Original Research Article

FNAC playing its role in Diagnosing and Managing Solitary Thyroid Nodules

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Abstract

Background: Thyroid nodule diagnosis with fine-needle aspiration cytology (FNAC) being a simple and cost-effective procedure has increased sensitivity and specificity rates which has resulted in a significant increase in malignancy rates of removed nodules. **Aim:** The goal of this investigation was to see if FNAC was efficient in evaluating thyroid nodules by comparing the results to histopathologic evaluation and comparing the results to the literature. **Materials and Methods:** This study looked at 1610 FNACs from 1335 patients who were classified using the Bethesda criteria, as well as 126 histological examinations from the cohort. The patients' average age was 51.24 years (range: 17-89, 17 percent male and 83 percent female). The accuracy rates, sensitivity, specificity, positive and negative predictive values were all assessed. **Result:** The specificity was 64.6 percent and sensitivity was 87.1 percent. 76.1 percent, 79.5 percent, and 77.3 percent, respectively, were for positive and negative predictive value plus accuracy. **Conclusion:** The Bethesda system's calculation of thyroid FNAC samples was substantially linked with the outcomes of histological diagnosis in our investigation. FNAC plays a key part in diagnosis and therapy of solitary thyroid nodules as well as dominant nodules in multi nodular goitre because of its high accuracy, specificity, and sensitivity. In India, pathologists obtain the much of thyroid aspiration samples via manual palpation. TBSRTC is most extensively utilised reporting system at the moment, with multiple studies showing its usefulness and inter observer agreement.

Keywords: Thyroid nodule, efficacy, fine-needle aspiration cytology, predictive value, sensitivity, specificity.

Introduction

Martin and Ellis were the first to disclose the use of aspiration cytology to diagnose thyroid lesions in 1930 [1]. The use of fine needle aspiration cytology (FNAC) in examination of thyroid nodules has resulted in reduction in the amount of people who have thyroidectomy for benign thyroid diseases. As a consequence, incidence of cancer following thyroid surgery has risen from 5-10% to 30-50% in recent years [2]. This relatively easy treatment has become most important factor in selecting how individuals with thyroid nodules should be treated. However, numerous essential factors contribute to the efficacy of FNA, including aspirator expertise, skilled cytological interpretation, and a rational analysis according to a synthesis of cytological and clinical data in relation to an individual patient. The goal of this investigation was to assess thyroid FNAC results and, if at all feasible, correlate them with histology. The current research focused on the effect of FNAC on the reduced rate of surgery in clinically suspicious thyroid lesions. The incidence was particularly high among females of Patna District in Bihar (age adjusted rate 20.7 per 100,000 population), followed by Jamshedpur (13.3) and Ranchi Districts (12.0) in Jharkhand, according to the National Cancer Registry Program's latest three-year report of 27 population-based cancer registries from 2015 to 2017.

The commonest symptom of thyroid carcinoma is solitary thyroid nodule. The Endocrine Society of India issued consensus guidelines for thyroid nodule management that summarised current medical evidence and optimised the guidelines for clinical practise in India [3]. It includes a strong recommendation (Level A) that all thyroid nodules larger than 1 cm be evaluated, including both palpable and radiologically distinct non-palpable nodules.

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In India, 12.2 percent of people have palpable nodules [4]. Because goitre is common in India due to iodine deficiency, it's critical to distinguish between benign and cancerous thyroid nodules. Fine-needle aspiration cytology (FNAC) has been shown in numerous trials to work as a reliable method for evaluating thyroid nodules in both adults and children. The use of FNAC in thyroid nodule management and risk evaluation has grown in recent years.

