse prognosis, the prognostic significance of lymph node metastases is controversial (115).

Gross nodal disease occurs in 20–30% of adult cases of PTC, and is certainly justification for lymph node dissection(116).

Lymph node metastases are also associated with a higher recurrence rate when patients are matched for age and gender. Therefore, nodal metastases confirmed by preoperative ultrasound or intraoperative exploration should be treated with node dissection .Specifically, removal of ipsilateral central neck nodes and perithyroid lymph nodes (Delphian node and lymph nodes medial to the carotid sheath) or lateral compartment nodes (levels 2–5) is important for nodes that have identifiable involvement with disease(108).

Compartment based resections of lateral neck nodes are preferable to “berry-picking” if they are clinically involved. For lateral compartment disease, the best approach is to perform functional modified radical neck dissection, during which all fibrofatty tissue with lymph nodes is removed. This procedure spares motor and sensory nerves, the sternocleidomastoid muscle, and the internal jugular vein as

well, unless they are involved by tumor. Removal of central neck lymph nodes is associated with an improvement in the regional recurrence rate, and an improved survival rate in retrospective studies (117).

The current American Thyroid Association Guidelines for the management of differentiated thyroid cancer now call that a staging/prophylactic level 6 lymph node dissection for all patients undergoing thyroidectomy for thyroid carcinoma should be considered .Prophylactic lateral neck node dissection is not recommended because in patients it is not associated with improved overall survival, and involves violation of additional planes by a substantially more extensive operation (118).

Technique of thyroidectomy

Extent of surgery and definitions

Until 2000 there was no uniformly applied definition in the literature regarding the extent of thyroidectomy that should be performed for benign and malignant pathologies. To fill this gap, Kebebew and Clark formulated such a classification. Lumpectomy or nodulectomy refer to removal of a thyroid nodule alone with minimal surrounding thyroid tissue. Partial

thyroidectomy involves removal of a nodule with a larger margin of normal thyroid tissue. The definition of subtotal thyroidectomy belongs to the bilateral removal of more than 50% of each lobe including the isthmus. Lobectomy or hemithyroidectomy refers to the complete removal of one lobe with the isthmus. Near total thyroidectomy is defined as the total extracapsular removal of one lobe including the isthmus with less than 10% of the contralateral lobe left behind. During total thyroidectomy both lobes and the isthmus are completely removed leaving behind only viable parathyroid glands (119).

Preoperative measures

All patients should be rendered euthyroid before surgery. The planned procedure should be discussed with the patient and informed consent must be obtained. Routine preoperative laryngoscopy is not necessary if the patient does not report voice changes. The skin incision is marked preoperatively using a permanent marker pen on the awake patient with reclined neck (119).

Positioning and draping

The patient is positioned with the neck extended. Rolled towels are placed under the shoulders which allow sufficient