

## “The Role Of Fine Needle Aspiration Cytology In Evaluation Of Neck Masses

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**Abstract Background:** Fine needle aspiration cytology is a minimally invasive technique used in the initial diagnosis of different types of lesions located in neck region commonly originating from cervical lymph node, thyroid gland, salivary glands and soft tissues. The objective of this study was to evaluate the diagnostic accuracy, sensitivity and specificity of FNAC in various neck lesions in correlation with their histopathological examination. **Materials and methods:** A hospital based prospective study was conducted among 86 patients with palpable neck region lesions in the Department of Pathology, SPMC BIKANER from JUNE 2011 to December 2013. FNAC were done from palpable masses of neck regions. **Result:** There were 86 FNAC cases enrolled, out of which lymph node lesions (n=42) were the most common lesions followed by thyroid (n=26), other miscellaneous lesions (n=2) and salivary gland (n=14) and 2 are unsatisfactory. In the present study, out of the total 86 samples, 46 cases (53.48%) were non-neoplastic, while 40 cases (46.51%) were neoplastic lesions. Among the 40 neoplastic lesions, 13 cases were benign (32.50%) and 27 cases (67.50%) were malignant. High accuracy (95.23%), sensitivity (81.81%) and Specificity (93.93%) were observed in this study.

**Conclusion:** FNAC is a minimally invasive first line investigation with a high sensitivity and specificity for the diagnosis of various neck lesions

**Keywords:** Palpable lesions, Fine Needle Aspiration Cytology, Histopathology, Sensitivity, Specificity, lymph nodes, salivary Glands, thyroid

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### I. Introduction

Fine Needle Aspiration Cytology (FNAC) is a simple, quick and inexpensive diagnostic technique with minimal trauma and high specificity [1,2]. Being a minimally invasive technique, it is particularly suitable in sensitive area where incision biopsy is difficult and it avoids need of surgery if the lesions show non-neoplastic, suspected metastatic or recurrent tumor [3]. The modern method of FNAC was introduced by Martin and Ellis in 1930 and now it has become a popular procedure in the evaluation of various palpable lumps [4]. FNAC is applicable to palpable lesions of neck region including various neoplastic and non-neoplastic lesions of lymph node, salivary gland, thyroid gland and other soft tissues [5]. An early diagnosis and differentiation of such lesions from inflammatory to neoplastic play crucial role on planned treatment [6]. The prime objective of the study was to assess the utility of FNAC in diagnosis of neck lesions and correlate the cyto-morphological features with histo-pathological findings.

### II. Materials and methods:

A hospital based prospective study was conducted among 86 patients with palpable neck region swellings in the Department of Pathology, SPMC BIKANER from JUNE 2011 to december 2013 after Ethical clearance was obtained by institute. All patients were asked about history related to neck swelling, probable etiological cause, family history of tuberculosis and other relevant disease. Informed consent from each individual was taken. Patients with non-diagnostic type of FNAC and previous history of chemotherapy, radiation therapy or any antituberculosis drugs were excluded from the study. FNAC was performed by 22-23 gauged needles with syringe. The specimen was expelled on one or two glass slides according to the amount of material and smeared, wet fixed or air dried followed by staining with Giemsa and Papanicolaou stain (PAP) similarly, biopsies obtained from these patients were fixed in 10% formalin. Different Sections were taken from different parts of the specimen and processed. The sections so obtained were stained with hematoxylin and eosin (HE) stains. This was followed by cytological-histopathological comparison.

### III. Discussion

Present study was carried out to evaluate the accuracy of fnac of neck masses and this study was done in the department of pathology of sardar patel medical college, Bikaner. The study was conducted from July 2011 to December 2013. A total of 86 FNACs done from neck region were included in the study. Fnac of 86 randomly selected cases of neck masses was performed. The results were correlated with available histopathology in 44 cases.

Neck masses which were aspirated had their origin from lymph nodes, thyroid, salivary gland and soft tissues.