Materials and methods

Between 2015 and 2017, 435 patients having thyroid hypertrophy were treated with FNAC. The records were searched for information on the patients' medical history, inspection of the body, thyroid function tests, and clinical diagnosis. In every case, cytopathologists performed the procedure. A physical examination was performed prior to aspiration to determine the thyroid's mobility during swallowing and the presence of any enlarged cervical lymph nodes. Patients were forced to lie supine with their necks spread out. With or without aspiration, a 23-gauge needle was connected with a Franzen's handle and aspirated with a 25-ml disposable syringe. Each case had two or three passes. What's within the cystic nodules were removed, centrifuged, and the sediment was used to make cytological slides. May-Grünwald-Giemsa (MGG), hematoxylin and eosin (H and E), and papanicolau (Pap) stains were used to stain the slides. There were no severe problems such as tracheal invasion, palsy of the laryngeal nerve, or hematoma. Some patients just complained of minor discomfort.

Surgery was used to treat 67 (15.20 percent) of the 435 patients, including complete, subtotal, and hemithyroidectomy. These specimens were histopathologically examined. Following the extensive gross examination, 5-10 tissue bits from representative locations were selected for standard paraffin portions stained with H and E. Clinical characteristics, thyroid function tests, and histological investigation were all used to correlate with cytological findings. To assess our findings, we used descriptive statistics.

When there was little cellularity (no objective quantification) and when abundant blood or poor technical quality hid smears, such as

conspicuously thick smears and air drying of alcohol-fixed smears, pre-Bethesda research regarded a FNA unsatisfactory/non-diagnostic. Except for a handful who follow the Royal College rules, most cytopathologists now utilise TBSRTC's objective adequacy criteria [5].

Results

The patients were in age mainly from 5 to 75 years old, with a typical age of 37.59 ± 14.63 years and a male-to-female proportion of 6:1. Thyroid enlargement, whether broad or nodular, was the most prevalent all of the patients' presenting symptom. Other signs and symptoms were milder: ten patients had thyroid-related discomfort, six had dysphagia, ten had voice hoarseness, and seven had cough. The lymph nodes in the neck were felt in five patients. Oedema had been for a period of more than a year in 290 (62.2%) of cases, three months or less in 35 (7.6%), and for a period of three months to a year in 30 (6.68%) of cases, according to the patients. There was thyroid illness in the family in two of the cases.

In 125 patients, thyroid function testing was carried out (27.64 percent). Seventy individuals were determined to be euthyroid (66.66 percent), 30 hyperthyroid (20.83 percent), and 25 hypothyroid (13 percent). In 10 patients with solitary or multiple nodules, eight patients with extensive swelling, six patients with thyroiditis, and one patient with malignancy, hyperthyroidism developed. The outcomes were contrasted with the cytology findings. The diagnosis of 22 FNAC patients was insufficient due to a lack of cellularity.

