DISCUSSION
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Fine needle aspiration biopsy cytology (FNAC) has been widely accepted in the diagnosis of different thyroid nodules. The high prevalence of goitres in this and other parts of the state has created an increased awareness of the need of practising "Selective" thyroid surgery, because by fine needle aspiration cytology neoplastic tumours can be easily differentiated from non-neoplastic conditions.

The present study entitled "FINE NEEDLE ASPIRATION CYTOLOGY, ITS CORRELATION WITH HISTOPATHOLOGY IN THYROID TUMOURS" is based on 27 cases of thyroid nodules. These patients were selected from the Out Patient Department and in patients admitted to various surgical wards in M.L.B. Medical College Hospital, Jhansi.

The purpose of this study was to determine the clinical value and accuracy of FNAC procedure in the preoperative detection of malignancy, special attention were paid to see the sensitivity, specificity and overall diagnostic accuracy of FNAC as a diagnostic tool in preoperative patients with thyroid swelling.
In present study females constituted about 96.30% whereas male constituted only 3.70%. Since present study was small and only selected type of cases were included for study. The male female ratio was 1:3. In other studies the male female ratio has been reported as 1:4.5 (Lohagen 1979), 1:6 (Geeta Jayram 1989) and 1:17 (Edneia 1989) in lymphoid lesion of thyroid.

In present study maximum number of patient were found to be between 21-30 years age range (48.15%), may be because younger female patients reported for their neck swelling due to cosmetic reasons. Pandit and Kinare (1986) have reported only 25% patient in the above age range in their studies. As regards, patients in different age ranges, our findings are similar to findings by others (Pandit, A.A. and Kinare, 1986).

The cases mostly presented as swelling in neck associated with pain and dysphagia some cases did have Hoarseness of voice.

In present series thyroid swellings were unilateral with smooth surface and of variable consistency. Other signs e.g. exophthalmos, fixation to deeper structures were observed in some cases only. Similar type of presenting signs and symptoms have been reported in the series study by different authors (Geeta Jayram et al 1989).
Most of the cases of goitres were diagnosed on the basis of abundance of colloid, some atrophic follicular cells. In cystic colloid goitres phagocytes were a frequent finding. As regards diagnostic accuracy, in all histopathology confirmed the cytological (FNAC) diagnosis of goitre in 6 cases - A diagnostic accuracy of 100% which is in accordance with the accuracy percentage (100%) reported by Aggarwal et al (1989), whereas 95.8% accuracy was reported by Geeta Jayram (1985) in goitre cases.

Acute thyroiditis was observed only in one case cytologically, and histopathological correlation was not possible due to non availability of biopsy material. Thyroiditis is classified according to the predominant inflammatory cell type viz. acute thyroiditis when the inflammatory component is granulocytic. The diagnostic accuracy achieved was 100% in cases of acute thyroiditis and 70% in cases of Hashimoto's thyroiditis (Geeta Jayram 1989).

Thyroid neoplasms in (FNAC were identified by highly cellular smears with tumour patterns. Cytologically three (3) cases were observed as follicular adenoma on the basis of monomorphic aspirate, with rather cohesive small polarized sheets or acini arranged around colloid (Kline, 1981). As regards diagnostic accuracy in two cases histopathology confirmed the cytological diagnosis of follicular
adenoma in one case - A diagnostic accuracy of 50%, whereas
as Geeta Jayram (1985) reported 100% accuracy in follicular
adenoma. Histologically other cases in present study was
confirmed as papillary carcinoma thyroid.

FNAC revealed follicular carcinoma in thyroid
cases on the basis of an abundant, monotonous, monomorphic
collection of follicular cells with slight anisomucleosis
and some nuclear overlapping and crowding. They form folli-
cles with discernable colloid as small sheets, or are iso-
lated. The ecentric, oval nuclei, some time larger, regular
nuclear membranes, fine or coarse chromatin, and prominent
nucleoli (Kline 1981). As regards diagnostic accuracy in two
cases; histopathology confirms the diagnosis of follicular
carcinoma in one case. A diagnostic accuracy of 50%, other
case was found to be a case of chronic granulomatous thyroi-
ditis. Whereas Geeta Jayram (1985) have a diagnostic accuracy
of 21.1% and 100% accuracy was reported by Aggarwal (1989) in
cases of follicular carcinoma thyroid specially cold thyroid
modules.

Anaplastic carcinoma exhibited the most malignant
cell pattern. The giant cell type presented as heterogeneous
material composed of necrotic tissue with bizarre giant cells.
In present study FNAC showed only one case of giant cell
carcinoma unfortunately biopsy was not available for histo-
pathological correlation. Geeta Jayram (1985) and Accarwal (1989) both had reported 100% diagnostic accuracy in anaplastic carcinoma cases by FNAC.

Cytologically a diagnosis of suspicious for malignancy was made when the smears were very cellular shows tissue fragments, the cells did not confirm diagnostic criteria of malignancy, but they revealed large nucleus, compared to benign smears. The honey comb pattern seen in benign lesions is present, but the cells are crowded, overlapping and pleomorphic (Pandit 1986). In present study there was one case where a diagnosis of suspicious for malignancy was made, which was later on histopathology confirmed as follicular carcinoma. There is an accordance with observations by Pandit and Kinare (1986) when all cytologically suspicious cases were confirmed as follicular carcinoma histopathologically later on.

