Thyroid Cytology Evaluation By Bethesda System

‘Thyroid Cytology Evaluation By Bethesda System
A Two Year Prospective Study’

Gharia Amit A. 1*, Agravat Amit H. 2, Dhruva Gauravi A 3

13rd year resident, 2(MD): Associate Professor, 3(MD): Professor & Head, Department of Pathology, PDU Medical College Rajkot

INTRODUCTION
Thyroid lesions are one of the common conditions encountered in clinical practice. It is difficult to clinical evaluation & reach to correct diagnosis. Hence it is essential that a correct diagnosis is made as early as possible. The majority of solitary thyroid nodules are benign; the incidence of malignancy being only 5-20% of surgically excised thyroid nodules on histopathology. In the management of solitary thyroid nodule, the primary challenge is to separate benign nodules (the majority) from malignant lesions (the minority). About 50% of clinically apparent solitary thyroid nodules turn out to be dominant nodule of multi-nodular goiter. 1 Percentage of solitary thyroid nodule increased with age along with increased prevalence of malignancy in third, fourth and fifth decades of life. Thyroid tumours are more prevalent in females and papillary carcinoma is the most common histological type of thyroid tumours followed by follicular carcinoma, medullary carcinoma, anaplastic carcinoma, non Hodgkin's lymphoma and unclassified tumours in order of frequency. Fine Needle Aspiration Cytology (FNAC) is a diagnostic tool in which cells are extracted from a palpable swelling using FNAC gun, syringe and fine needle. It is a simple, cost effective, quick, and relatively less painful procedure which can be used as an outdoor patient procedure or as a part of screening programme for the diagnosis of thyroid lesion. Bethesda system is very much helpful in categorizing thyroid lesion and avoiding confusion as was associated with previous categorizing methods.

*Corresponding Author:
Gharia Amit A
D-38, High Rise Building,
10th Floor, Jamtowel chowk
Jamnagar Road, Rajkot- 360001
Contact No. 08140320435
E-mail: dramit11@rediffmail.com.

ABSTRACT
BACKGROUND: Thyroid lesions are one of the common conditions encountered in clinical practice. It is difficult to clinical evaluation & reach to correct diagnosis. Hence it is essential that a correct diagnosis is made as early as possible. The present study was carried out in Department of Pathology, P.D.U Medical College and Hospital, Rajkot

OBJECTIVES OF THE STUDY: The objectives of present study are: To study various cytological features of material aspirated from thyroid swelling and hence making a pre-operative cytological diagnosis. 1 To categorize all the thyroid FNA’s according to the Bethesda system proposed by the National Cancer Institute (TBSRTC), Bethesda, USA in 2007. 2 To study the prevalence of various thyroid pathology by Bethesda system. 3 To correlate cytological features of thyroid swelling with the thyroid hormone profile. 4 To study age and sex distribution of patient with thyroid pathology.

METHODOLOGY AND MATERIALS USED: Materials needed for aspiration are: Disposable needles, Glass slides – clean and grease free, Methanol as fixative, Reagents for H&E stain and Giemsa stain, sterile gloves, gauze piece and spirit swab and through proper method of aspiration & examination has been done.

CONCLUSION: It is concluded that fine needle aspiration cytology is a simple, cost effective, quick, and relatively less painful procedure which can be used as an outdoor patient procedure or as a part of screening programme for the diagnosis of thyroid lesion. Bethesda system is very much helpful in categorizing thyroid lesion and avoiding confusion as was associated with previous categorizing methods.

