INTRODUCTION

Thyroid nodules occur in 4-15% of adult population and can be found in up to 90% of women over the age of 60 years\(^1\). However the incidence of malignancy is only 50 per million population\(^2\). The major challenge faced by a clinician is to determine whether a thyroid nodule is benign or malignant. Although certain aspects of the history and physical examination may suggest malignancy, in most cases, these are nonspecific and are of no predictive value. Tests that may help in establishing a diagnosis of malignancy include, radioisotope imaging of the thyroid, thyroid ultrasound and fine needle aspiration cytology (FNAC). It is important to evaluate thyroid nodules in a way which is not only cost-efficient but also carries the lowest margin of error.

Based upon radioisotope image, nodules can be classified as cold, hot or indeterminate (warm). A cold nodule shows decreased tracer uptake compared to the surrounding normal thyroid tissue\(^3\). A cold nodule reflects lack of organification (or trapping) and subsequent thyroxine synthesis. A cold nodule may be benign or malignant. Benign lesions include simple cysts, adenomatous hyperplasia, focal haemorrhage, colloid cysts, non functioning follicular adenomas, abscesses, focal thyroiditis, parathyroid adenomas. Approximately 80% of thyroid nodules are cold and only about 10% of these are malignant.\(^4\) 4% of hot nodules are shown to contain tumor. Thus, radioisotope imaging is unreliable in excluding or confirming the presence of cancer.\(^5\)

Historically, radioisotope imaging has played a major role in the work up of thyroid nodules; however, with the advent of fine needle aspiration cytology (FNAC), this role has become less clear.

RESEARCH METHODOLOGY

This cross sectional study was carried out between November 2002 and April 2004 in the outpatient department of surgical A unit of Khyber Teaching Hospital. A total of 48 patients with cold nodules on thyroid radioisotope scan were included in the study and underwent fine needle aspiration cytology.

Surgery was carried out in all patients. The type of surgery was dictated by fine needle aspiration results. Patients diagnosed with thyroid cancer on FNAC underwent total or near-total thyroidectomy. Patients with solitary thyroid nodules and a benign FNAC result, underwent lobectomy with isthmectomy. Patients with multinodular goiter with a dominant nodule and a benign FNAC result, underwent subtotal thyroidectomy. All specimens were sent for histopathology. Patients with benign FNAC results who turned out to have malignancy on histopathology underwent total-thyroidectomy or near-total thyroidectomy at a second stage.
RESULTS

The ages of these patients ranged between 11 and 60 years with the mean age being 36.2 years (S.D± 13.7). Further stratification of age is shown in Table-I. 91% (44) patients were female and 9% (4) were males. 45.8% (22) patients had a multinodular goiter with a dominant nodule while 44.2% (26) had a solitary nodule. Four patients with dominant nodules were found to have malignancy on FNAC. Further surgery and histology did not alter this figure. Among the 44.2% (26) patients with solitary nodules, 2% (1) was a cyst with benign cytology and was aspirated to dryness. In 6.25% (n=3) of patients the nodule was both cystic and solid while in the remaining 44.2% (22) patients, the nodules were solid. The FNA reported papillary carcinoma in only 2% (1) patient with a solitary solid nodule. This figure rose to 4% (2) on further histology after surgery. The total number of patients who had malignancy among the 48 patients with cold nodules was therefore, six (12.5%). This figure was 18 percent in multinodular goiter and 7.7 percent in solitary thyroid nodules.

Table 1: Age Wise Distribution of patients with Cold Nodules

<table>
<thead>
<tr>
<th>Age</th>
<th>No. of Patients</th>
<th>Percent-age</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20 Years</td>
<td>6</td>
<td>12.5</td>
</tr>
<tr>
<td>21-30 Years</td>
<td>13</td>
<td>27.1</td>
</tr>
<tr>
<td>31-40 Years</td>
<td>14</td>
<td>29.1</td>
</tr>
<tr>
<td>41-50 Years</td>
<td>8</td>
<td>16.7</td>
</tr>
<tr>
<td>51-60 Years</td>
<td>7</td>
<td>14.6</td>
</tr>
</tbody>
</table>

DISCUSSION

The overall frequency of malignancy in cold nodules has been variably reported to be between 5 to 10 percent. Belfiore et al in a series has put this figure at 4.5%. In our study, the overall frequency was 12.5%

In a large review of patients presenting for the evaluation of a cold thyroid nodule, the frequency of thyroid cancer was only about 5% (in an iodine sufficient area) and there was no change in the frequency of malignancy (4.9%) in patients with a multinodular goiter and a dominant nodule. In another study, the frequency of malignancy in cold nodules in MNG was 9.8% and 8% in the single nodule group. Other authors have also concluded that there is not a statistically significant difference in the incidence of thyroid cancer in patients with solitary or multiple thyroid nodules. Our study shows contrary results with the frequency of malignancy being 18 percent in multinodular goiters as compared to 7.7 percent in solitary thyroid nodules. This is likely to be due to the late presentation of patients in our setup.

The likelihood of a cold nodule being malignant was lower in iodine deficient patients (roughly 2.5-3%). This was also seen in our study where three of the nine patients (33.3 percent) belonging to Peshawar had a malignant thyroid. Three of the thirty nine patients belonging to iodine deficient areas had a malignant thyroid (7.5 percent).

Certain factors have been shown to increase the risk of malignancy in a cold nodule. These include:

1- History of radiation to head and neck as an adolescent or child
2- Regional lymphadenopathy
3- Age
4- Male sex
5- Evidence of local invasion
6- Nodule greater than 3 cm
7- Enlargement of nodule while on thyroid suppression
8- Family history

The likelihood of malignancy in a solitary nodule is about 30% if there is a history of radiation, and 35%, if multiple nodules are detected. It is important to note that about 5% of patients who received radiation in childhood and have a normal thyroid scan are found to have a malignancy. In our study none of the patients gave a history of exposure to radiations.

Regional lymphadenopathy increases the likelihood of malignancy in cold nodules. In our study, two patients had regional lymphadenopathy but histology of the thyroid showed benign disease. There is a two fold increased risk of malignancy in patients who are less than 20 years of age and a six fold increased risk in patients over 60 years. In our study four patients were 60 years of age while two were in their forth decade.

The chance that a cold nodule is malignant is about 2 times greater in a male patient. Generally, carcinoma is found in about 20-25% of cold nodules in men. In our study all patients with malignant thyroid glands were females.

Local invasion, nodules greater than 3 cm in size, a positive family history for thyroid cancer and enlargement of thyroid nodules while on thyroid suppression therapy all increase the chances of a cold nodule being malignant. In our study, four patients with malignancy had evidence of local invasion and all six had nodules of greater than 3 cm in size. There was no positive family history for thyroid cancer in any patient while none of the patients were put on...
preoperative thyroid suppression. Further trials are recommended to uncover the predisposing factors of thyroid malignancy.

CONCLUSIONS

A thyroid scan has little to add in the diagnosis of malignancy. In our setup where a trend to use cost effective investigations should be followed, a thyroid radioisotope scan can be withheld, as this adds little in determining which nodules require surgical excision. All euthyroid patients with solitary nodules or dominant nodules, in a background of multinodular goiter should undergo FNAC followed by surgery.

REFERENCES


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