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Original Research Paper

A Cytomorphological Study of Thyroid Lesions In Children and Adolescents

Medical Science

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ABSTRACT

Background and Objectives: *Fine-needle aspiration is a safe and efficacious process in the evaluation of nodular diseases in the adults.The purpose of this study was to assess the extent of its applicability in thyroid lesions in children and adolescents, as well as to determine distribution of thyroid lesions in pediatric and adolescent patients in whom the prevalence of thyroid nodules and probability of malignancy are different.*

Methodology: *This is a three-year study undertaken between January 2012 and December 2015, during which, 284 fine-needle aspiration cytology were performed for palpable thyroid lesions in children and adolescents and analysed. Out of these 11, 52, 82 and 116 aspirates belonged to the age group between 7-<12 years, 12 -<16 years, 16 -<19 years, 19-21 years respectively. There were 261 (91.9%) satisfactory aspirates and 23 unsatisfactory aspirates (8.1%). These 261 satisfactory aspirates with adequate cellular material were taken up for interpretation and analysed.*

Results: *Benign cytology was reported in 89 cases (34.2%) where 11 cases (4.2%) were males. Thyroiditis was observed in 154 cases (59%) and 8 cases (3.1%) were males. Suspicious cytology was reported in 12 cases and comprised of 2 cases with a suspicion of Papillary Carcinoma and 10 cases (3.8%), with a suspicion of a Follicular lesion. Papillary Carcinoma was detected on 6 cases where all were females.*

Conclusion: *Fine-needle aspiration cytology of palpable thyroid lesions in children and adolescents is a good screening test because of its high sensitivity.*

INTRODUCTION:

Thyroid nodules are rare in children and adolescents, affecting 1% to 2% of the paediatric population, at large [1]. But the recent dats suggest incidence of malignancy in paediatric thyroid nodules is high and the risk of surgical complications are significant. [2]. Various studies have also found that, "Incidence of cancer in solitary nodules ranges from 14% to 40% as compared to 5% in adults" [3]. Benign lesions have to be differentiated from malignant lesions as they are managed in a different way. Fine needle aspiration is very useful as a screening test for thyroid nodules. Its utility has increased significantly in recent years, particularly because of the availability of ultrasound guided techniques, which allow detection and aspiration of smaller and deep-seated nodules. Consequently, more thyroid cancers are diagnosed at an early stage. Patients with Fine needle aspiration cytology(FNAC) diagnosis that suggest neoplasia and malignancy are managed surgically, whereas, patients with FNAC diagnosis that favour a benign lesion can be followed clinically [4].

FNAC has reduced the number of patients presentingwith thyroid lesions who actually require surgery and thereby reduced the surgical complications aswell [5].

A few studies discuss the role of FNAC in the management of paediatric and adolescent thyroid disease and its reliability in selecting patients for surgical exploration. The purpose of this study is to highlight the cytomorphological spectrum seen in paediatric and adolescent thyroid aspirates and to compare the findings with the other studies.[6]

MATERIALS AND METHODS :

The present study was undertaken in the Department of Pathology, Patna Medical College and Hospital, Patna, Bihar, India from January 2012 to December 2015 (43years). Among 3200 FNACs performed, 284 FNACs were performed on patients who were less than 21 years of age.

Fine needle aspiration was performed by the pathologist using a 23 gauge needle attached to a disposable 10ml syringe. The aspirated material was expressed onto slides and smears were prepared. Half of the smears were immediately fixed in 95% ethyl alcohol for Papanicoloau and Haematoxylin and Eosin staining. The remaining smears were air-dried and stained by May- Grunwald-Giemsa Stain.

