DISCUSSION
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An array of the diseases in human beings are manifested more or less as enlargement of the lymphnodes either primarily or secondarily, and that's why the study of lymphnodes is an exclusive need and the proper procedure for the clinical diagnosis of both medical as well as surgical point of view. It is the pathologist whose meticulous study by various procedures e.g. imprint cytology, frozen section and paraffin section technique, not only assures the clinician about the various aspects of the disease and its diagnosis but also helps them in providing the guideline for the treatment.

Thus the pathologists responsibility is great and task difficult because of inherent problems in obtaining standard and excellent section from fresh tissue. An accuracy of such study may be improved and difficulties may be reduced by supplementing the tissue slides with imprint cytology and frozen sections.

In light of above facts, present study has attempted to achieve the exact diagnosis of the lymphnode submitted for examination. Three important procedures like; imprint cytology, frozen section and paraffin section technique have been undertaken and their comparative study has been done on the basis of the diagnosis worked out, taking the paraffin section technique as standard one for final diagnosis.
A total of 114 cases were included in the present study. Out of which a large number was constituted by those of cervical lymphnodes 39.5%, followed by axillary lymphnodes 28.0%, the minimus involvement 5.3% was seen in case of mesentric lymphnodes. Gupta et al (1988) also reported maximum cases of lymphadenopathy in cervical group followed by abdominal groups.

In the present study lymphadenopathy predomiance in females as compared to males (65.5% female V/s 35.5% males) was seen. Maximum cases of lymphadenopathy were found in 11-30 years age groups and minimum cases of lymphadenopathy were found in 60-70 years group.

Histopathological examination of the lymphnodes by various technique's revealed that imprint cytology is reasonably simple and quick procedure for early diagnosis at the same time frozen section is also giving quick and early diagnosis.

In the study of imprint cytodiagnosis of lymph nodes multiple stains viz. Haematoxyline and eosin, Papnicolaou and Ziehl-Neelson staining (in case of tuberculous lymphadenitis) are used giving more information. Ultmann (1958), Agarwal et al (1977) were also used multiple staining viz. Haematoxyline and eosin, papanicolaou and Giemsa stain and reported more information than using only the
conventional haematoxyline and eosin stain. Haematoxyline and eosin stain in our opinion gave better results in comparison to papanicolaou, because the nucleous and cytoplasm of the cells are more clearly visualised. Lucas (1955), Ultmann et al (1958), Agarwal et al (1977) found that Papanicolaou's stain gave better results in comparison to haematoxyline and eosin stain. Chaudhary (1984) also used multiple stain and found identical results.

On cytological examination of imprints, standard criteria were used to classify the cells as benign and malignant.

1. The malignant cells were invariably seen in clumps while the benign cells were seen isolated or in small clumps. Mention has already been made on the nature of cellularity.

2. An important criteria was the size of the cells. All malignant cells were larger than the benign cells. As a rule the larger the cells, higher was the grade of malignancy.

3. The nuclear cytoplasmic ratio was increased in the malignant cells while it was normal in benign cells. Mostly all malignant lesion showed variation in nuclear size and shape with marked pleomorphism in high grade tumour.
4. The nucleoli were more prominent or multiple in the malignant cells.

5. Mitosis figures were infrequently seen, but a deliberate attempt to identify them was not made.

However, none of these criteria are individually pathognomonic of malignancy (Tribe, 1965). Only by assessing all the features of the imprints cells and its correlation with gross and clinical finding a diagnosis of malignancy could be made.

In the present series, imprint cytodiagnosis of 114 cases, showing lymphadenopathy due to inflammatory conditions in 65.8% cases, out of which 15.8% showing chronic lymphadenitis and 50% as tuberculous lymphadenitis, and paraffin section which are taken as a final diagnosis also showing inflammatory lesions in 65.8% as imprint cytodiagnosis but these inflammatory lesions include 46.5% of tuberculous lymphadenitis, 11.4% chronic lymphadenitis and 7.9% reactive hyperplasia. We could not made out the diagnosis of reactive hyperplasia with imprint cytology. Agarwal et al (1977), observed the maximum (68.0%) cases of lymphadenitis are due to inflammatory lesion followed by secondary neoplasm (metastasis) and maximum cases in inflammatory lesions were due to chronic lymphadenitis followed by tuberculous lymphadenitis.
The second important cause of lymphadenopathy was due to primary neoplasm including Hodgkin's lymphoma and Non-Hodgkin's lymphoma (18.4%).

