Cytomorphological Patterns associated with Lymphadenopathy; A Study of FNACs conducted at A Tertiary Care Public Hospital of Rawalpindi.

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Abstract
Background: Lymphadenopathy is an important clinical manifestation of a vast variety of diseases. Fine needle aspiration cytology (FNAC) plays an important role in the cytomorphological diagnosis of lymphadenopathy. The present study was undertaken to assess the different cytomorphological patterns associated with lymphadenopathy and to explore the spectrum of lesion with respect to the age and gender.

Methods: This descriptive cross sectional study was conducted in the Pathology Department of Benazir Bhutto Hospital, Rawalpindi, from April 2015 to April 2016. All the consecutive 195 FNACs performed during this one year on lymph nodes were included in study.

Results: Lymphadenopathies were common among younger patients with the maximum number of incidence in the age group of 11-30 years (53.3%). The most common finding was Reactive hyperplasia, 112 cases (57.4%), followed by Chronic Granulomatous inflammation with 73 cases (37.4%). There were 3 cases (1.54%) of lymphoproliferative disorders; two Hodgkin’s and one Non-Hodgkin’s lymphoma while 7 cases (3.6%) were diagnosed with metastatic carcinoma. The most common site involved was cervical nodes with 141 (72.3%) cases.

Conclusion: Reactive hyperplasia was the most common diagnosis through FNAC in our study followed by chronic granulomatous inflammation.

Keywords: Lymphadenopathy, FNAC

Introduction
FNAC (Fine Needle Aspiration Cytology) is a technique used in the diagnosis of many diseases. From regional masses of the head and neck, including lymph nodes, thyroid gland, breast, salivary gland to all superficial lesions, FNAC is used for diagnosis.1 FNAC has many advantages over open biopsy. It is safe, simple, rapid and relatively cheap. It leaves no scars and there is no risk of seeding tumors along the needle tract. It is relatively free of complications, well tolerated by patients, done on an outpatient basis and is repeatable.2 Due to all these advantages, aspiration cytology is now considered a valuable diagnostic aid and has become the part and parcel of a pathologist’s repertoire.3 Similarly in breast cancer patients, axillary lymph nodes FNAC is a helpful tool in the pre-operative diagnosis and to know the extent of disease.4 From the surgery perspective, it is a reliable procedure for diagnosis of cervical lymphadenopathy and the decision to proceed for surgery or not, can be made on it.5 In terms of approach, ultrasound guidance is needed for deep swellings whereas the superficial swellings are approached directly. To distinguish between malignant and benign tumors, and guide the treatment options, FNAC is recommended as it doesn’t cause spread through the skin contact.6 For vast variety of diseases like reactive lymphoid hyperplasia, infectious disease, granulomatous lymphadenitis, and metastatic malignancy, it offers an almost accurate diagnosis.7

The purpose of the study was to evaluate the findings of fine needle aspiration cytology (FNAC) of lymph nodes of patients presenting to a tertiary care health facility of Rawalpindi. The objectives of the study were to assess the different cytomorphological pattern associated with lymphadenopathy and also to determine the spectrum of lesion with respect to the age and gender.

Materials And Methods
This descriptive cross sectional study was conducted in the Department of Pathology, Benazir Bhutto Hospital, Rawalpindi (a tertiary care hospital) during a period of one year from April 2015 till April 2016. All the consecutive FNACs performed on lymph nodes were taken into study on non-probability consecutive sampling technique irrespective of age and gender. A total of 195 cases were studied. FNAC was performed...
under strict aseptic measures using a 22G needle; two smears were made from a single patient’s aspirate and were stained with Hematoxylin and Eosin stain. The data was collected regarding the demographic variables including age, gender, site and diagnosis of the lymphadenopathy. The data was analyzed using Statistical package of social sciences (SPSS 20) and descriptive statistics like frequencies and percentages were calculated. Cross tabulations were constructed to assess the sites and diagnosis of the lymphadenopathy based on gender and age groups.

