

The role of pre-operative investigations in deciding the outcome of thyroid surgery

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Abstract

Background: Patients undergoing surgery for solitary thyroid nodules or multinodular goiter are investigated preoperatively. These investigations may define or possible cases of thyroid malignancy and so help in planning the surgical approach and affect the outcome of the management of the patient in general.

Aims: To evaluate the roles played by preoperative investigations in cases of thyroid enlargement in deciding the probable outcome of the operative procedure with emphasis on cases of thyroid malignancies.

Patients and Methods: All patients admitted for thyroid gland surgery at Al-Yarmouk teaching hospital for the period from Oct.1 2008 to Oct.1 2009 were fully evaluated preoperatively. Clinical, radiological, hormonal and FNA cytological findings were recorded. Operative findings were reported. Histopathological diagnosis followed and reported.

Results: During the period of the study (102) patients were admitted with management, the majority were females (82) in the fourth decade of life (35 cases). The main clinical presentation was multinodular goiter (84) ultrasonography revealed (78) cystic lesions and (24) solid lesions. The main pre-operative investigation was F.N.A cytology. The majority of the reports were normal (78) with four reports of malignancy. The main finding at surgery was multinodular goiter (94 cases). The most common operative procedure was sub-total thyroidectomy (59). Histopathological examination revealed (85) benign pathology and (17) malignant all of them papillary carcinoma.

Conclusions: F.N.A cytology is the most important pre-operative diagnosis and because of the reported low sensitivity further experience and training is recommended.

Keywords: Pre-operation, Thyroid

INTRODUCTION

The key to the workup of thyroid masses whether solitary thyroid nodule or multi-nodular goiter is to differentiate malignant from benign disease this will determine which patients require intervention, the type of surgery needed and the plan for further management.

History taking, physical examination, laboratory evaluation and fine – needle aspiration cytology are the mainstays in the evaluation of thyroid nodules and goiter.

Imaging studies are of value in confirming the diagnosis of malignancy. The extent of the disease, involvement of local organs and tissues, possible distant metastasis,

pre-operative staging and as a guide for further management.

FNA cytology is the most important diagnostic tool in evaluating thyroid masses and should be the first intervention. Ultrasonographic guidance can help to increase the accuracy of FNAC successful diagnosis by the cytologist depends on accurate sampling of the nodule or mass and specimen cellularity. Ultrasonographic is the imaging modality most commonly used to evaluate thyroid disease. However the usefulness of ultrasound to distinguish between malignant and benign thyroid disease is limited. Even cysts seen on Ultrasound could be complex and these may potentially harb or malignancy. Micro calcification noted on Ultrasound is associated with malignancy. Radio-iodine imaging can help in determining the functional status of a nodule but carcinoma cannot be excluded on the basis of radio iodine scan. In select situations like cold nodules such scans can act as diagnostic adjuncts. CT scanning and MRI can be used to evaluate soft-tissue extension of large or suspicions mussels into the neck, trachea, or esophagus and to asses metastases to the cervical lymph nodes. They have no role in the routine management of solitary thyroid nodules.

PATIENTS AND METHODS

This is a prospective study involving all consecutive cases of thyroid disease who presented to the surgical unite at Al- Yarmouk teaching hospital during the period Oct.1 2008 to Oct.1 2009.

All patients were assessed for personal data, clinical evaluation, results of pre-operative investigations and a provisional diagnosis. This was recorded in a special form the patients who were chosen for surgery were included in the study and the others omitted operative findings and details of surgical procedure were recorded. Post-operative histopathology followed and recorded. The number of cases which fulfilled these criteria was 102.

The correlation between pre-operative provisional diagnosis especially FNAC based and the definitive post-operative histopathological diagnosis was studied in detail. Also studied was how the pre-operative diagnosis affected the course of surgical planning and actual management.