The remaining cause of lymphadenopathy was due to secondary neoplasm, which included metastasis of squamous cell carcinoma, adenocarcinoma, mucoid adenocarcinoma and myeloid leukaemic cell infiltration.

Out of 114 cases of the present series, with histopathological diagnosis, we found 75 had benign lesion, 19 were of primary tumour or lymphoma and 18 were metastasis from malignant neoplasm elsewhere in the body and in miscellaneous group single case of angio-follicular lymphnode hyperplasia and benign sinus histiocytosis was seen.

By imprint cytodiagnosis of 114 cases of lymphadenopathy revealed 18 of chronic lymphadenitis, 57 of tuberculous lymphadenitis, 6 of Hodgkin's lymphoma, 15 of non-Hodgkin's lymphoma in which 7 cases of lymphocytic lymphoma, 3 cases of histiocytic-lymphocytic lymphoma (mixed cell type); 4 cases of lymphoreticular lymphoma and one case of lymphoblastic lymphoma poorly differentiated was seen. In metastatic group 6 cases were of metastatic epidermoid carcinoma, 7 of adenocarcinoma
4 of mucoid adenocarcinoma and one was of myeloid leukemic cell infiltration. The accuracy rate of these cases were chronic lymphadenitis 55.6%, tuberculous lymphadenitis 87.7%, Hodgkin's lymphoma 100%, metastatic lymph node 100% and in cases of non-Hodgkin's lymphoma. Accuracy rate was 86.7%. The overall accuracy rate was 85.1%.

The imprints of chronic lymphadenitis were mistaken for tuberculous lymphadenitis, reactive hyperplasia and angiofollicular lymph node hyperplasia imprint of tuberculous lymphadenitis were mainly mistaken for chronic lymphadenitis, benign sinus histiocytosis whereas non-Hodgkin's lymphoma were mistaken for reactive hyperplasia. In cases of Hodgkin's lymphoma, the presence of characteristic Reed Sternbergh cell contributed for 100% diagnosis.

