Histopathological Spectrum of Bronchial Biopsies in a Teaching Hospital from Kashmir Valley

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ABSTRACT

Introduction: The diagnostic yield of bronchoscopy has been assessed from different specimens obtained during procedure. The bronchial biopsy besides providing histological diagnosis renders material for other investigations like immunohistochemistry and genetic mutation studies. This study was carried out to assess the diagnostic yield of bronchoscopy exclusively from bronchial biopsies. Material and methods: A retrospective study was conducted from Dec 2014 to Nov 2015. All the bronchial biopsies received during this period were reviewed and age and gender of each case was recorded from medical records. Malignant lesions were classified according to WHO classification and Non-Neoplastic lesions were classified into four subgroups: normal histology, nonspecific chronic inflammation, chronic granulomatous inflammation and other infective lesions. Results: There were total of 181 cases. The mean age was 72.27 years and male to female ratio was 2.54:1. The histological diagnosis of malignancy was reported in 49.17 % cases, 40.88% cases had Non-Neoplastic lesions and 9.9% cases had normal histology. Conclusion: Bronchial biopsies help in diagnosing Non-neoplastic lesions as well as establishing the cell type of malignant lung lesions. The study showed that lung carcinoma has male predominance with mean age of 60.13 years. Squamous cell carcinoma is most common histological type in males and adenocarcinoma is common in females.

KEYWORDS: Bronchial Biopsy, Chronic Granulomatous Inflammation, Diagnosis, Infective Lesions, Kashmir, Lung malignancy

INTRODUCTION

Bronchoscopy has been used for 45 years in evaluating lung lesions [1, 2]. Bronchoscopy is invasive procedure done with aid of flexible or rigid bronchoscope [3]. Patient acceptance is better with flexible one because it is done in conscious patients as outpatient procedure. It also has better reach extending up to 6th level of bronchial branch [4, 5]. Multiple studies have investigated diagnostic yield of fiberoptic bronchoscopy and factors affecting it. Almost all of these studies have evaluated diagnostic yield from different specimen like bronchial wash, Broncho Alveolar Lavage (BAL) and bronchial biopsy obtained by bronchoscopy.

In few previous studies, brushing smear obtained lower diagnostic yield compared with Trans Bronchial Biopsy (TBB) [6-9]. Both TBB and brushing smear sampling techniques have advantages and disadvantages. The histology as a diagnostic method not only reveals the morphology of cells but also provides additional information about tissue architecture and nearby structures. Moreover, histology sections allow for further investigation of immunohistochemistry and detection of tumor genetic mutations [6]. The present study was carried out to assess the diagnostic yield of bronchoscopy by evaluating the Histopathology of bronchial biopsies.

MATERIALS AND METHODS

The study was conducted in Govt Medical College and associated hospitals Srinagar, J &K, India from December 2014 to November 2015. We retrospectively reviewed all
the bronchial biopsies received in the department of pathology. The variables including age, gender and type of lung lesion were determined according to the patient’s medical records. The malignant lesions were classified according to WHO histological classification as squamous cell carcinoma, small cell carcinoma, adenocarcinoma while as undifferentiated and large cell were categorised together as “others” and the non malignant lesions were categorised into four subgroups: normal histology, nonspecific chronic inflammation with or without metaplasia, chronic granulomatous inflammation and other infective lesions. The Confidentiality of patients’ identity was maintained. Descriptive statistics was used for describing the data using SPSS version 20 and results were presented in percentage and simple frequency.

RESULTS

There were a total of 181 patients in which bronchial biopsy was taken while undergoing bronchoscopy. The mean age among the study group was 72.27 years and male to female ratio was 2.54:1. The histological diagnosis of malignancy was reported in 89 cases (49.17 %), 74(40.88%) cases had Non neoplastic lesion and 18(9.9%) cases had normal histology (Table 1). Bronchial biopsy could give specific diagnosis in 101 cases comprising of 89 malignancies, 7 having chronic granulomatous inflammation consistent with Tuberculosis / Sarcoidosis and 5 with infective lesions. This represents the diagnostic yield of 55.80%. Among the rest 80 cases, 62 showed chronic non specific inflammation and 18 had normal histology. Table 2 shows frequency distribution of histological diagnosis by mean age and sex.

