Prognostic Factors in Thyroid Cancer

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In a European population the incidence of thyroid carcinomas varies between 1.75/100000 population for males and 6.38/100000 population for females [1]. The world-wide incidence is in the region of 4/100000 population/year with the highest being in Iceland and Hawaii (15/100000/year) [2].

A number of staging systems have been proposed in an attempt to predict outcome and to help tailor treatment and extent of surgery. The most important prognostic factors include gender, age, histology, size, grade, presence of extrathyroid extension, lymph node involvement, and completeness of resection.

In 1987, Hay et al. [3] proposed a prognostic system named AGES: age >40, histological grade >1, extrathyroid extension, size >3 cm. This system divides the patients into four groups that correlate with progressively shorter survival according to their prognostic score.

One year later, Cady and Rossi introduced a simpler scheme, AMES: age >40, histological grade >1, extrathyroid extension, size >5 cm [4]. His system divides patients into high risk (AMES factors present) and low risk (AMES factors absent) groups. Only 5% of patients in the low risk group but 55% in the high risk group developed recurrent disease.

Memorial Sloan Kettering Cancer Centre developed new scheme in 1992, GAMES, starting from histological grade >2, age >45, distant metastasis, extension beyond the thyroid capsule, and size >4 cm. Shah et al. [5,6] pointed out that in the low risk groups total thyroidectomy offered no survival advantage over lobectomy.

Also in 1992, Karolinska Institute added a "D=DNA ploidy" to AMES score, based on a study [7] which showed that the assessment of tumor nuclear DNA content added prognostic value.

In 1993, Hay et al. [8] revised their staging system and proposed a new scheme, MACIS: metastasis, age >40, completeness of resection, extrathyroid invasion, and size.

The commonest factors for all these prognostic scores are age, tumor size and whether or not growth is confined within the gland capsule, regional or distant metastasis. TNM staging system for thyroid carcinoma [9] includes all these prognostic factors (Table 1). Unlike squamous cell carcinoma staging in head and neck, mediastinal lymph node disease is classified by N stage rather than as distant metastasis.

References

T Primary Tumor
T0 No evidence of primary tumor
T1 Tumor 2 cm or less in greatest dimension, limited to the thyroid
T1a Tumor 1 cm or less, limited to the thyroid
T1b Tumor more than 1 cm but not more than 2 cm in the greatest dimension, limited to the thyroid
T2 Tumor more than 2 cm but not more than 4 cm in greatest dimension, limited to the thyroid
T3 Tumor more than 4 cm in greatest dimension, limited to the thyroid or any tumor with minimal extrathyroid extension (sternotomy muscle or perithyroid soft tissues)
T4 Moderately advanced disease
T4a Tumor of any size extending beyond the thyroid capsule to invade subcutaneous soft tissues, larynx, trachea, esophagus, or recurrent laryngeal nerve
T4b Tumor invades prevertebral fascia or encases carotid artery or mediastinal vessel

N Regional Lymph Nodes
N0 No regional lymph nodes
N1 Metastasis in ipsilateral cervical lymph node(s)
N2 Metastasis in midline, contralateral or bilateral cervical node(s) or metastasis in mediastinal lymph node(s)
M Distant Metastasis
M0 No metastasis
M1 Metastasis present

Table 1: TNM staging system for thyroid carcinoma.

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