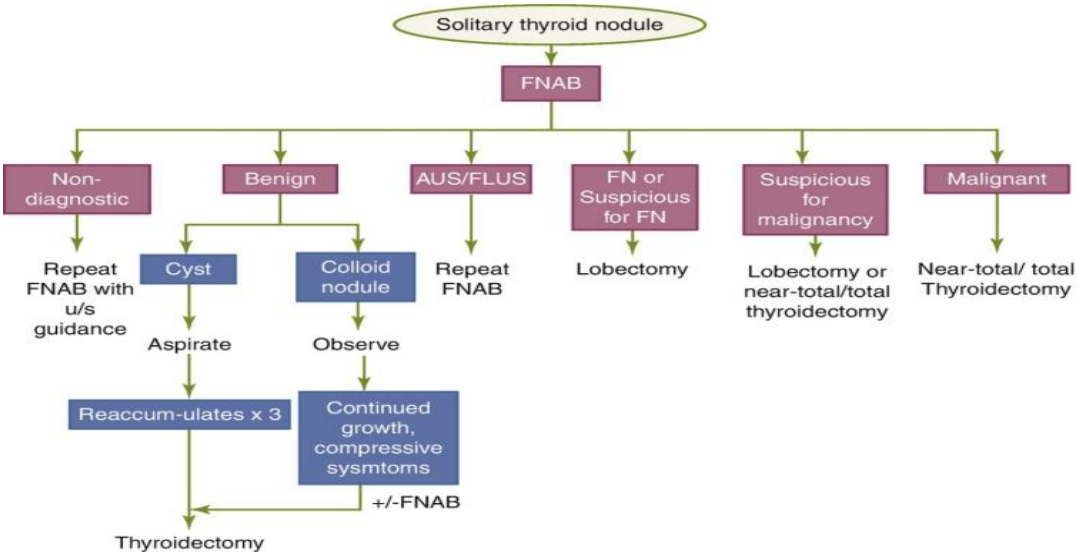

Fig. 1: Classification of solitary thyroid nodule

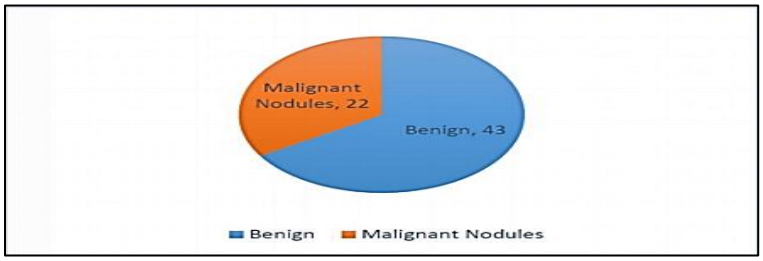

Fig. 2: Distribution of malignant and benign nodules

Discussion

Thyroid enlargement in the form of a nodule or a widespread enlargement, triggers a slew of tests, mostly to exclude the possibility of a tumour or thyroiditis. In most cases, FNAC is used as the initial line of study, followed by other tests such as ultrasonography (US), thyroid function tests, thyroid scans, and antibody levels, all with the goal of determining which individuals need surgery intervention and which may be handled conservatively [6]. FNAC was first introduced in India in the early 1970s [7]. Gupta et al. published the first paper on FNAC in the Indian Journal of Cancer in 1975 [8]. Thyroid FNAC is frequently used since it is risk-free, quick, cheap, and accurate in the identification of thyroid nodules. The thyroid FNAC has sensitivity of 80 to 98 percent plus specificity of 58 to 100 percent. The sensitivity came to be 97 percent and the specificity was 100 percent in our investigation. In this investigation, the insufficiency

rate was 5.06 percent. According to previous studies, the proportion of deficient material varies between 0 and 25%.

Several studies have established the effectiveness of US guidance that may find circumscribed lesions as less as 1 mm in diameter. Furthermore, US-guided aspiration definitely surpasses palpation-guided aspiration in mixed, solid-cystic lesions or difficult-to-palpate lesions. Enlargement of thyroid is quite prevalent in most parts of the globe [9, 10, 11]. In the region of the Himalayan foothills of India, there is the world's largest goitre belt. According to our research, the frequency of goitre within thyroid nodules is substantially higher in basically the iodine-deficient areas (57.60 percent). In our investigation of colloid goitres, the cytohistological concordance rate was 90 percent (45 out of 50 cases). A colloid goitre was detected cytologically in single false negative case. Papillary cancer with colloid goitre was discovered on histopathological testing. The cytological sample in this case only included discovered thyroid follicular epithelial cells, which led us to infer that the needle didn't pierce the genuine 1.2 cm nodule detected on histological inspection, and that only the thyroid's immediate surroundings with colloid goitre alterations was aspirated [12, 13, 14, 15].

Conclusion

FNAC plays a key role in diagnosis plus therapy of solitary thyroid nodules and dominant nodules in multi nodular goitre because of its high accuracy, specificity, and sensitivity.

The low prevalence of surgical intervention is possibly the best example of FNAC's good impact on thyroid disease care (15.2 percent in this series). Surgery being primarily avoided in the cases of colloid goitre and thyroiditis. As a consequence, FNAC can be utilised as a first line of defence in the examination of palpable thyroid nodules, helping to distinguish between lesions that require surgery and those that can be handled without surgery.

In India, pathologists obtain the majority of thyroid aspiration samples via manual palpation. The majority of centres prepare both alcohol-fixed and air-dried smears stained with Papanicolaou/H&E and May-Grünwald-Giemsa. TBSRTC is most extensively utilised reporting system at the moment, with multiple studies demonstrating its usefulness and inter observer agreement.

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