Extrathyroidal extension (Core)

Extrathyroidal extension (ETE), defined as tumour extension beyond the thyroid capsule into the adjacent soft tissue, is a common pathologic finding detected in 23.5% of all papillary thyroid carcinomas.[1] ETE has long been considered as an adverse prognostic factor with an increased risk of recurrence and mortality.[1-4] It can be further subdivided into two categories: 1) minimal (or microscopic) ETE, which is invasion into the immediate perithyroidal soft tissue, detected solely at microscopic level and not appreciated clinically or grossly at the time of surgery; and 2) extensive (or gross) ETE that is defined as gross direct extension of the carcinoma into strap muscles (e.g., sternohyoid, sternothyroid, thyrohyoid, and omohyoid muscles), subcutaneous tissue, adjacent viscera (e.g., larynx, trachea, and oesophagus), or recurrent laryngeal nerve, and is typically established clinically by imaging or during the operation. These two categories of ETE bear different prognostic values: the risk of recurrence associated with minor extrathyroidal extension is approximately 3 to 9%,[5-11] compared with 23 to 40% risk of recurrence in patients with gross ETE.[5,6,8-10,12,13] Furthermore, several recent studies have shown that microscopic ETE is not an independent predictor for persistent disease, recurrence free survival and disease specific survival.[7,8,11,13-15] The National Comprehensive Cancer Network (NCCN) 2019 guidelines recommend completion thyroidectomy and post-operative radioactive iodine (RAI) for lesions with gross ETE, while the administration of 30 mCi of iodine 131 is considered optional for patients with a primary tumour of <4 cm, clinical M0 and minor ETE.[16] Histologically, the thyroid gland is devoid of a well-defined capsule in many areas along its periphery, and the follicles are often intermingled with adipose tissue or even skeletal muscle.[17] Therefore, the very definition of microscopic ETE is problematic and subjective, and a universally accepted pathologic criterion for ETE is lacking. The fact that microscopic ETE is associated with poor interobserver agreement[17] and does not affect recurrence and survival raise concerns of whether microscopic ETE alone is sufficient to upstage a patient. Because of all the above, in the most recent American Joint Committee on Cancer (AJCC) and Union for International Cancer Control (UICC) 8th editions, microscopic ETE has been removed entirely from the staging system of differentiated thyroid carcinoma.[18,19] Gross ETE invading strap muscles only, by a tumour of any size, will be staged as pT3b, while gross ETE with invasion into subcutaneous soft tissue, larynx, trachea, oesophagus, or recurrent laryngeal nerve will be staged as pT4a. In view of the above, the pathologists' role is 1) to mention in their report the ETE seen histologically (whether microscopic or gross) and 2) communicate with the surgeon in regard to staging since the determination of gross ETE is done intra-operatively.

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