EVALUATION OF INCIDENCE OF MALIGNANCY IN SOLITARY THYROID NODULE AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: This study aims to identify the incidence of malignancy in solitary nodule thyroid in a tertiary care hospital in Kalaburagi, Karnataka.

Methods: This was a prospective non-randomized hospital-based interventional study carried out on 50 patients over a period of 1 y, who presented with clinically palpable solitary thyroid swellings and subsequently underwent surgery for the same at the Department of General Surgery, Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka.

Results: Over the total duration of the study period, there were 50 cases of clinically detected solitary thyroid nodules with a high female preponderance. The mean age of the incidence of solitary thyroid nodule was 40.6 y. The incidence of malignancy in solitary thyroid nodule was found to be 18%.

Conclusion: It is concluded from the present study that 18% of solitary thyroid nodules are malignant, with female preponderance and a mean age of solitary thyroid nodule is 40.62 y.

Keywords: Malignancy, Age and Sex, Solitary thyroid nodule

INTRODUCTION

Patients presenting to the surgical outpatient department with a solitary nodule in the Thyroid gland are quite common. Incidence of a clinically palpable nodule in the thyroid gland in the adult population stands at approximately 8%. With recent advances in diagnostic imaging techniques, especially high-resolution ultrasonography (HRUSG), the rate of detection of even clinically impalpable thyroid nodules have increased many folds [1].

The prevalence of nodules in the thyroid gland increases to up to 50% when the clinical examination is combined with HRUSG [2].

A Thyroid nodule is traditionally defined as a ‘palpable lesion or a lesion radiologically distinct from the surrounding normal parenchyma of the gland’. Depending on the number, the nodules are classified as either solitary or multiple [3].

Furthermore, Solitary nodules can either be an exclusively single nodule or it can be a dominant nodule in a multinodular gland in which the other smaller nodules are clinically impalpable [4].

Pathologically, the presenting lesions can range from benign to being malignant. Benign nodules can have multiple etiologies like simple cysts, thyroid adenoma or colloid nodules. Malignant nodules, on the other hand, can include papillary carcinoma, follicular carcinoma, medullary carcinoma, medullary carcinoma or secondary from other sites [5].

Since Solitary thyroid nodules are a common occurrence, the risk of malignancy in these nodules has to be borne in the surgeon’s mind while dealing with it either non-operatively or surgically.

Thus, the identification of patients with a significant risk of malignancy is a must and evidence-based guidelines needs to be followed for the management of these patients [6].

The incidence of thyroid cancer in general population with thyroid nodules, ranges from 5-20%, where as in population who are exposed to ionizing radiation is more (18-30%) [7].

Therefore, an exhaustive pre-operative work-up of the swelling becomes the need of the hour to create the precise distinction between benign and malignant swellings. With the advances in imaging and tissue sampling modalities, it has become comparatively easier to arrive at a reliable pre-operative diagnosis and thereby helps in avoiding unnecessary extensive surgery [8, 9].

This study was conducted over a period of 6 mo in a tertiary care hospital in Kalaburagi, Karnataka, India, aiming to evaluate the incidence of malignancy in Solitary thyroid nodules operated in our hospital and also to study the age and gender predispositions seen in such swellings.

MATERIALS AND METHODS

Methods

This was a prospective non-randomized hospital-based interventional study carried out on 50 patients who presented with complaints of Solitary thyroid swelling and subsequently underwent surgery for some at a tertiary care hospital. The study was conducted for a period of 6 mo from January 2022 to June 2022. The Institutional Ethics Committee (ECR/889/Inst./2017) approval was obtained at the beginning of the study. The patients presenting with a clinically palpable solitary thyroid nodule between 10 to 65 y of age of both gender were included in the study. And the patients with non-solitary thyroid swellings i. e. clinically, radiologically and surgically proven multinodular goiter, patients not consenting for the interventions, previously operated patients with recurrent thyroid swellings, patients with a history of radiation exposure, and pregnant females were excluded from the study.