Many worker's studied imprints cytology and compared it with paraffin section technique (Morrison et al, 1952; Lucas, 1955; Aust et al, 1971; Agarwal et al, 1977; Suen et al, 1978, Tyaqi et al, 1981; Nagpal et al, 1982; Verma et al, 1983; Chaudhary, 1984, Ademilloyi, 1986; Gupta et al, 1988 and Anuradha et al, 1989) and these comparative figures have been presented in (Table-X) and discussed in following paragraphs.
TABLE - X: Showing comparative accuracy rate (%) of different workers in prospect of correlation of cytodiagnosis with histopathological diagnosis.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Author's name and year</th>
<th>Chronic lymphadenitis</th>
<th>Tuberculous lymphadenitis</th>
<th>Reactive hyperplasia</th>
<th>Reactive Hodgkin's lymphoma</th>
<th>Non Hodgkin's lymphoma</th>
<th>Metastatic tumour</th>
<th>All accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Morrison et al, 1952</td>
<td>90.0</td>
<td>-</td>
<td>-</td>
<td>80.0</td>
<td>83.0</td>
<td>100.0</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Lucas et al, 1955</td>
<td>58.3</td>
<td>16.5</td>
<td>-</td>
<td>76.9</td>
<td>29.4</td>
<td>100.0</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Ultmann et al, 1958</td>
<td>92.7</td>
<td>100.0</td>
<td>-</td>
<td>100.0</td>
<td>90.9</td>
<td>93.9</td>
<td>93.1</td>
</tr>
<tr>
<td>4.</td>
<td>Shankaran and Reddy, 1970</td>
<td>69.2</td>
<td>60.8</td>
<td>66.6</td>
<td>100.0</td>
<td>60.0</td>
<td>79.0</td>
<td>79.0</td>
</tr>
<tr>
<td>5.</td>
<td>Aust et al, 1971</td>
<td>100.0</td>
<td>80.7</td>
<td>-</td>
<td>100.0</td>
<td>-</td>
<td>100.0</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Agarwal et al, 1977</td>
<td>100.0</td>
<td>100.0</td>
<td>-</td>
<td>100.0</td>
<td>71.4</td>
<td>94.4</td>
<td>97.6</td>
</tr>
<tr>
<td>7.</td>
<td>Suen et al, 1978</td>
<td>83.0</td>
<td>-</td>
<td>88.0</td>
<td>96.0</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Tyagi et al, 1981</td>
<td>-</td>
<td>89.2</td>
<td>-</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>73.6</td>
</tr>
<tr>
<td>9.</td>
<td>Nagpal et al, 1982</td>
<td>60.0</td>
<td>95.4</td>
<td>-</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>94.0</td>
</tr>
<tr>
<td>10.</td>
<td>Verma et al, 1983</td>
<td>80.0</td>
<td>73.9</td>
<td>83.3</td>
<td>87.5</td>
<td>100.0</td>
<td>83.0</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Choudhary, 1984</td>
<td>-</td>
<td>100.0</td>
<td>91.6</td>
<td>80.0</td>
<td>85.7</td>
<td>100.0</td>
<td>90.4</td>
</tr>
<tr>
<td>12.</td>
<td>Ademiloyi et al, 1986</td>
<td>50.0</td>
<td>30.77</td>
<td>-</td>
<td>40.0</td>
<td>91.6</td>
<td>84.6</td>
<td>66.0</td>
</tr>
<tr>
<td>13.</td>
<td>Gupta et al, 1988</td>
<td>81.57</td>
<td>88.9</td>
<td>-</td>
<td>76.9</td>
<td>62.5</td>
<td>84.39</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Anuradha et al, 1989</td>
<td>100.0</td>
<td>100.0</td>
<td>-</td>
<td>100.0</td>
<td>87.5</td>
<td>100.0</td>
<td>94.0</td>
</tr>
<tr>
<td>15.</td>
<td>Present study, 1990</td>
<td>55.6</td>
<td>87.7</td>
<td>-</td>
<td>86.7</td>
<td>100.0</td>
<td>100.0</td>
<td>85.1</td>
</tr>
</tbody>
</table>
In our study the overall accuracy was 85.1% with imprint cytodiagnosis. Nearly similar accuracy rate have been reported viz 93.1% (Ultmann et al, 1958), 79% (Sankaran and Reddy, 1970), 97.6% (Agarwal et al, 1977), 94% (Nagpal et al, 1982), 83% (Verma et al, 1983), 66% (Ademiloyi, 1986), 84.39% (Gupta et al, 1988), and 94% (Anuradha et al, 1989).

The cytological criteria for diagnosis of chronic lymphadenitis was increased in cellularity of the imprint smear together with presence of few neutrophils, plasma cells, and eosinophils. Similar observations have also been made by Lucas (1955), Ultmann et al (1958), Agarwal et al (1977), Nagpal et al (1982), Anuradha et al (1989). The accuracy rate in case of chronic lymphadenitis in the present series was 55.6%, however several other workers reported the accuracy rate varying from 50 to 100% (Morrison et al, 1952; Lucas, 1955; Ultmann, 1958; Shakaran and Reddy, 1970; Aust et al, 1971; Agarwal et al, 1977; Nagpal et al, 1982; and Verma et al, 1983; Chaudhary, 1984; Ademiloyi, 1986; Gupta et al, 1988; and Anuradha et al, 1989).