**Results**

Total 195 FNACs were performed out of which 110 (56.4%) belonged to females patients and 85 (43.6%) were from male patients. The age of patients ranged from 1 year to 76 years. The patients were divided into four age groups, 1-10 years, 11-30years, 31-50 years and above 50 years. The lymphadenopathies were common among younger patients with the maximum number of cases in the age group of 11-30 with 104 cases (53.3 %), followed by the age group 1-10 with 48 cases (24.6 %). The age distribution is displayed in (Chart I).

**TABLE I: Spectrum of diseases with respect to gender and age groups**

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>TOTAL PARTICIPANTS</th>
<th>GENDER OF PATIENTS</th>
<th>AGE GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># (%)</td>
<td>MALE # (%)</td>
<td>FEMALES # (%)</td>
</tr>
<tr>
<td>1. REACTIVE HYPERPLASIA</td>
<td>112 (57.4%)</td>
<td>53 (62.4%)</td>
<td>59 (53.6%)</td>
</tr>
<tr>
<td>2. CHRONIC GRANULOMATOUS</td>
<td>73 (37.4%)</td>
<td>25 (29.4%)</td>
<td>48 (43.6%)</td>
</tr>
<tr>
<td>INFLAMMATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. METASTATIC CARCINOMA</td>
<td>7 (3.6%)</td>
<td>5 (5.9%)</td>
<td>2 (1.8%)</td>
</tr>
<tr>
<td>LYMPHOPROLIFERATIVE DISORDER</td>
<td>2 (1%)</td>
<td>1 (1.2%)</td>
<td>1 (0.9%)</td>
</tr>
<tr>
<td>- HODGKINS LYMPHOMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LYMPHOPROLIFERATIVE DISORDER</td>
<td>1 (0.5%)</td>
<td>1 (1.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>- NON-HODGKINS LYMPHOMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>195 (100%)</td>
<td>85 (100%)</td>
<td>110 (100%)</td>
</tr>
</tbody>
</table>

**TABLE II: Sites aspirated with respect to gender and age groups**

<table>
<thead>
<tr>
<th>SITE</th>
<th>TOTAL PARTICIPANTS</th>
<th>GENDER OF PATIENTS</th>
<th>AGE GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># (%)</td>
<td>MALE # (%)</td>
<td>FEMALES # (%)</td>
</tr>
<tr>
<td>CERVICAL</td>
<td>141 (72.3%)</td>
<td>66 (77.6%)</td>
<td>75 (68.2%)</td>
</tr>
<tr>
<td>SUBMANDIBULAR</td>
<td>18 (9.2%)</td>
<td>9 (10.5%)</td>
<td>9 (8.2%)</td>
</tr>
<tr>
<td>SUPRACLAVICULAR</td>
<td>13 (6.7%)</td>
<td>3 (3.5%)</td>
<td>10 (9.1%)</td>
</tr>
<tr>
<td>AXILLARY</td>
<td>9 (4.6%)</td>
<td>4 (4.7%)</td>
<td>5 (4.5%)</td>
</tr>
<tr>
<td>INGUINAL</td>
<td>6 (3.1%)</td>
<td>2 (6.2%)</td>
<td>4 (3.6%)</td>
</tr>
<tr>
<td>SUBSCAPULAR</td>
<td>4 (2.1%)</td>
<td>1 (0.1%)</td>
<td>3 (2.7%)</td>
</tr>
<tr>
<td>OTHERS</td>
<td>4 (2.1%)</td>
<td>0 (0%)</td>
<td>4 (3.6%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>195 (100%)</td>
<td>85 (100%)</td>
<td>110 (100%)</td>
</tr>
</tbody>
</table>
As regards the diagnosis, the most common finding was Reactive hyperplasia with 112 cases (57.4%), followed by Chronic Granulomatous inflammation with 73 cases (37.4%). There were 3 cases (1.54%) of lymphoproliferative disorders; two Hodgkin’s and one Non- Hodgkin’s lymphoma. Metastatic carcinoma was found in 7 cases (3.6%) (Table I).

