

Original Article-1

A Study on Morphological, Histological and Diagnostic Correlation in Endoscopically Visible Bronchogenic Carcinoma (Baca)

R.PRASAD, S.K.VERMA, C.P.MALL, R.TANDON, P.K.MUKHERJI, P.K. AGARWAL

ABSTRACT

Background : Bronchogenic carcinoma is frequently misdiagnosed or diagnosed late. Endoscopic appearance, cell type and diagnostic success are inter-related features.

Methods : To evaluate the same, 283 bronchoscopic procedures performed in 231 suspected patients of bronchogenic carcinoma (BACA) from August.1995 to August. 1998 were analysed.

Results : Of 158 patients finally diagnosed as BACA, 114 (72.1%) had endoscopically visible lesions. A right side preponderance was found (55.3%). Most of these lesions were located centrally (79.8%). Majority of the lesion were either of infiltrative or had a tumour like morphology (34.2%each), followed by necrotic lesions (15.8%), Compressive (10.5%) and aspecific (5.3%). The most frequent cell type was squamous cell carcinoma (59.6%) followed by small cell carcinoma (19.3%), adenocarcinoma (15.8%), large cell (3.5%) and carcinoma in situ (1.8%). Forceps biopsies were positive in 71.1% cases and brushings in 52.6% cases, combined yield being 78.9%. Squamous cell carcinoma and small cell carcinoma were seen mostly as central and tumour like morphology while adenocarcinoma presented as peripheral and infiltrative lesion. Forceps biopsies were very effective in tumour like lesions (94.9%)

while brushings were more effective in aspecific (83.3%) and infiltrative lesions (56.4%).

Conclusions : Thus visible characteristic and location of lesions at bronchoscopy can help in anticipating the diagnosis and the histology of BACA and can also guide the appropriate diagnostic endoscopic procedures i.e. more forcep biopsies for tumour like lesions, more brush biopsies for infiltrative and aspecific lesions while more number of forcep and brush biopsies both for necrotic and compressive lesions.

INTRODUCTION

Endoscopic examination of the tracheo-bronchial-tree has proven to be a valuable tool in the diagnosis of bronchogenic carcinoma. The introduction of the fiberoptic bronchoscope in the late 1960's further enhanced the diagnostic potential of the examination. Bronchoscopy, visual inspection and collection of specimens for cytohistologic studies have become an essential part of the routine work-up of any patient suspected to have lung cancer. Sackner¹ reviewed the clinical application of flexible bronchoscopy in 1975. Since then, newer applications of the procedure such as trans-bronchial lung biopsy, transbronchial needle aspiration and alveolar lavages have evolved however, biopsies still remain the most commonly used procedures to substantiate a diagnosis of bronchogenic carcinoma. This retrospective study was undertaken to study the correlation between endoscopic morphology, histological classification and diagnostic accuracy in bronchogenic carcinoma.

Department of Pulmonary Medicine & Department of Pathology,
K.G's Medical University, Lucknow.
Correspondence to: RAJENDRA PRASAD,
E-mail: rprasad2@sancharnet.in

MATERIALS AND METHODS

August 1995 to August 1998, 283-fibreoptic bronchoscopies were performed in 231 patients suspected of bronchogenic carcinoma; 158 patients were finally diagnosed to have bronchogenic carcinoma. Among these 158 patients, 114 (72.1%) lesions were endoscopically visible. These were finally analysed and are reported here. Bronchoscopic procedures were performed by the same experienced operator in all the patients. Endobronchial lesions were classified according to Ikeda² and Bucheri,³ into the following categories:¹ Tumour: An endobronchial mass presenting either as an irregular cauliflower like vegetation or as a lobulated fleshy growth.² Necrosis: White necrotic coating of either flat mucosal lesions or frankly polypoid tumours.³ Infiltrations: An irregular area of mucosal surface, often swollen and surrounded by halo of redness and engorgement of blood vessels.⁴ Compression: Any form of extrinsic compression, deformation and narrowing of bronchi, often associated with fixity and reduced motility and with an apparently well preserved mucosa.⁵ Aspecific finding: Localized redness and vessel engorgement without swelling and irregularity of the mucosal layer.⁶ Normal: Absence of localized abnormalities.