Majority of the aspirates were satisfactory for cytological evaluation in only 2 cases aspirates were unsatisfactory for diagnosis. In the present study the ratio of satisfactory to unsatisfactory is 43:1 which is correlated with many authors.

**Table: 1 Comparison Of Neoplastic And Non-Neoplastic Lesions With Other Studies.**

Author	Non-neoplastic (%)	Neoplastic (%)
Russ et.al. <sup>7</sup> (1978)	53.80	46.19
Gertner et.al. <sup>8</sup> (1984)	70.29	29.17
Present study	53.48	46.51

**Table 2: Comparison of Benign And Malignant Lesions With Other Studies.**

Author	Benign (%)	Malignant (%)
Russ et.al. <sup>7</sup> (1978)	70.44	29.56
Frale and Frable <sup>9</sup> (1982)	44.07	47.60
Gertner et.al. <sup>8</sup> (1984)	69.56	30.14
Smallman et.al. <sup>10</sup> (1988)	28.17	71.83
Andleeb Abrari et.al. <sup>11</sup> (2002)	60.5	29.5
Present study	32.50	67.50

Thus in present study, we found that malignant lesions were more common than benign lesions which is in concordance with study conducted by Smallman et al.<sup>10</sup>

**Table 3: Comparison Of Organ Wise Distribution Of Lesions Of Present Study With Other Studies**

Author	Thyroid	Salivary gland	Lymph Node	Miscellaneous
Frale and Frable <sup>9</sup> (1982)	24.10	17.77	49.91	8.19
Smallman et.al. <sup>10</sup> (1988)	2.11	21.12	64.08	12.6
O'Donnell ME et.al. <sup>12</sup>	30.37	16.29	34.07	19.2
Present study	32.55	16.27	48.83	2.32

Thus the findings of present study correlate well with other studies.<sup>9,10,11</sup> The observation of other studies conducted by are tabulated in table no.3.

#### Lymph Node Lesions

##### Reactive Hyperplasia:

In the present study, out of 42 lymph nodes aspirated, 11 cases (26.19%) were diagnosed as reactive lymph nodes. Lymph nodes were the most common aspirated organ in our study.

**Table 4: Comparison Of Reactive Lymphadenitis With Other Studies**

Author	Percentage (%)
Patra et.al. <sup>13</sup> (1983)	38.10
Stani <sup>14</sup> (1987)	23.50
Gupta et.al. <sup>15</sup> (1992)	30.72
Steel et.al. <sup>16</sup> (1995)	33.46
Present study	26.19

#### Suppurative Lymphadenitis

In the present study, there were 2 cases (4.76%) of suppurative lymphadenitis. Our study correlates with that of Patra et.al.<sup>13</sup> who have reported 5.3% cases of Suppurative lymphadenitis.

#### Tuberculous Lymphadenitis:

In the present study we reported 10 cases out of 42, as tuberculous lymphadenitis (23.80%).

**Table 5: COMPARISON OF TUBERCULOUS LYMPHADENITIS WITH OTHER STUDIES.**

Authors	No. of lymphnodes aspirated	Tuberculous lymphnodes	Percentage
Patra et.al. <sup>13</sup> (1983)	113	34	30.01
Bharadwajet.al. <sup>17</sup> (2000)	132	54	40.90
Present study	42	10	23.80

**Metastatic Lymph Node:**

Of the 42 patients with lymphadenopathy, 14 cases (33.33%) showed evidence of metastases. out of the 14 cases with metastases 8 were squamous cell carcinomas, 5 cases (38.46%) were of metastatic adenocarcinomas and 1 case (7.14) of metastatic small cell anaplastic Ca. was reported.

**Comparison Of Percentage Of Lymphoma Patients With Other Studies**In our study we observed 5 cases (11.90%) of lymphomas which is in concordance with the study done by Naila Tariq et. Al<sup>18</sup> (2007).

**Thyroid Gland Lesions**

In final analysis of 26 cases of thyroid lesions out of 86 neck lesions, there were 22 benign (84.61%) lesions and 4 malignant (15.38%) lesions. Russ et.al.<sup>7</sup>have reported 90.58% benign lesions and 9.4% of malignant lesions.