Among the sites, the most common was cervical with 141 (72.3%), followed by submandibular 18 (9.2%), supraclavicular with 13 (6.67%), as displayed in Table II. Reactive hyperplasia is the most common diagnosis in age group 1-10 years (35.7%), while the second most common diagnosis in age group 11-30 years. Hence reactive hyperplasia is most common in children while metastatic carcinoma is common in age group above 50 years. Tuberculosis (chronic granulomatous inflammation) is most common during the second and third decade of life (Table II).

Discussion
Lymphadenopathy is of great clinical significance because it is a manifestation of vast variety of diseases which could be infectious, malignant, degenerative, and immune related. Cytomorphological diagnosis of lymph nodes can be done by a surgical biopsy or fine needle aspiration cytology (FNAC).

Smears that showed polymorphous population of lymphoid cells with small cells, intermediate cells and immune related cells were classified as reactive hyperplasia. Reactive hyperplasia was due to different causes; viral, bacterial, non-specific etiology, the pattern depended on the type of tissue from which the smear was made (Figure 2, 3). Among the 195 cases studied, reactive hyperplasia was the most common diagnosis with 57.4% cases. This result is in concordance to similar studies related to lymphadenopathy. Reactive hyperplasia was the major diagnosis in the age group 1-10 and the second most common diagnosis in the age group 11-30 which shows that it is common in younger ages. This is supported by Fatima’s study done in Karachi in 2011. In cases of chronic granulomatous inflammation smears showed epitheloid granuloma with casseous necrosis (Figure 3, 4). Such smears were definitive findings of tuberculosis. In the past one decade, tuberculosis has again emerged as one of the most common endemics in the developing countries, also with prevalence of HIV, the occurrence of TB has increased. Tuberculosis and poverty are closely related. Poverty results in malnutrition resulting in alterations in immune functions. Similarly poor hygiene conditions, over population and poor ventilation result in increased transmission of TB.

According to the local studies conducted in Pakistan, majority show Chronic Granulomatous Inflammation as the most common diagnosis. In our study it accounts for 37.4% cases. Among the 73 cases of CGI, 67% were females, a result supported by Mir Attaullah’s research and Ruchis research carried out in Jammu, in 2006. No specific reason can be attributed to the female preponderance. Sociocultural risk factors related to gender roles along with biological sex differences can be considered as likely reasons that make women more vulnerable to the disease. There were seven cases of metastatic lymphadenopathy that is sheets of atypical epithelial cells seen in reactive lymphoid background, out of these five were squamous cell carcinoma, and two were adenocarcinoma. Five of them were male and also five belonged to the age group of 50 above which shows that the incidence of neoplasms is more common among males and in older age. With increasing age, carcinogenesis and subsequent cancer growth occurs due to number of changes occurring at molecular, cellular and physiologic levels. Other studies also showed the same results related to age, gender and the type of malignancy except a study of PIMS which showed a female dominance. Smears that showed a collection of atypical lymphoid cells were classified as lymphoproliferative disorder which was further divided into Hodgkin’s and Non-Hodgkin’s lymphoma. There were three cases of lymphoma, all three under the age of 30, two of them were Non-Hodgkin’s lymphoma and one was Hodgkin’s lymphoma. Related studies show that among malignancies, metastatic carcinoma is the most common followed by lymphomas which is also evident from our results. FNAC corroborated by immunophenotyping is an accurate method of lymphoma diagnosis. In our study the most common site of lymphadenopathy was cervical which is supported by other researches among which the right cervical dominated followed by left, then bilateral. Similar study in Kathmandu Medical College also showed cervical lymph nodes as the most common site involved in the lymphadenopathies. Though FNAC is a very useful technique in the diagnosis of different lymphadenopathies, in case of negative results, excision biopsy can be done as the second line investigation.

Conclusion
Reactive hyperplasia was the most common diagnosis through FNAC in our study followed by chronic granulomatous inflammation.
Acknowledgement

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References