After applying inclusion and exclusion criteria, 50 patients were selected to be included in the study. Informed Consent was taken from all the included patients by explaining about the study in the local kannada language. The data was collected regarding history of presentation of the swelling and relevant history to trace the etiological causative factors of the swelling. Additionally, a history of any previous surgeries, history of any co-morbidities, any positive family history, and drug history were obtained and documented. All the study participants were subjected to thorough general physical examination, complete systemic examination and in-depth thyroid examination and same was documented in the performa.
Additionally, baseline routine pre-operative work-up as well as specific investigations like thyroid function tests, fine needle aspiration biopsy (FNAB), X-ray of the neck, anteroposterior and lateral views to look for retrosternal extension in larger swellings, HRUSG of the neck and indirect laryngoscopy to ascertain the condition of the vocal cords were performed.

A euthyroid state was achieved in all patients by appropriate medical therapy before undergoing surgery. As a criterion for inclusion, a solitary thyroid nodule was defined as a “single swelling involving either lobe of the gland or isthmus of the gland and with no features of multi-nodularity detected either clinically, radiologically or postoperatively on histopathology”.

All patients underwent surgery by the same team of 2 surgeons and the operated specimen was sent for histopathological examination. The histopathological reports were subsequently evaluated and correlated with the pre-operative clinical diagnosis by standard statistical methods. The data were analyzed using descriptive statistics using Microsoft Excel software and the results were depicted in frequency and percentage.

**RESULTS**

This study was conducted on 50 patients who presented to the Department of Surgery with solitary thyroid nodule.

A standard proforma was designed to collect the data such as clinical presentation, investigation findings, an operative procedure performed and histopathological findings and analysis was performed using descriptive statistics. The following observations were made from the current study.

The youngest participant in the study was 12 y of age and the oldest participant was 65 y. The mean age of patients was found to be 40.62 y, with the highest prevalence of solitary thyroid nodules observed in the age group of 41-50 y (fig. 1).

More females (42) were found to be affected than males (8) (fig. 2).

**Fig. 1: Age distribution of solitary thyroid nodule**

**Fig. 2: Gender distribution of solitary thyroid nodule**

**Fig. 3: Thyroid profile of the patients**
In our study series, 41 patients (82% of sample) had benign nodules, with 9 patients (18% of sample) diagnosed with malignancy (Table 1).

Out of the 50 subjects included in the study, malignancy was detected in 9 patients and papillary carcinoma of thyroid was found to be the most common malignancy occurring in the Solitary Thyroid nodules accounting for 7 of the total of 9 malignancies. Out of these 9 patients, 8 were females. Thus, malignancy was also found to be more prevalent in the female gender (Table 2).

Table 1: Diagnosis of thyroid nodules

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>41</td>
<td>82%</td>
</tr>
<tr>
<td>Malignant</td>
<td>9</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig. 3 shows the histopathological diagnosis of the patients, in which 50% of the cases are found to be nodular goiter, followed by 20% of Colloid Goiter, 14% of papillary carcinoma, 12% of follicular goitre and 4% follicular carcinoma (Fig. 4).

Table 2: Gender-wise distribution of malignancy

<table>
<thead>
<tr>
<th>Type of malignancy</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular Carcinoma</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Papillary Carcinoma</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

DISCUSSION

Although majority of solitary nodules are benign, the risk of malignancy cannot be ignored which will present a significant challenge to the surgeons. Because, according to recent studies, the incidence rate of thyroid malignancy in patients with a palpable solitary nodule lies in the range of 11-20% [11, 12].

Table 3 shows the comparison of incidence of Malignancy in solitary thyroid nodule with other studies [13-16].