Of these 26 patients there were 20 females and 6males.The male:female ratio was 1:3.33,which shows that female comprised the majority of our patients. Similar results were seen by various authors.Our study had 15 cases (57.69%) of adenomatous goiter Our findings of aspirates and their relationship to diagnosis correlates well with the study done by Kung and Yuen.<sup>19</sup> and Naila Tariq et al<sup>18</sup>.

There were 4 cases of follicular neoplasm (15.38%), 3 cases of Hashimoto’s thyroiditis (11.53%), 2 cases of papillary carcinoma (7.69%) of thyroid, 1 case of anaplastic carcinoma (3.84%), 1 case of medullary carcinoma (3.84%) of thyroid.

**Salivary Gland Lesion**

In present study, salivary gland lesions comprised of 14 cases (16.27%) of the total Neck lesions. Other authors have reported a percentage of salivary gland Lesions ranging from 11% to 17.4% amongst the lesions of the neck region.

In the present study 7 cases out of 14 were of pleomorphic adenomas (50%), 2 cases of chronic sialadenitis, 2 cases of mucoepidermoidCa and 1 case of warthin tumor, Adenoid cystic Ca and 1 case of Acinic cell Ca.

**Miscellaneous–Lesions**

In the present study we had 2 cases (2.32%) in the group of miscellaneous Lesions that were done in the region of neck both the cases were of lipoma.

**Table No 6 Sensitivity, Specificity And Overall Accuracy Of Fnac Diagnosis In 44 Histopathologically Proven Cases Of Neck Masses**

Cytology no. of cases	Histopathological Diagnosis	
	Benign	Malignant
Benign = 33	31 (TN)	2 (FN)
Malignant = 9	0 (FP)	9 (TP)
Unsatisfactory = 2	2	0

**Table No 7 : Statistical Analysis For Evaluating Diagnostic Utility Of Fnac Of Neck Masses**

Cytology no. of cases	Histopathological Diagnosis	
	Negative	Positive
Benign = 33	31 (TN)	2 (FN)
Malignant = 9	0 (FP)	9 (TP)
Unsatisfactory = 2	2	0

Sensitivity	81.81%
Specificity	93.93%
False positive ratio	0
False negative ratio	6.6%
Overall accuracy	95.23%

#### IV. Results

This prospective study from June 2011 to December 2013 was comprised of 86 FNACs of swellings in the neck region. Among the total number of 86 patients, 37 were males and 49 were females, Giving a male: female ratio of 1:1.32

The sensitivity in present study is 81.81% , Specificity is 93.93% and Diagnostic accuracy of 95.23% is observed. In the present study, out of the total 86 samples, 46 cases (53.48%) were non-neoplastic, while 40 cases (46.51%) were neoplastic lesions.

- Among the 40 neoplastic lesions, 13 cases were benign (32.50%) and 27 cases (67.50%) were malignant.

#### V. Conclusion

Fine needle aspiration cytology is a useful technique for evaluation of patients with neck lesions. It is a rapid, safe, inexpensive and a reliable diagnostic procedure which can be carried out on Outpatient department basis and can be repeated if necessary.

It helps to differentiate non-neoplastic conditions from neoplastic diseases. Follicular neoplasms require Histopathological evaluation to distinguish between Follicular adenoma and carcinoma.