Keyword: tumours, Thyroid Cytology Evaluation

INTRODUCTION
Thyroid lesions are one of the common conditions encountered in clinical practice. It is difficult to clinical evaluation & reach to correct diagnosis. Hence it is essential that a correct diagnosis is made as early as possible. The majority of solitary thyroid nodules are benign; the incidence of malignancy being only 5-20% of surgically excised thyroid nodules on histopathology. In the management of solitary thyroid nodule, the primary challenge is to separate benign nodules (the majority) from malignant lesions (the minority). About 50% of clinically apparent solitary thyroid nodules turn out to be dominant nodule of multi-nodular goiter. 1 Percentage of solitary thyroid nodule increased with age along with increased prevalence of malignancy in third, fourth and fifth decades of life. Thyroid tumours are more prevalent in females and papillary carcinoma is the most common histological type of thyroid tumours followed by follicular carcinoma, medullary carcinoma, anaplastic carcinoma, non Hodgkin's lymphoma and unclassified tumours in order of frequency. Fine Needle Aspiration Cytology (FNAC) is a diagnostic tool in which cells are extracted from a palpable swelling using FNAC gun, syringe and fine needle. It is a simple, speedly, safe, cost effective and accurate technique being used worldwide. Thyroid disease may be classified into hyperthyroidism, hypothyroidism and euthyroidism. Thyroid disease such as goiter, thyroid adenoma and thyroid carcinoma typically occurs in individual who are euthyriod, while hyperthyroidism is commonly associated with Grave’s disease and primary hypothyroidism is most commonly iatrogenic in origin. Thyroid function test which includes

*Corresponding Author:
Gharia Amit A
D-38, High Rise Building,
10th Floor, Jamtowel chowk
Jamnagar Road, Rajkot- 360001
Contact No. 08140320435
E-mail: dramit11@rediffmail.com.
Thyroid Cytology Evaluation By Bethesda System

quantitative estimation of T₃, T₄ and TSH have a diagnostic as well as prognostic role in thyroid disorders.²

RATIONALE OF THE STUDY
This study is undertaken to study the cytology of palpable thyroid lesions to minimize surgical intervention and correlating the same with the thyroid function test and histopathological examination to confirm the diagnosis and planning post surgical management of malignant thyroid lesions.

OBJECTIVES OF THE STUDY
The objectives of present study are:
- To study various cytological features of material aspirated from thyroid swelling and hence making a pre-operative cytological diagnosis.
- To categorize all the thyroid FNA’s according to the Bethesda system proposed by the National Cancer Institute (TBSRTC), Bethesda, USA in 2007
- To study the prevalence of various thyroid pathology by Bethesda system.
- To correlate cytological features of thyroid swelling with the thyroid hormone profile.
- To study age and sex distribution of patient with thyroid pathology.

METHODOLOGY AND MATERIALS
The present study was carried out in cytopathology laboratory, PDU Medical College and Hospital, Rajkot between September 2012 to August 2014 during this period 5085 FNA is done, out of which 200 cases were included for the purpose of study. Most of the patients in the institute are directly referred by Department of Surgery, Department of ENT and other clinical departments for FNAC in cytopathology laboratory. Materials needed for aspiration are : Disposable needles of 22-24G with length of 2.5-3.8 cm, Disposable plastic syringes of 10-20 cc, Glass slides – clean and grease free, Methanol as fixative, Reagents for H&E stain and Giemsa stain³, Sterile gloves, gauze piece and spirit swab and through proper method of aspiration examination has been done. For the purpose of study both male and female patients presenting with thyroid swelling in any lobe of thyroid selected by clinical palpation (multinodular, solitary nodules, diffuse goiter etc) and patients with recurrent thyroid swellings after a previous thyroid surgery in the age group of 10-80 years have been included.

RESULTS & DISCUSSION
The results of the study were shown in various tables.

Table 1: No. of FNAC from Thyroid Lesions

<table>
<thead>
<tr>
<th>Duration (2 Years)</th>
<th>Total no. of cytology done</th>
<th>Total no of thyroid cytology done</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st September 2012 to 31st August 2014</td>
<td>5085 (100%)</td>
<td>409 (8.04 %)</td>
</tr>
</tbody>
</table>

As shown in table no. 1 during the period of present study total 5085 of cytology were done. This included fine needle aspiration cytology from the various lesions. Out of total 5085 aspirates, 409 were from thyroid fine needle aspiration cytology smears comprising of 8.04% of the total cases.