Table 1: Histological Distribution of Cases.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number Of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malignant</td>
<td>89</td>
<td>49.17</td>
</tr>
<tr>
<td>Non-Neoplastic</td>
<td>74</td>
<td>40.88</td>
</tr>
<tr>
<td>Normal histology</td>
<td>18</td>
<td>9.9</td>
</tr>
</tbody>
</table>

Malignant cases

Out of the 89 malignancies, the most common variant was squamous cell carcinoma attributing to 47 cases (52.80%), followed by small cell carcinoma with 19 (21.34%) cases. Adenocarcinoma was reported in 16(17.97%) cases and undifferentiated carcinoma was reported in 7(7.86%) cases. The mean age of cases reported with malignancy was 60.13 yrs with M: F ratio of 22.5:1. The mean age for cases of squamous cell carcinoma was 62.085years and male to female ratio of 22.5:1. In the 16 cases of adenocarcinoma mean age and male to female ratio was noted 61years and1.66:1. An average age of men was 62.1years and for women was 60.83years.

Among the 19 cases of small cell carcinoma, average age was found to be 59.47 years with male to female ratio of 5.33:1. The average age of male and female patients was noted as 62 and 42 years respectively. In the “others” category 7 cases were diagnosed with male to female ratio of 4:3 and average age of 58years. Among these cases two were diagnosed as undifferentiated large cell, one as pleomorphic anaplastic carcinoma, one as adenoid cystic, one as poorly differentiated carcinoma and other two as metastastic deposits (Table 2).

Non-Neoplastic lesion

1. Chronic nonspecific inflammation with and without metaplasia

Total of 62 cases were reported as chronic nonspecific inflammation, among which 12 showed squamous metaplasia of the lining respiratory epithelium. In this group, 42 cases were male and 20 cases were female making M: F ratio of 2.1:1. The average age among females was 67.35 years and among males was 62.14years (Table 2).

2. Chronic granulomatous inflammation

Granulomatous pathology was reported in 7 cases with male to female ratio of 1:6. The Minimum age noted was 35 years and maximum age was 84years. The average age for female was 67.33years. Single male with granulomatous pathology was 65 years in age. The diagnosis of chronic granulomatous inflammation was reported as consistent with tuberculosis or sarcoidosis depending upon clinic radiological and serological findings (Table 2).

3. Infective lesions

Five infective lesions were diagnosed on the biopsy specimen. Three cases were reported as Hydatid disease of lung and two others were reported as aspergillosis. All the cases of hydatid lung were females with mean age of 44 years, minimum age being 32yrs and maximum being 50 years. Aspergillosis was diagnosed in two cases, one male and one female aged 56 and 42 years respectively. One of the cases of small cell carcinoma also showed Hyphae of Aspergillus, however it was counted in malignant group only (Table 2).