#### Acknowledgements

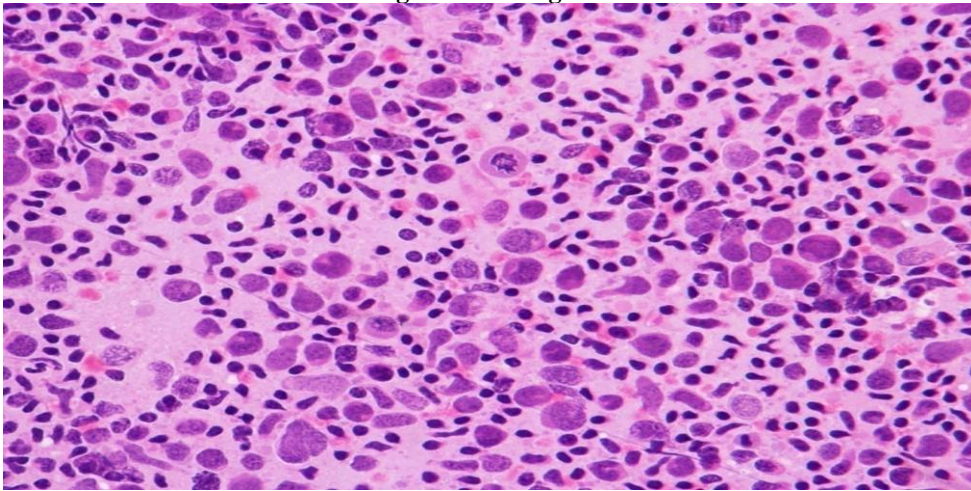
We sincerely thank all the surgeons, pathologists, histopathology technicians and the participants of Sardar Patel Medical College, Bikaner.

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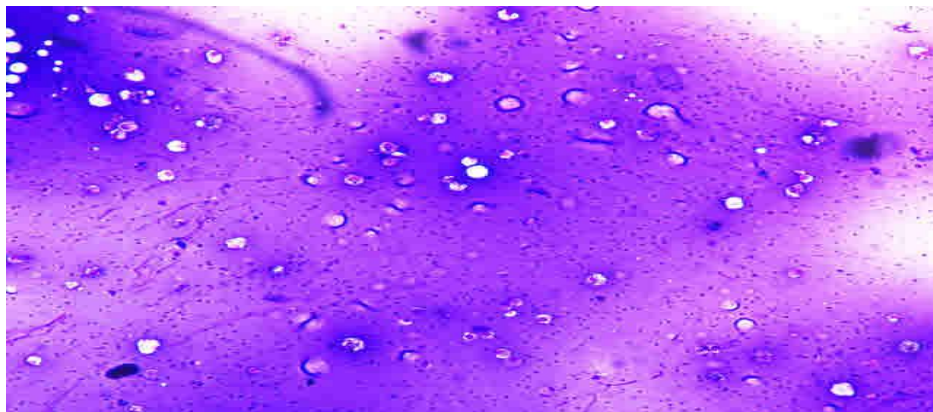
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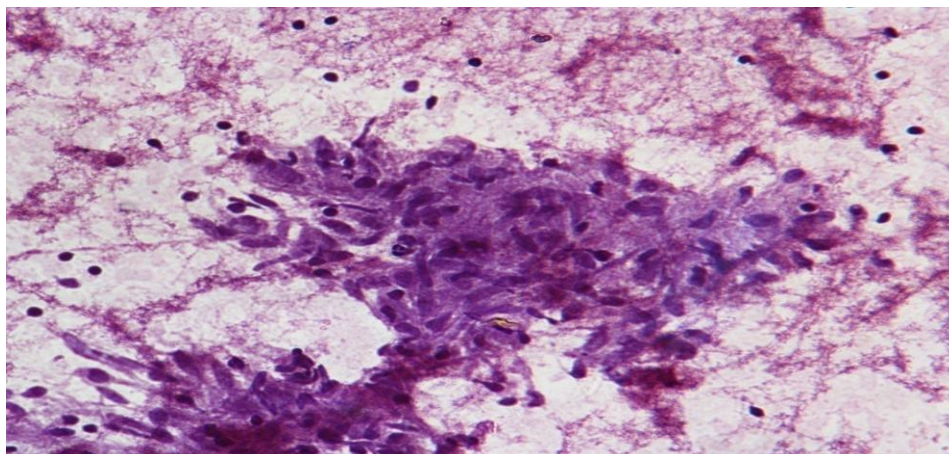
**Figure With Legend**