Figure 1: Bar Diagram Showing The Total Number Of Fna Done As Well As Thyroid Fna From 1st September 2012 To 31st August 2014

Table 2: Conventional Cytological Diagnosis Method of Thyroid FNAC is as follows:

<table>
<thead>
<tr>
<th>Cytological Diagnosis</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cystic lesion</td>
<td>12</td>
<td>6 %</td>
</tr>
<tr>
<td>Inflammatory Lesions</td>
<td>21</td>
<td>10.5 %</td>
</tr>
<tr>
<td>Lymphocytic thyroiditis</td>
<td>11</td>
<td>(5.5 %)</td>
</tr>
<tr>
<td>Hashimoto’s thyroiditis</td>
<td>10</td>
<td>(5.0 %)</td>
</tr>
<tr>
<td>Benign lesions</td>
<td>133</td>
<td>66.5 %</td>
</tr>
<tr>
<td>Colloid goiter</td>
<td>113</td>
<td>(56.5 %)</td>
</tr>
<tr>
<td>Hyperplastic thyroid lesion</td>
<td>20</td>
<td>(10 %)</td>
</tr>
<tr>
<td>Malignancy</td>
<td>29</td>
<td>14.5 %</td>
</tr>
<tr>
<td>Follicular neoplasm</td>
<td>16</td>
<td>(8.0 %)</td>
</tr>
<tr>
<td>Papillary carcinoma</td>
<td>07</td>
<td>(3.5 %)</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>04</td>
<td>(2.0)</td>
</tr>
<tr>
<td>Anaplastic carcinoma</td>
<td>02</td>
<td>(1.0 %)</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>05</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100 %</td>
</tr>
</tbody>
</table>

As shown in the table no. 2, out of the total 200 cases of thyroid aspirates, 21 (10.5 %) cases were inflammatory lesions, 133 (56.5 %) cases were benign lesions, 29 (14.5 %) cases were malignant aspirates.
The 5 (2.5%) cases were the unsatisfactory aspirates, which could not be reported in spite of the repeated fine needle aspiration cytology.

Table 3: Age Wise Distribution of Thyroid Lesions is as follows:

<table>
<thead>
<tr>
<th>Age Range (in years)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 10</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>11 – 20</td>
<td>25</td>
<td>0.125%</td>
</tr>
<tr>
<td>21 – 30</td>
<td>48</td>
<td>24 %</td>
</tr>
<tr>
<td>31 – 40</td>
<td>46</td>
<td>23%</td>
</tr>
<tr>
<td>41 – 50</td>
<td>40</td>
<td>20%</td>
</tr>
<tr>
<td>51 – 60</td>
<td>27</td>
<td>13.5%</td>
</tr>
<tr>
<td>61 – 70</td>
<td>11</td>
<td>5.5%</td>
</tr>
<tr>
<td>71 – 80</td>
<td>03</td>
<td>1.5%</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100%</td>
</tr>
</tbody>
</table>

As shown in the table no. 3, the maximum incidence of thyroid lesions, are between the ages of 21 - 30 years, i.e. 48 cases (24%). There was no case reported in the 0 – 10 year age group and >80 years of age during the present study.

Figure 2: Bar Diagram showing Age Wise Distribution of Thyroid FNA Cases

As shown in the table no. 4, the present study of 200 cases comprised of 177 cases (88.5%) from the female thyroid lesions while 23 cases (11.5%) from the male thyroid lesions.

Table 4: Sex Wise Distribution of Thyroid Lesions is as follows:

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>177</td>
<td>88.5%</td>
</tr>
<tr>
<td>Males</td>
<td>23</td>
<td>11.5%</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100%</td>
</tr>
</tbody>
</table>

As shown in the table no. 4, the present study of 200 cases comprised of 177 cases (88.5%) from the female thyroid lesions while 23 cases (11.5%) from the male thyroid lesions.