Normal histology

Bronchial biopsy with normal histology was reported in 18 cases which included 11 males and 7 females. The male: female ratio was 1.57:1. The minimum age reported was 35years and maximum age reported was 80 years. The mean age for men was 61.81years and for women, it was 58.57(Table 2).
## Table 2: Distribution of Histological Diagnosis By Mean Age And Sex.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Diagnosis</th>
<th>Average age(years)</th>
<th>Males (%)</th>
<th>Females (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCC</td>
<td>62.085</td>
<td>45(24.86)</td>
<td>2(1.10)</td>
<td>47(25.96)</td>
</tr>
<tr>
<td>2</td>
<td>AC</td>
<td>61</td>
<td>10 (5.55)</td>
<td>6(3.31)</td>
<td>16(8.83)</td>
</tr>
<tr>
<td>3</td>
<td>SC</td>
<td>59.47</td>
<td>16 (8.83)</td>
<td>3(1.65)</td>
<td>19(10.4)</td>
</tr>
<tr>
<td>4</td>
<td>Others</td>
<td>58</td>
<td>4 (2.20)</td>
<td>3(1.65)</td>
<td>7 (3.86)</td>
</tr>
<tr>
<td>5</td>
<td>Ch.granulomatous</td>
<td>66.16</td>
<td>1(0.55)</td>
<td>6(3.31)</td>
<td>7(3.86)</td>
</tr>
<tr>
<td>6</td>
<td>Ch.nonspecific inflammation</td>
<td>64.74</td>
<td>42(23.20)</td>
<td>20(11.04)</td>
<td>62(34.25)</td>
</tr>
<tr>
<td>7</td>
<td>Hydatid</td>
<td>44</td>
<td>Nil</td>
<td>3(1.65)</td>
<td>3(1.65)</td>
</tr>
<tr>
<td>8</td>
<td>Aspergillus</td>
<td>49</td>
<td>1(0.55)</td>
<td>1(0.55)</td>
<td>2(1.10)</td>
</tr>
<tr>
<td>9</td>
<td>Normal</td>
<td>60.19</td>
<td>11(6.07)</td>
<td>7(3.86)</td>
<td>18(9.94)</td>
</tr>
</tbody>
</table>

SCC=squamous cell carcinoma, SC=small cell carcinoma, AC= Adenocarcinoma, Ch.=chronic.

## Table 3: Comparative Gender Ratio, Mean Age And Cell Type Of Malignant Tumor In Different Studies.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Authors</th>
<th>Total cases</th>
<th>M:F</th>
<th>Average age (years)</th>
<th>SCC (%)</th>
<th>SC (%)</th>
<th>AC (%)</th>
<th>Others (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sheema et al[14] 2010</td>
<td>783</td>
<td>6.98</td>
<td>57.88</td>
<td>71.2</td>
<td>20.81</td>
<td>4.34</td>
<td>0.54</td>
</tr>
<tr>
<td>2</td>
<td>Mandal et al[16] 2013</td>
<td>454</td>
<td>1.09</td>
<td>49.1</td>
<td>14.8</td>
<td>30.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hajmanoochehri et al[17] 2014</td>
<td>203</td>
<td>4.34</td>
<td>65.7</td>
<td>52.7</td>
<td>13.3</td>
<td>14.8</td>
<td>19.2</td>
</tr>
<tr>
<td>4</td>
<td>Koul et al[15] 2010</td>
<td>462</td>
<td>6.1</td>
<td>57.6</td>
<td>67.5</td>
<td>20.8</td>
<td>3.03</td>
<td>4.7</td>
</tr>
<tr>
<td>5.</td>
<td>Nafae et al[12] 1973</td>
<td>100</td>
<td>All</td>
<td>51</td>
<td>56</td>
<td>20</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Gupta et al[18] 2001</td>
<td>265</td>
<td>7.8</td>
<td>50-70</td>
<td>60</td>
<td>21.5</td>
<td>16.2</td>
<td>2.3</td>
</tr>
<tr>
<td>7.</td>
<td>Elif et al[19] 2013</td>
<td>566</td>
<td>6.16</td>
<td>61.6</td>
<td>46.1</td>
<td>15.7</td>
<td>11.7</td>
<td>14.4</td>
</tr>
<tr>
<td>8.</td>
<td>Present study</td>
<td>89</td>
<td>5.35</td>
<td>60.13</td>
<td>52.80</td>
<td>21.34</td>
<td>17.87</td>
<td>7.86</td>
</tr>
</tbody>
</table>

M:F=male to female ratio, SCC=squamous cell carcinoma, SC= small cell carcinoma, AC= adenocarcinoma

### DISCUSSION

The present study was carried to assess the diagnostic yield of bronchial biopsies in malignant as well as Non-Neoplastic lesions. The indication for biopsy was combination of clinical signs and symptoms along with the lesion on chest X-ray in accordance with approved guidelines of British thoracic society[10]. Bronchoscopy with biopsy helps to resolve the diagnosis in patients with nonspecific symptoms and lesion on chest X-ray[11].