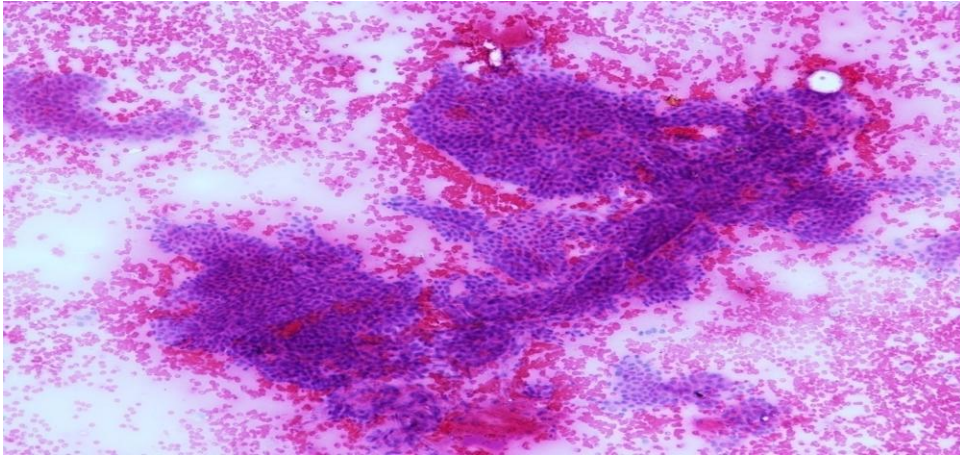
Reactive lymphadenitis: Smear showing varied population of lymphoid cells in different stages of development and a mitotic figure also seen.



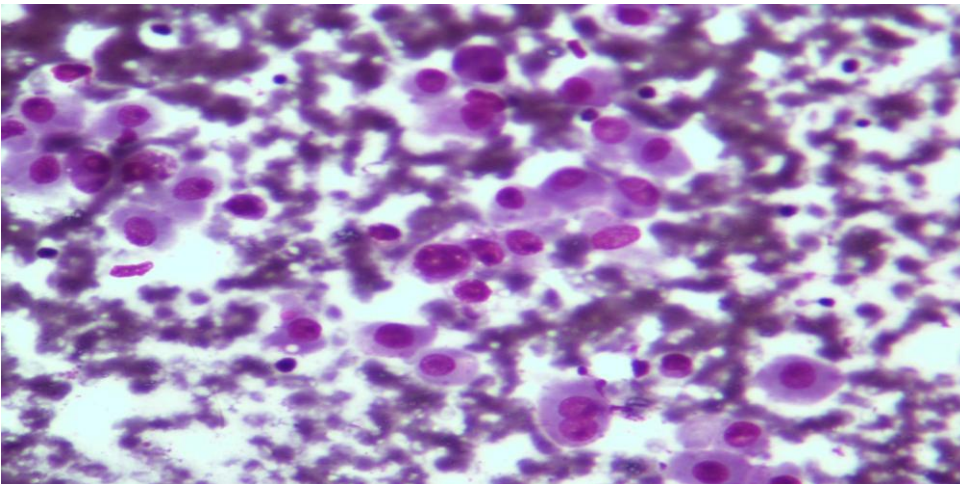
Colloid goitre: abundant colloid in background with dispersed foamy macrophages. (Giemsa, 10X)



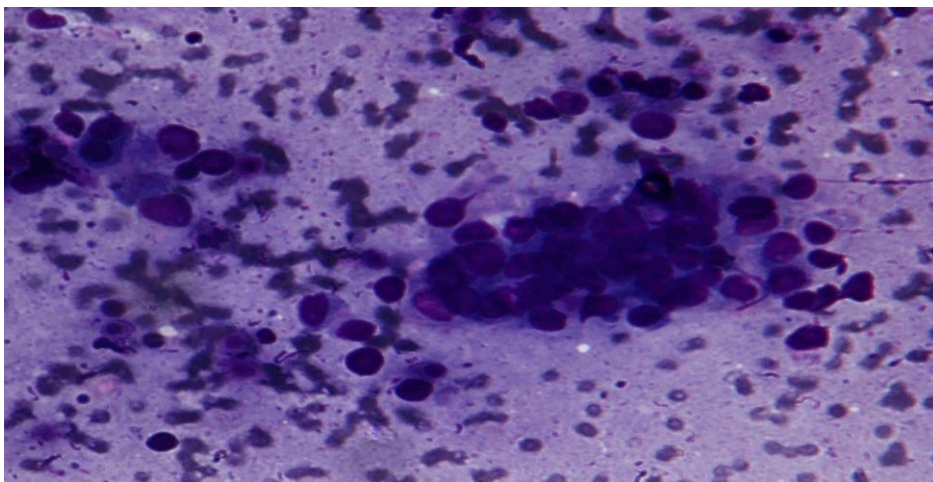
Tubercular Lymphadenitis : Smear showing clusters of epithelioid cells with necrosis. (H & E, 40 X) Inset giant cell. (H & E, 40 X)