Table 3: Comparison of incidence of malignancy in solitary thyroid nodule with other studies

<table>
<thead>
<tr>
<th>Studies</th>
<th>Incidence rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>The present study</td>
<td>18%</td>
</tr>
<tr>
<td>Fenn et al. [13]</td>
<td>12%</td>
</tr>
<tr>
<td>Bhansali SK et al. [14]</td>
<td>09%</td>
</tr>
<tr>
<td>Rehman AU et al. [15]</td>
<td>11%</td>
</tr>
<tr>
<td>Naz Akhtar et al. [16]</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

Historically, surgeons would perform routine surgical removal for every solitary thyroid nodule, but such a radical approach led to a tricky conundrum wherein many patients underwent unnecessary surgery for a STN that later turned out to be a benign lesion on histopathological examination.

Through the passage of time and with advancements in diagnostic modalities, it was realized that the need of the hour was to chart out a more selective surgical algorithm for patients with solitary thyroid nodules. For the same reason, at present, fine needle aspiration cytology (FNAC) has attained widespread acceptance as a quick, easy and reliable armament in the surgeon's armory for the diagnostic workup of solitary nodules of the thyroid gland.

In their Series of 299 patients with STN at the time of surgery, Veith FJ, Brooks JR, Grigsby WP, et al. (1964) reported the female-to-male ratio to be 5:1 with papillary carcinoma being the predominant malignancy among them [17].

In his study on the surgical and histopathological data of 172 patients operated for solitary thyroid nodules, Khairy GA reported 13.9% incidence of malignancy, wherein papillary type made up for the majority [18].

In our study, after final histopathological examination, 9 of the 50 STN were found to be malignant with papillary carcinoma found to be the most frequent diagnosis (with 7 out of the 9 cases being diagnosed with it). The remaining 2 were follicular carcinoma.

The highest numbers of thyroid nodules were seen in the age group of 41-50 y; the mean age of patients was 40.62 y. The patients were spread across the age group with the youngest being of 12 y age and the eldest being 65 y old.

The pattern of age distribution assumes a major significance because the incidence of malignancy in STN has been quite frequently observed to be high at the extremes of ages.
It therefore goes without saying that the patients presenting with STN who are either younger than 20 y or older than 50 y have to be evaluated with high degree of clinical suspicion. It would be safer to assume all STNs occurring at the extreme of ages to be malignant until confirmed histopathologically.

In their study, Akhtar N et al. noted that 42.7% of the patients were between 31-40 y. Incidence of malignancy in STNs was recorded to be at 15.3% [16].

Hossain MA et al., reported male to female ratio of 1:7 and the 31-40 age group had the greatest number of patients with STN (12). Additionally, 28% of the patients had malignant lesions in their study [19].

In their study on the incidence of malignancy in solitary nodule of thyroid, Babu R et al. (2015) reported the female-male ratio to be 8:1. The peak age incidence was found to be in the 21-30 y age group with the incidence of malignancy being at 10.83% [20].

The present study has the limitation of smaller sample size and it is a single-center study. Furthermore, we had included only solitary types of nodules, excluding multinodular goiter. The present study provides baseline information for conducting future studies in a larger sample and including multinodular goiter at multiple centres.

CONCLUSION

From this study, done at a tertiary care hospital in Kalaburagi, Karnataka, we have drawn the conclusion that 18% of solitary thyroid nodules were observed to be malignant, and the incidence of malignancy was found to be 5 times greater in females than in males (5.2: 1) and a mean age of presentation of patients with solitary thyroid nodule was 40.62 y.

ACKNOWLEDGEMENT

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Nil

AUTHORS CONTRIBUTIONS

All the authors Dr. Mohammad Noor Alam, Dr. Vijaylaxmi Dulange, Dr. Sadia Afreen S Alam and Dr. Pramod, have equally made a substantial contribution in the conception, acquisition of data, interpretation of data, and in drafting the article and agreed to be held accountable for all aspects of the work.

CONFLICT OF INTERESTS

There was no conflict of interest in this work.

REFERENCES