In our study we reported histological diagnosis of malignancy in 89 cases, 74 cases had Non-Neoplastic lesion and 18 cases had normal histology. In a similar study conducted on 16 cases by Okugbo and Ugiagbe[10] in University of Benin teaching hospital, they reported 6 cases with inadequate sample, 4 with lung carcinoma, 3 with chronic inflammatory lesion, 1 with chronic venous congestion, 1 with inflammatory lesion and 1 with normal histology.

In our study we reported histological diagnosis of malignancy in 89 cases, 74 cases had Non-Neoplastic lesion and 18 cases had normal histology. In a similar study conducted on 16 cases by Okugbo and Ugiagbe[10] in university of Benin teaching hospital, they reported 6 cases with inadequate sample, 4 with lung carcinoma, 3 with chronic inflammatory lesion, 1 with chronic venous congestion, 1 with inflammatory lesion and 1 with normal histology.

The Non-Neoplastic lesion included in our study were chronic nonspecific inflammation with 62 cases among which 12 showed squamous metaplasia, chronic granulomatous inflammation with 7 cases, infective pathology with 3 cases of Hydatid disease and 2 cases of Aspergillus. The chronic granulomatous inflammation showed female preponderance with only one out of seven cases reported in male while Hydatid was exclusively reported in females. Aspergillus was reported in two cases included one male and one female. In 18 cases, the biopsy was reported to have normal histology indicating either no disease or non-representative specimen depending upon the bronchoscopic and clinico-radiological profile. On review of literature none of the studies have commented upon role of bronchial biopsy in establishing diagnosis of Non-neoplastic lesions therefore, we did not have any comparison.

The mean age among the malignant lesions was reported to be 60.13 years which is close to the other studies reported from Kashmir as well as India. The sex ratio reported in our study is 5.35:1. Nafae et al[12] and Khan et al [13] from valley showed males being predominantly affected by the disease. Sheema et al[14] and Koul et al[15] reported male to female ratio of 6.98:1 and 6.1:1 respectively. In contrary to it Mandal et al[16] reported male to female ratio of 1.09:1 from northeastern regional cancer centre in India.

The squamous cell carcinoma (52.80%) was common histological type followed by small cell carcinoma (21.34%).
and adenocarcinoma (17.87%). The other’s category comprised of 7.86% cases only. In a study on 783 cases from Kashmir by Sheema et al.[14], squamous cell carcinoma was reported to be commonest (71.26%) followed by small cell carcinoma (20.81%), adenocarcinoma (2.55%) and others (5.53%). Nafae et al.[12] and Khan et al.[13] also showed squamous cell carcinoma to be most common followed by small cell carcinoma and adenocarcinoma.

The gender distribution of histological type showed squamous cell carcinoma to be commonest among males. Only 14 females were reported to have malignant lesions with the commonest malignancy being adenocarcinoma (6/14) followed by small cell carcinoma (3/14), others category (3/14) and squamous cell carcinoma (2/14). In a study by Sheema et al.[14], they reported relatively high frequency of small cell carcinoma and adenocarcinoma in females as compared to males although commonest malignancy was squamous cell carcinoma in both genders.

Many studies have been done to analyse the prevalence and Histopathological spectrum of lung cancer. Table 3 represents the comparative cell type pattern mentioned in different studies.

CONCLUSION

The advantage of present study highlighted the role of diagnosing benign lesions by bronchial biopsy as well as established the histological spectrum of lung malignancy. The main limitation of our study was lack of correlation with bronchoscopic findings which would have permitted us to identify non representative specimen as another category. The study showed that lung carcinoma has male predominance with mean age of 60.13 years. Squamous cell carcinoma is most common histological type in males and adenocarcinoma is common in females.

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