In our study we found that 57 cases diagnosis as tuberculous lymphadenitis but histopathologically only 53 (46.5%) cases of tuberculous lymphadenitis were confirmed, Agarwal et al 1977 reported 32% of the patient has tuberculous lymphadenitis which were histologically proved.
Pamra and Mathur reported the incidence of tuberculosis as 70.6% in a large series of 303 cases of cervical lymphadenopathy. Since the respiratory route of tuberculosis infection predisposing the cervical lymphnodes to scading with tubercle bacilli, the increased incidence of tuberculosis in cervical lymphnode is easily explained in this study also. Cervical tuberculous lymphadenitis was higher in 24 cases than generalized tuberculous lymphadenitis in 8 cases.

The tuberculosis patient had a age of 35 years with male female ratio of 1:4. Gupta et al reported lymph node tuberculosis at a mean age of 33 years with a male to female ratio of 2:1, while compbell and Dyson reported lymphnode tubercular at a mean age of 35 years but in the female prepondarance from our study we concluded that tubercular lymphadenitis was more commonly seen in female than male in this region and a large majority of cases were between 11 to 30 years age group. Similar result was reported by Pamra and Mathur (1974).

Lucas (1955), Ultmann et al (1958), Aust et al (1971), have stated that diagnosis of tuberculosis could be made on the demonstration of epitheloid cells with occasional demonstration of acid fast bacilli. From the present study, it was felt that where there was hypocellularity, associated with the granular material in the imprint smear, the diagnosis of tuberculous lymphadenitis should be
suspected and a meticulous search would always result in spotting out group of epitheloid cells and giant cells. Acid fast bacilli could not be demonstrated by special stain in any of the imprints smear of tuberculous lymphadenitis in our study.

Agarwal et al (1977) have demonstrated acid fast bacilli only in 3 out of 40 instances.

In the present study, the accuracy rate in case of tuberculous lymphadenitis was 87.7%, almost similar accuracy has been observed by Aust et al (1971), Verma et al (1983), and Gupta et al (1988). However the accuracy rate as low as 16.5% found by Lucas (1955), and as high as 100% (Ultmann et al, 1958; Agarwal et al, 1977; Choudhary, 1977; Anuradha et al, 1989) is also have been reported.

Reactive hyperplasia in our study by paraffin section diagnosed in 9 (7.9%) cases. But with imprint cytology I failed to diagnosis any single case of reactive hyperplasia. Verma et al (1983) diagnose reactive hyperplasia in 10/12 imprint smears and Choudhary (1984), also found accuracy rate of 91.6% in cases of follicular reactive hyperplasia. The criteria for this diagnosis increased cellularity of the smears with predominance of lymphocytes at various stage of maturation, but in my opinion the reactive hyperplasia diagnosis made by imprint cytology is very difficult. Verma et al (1983) found one false positive case
of reactive hyperplasia which turned out to be Hodgkin's lymphoma and this difficulty was also expressed by Gupta et al (1977). Shankaran and Reddy, (1970) and Verma et al (1983) found accuracy rate in cases of reactive hyperplasia by imprint cytology was 66.6% and 83.3% respectively.

The commonest cause of generalised lymphadenopathy was lymphoma. In Hodgkin's lymphoma the accuracy rate was 100% in our study and this is due to presence of characteristics, Reed Sternberg giant cells in the imprint smears, but all the cases were of mixed cellularity type. The accuracy rate in Hodgkin's lymphoma have been observed by other worker's as 83% Morrison et al (1952), 29.4% by Lucas (1955), 90.9% Ultmann et al (1958), 60% Shankaran and Reddy (1970), 71.4% Agarwal et al (1977), 100% Nagpal et al (1982), 85.7% Choudhary (1984), 91.67% Ademiloyi et al (1986), and 87.5% Anuradha et al (1989).

The low accuracy rate was mainly due to the Hodgkin's disease of nodular sclerosis type and also due to lymphocytic predominance and lymphocytic depletion type. However, the accuracy rate was found to be high by above workers also in mixed cellularity type of Hodgkin's disease. Fortunately our all cases of Hodgkin's lymphoma were of mixed cellularity type in which characteristic Reed Sternberg giant cells and pleomorphism together with the presence of premature of mature reticulam cells seen. In observing
the absence of these specific cells the smears could be mistaken for that of chronic lymphadenitis. The same remark have been expressed by Morrison et al (1952) and Koss (1968) in case of Hodgkin's disease specially of sclorising type. Ultmann et al (1958) gave 90.9%, Suen et al (1978) gave 87.5%, Verma et al (1983) gave 76.92% Gupta et al (1988), accuracy rate were found in lymphoma (Hodgkin's and Non-Hodgkin's type).