Figure 3: Bar Diagram Showing Sex Wise Distribution of Thyroid Cases

Table 5: Cytological Diagnoses Of 200 Cases According To Bethesda System Is As Follows:

<table>
<thead>
<tr>
<th>Bethesda Diagnostic Category</th>
<th>Bethesda Description</th>
<th>No. Of Cases</th>
<th>Percentage Of Total Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Non Diagnostic Or</td>
<td>05</td>
<td>0.025%</td>
</tr>
</tbody>
</table>

As shown the table no. 5, out of 200 cytological diagnosed cases of thyroid lesions, 165 (82.5 %) cases were of Benign category II, 12 (06 %) cases were of follicular neoplasm or suspicious of follicular neoplasm category IV, 12 (06 %) cases were of Malignant nature category VI, 05 (0.025%) cases were Non diagnostic or unsatisfactory, 04 (0.02 cases were of Atypia of undetermined significance / follicular lesion of undetermined significance / cystic lesions and 02 cases were of Suspicious for malignancy category V respectively.

Figure 4: Pie Chart showing Bethesda Category Wise Distribution of Thyroid FNA Cases

Table 6: Age and Sex Incidence of Thyroid Lesion

As shown in the table no. 6, thyroid lesions are more common in females. In present study, only 23 cases were from the male thyroid lesions. Maximum numbers of cases were of (Benign thyroid lesion)
Thyroid Cytology Evaluation By Bethesda System

Table 7: Cytological examination of thyroid lesion with hormonal correlation

<table>
<thead>
<tr>
<th>BETHESDA Diagnostic Category</th>
<th>THYROID FUNCTION TEST</th>
<th>Hypothyroid</th>
<th>Euthyroid</th>
<th>Hyperthyroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bethesda Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Non diagnostic or unsatisfactory</td>
<td>00</td>
<td>05</td>
<td>00</td>
</tr>
<tr>
<td>II</td>
<td>Benign</td>
<td>03</td>
<td>150</td>
<td>12</td>
</tr>
<tr>
<td>III</td>
<td>Atypia of undetermined significance / follicular lesion of undetermined significance</td>
<td>01</td>
<td>03</td>
<td>00</td>
</tr>
<tr>
<td>IV</td>
<td>Follicular neoplasm or suspicious of follicular neoplasm</td>
<td>00</td>
<td>11</td>
<td>01</td>
</tr>
<tr>
<td>V</td>
<td>Suspicious for malignancy</td>
<td>00</td>
<td>02</td>
<td>00</td>
</tr>
<tr>
<td>VI</td>
<td>Malignant</td>
<td>00</td>
<td>12</td>
<td>00</td>
</tr>
<tr>
<td>Total (200 Cases)</td>
<td></td>
<td>04</td>
<td>183</td>
<td>13</td>
</tr>
</tbody>
</table>

As shown in the table no. 7, 183 cases were euthyroid, 04 cases were hypothyroid and 13 cases were hyperthyroid. In present study, out of total 200 cases of thyroid lesions, 165 cases were of benign thyroid lesion Category II. Out of these 165 cases, 150 cases were euthyroid, 03 cases were hypothyroid and 12 cases were hyperthyroid. Out of 06 cases of hyperplastic thyroid lesion, 05 cases were diagnosed as Grave’s disease. (Primary Thyrotoxicosis) and 01 case was diagnosed as Secondary thyrotoxicosis, all of were hyperthyroid. All the malignant and cystic lesions were euthyroid while cases of Hashimoto’s thyroiditis were hypothyroid.

Figure 5: Bar Diagram Showing Thyroid Hormonal Status and Bethesda Category

DISCUSSION

FNAC is a method where a very small quantity of tissue, fluid and cells are aspirated from a lesion for cytological examination. Although needle aspiration cytology had been performed intermittently in the second half of the last century, it was popularized by Martin, Ellis and Stewart at Memorial Hospital for Cancer and Allied Diseases, New York in the 1930s. FNAC is now accepted as the cost effective, minimally invasive, low complication, non operative diagnosis for most of the thyroid lesions and is highly successful in triaging the patients with solitary thyroid nodule in to non operative and operative group. The location of target lesion, careful searching for malignant cells and repeat FNAC is the key to successful diagnosis to plan proper surgical management in thyroid mass. The distinction of benign and malignant thyroid nodules is fundamental, as malignancy necessitate surgery while strict patient follow up is necessary in case of benign thyroid mass. FNAC is considered to be gold standard in the selection of the patients for surgery. During the present study, no complication like hematoma, transient laryngeal nerve palsy or perforation of trachea was noted. For the staining, the haematoxyline and eosin and giemsa stain were done. But mainly the haematoxyline and eosin was chosen because of its familiarity and easily discernible cytomorphology.