RESULTS

Total number of cases admitted to the study was 102 most were females 82 and only 20 were males most were within the fourth decade of life (35 cases). 58 presented with bilateral multiple nodules (multi-nodular goiter), 25 as unilateral (multiple nodules) 10 as diffuse enlargement and 8 only as solitary nodule.

Pre-operative ultrasonography revealed 78 cystic lesions, 20 simple solid lesions and 4 complex solid lesions. Thyroid function tests were mostly within normal (8), 4 were hyper-thyroid and 4 hypothyroid.

Fine needle aspiration cytology was normal in 78 cases. 16 were suspicious, 4 inflammatory and 4 were malignant. The operative findings were multi-nodular goiter in 44 cases. 59 patients under went sub-total thyroidectomy, 28 hemi-thyroidectomy, 14 near-total thyroidectomy and only one total thyroidectomy.

No frozen sections were done because of technical deficiencies. Post-operative histopathologic studies revealed mainly benign colloid goiter (72), inflammatory lesions in 11 and hyperplastic changes in 2 total benign lesions were 85 (87%). Malignant lesions were diagnosed in 17 patients, all showing papillary carcinoma with no follicular or other types.

Of 80 cases diagnosed pre-operatively a benign 73 proved benign and 7 turned to be malignant.

Of 8 cases diagnosed by F.N.A.C as malignant only 4 proved to be a such (50%).

Of 24 suspicious FNAC results, 6 proved to be malignant (25%) and 18 were benign.

For patients diagnosed pre-operatively as malignant 3 underwent near-total thyroidectomy and one total thyroidectomy one patient needed re-operation. For patients with pre-operative benign or suspicious FNAC who turned to be later malignant (7+6=13) all of them underwent subtotal thyroidectomy.

DISCUSSION

The incidence of thyroid gland disease presenting for surgical treatment is increasing at the same time there are many reports which indicate a rise in the incidence of thyroid malignant in Iraq. As the surgical pre-operative planning and operative techniques differ in benign and malignant thyroid disease, it is becoming very important to get a clear a diagnosis as possible before operation. A diagnostic dilemma is present as both benign and malignant thyroid conditions have similar presentations. The most common presentation of thyroid cancer is a non

tender palpable nodule or a lesion within multi nodular goiter. A palpable nodule occurs in up to 7% of the general female population. A single nodule has a 5-12% malignant rate. Multiple nodules have a 3% malignant rate.^[4]

Thyroid cancer diagnoses each year worldwide.

Clinical findings are sometimes suggestive of malignancy but they are never diagnostic solitary nodules are mostly malignant above the age 60 and below 30 years.

F.N.A cytology has become the diagnostic tool of choice for the initial evaluation of solitary thyroid nodule and multi nodular goiter because of its accuracy, safety and cost-effectiveness^[2] but although needle biopsy can be performed easily, consistently obtaining adequate tissue and processing the specimens to achieve accurate cytopathological interpretation requires expertise and experience.

FNA specimens are classified as malignant, benign, intermediate (or suspicious) or insufficient for diagnosis. A comprehensive review of FNA series benign lesions were found in 53-40% and malignant in 1-10% overall sensitivity for FNA is reported to be 83%. However, in our study it is much less than that and this reflects the lesser experience available papillary thyroid carcinoma is readily identified using FNA and interestingly enough. All the cases of malignant in our series were of papillary type.

Malignant FNAC diagnosis requires surgical intervention. Papillary thyroid cancer is often positively identified on the basis of FNAC. Results alone in patients with these carcinomas, definitive surgical planning can be undertaken at the outset.^[3] However, most authorities believe that it is nearly impossible to distinguish a follicular adenoma from a follicular carcinoma on the basis of FNAC findings patients with follicular neoplasm as determined with FNAC results should undergo surgery for thyroid lobectomy for tissue diagnosis these patients require complete thyroidectomy if a malignancy is discovered on review of the pathology authorities differ regarding the extent of thyroidectomy (total thyroidectomy subtotal or lobectomy).