In the diagnosis of non-Hodgkin's lymphoma lymphocytic or lymphoreticular type has been quite easy to diagnose by imprints due to marked hypercellularity of the smears together with the monomorphic character of the corresponding cells. The same features have also been stressed by most of the workers (Lucas, 1955 and Ultmann et al, 1958, and Nagpal et al 1982, Agarwal et al 1977). However two cases could not be confirmed by paraffin section technique in present study. False positivity has also reported by Webbs (1978).

Metastatic lesions were also found to be the maximum in axillary lymphonodes followed by cervical lymphnodes. Out of 18 cases, 9 had involvement of axillary followed by cervical (6), and one each for mesentric and inguinal lymphnodes. Leukaemic cell infiltration was associated with generalised lymphadenopathy. Gupta et al (1988) found maximum involvement in cervical followed by axillary
lymphnode. Maximum cases of secondaries were found in older age group (51 to 60 years). None of the case was showing metastasis below 30 years or above 70 years age.

The diagnosis of secondaries in the lymphnodes from a tumour else where in the body present hardly any diagnostic problem. In our imprint cytological smears the accuracy rate in this group was 100%, similar observations were found by various worker like Morrison et al (1952), Lucas (1955), Aust et al (1971), Tyagi et al (1981), Nagpal et al (1982), Verma et al (1983), Ghandur (1984), Anuradha et al (1989). Primary lesion could be diagnosed easily provided the cells in the smears were well differentiate e.g. in instances of squamous cell carcinoma, adenocarcinoma or mucoid adenocarcinoma. Moore and Reagan (1953) in their study of lymphnode imprint found 20 lymphnodes with metastatic diseases showing 100% correlation between imprint and tissue section.

The problem of diagnosis however persisted in case of leukaemic cell infiltration cause the smears showed pleomorphism apparently similar to that observed in chronic lymphadenitis, but on closer scrutiny a correct diagnosis was possible due to presence of myeloid series of cells in different stages of maturation. The overall accuracy was found with imprint cytodiagnosis in cases of lymphadenopathy as 85.1%.
Near about similar over all accuracy rate by imprint cytodiagnosis were found by Gupta et al 1988 (84.39%), Verma et al 1983 (83.0%), Shankran and Reddy 1970 (79.0%), Tyagi et al 1981 (73.6%) and minimum accuracy rate was recorded by Ademiloyi 1986 (56.0%) and maximum overall accuracy was observed by Chaudhary 1984 (90.4%), Ultmann et al 1958 (93.1%), Nagpal et al 1982 (90.4%), Anuradha et al 1989 (94.0%) and Agarwal et al 1977 (97.6%).

In conclusion we can say that imprints smear method is reliable and dependable procedure for diagnosing various lymphnode diseases.

Both imprints cytology and frozen section technique were found to be reasonably simple and quick. Godwin (1976) advocated the use of haematoxyline and eosin for in conclusive cytological diagnosis with other stain. Frozen section took a little more time before a diagnosis was ventured because we used a cryostat, a new modification of the conventional freezing microtome, taking about 15 minutes and using haematoxyline and eosin stains. The use of the same stain helped in comparing the two methods. The slides prepared by cryostat were however of superior quality and thin (5-6 microns), thereby making possible high power microscopic details to be observed with ease. Another advantage of this method was that multiple process of fresh
frozen tissue from different sites were processed simultaneously thus reducing the chances of sampling errors. These findings are similar to concurred by Horn (1962) and Sparkman (1962).