Table 8: Comparison of Age incidence

<table>
<thead>
<tr>
<th>Studies</th>
<th>Range of age in years</th>
<th>Median age in years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabaqchali et al (2000)</td>
<td>8.5 - 85</td>
<td>48</td>
</tr>
<tr>
<td>Handa et al (2008)</td>
<td>6 – 80</td>
<td>37.69</td>
</tr>
<tr>
<td>Gupta et al (2010)</td>
<td>22 – 58</td>
<td>38.72</td>
</tr>
<tr>
<td>Present Study (2014)</td>
<td>11 – 75</td>
<td>35</td>
</tr>
</tbody>
</table>

Table no 1 shows the comparison of age incidence in the present study with other studies. In the present study median age was 35 years. In Sengupta et al also showed the same result. In Tabaqchali et al and Afroze et al showed median age above 40 years. This variation is due to fact that these studies were not performed in particular age group or as a screening.
programmed, but randomly done on the patients coming to the hospital with thyroid lesion.  

**Table 9: Comparison of sex wise distribution of thyroid lesion**

<table>
<thead>
<tr>
<th>Studies</th>
<th>Total cases</th>
<th>Male</th>
<th>Female</th>
<th>Male:Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabaqchali et al (2000)</td>
<td>239</td>
<td>26</td>
<td>213</td>
<td>1.82</td>
</tr>
<tr>
<td>Afroze N et al (2002)</td>
<td>170</td>
<td>48</td>
<td>122</td>
<td>1:2.54</td>
</tr>
<tr>
<td>Gupta et al (2010)</td>
<td>75</td>
<td>6</td>
<td>69</td>
<td>1:11.5</td>
</tr>
<tr>
<td>Sengupta et al (2011)</td>
<td>178</td>
<td>37</td>
<td>141</td>
<td>1:3.81</td>
</tr>
<tr>
<td>Present Study (2014)</td>
<td>200</td>
<td>23</td>
<td>177</td>
<td>1:7.6</td>
</tr>
</tbody>
</table>

Table 2 shows the sex distribution in thyroid lesions. There was the predominance of female patients in all studies.

Table 10: Comparison of different thyroid lesion

<table>
<thead>
<tr>
<th>Studies</th>
<th>Cystic lesion</th>
<th>Thyroiditis</th>
<th>Colloid goiter</th>
<th>Follicular adenoma</th>
<th>Papillary carcinoma</th>
<th>Follicular carcinoma</th>
<th>Medullary carcinoma</th>
<th>Anaplastic carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabaqchali (2000)</td>
<td></td>
<td></td>
<td>2</td>
<td>0.4%</td>
<td>2.9%</td>
<td>136</td>
<td>56.9%</td>
<td>23</td>
</tr>
<tr>
<td>Afroze (2002)</td>
<td></td>
<td></td>
<td>0</td>
<td>0%</td>
<td>10</td>
<td>5.88%</td>
<td>65.3%</td>
<td>21</td>
</tr>
<tr>
<td>Handa (2008)</td>
<td></td>
<td></td>
<td>3</td>
<td>3.03%</td>
<td>0%</td>
<td>45</td>
<td>68.2%</td>
<td>13</td>
</tr>
<tr>
<td>Gupta (2010)</td>
<td></td>
<td></td>
<td>0</td>
<td>0%</td>
<td>3%</td>
<td>42</td>
<td>56%</td>
<td>15</td>
</tr>
<tr>
<td>Sengupta (2011)</td>
<td></td>
<td></td>
<td>0</td>
<td>0%</td>
<td>8.43%</td>
<td>15</td>
<td>75.8%</td>
<td>11</td>
</tr>
<tr>
<td>Present study</td>
<td></td>
<td></td>
<td>3</td>
<td>3%</td>
<td>6%</td>
<td>76</td>
<td>76%</td>
<td>4</td>
</tr>
</tbody>
</table>

As shown in the above table, percentage of incidence of various thyroid lesions of present study is nearer to study of Sengupta et al and Handa et al. In present study predominate lesions were benign while there were higher percentage of malignant lesion in Tabaqchali et al and Afroze et al studies.