FNAC results were categorized as benign, suspicious for a neoplasm, neoplastic and unsatisfactory as per the Bethesda system for cytological reporting of thyroid lesions. The aspirates were classified as "Benign NOS" (Not otherwise specified) when they were characterized by colloid and 6 or more groups of benign follicular cells. "Cystic change" was reported when macrophages with or without hemosiderin were identified. "Hyperplasia" was characterised by fire-flare appearance of the follicular cells. "Thyroiditis" was reported, when there was oxyphilic change and lymphocytic infiltrate. The aspirates under the category of "Suspicious for malignancy" included those with features suggestive but not diagnostic of a Papillary carcinoma. Suspicious lesions also, included aspirates that were interpreted as "Follicular lesion" Table/Fig-1] when it was difficult to differentiate a hyperplastic nodule from a follicular neoplasm or a follicular variant of Papillary carcinoma on FNAC.

The aspirates categorized as "Neoplastic" included those with the morphologic features diagnostic of a Papillary carcinoma. The "Unsatisfactory aspirates" had fewer than 5 groups of follicular cells in each aspirate. A cyto-histologic correlation was attempted wherever possible.

RESULTS

Out of the 284 FNACs of palpable thyroid lesions in the pediatric and adolescent age-group, 259 (91.1%) were females and 25 (8.9%) were males. The patients age ranged from 7 to 21 years. The distribution of female and male patients in different age groups is shown in [Table1]. The female to male ratio10.4:1. The age-wise distribution of the thyroid lesions is shown in . In age group of 7 to less than 12 years, 7 cases (64%) were reported as benign and 4 cases (36%) as thyroiditis. Out of these 2 were male patients with a benign cytology. In the age group of 12 to less than 16 years, 13 (25%) and 39 (75%) cases were reported as benign cytology and thyroditis, respectively. Eight were male patients (3 with benign cytology and 5 with thyroiditis). In the age-group of 1636

to less than 19 years; 33(40%); 46 (56%), 1(1.2%), 2(2.8%) cases were reported as benign cytology, thyroiditis, suspicious cytology and papillary carcinoma. In the age-group of 19-21 years; 36(31%), 65(56%), 11(9.5%), 4(3.5%) cases were reported as benign cytology, thyroiditis, suspicious

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and papillary carcinoma respectively.(Figure 1 &2) .Benign cytology was reported in 34.2% aspirates, out of which 29% were in females and 4.2% were in males. Thyroiditis was reported in 154(59%) cases, out of which 56% were in females and 3.1% were in males. Suspicious cytology was reported in 12 cases (4.5%), out of which 3.8% were females and 0.7% males. Carcinoma was reported in 6 cases (2.3%) and all were females. Majority of the lesions were in the 19-21 years age group.

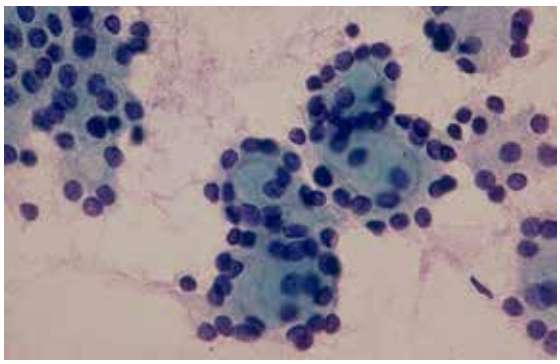

Fig 1: showing repetitive microfollicular pattern of thyroid follicles suggesting follicular neoplasm.Pap,400X

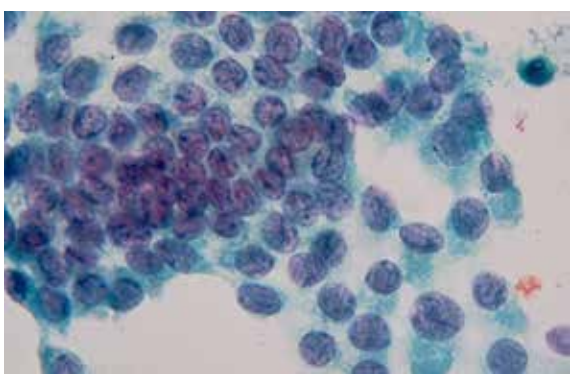

Fig 2: showing nuclear overlapping,nuclear grooves favouring Papillary carcinoma thyroid,Pap,400X