In the present study, frozen section done of all the 114 cases of lymphnode with help of cryostat and found 77 cases (67.5%) of lymphadenopathy were due to inflammatory lesions in which chronic lymphadenitis were seen in 14 (12.2%), tuberculous lymphadenitis in 53 cases (46.5%) and reactive hyperplasia in 10 cases (8.8%). In primary neoplasm 19 (16.7%) and secondaries neoplasia 18 (15.8%), the results are same as compare the paraffin section.

In cases of chronic lymphadenitis out of 14 cases only 13 cases were confirmed by paraffin section and one case was misdiagnosed which was confirmed by paraffin section as a angiofollicular lymphnode hyperplasia, thus accuracy rate was found in case of chronic lymphadenitis was 92.8%. All the 53 case of tubercular lymphadenitis were diagnosed by frozen section method and were confirmed by paraffin section. Thus in tuberculous lymphadenitis the accuracy rate was 100%. 10 cases diagnosed as a reactive hyperplasia with frozen section technique in which only 9 cases were confirmed with paraffin section, one case misdiagnosed by frozen section was
confirmed as benign sinus histiocytosis with paraffin section. Thus accuracy rate in cases of reactive hyperplasia with frozen section technique was found to be 90%. All the cases of Hodgkin's lymphoma and non-Hodgkin's lymphoma and metastatic lymphnode were diagnosed correctly, thus the accuracy rate was 100% in lymphoma and metastasis including myeloid leukaemic cell infiltration. The overall accuracy rate was found to be 98.2% by frozen section technique. Other workers have reported accuracy rate as 97.1% (Kaufman et al, 1986), 93% (Chaudhary, 1984) and 98.0% (Ackerman and Ramirej, 1959). Godwin (1976) used the scraping technique for 20 years and although the reports no figures, his statement indicate that he prefer imprints to frozen section.

Bloustein and Silberberg 1977 studied 21 benign lymphnodes, 23 with metastatic carcinoma and 4 with lymphoreticular neoplasm. They state that a small focus of cancer in a lymphnode can be missed by frozen section with the conventional method of sampling the nodes.

Sakai and Lauslathi (1969) in comparing and analysing the results of cytodiagnosis and frozen section during operation attained an accuracy of 95.7% by frozen section and 95.5% by imprint cytology. Pickren and Burke (1963) in a similar type of study attained combined accuracy of 97.4% but did not give statistical analysis of
their 1819 cases. Suen et al (1978) accomplished a combined accuracy of 98.3% and an overall accuracy rate of 93.6% by imprints. Thus the accuracy rate in our series compared favourably with the rate of other authors.

Chaudhary (1984) also studied 52 unselected lymph node biopsies with imprint cytology and frozen section and the results were compared with paraffin section, and found accuracy of frozen section diagnosis of lymphnode was 93% more than imprint cytology accuracy rate (90.4%).

Frozen section in conjunction with imprint cytology should be used where gross examination findings are equivocal, like in well differentiated carcinoma, or where peroperative diagnosis has an immediate bearing on the surgical modification; where immediate interference is not contemplated, only imprints would suffice. Sakai and Lauslathi (1969), Suen et al (1978), Pickerman Burke (1963) and Bamforth and Osborn (1958) all advocate adjuvant cytology to frozen section because is helps in establishing nature of pathological entity, avoids false decision, ensures accuracy in rapid tissue diagnosis and reduce sampling error. Tribe (1965) concluded that tumour imprints would probably never replace first class frozen section, especially those produced on cryostat, but suggested that they have a definite place in combination with frozen section.
We concur with the findings of various other authors that the high degree of accuracy by frozen section with cryostat in our series and a overall accuracy of 98.2% suggest that the smear or imprint cytological diagnostic method are not as reliable as cryostat frozen section. It is believed that by a more meticulous technique, and with experience, the accuracy of imprints cytology can be improved further.

Considering its simplicity, universal application, economical advantages and the absence of false positive in our results, we strongly recommended that it should be used universally in all hospitals as a routine parts of surgical interference; practiced in an operating suite, even surgical resident and house surgeons taught to interpret the common malignant tumour in the light of gross study.

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