In present study, the overall incidence of malignant neoplasm/suspicious on the basis of FNAC cases are to be approximately 27.3%. This is in accordance with reported incidence of 29.5% (Molich 1974), 22.2% (Pandit, 1986), 22.1% (P Harsoules 1986), whereas incidence of 44.4% reported by Aggarwal (1989) in cold thyroid nodules. As regard diagnostic accuracy of suspicious/malignant neoplasm it was 66.67% as compared to reported accuracy 65% (March 1989), 46.8% (Lohagen 1979), 95.4% (Aggarwal, 1989) and 100% (Pandit 1986).
**TABLE - I**

Statistical data for diagnostic sensitivity, diagnostic specificity, false positive rate, false negative rate, overall diagnostic accuracy and positive predictive value.

- Total number of cases - 11
- Cytological Benign cases - 8
  (a) Histologically benign cases - 7 (True negative)
  (b) Histologically malignant case - 1 (False negative)
- Cytological suspicious/malignant case - 3
  (a) Histologically malignant case - 2 (True positive)
  (b) Histologically benign case - 1 (False positive)

1. **Diagnostic Sensitivity**

\[ \text{True positive} \]
\[ \text{True positive + False negative} \]
\[ \frac{2}{2+1} = \frac{2}{3} = 66.67\% \]

2. **Diagnostic Specificity**

\[ \text{True Negative} \]
\[ \text{True Negative + False Positive} \]
\[ \frac{7}{7+1} = \frac{7}{8} = 87.50\% \]

3. **False Positive Rate**

\[ \frac{False Positive}{True Positive + False Positive} \]
\[ \frac{1}{2+1} = \frac{1}{3} = 33.33\% \]

4. **False Negative Rate**

\[ \frac{False Negative}{False Negative + True Negative} \]
\[ \frac{1}{1+7} = \frac{1}{8} = 12.5\% \]

5. **Overall Diagnostic Accuracy**

\[ \frac{True Positive + True Negative}{True Positive + True Negative + False Positive + False Negative} \]
\[ \frac{2+7}{2+7+1+1} = \frac{9}{11} = 81.81\% \]

6. **Positive Predictive Value**

\[ \frac{True Positive}{True Positive + False Positive} \]
\[ \frac{2}{2+1} = \frac{2}{3} = 66.7\% \]
Thus we could give a 81.8% correct diagnosis in
cases of thyroid swellings as compared to Harch (1989) and
Aggarwal (1989) who give 87.0% and 97% correct diagnosis
respectively.

Out of eleven cases, cytologically benign cases
were eight, seven were proved histologically as benign -
hence, true negative, and one was histologically malignant-
hence, false negative. In three cases findings were cytolo-
gically suspicious/malignant, two histologically proved
malignant - true positive and one was histologically benign-
false positive (Akerman 1985).

The diagnostic sensitivity on the basis, formula given
in Table I: 

\[
\frac{(True \ positive)}{(True \ positive + \ False \ negative)}
\]
gives the probability for the method to detect a thyroid
malignancy was 66.67% in this study, whereas in other reported
series sensitivity was 89.2%, 97.0%, 75.0%, 68.1%, 84.6%,
according to P. Harsoulis (1986); Man Akerman (1985); H. Ruben
respectively.

The diagnostic specificity on the basis, given
formula in Table I: 

\[
\frac{(True \ negative)}{(True \ negative + \ False \ positive)}
\]
gives the probability for the method to confirm
a malignant thyroid mass was 87.5% in this study. Literature
shows 95.4%, 98.0%, 99.0%, 100% and 78.70%, according to P.
Harsoulis et al (1986); Man Akerman et al (1985); H. Ruben
Harch (1989); S.K. Aggarwal et al (1989) and Schmid et al
(1989) respectively.
Over all diagnostic accuracy on the basis of given formula in Table I - \[
\frac{(\text{True positive} + \text{True negative})}{\text{True positive} + \text{True negative} + \text{False positive} + \text{False negative}}\] were 81.81% in our study. P. Harsoulis et al (1986) reported 94.2% over all diagnostic accuracy.

The false positive rate on the basis of given formula in Table I - \[
\frac{(\text{False positive})}{(\text{True positive} + \text{False positive})}\] was 33.33% and P. Harsoulis et al (1986) reported 17.5%. The false negative rate on the basis of formula in Table I - \[
\frac{(\text{False negative})}{(\text{False negative} + \text{True negative})}\] was 12.5%, P. Harsoulis et al reported 2.7%.

The percent of correct positive diagnosis expressed as the positive predictive value on the basis of formula given in Table I - \[
\frac{(\text{True positive})}{(\text{True positive} + \text{False positive})}\] was observed 66.67% in our study.

The slightly low values in the statistical data is due to lesser number of cases available for correlation with histopathology.

The present study shows that FNAC is a safe and simple method with high degree of over all diagnostic accuracy, sensitivity and specificity.