Thyroid Carcinoma

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Thyroid carcinoma is the commonest endocrine malignancy and accounts for approximately 1% of all malignancies. Approximately 34000 new cases are diagnosed each year in USA. Majority of diagnosed patents are women making thyroid carcinoma as the seventh most common female malignancy.[1] Outcome in thyroid carcinoma is very variable ranging from clinically insignificant disease to a very aggressive disease. Overall the prognosis of thyroid carcinoma is good with an excellent disease free survival. Hundahl SA et al reported ten year relative survival rate based on total cohort of 53,856 patients in USA of 93% for papillary and 85% for follicular carcinomas.[2] Theincidence of thyroid carcinoma is increasing but some of it is due to early detection secondary to appropriate management of thyroid nodules.

Thyroid carcinoma arises from thyroid follicular cells (Papillary, follicular and anaplastic) or from other cells within the thyroid gland like lymphocytes (primary thyroid lymphoma) or neuroendocrine C cells (medullary thyroid carcinoma). Papillary and follicular carcinomas are considered differentiated carcinomas and are often managed similarly despite many differences between the two. Papillary thyroid carcinoma accounts for the majority 80-90% while follicular 5-10% and anaplastic carcinomas are rare at 1-2%. In Pakistan among thyroid carcinomas papillary is the commonest ranging from 69-71% followed by follicular carcinomas from 11.6-13%.[3,4]

Radiation is the best known risk factor for the development of thyroid carcinoma. The fallout from the Chernobyl disaster led to increased incidence of thyroid carcinoma in the surrounding areas. Solitary nodules in a thyroid or nodules within the multinodular goiter are risk factors for thyroid carcinoma but only a small proportion of thyroid nodules i.e. 5-10 are cancerous.[5] Thyroid carcinoma though more common in females, thyroid nodules if detected are more likely to be cancerous in males particularly at extremes of age.

Thyroid carcinoma usually presents as an asymptomatic painless nodule or a mass in the neck detected by the patient or health care professionals or as an incident thyroid nodule during increasingly widespread use of cross-sectional imaging of head and neck region.

Since thyroid nodules may be present in up to 76% of unselected females using ultrasound[6,7] and only less than 5-10% of these nodules are malignant, the challenge is to diagnose and treat malignant thyroid nodules in a sea of benign nodules. Certain features which increase the likelihood of a nodule to be malignant are local pressure symptoms, vocal cord paralysis, associated lymphadenopathy, rapid growth, male gender, family history and history of radiation exposure.[8]

The investigation of a thyroid nodule or mass includes ordering a thyroid function test which is universally normal. Some authors have shown positive correlation of TSH level with thyroid malignancy within the normal TSH range.[9] Ultrasound is a useful tool that characterizes a mass or a nodule and various ultrasound characteristics help in raising the suspicion of malignancy like hypoechogenicity, microcalification, absent halo, irregular margins and increased vascularity.[10] Presence of lymphadenopathy on ultrasound, also gives an idea about the extent of spread of thyroid carcinoma locally.Elastography is a new development in ultrasound for predicting malignancy in thyroid nodules.[11] Thyroid ultrasound is the most accurate imaging technique for the detection of thyroid nodule and is mandatory when a nodule is discovered upon palpation. It is also a guide for performing FNAC. Diagnostic ultrasound should be performed unless TSH is suppressed.Fine needle aspiration cytology is the single most useful tool in the diagnosis of thyroid carcinoma.[12] The cytologic characteristic of papillary carcinoma is typical but a follicular carcinoma cannot be diagnosed on FNAC. FNAC has a high specificity and sensitivity for detecting thyroid malignancy and remains the mainstay for the diagnosis of thyroid carcinoma. It's diagnostic efficacy is enhanced if FNAC is done under ultrasound guidance.[13,14] Local studies have also demonstrated high sensitivity and specificity of FNAC's.[15,16]

At the time of diagnosis thyroid carcinoma is localized to the thyroid in about 60%, has spread to regional lymph nodes in 34% and metastasized in about 5% cases.[17] In a small local series, spread to regional lymph node was seen in 40% of papillary carcinomas and 15% of follicular carcinomas, while the distant metastasis was seen in 9% of papillary carcinomas and 23% of follicular carcinomas respectively.[18]

Risk stratification is important for decision making as regards the initial treatment and follow up strategy. It is an ongoing process that begins with the diagnosis of thyroid

carcinoma and continues through all phases of treatment and follow up. Risk stratification divides thyroid carcinoma patients into three categories of low, intermediate and high risk, depending on age at diagnosis, size of the tumour, histology and local/distant metastasis.

Treatment of thyroid carcinoma includes surgery, radioactive iodine ablation followed by suppressive TSH therapy with thyroxine.

Surgery is the initial treatment and extent of surgery varies from lobectomy to near total / total thyroidectomy. In low risk patients risk with tumour size less than 1cm lobectomy is enough but in all other cases near total / total thyroidectomy with or without neck dissection is recommended.[19]

Following total thyroidectomy radio-active I^{131} ablation is used to destroy microscope foci of carcinoma cells within any thyroid remnant or metastatic deposits. Radioactive iodine ablation is carried out 3-4 weeks after total thyroidectomy allowing TSH to increase > 30 mu/L optimizing iodine uptake. Radioactive iodine ablation is not recommended in low risk patients with uni-focal or multifocal carcinoma of less than 1cm (of all foci individually) in size.[19]

TSH suppressive therapy follows radioactive iodine ablation aiming to keep TSH between 0.1 - 0.5 mU/L in low risk patients and less than 0.1 mU/L in high and intermediate risk patients, as most of these differentiated thyroid carcinomas are TSH dependent tumours.[19] The degree of TSH suppression has an impact on overall survival of these patients.[20]

Follow up is essential in the management of thyroid carcinoma, as is with malignancies in other parts of the body. This involves clinical assessments, ultrasound imaging of the neck, thyroglobulin measurement as a marker of disease recurrence with recombinant TSH or thyroxin withdrawal for few weeks. Low dose I^{131} whole body scan is also used selectively and at times CT scan / MRI and PET scanning are also required to locate recurrences and metastasis.

In summary differentiated thyroid cancers, the commonest endocrine malignancy, is rising in prevalence but has an overall good prognosis and survival. It is important to pick up cases at an early stage with the help of investigational modalities of ultrasound and fine needle aspiration cytology etc. Management involves thyroidectomy in most cases followed by radioactive iodine ablation and TSH suppressive therapy with thyroxine. Follow up with stimulated thyroglobulin levels and other imaging techniques are essential to pick up recurrences followed by timely appropriate management.

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