Regarding other modalities of investigation, the usefulness of ultrasonography to distinguish between malignant and benign nodules is limited. Ultrasound-guided FNAC increases the accuracy of the test.

Carcinoma cannot be excluded on the basis of radioiodine scans which can help to determine the functional status of a nodule.

CT-scanning and MRI can be used to evaluate soft tissue extension of large or suspicious nodules into the neck, trachea or esophagus and to assess metastasis to cervical lymph nodes as mentioned earlier, a definitive or possible malignant diagnosis pre-operatively will help greatly in planning surgery and post-operative strategy.^[9]

Primary treatment for papillary and follicular carcinomas is surgical excision whenever possible, total thyroidectomy has been the mainstay of treatment for well-differentiated thyroid carcinoma.^[5] Major complications are recurrent laryngeal nerve injury and hypoparathyroidism from inadvertent damage or removal of parathyroid glands after total thyroidectomy, patients undergo radio-iodine scanning to detect regional or distant metastatic disease followed by radio ablation of any residual disease found.

Subtotal thyroidectomy has been proposed to reduce recurrent laryngeal nerve injury and hypoparathyroidism. This should be followed by postoperative radioiodine treatment in an attempt to ablate the remaining thyroid tissue.

Some surgeons propose thyroid lobectomy with isthmusectomy as definitive treatment for patients at low risk for recurrent or metastatic disease.

Over the last decade new endoscope approaches to thyroidectomy have been developed because of a growing desire for less invasive surgery endoscope and minimally-invasive techniques reduce post-operative pain, improve cosmesis and shorten hospital stay.^[1] Some studies showed that minimally-invasive thyroidectomy could be used for patients with low-risk, well-differentiated carcinoma.

As all cases of malignancy in our series were of papillary type, we will discuss in more detail the management of this condition. Patients with papillary carcinoma can be separated into low and high-risk categories for mortality based on prognostic factors. These factors include age, distant metastatic disease, extra thyroidal invasion and size of primary lesion some surgeons believe that hemithyroidectomy is the most appropriate treatment for low-risk papillary carcinoma that is macroscopically localized in one lobe or for patients with occult papillary thyroid cancers.^[3]

A near-total thyroidectomy can be performed to decrease the risk of damage to the recurrent laryngeal nerve or parathyroid glands. Some thyroid tissue is left during the resection and subsequently can be ablated with iodine-131.^[5]

Total thyroidectomy remains the standard treatment for papillary thyroid cancer. It is recommended if the primary tumor is 1 cm. + or if extra-thyroidal extension or metastasis is present this surgical procedure removes all thyroid tissue so that postoperative I-131 is more effective in treating occult disease, eliminates the risk of leaving occult disease in the thyroid and allows serum thyroglobulin levels to be more sensitive in detecting recurrent or persistent disease. The risk of surgical complication is higher than other modalities but some experts believe that the risk of recurrent disease is lower and the survival rate is higher after total thyroidectomy papillary thyroid cancer readily enters the intrathyroidal lymphatics and spreads to lymph nodes in the antes ion compartment of the neck.^[11]

In general the prognosis for papillary carcinoma of the thyroid is excellent. A long term survival rate of 90% is reported in the USA.

Prognostic factors include tumor size, age, extrathyroidal spread and histology vascular invasion is associated with more aggressive disease and a higher incidence of tumor recurrence. About 30% at patients develop tumor recurrence. A long delay in initiating treatment results in more than two times the 30 year cancer mortality rate. So these facts illustrate very clearly the importance of as definite a diagnosis as possible preoperatively to allow for careful operative and post-operative planning.

The current clinical research is focused on finding better methods of detection and better prognostic indicators. Advances are made in the identification of genetic markers in tumor cells that indicate prognosis in general as well as the tendency of the cancer to metastasize.^[3]

Conflict of interest: none.

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