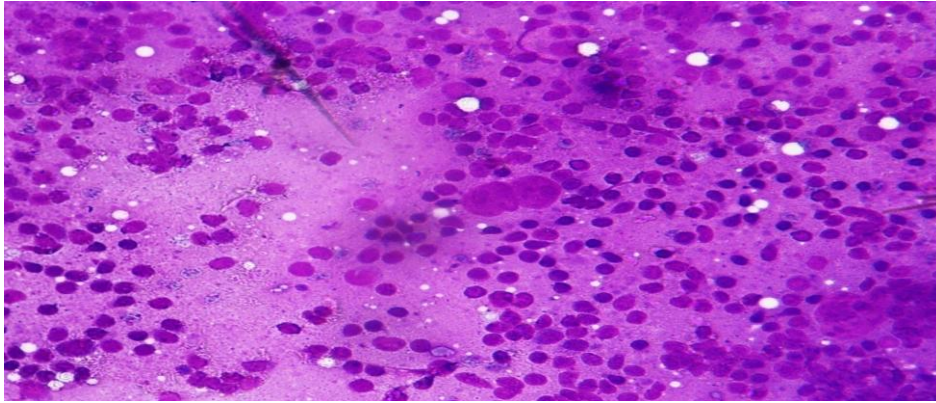
Papillary carcinoma :Hypercellular smear showing papillae with fibrovascular core.(H & E,10 X)



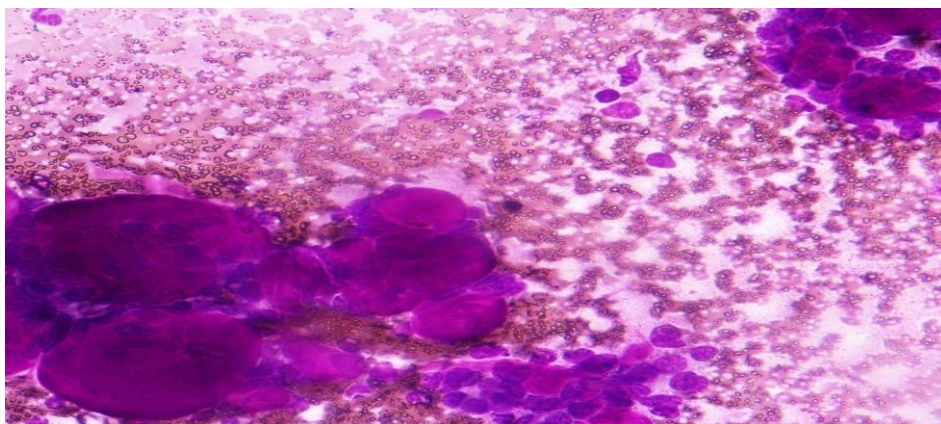
Medullary carcinoma:smear showing plasmacytoid cells with binucleated cell in dispersed pattern in haemorrhagic background.(HP, H&E)



Metastatic adenocarcinoma:clusters of cells having acinar pattern with basophilic cytoplasm.(Giemsa,40 X)



Hodgkin Lymphoma : Smear showing RS cell (binucleated cell with prominent eosinophilic nucleoli) in a background of lymphocytes.(H & E,40 X)



Adenoid cystic carcinoma : Smear showing clusters of hyaline globules surrounded by epithelial cells.

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