Table 11: Comparison of non-neoplastic to neoplastic ratio

<table>
<thead>
<tr>
<th>Studies</th>
<th>Non-neoplastic (A)</th>
<th>Neoplastic (B)</th>
<th>A : B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tabaqchali (2000)</td>
<td>145</td>
<td>94</td>
<td>1.54 : 1</td>
</tr>
<tr>
<td>Afroze (2002)</td>
<td>121</td>
<td>49</td>
<td>2.47 : 1</td>
</tr>
<tr>
<td>Handa (2008)</td>
<td>47</td>
<td>19</td>
<td>2.48 : 1</td>
</tr>
<tr>
<td>Sengupta (2011)</td>
<td>150</td>
<td>32</td>
<td>4.68 : 1</td>
</tr>
<tr>
<td>Present Study</td>
<td>155</td>
<td>45</td>
<td>3.44 : 1</td>
</tr>
</tbody>
</table>

As shown in above table, there was higher percentage non-neoplastic lesion in present study. This study documented the fact that the benign lesions of thyroid are the most common lesions. Such lesions are more common in young females. This increased case of benign lesions indicates increase awareness of patients. In such lesions the reassurance is the main line of treatment though close follow up is mandatory.

Table 12: Comparison of thyroid lesion with hormonal status correlation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid cyst</td>
<td>Euthyroid (100%)</td>
<td>Euthyroid (100%)</td>
</tr>
<tr>
<td>Thyroiditis</td>
<td>Euthyroid (100%)</td>
<td>Hypothyroid (83.33%)</td>
</tr>
<tr>
<td>Nodular goiter</td>
<td>Euthyroid (76.9%)</td>
<td>Hypothyroid (16.66%)</td>
</tr>
<tr>
<td>Malignant lesion</td>
<td>Euthyroid (100%)</td>
<td>Euthyroid (100%)</td>
</tr>
</tbody>
</table>

As shown in table, results of the hormonal status of the patient were comparable with study of Sang et al. In present study 5 patients with thyroiditis were hypothyroid while only 1 patient was hyperthyroid. While in Sang et al study, patients with thyroiditis were euthyroid. Hormonal status reflects the functional activity of the gland. So time of presentation is important. In present study, majority of nodular goiter (81.7%) were euthyroid. In 6 cases, goiter associated with hyperthyroidism, investigated further and diagnosed as primary thyrotoxicosis (Grave’s disease). Malignant lesions were euthyroid. Hormone study should be done to know the functional status of the patient, it also help us to support the diagnosis.
CONCLUSION
It is concluded that fine needle aspiration cytology is a simple, cost effective, quick, and relatively less painful procedure which can be used as an outdoor patient procedure or as a part of screening programme for the diagnosis of thyroid lesion. FNAC can be utilized as a first line diagnostic procedure in patient presenting with thyroid swelling especially in developing countries with limited resources. FNAC diagnosis of malignancy is highly significant and such patients should be subjected to surgery. A benign FNAC diagnosis should be viewed with caution as false negative results do occur and these patients should be followed up and any clinical suspicion of malignancy even in the presence of benign FNAC requires surgery. Bethesda system is very much helpful in categorizing thyroid lesion and avoiding confusion as was associated with previous categorizing methods. Hormone study should be done to know the functional status of the lesions, it also help us to lead the diagnosis. When combined with clinical examination, hormone study and imaging technique, FNAC gives more accurate results which will help clinician for proper line of treatment in the respective thyroid pathology.

REFERENCES
15. Safirrulah, Mumtaz N, Khan A. Role of fine needle aspiration cytology in the diagnosis of thyroid swelling. JPMI 2004; 18(2)