Years	Total no of cases	Satisfactory aspirates	Unsatisfactory aspirates	No. of female pts	No of male pts	Thyroid its	Suspicious cytology(follicular neoplasm)	Suspicious cytology (Papillary)	Papillary carcinoma
7-<12	14(4.9%)	11(4.2%)	3(11.04%)	12(46%)	2(8%)	4(2.6%)			
12-<16	59(20.4%)	52(19.9%)	6(26.03%)	47(18.1%)	11(44%)	39(25.3%)			
16-<19	84(31.3%)	82(31.4%)	7(30.4%)	85(32.8%)	4(1.6%)	46(29.9%)	39(25.3%)	39(25.3%)	39(25.3%)
19-21	123(43.3%)	115(44.4%)	7(30.4%)	115(44.4%)	8(32%)	65(42.2%)	46(29.9%)	46(29.9%)	46(29.9%)
Total	284	261(91.9%)	23 (8.1%)	259(91.9%)	25(8.9%)				

,Table/1: Comparision of age distribution between males and females presenting with enlarged thyroid and Distribution of thyroid lesions in FNAC samples in various age groups

DISCUSSION

Thyroid nodular disease comprises a wide spectrum of disorders, including a solitary nodule, multinodular goiter, nodular goiter observed in autoimmune thyroiditis and thyroid neoplasms [7].

In adults, FNAC has become a part of the routine evaluation of thyroid nodules. Chang et al., [8], noted in their study that since its introduction, the percentage of patients that have undergone thyroidectomy has decreased by 25% to 50% with the use of FNAC [7]. But, FNAC has been underutilized for evaluation of thyroid nodules in the young because of the possibility of complications and the need for sedation. They, also observed that sedation is rarely required and no complication have arisen. They opined that FNAC is a relatively simple procedure with few complications [9] Our study shows concurrent observations.

Thyroid nodules are quite common in the general population, but the vast majority of these nodules are benign [10]. By isolating the pediatric population, the prevalence of thyroid nodules becomes 10 fold lower, ranging between 1 to 2% [8].

In adult population, FNAC has evolved as a sensitive screening tool to limit the number of thyroid resection. Cited limitations are those related to sampling technique, the skill of the aspirator, experience of the cytopathologist and difficulty in differentiating benign Hurthle cell and follicular tumors from their malignant twins [9,10].

A few series reported on the utility of FNAC in children and diagnosis of papillary carcinoma. The nuclear grooves are non-specific features which can be seen, even in cases of Hashimoto's thyroiditis, nodular hyperplasia with oncocytes, follicular adenoma or Hurthle cell adenoma [11].

In another false positive case, a nodular hyperplasia was misdiagnosed as follicular adenoma on cytology, since high cellularity and microfollicular pattern were seen in the smears. Yang et al., [4] suggested that, the most important clue in differentiating follicular neoplasm from nodular hyperplasia was the presence of abundant blood containing microfollicles in the follicular neoplasm [11]. However, macrofollicular adenomas have far lower microvessel density than microfollicular nodules because the space occupied by the large colloid lakes are devoid of blood vessels. Therefore, macrofollicular adenomas may be diagnosed as nodular hyperplasia by FNAC. Likewise, a discrete but unencapsulated microfollicular nodule may be diagnosed as "follicular neoplasm" by FNAC resulting in excision of non-neoplastic nodules [9].

Radiological imaging, serological and molecular studies have made major advances in the last decade in the diagnosis and management of patients with thyroid diseases. However, to date, there is no single appropriate non invasive diagnostic test in clinical medicine that can accurately, in a timely and cost effective manner distinguish benign (mostly approached nonsurgically) from malignant (mostly managed surgically) nodules, except FNAC [8,11].

CONCLUSION:

FNAC is a good screening test for thyroid nodules, in children and adolescents because of its high sensitivity. The results of our study indicate that the majority of paediatric thyroid enlargements are benign and that, surgery is necessary in only a select number of patients but detection of malignant or suspicious cells is a definite indication for surgery. However, a negative FNAC must be viewed with caution and patients with negative FNAB results should have a close clinical follow up.

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