The visual inspection and the description of endoscopic findings and their classification was done by the same operator himself in every patient at the time of bronchoscopy. Bronchoscopy was performed via trans-nasal route under topical anaesthesia using Olympus BF-10 Model fibrescope with OES Halogen Light source Olympus CLE-10 in all patients after premedication with atropine. After complete inspection of tracheo-bronchial tree, samples were taken from areas that appeared to be abnormal. Forceps biopsies were performed in all patients. Usually 2-3 biopsy pieces were taken. If the biopsy report was inconclusive, biopsies were repeated. Brush biopsies were also performed in every patient with unsheathed

brush (Olympus). Smears were made by rubbing the brush over the slide in circular motion and fixed in Ethanol fixative. Forceps biopsy specimens were fixed in formalin. Histological and cytological classification was done at the Department of Pathology of K.G. Medical University as per the 1981 UICC classification⁴.

RESULTS

283 bronchoscopic procedures were performed in 231 suspected cases of bronchogenic carcinoma. 158 patients were finally diagnosed as bronchogenic carcinoma, 114 (72.1%) patients had endoscopically visible lesions; of these 114 visible lesions, 55.3% were on right side and 79.8% were centrally located. Tumours and infiltrations were the most common lesions (34.2%) followed by necrotic lesions (15.8%). Squamous cell carcinoma was the most frequent cell type (59.6%) followed by small cell (19.3%) and adeno-carcinoma (15.8%). Large cell carcinoma was diagnosed in 3.5% cases only. Yields of forceps biopsy and brush biopsy were 71.1% and 52.6%, respectively, their combined yield being 78.9% . 86.8% of squamous cell carcinomas and 95.4% of small cell carcinomas were located centrally while 55.6% of adenocarcinoma and 75% of large cell carcinomas had peripheral lesions (Table-1). Tumour-like lesion was the most common morphology in squamous cell carcinoma and small cell carcinoma while infiltrative lesions were the most common in adeno-carcinoma (Table-2). The yield of forceps biopsy was 80.2% in central lesions as compared to 34.8% in peripheral lesions while yield of brush biopsy was 82.6% in peripheral lesions as compared to 45% in central lesions. Yield of forceps biopsy was best (94.9%) in tumour like lesions followed by 83.3% in necrotic lesions, 59.0% in infiltrative lesions, 41.7% in compression and 16.7% in aspecific lesions, while the yield of brush biopsy yield was best in infiltrative lesions and followed by aspecific, tumour, necrosis and compression like lesion (Table-3).

Table-1 HISTOLOGY IN RELATION TO BRONCHIAL LOCATION

HISTOLOGY	CENTRAL	PERIPHERAL
SQUAMOUS CELL CARCINOMA (n=68)	59(86.8%)	9 (13.2%)
SMALL CELL CARCINOMA (n=22)	21(95.4%)	1 (4.6%)
ADENO-CARCINOMA (n=18)	8 (44.4%)	10 (55.6%)
LARGE CELL CARCINOMA(n=4)	1(25.0%)	3(75.0%)
CARCINOMA-IN-SITU(n=2)	2 (100.0%)	0

Table-2 HISTOLOGY IN RELATION TO MORPHOLOGY

HISTOLOGY	INFILTRATION	TUMOUR	NECROSIS	COMPRESSION	ASPECIFIC	TOTAL
SQU. CELL CARCINOMA	19	26	14	6	3	68
SMALL CELL CARCINOMA	5	12	1	2	2	22
ADENOCARCINOMA	13	1	2	1	1	18
LARGE CELL CARCINOMA	0	0	1	3	0	4
CARCINOMA-IN-SITU	2	0	0	0	0	2
TOTAL	39	39	18	12	6	114

**Table-3 DIAGNOSTIC YIELD OF BRONCHOSCOPIC PROCEDURES
IN RELATION TO MORPHOLOGY**

MORPHOLOGY	BIOPSY	BRUSHINGS
INFILTRATION (n=39)	23(59.8%)	22 (56.4%)
TUMOUR (n=39)	37(94.9%)	15(51.3%)
NECROSIS (n=18)	15(83.3%)	9(50.0%)
COMPRESSION (n=12)	5(41.7%)	4 (33.3%)
ASPECIFIC (n=6)	1 (16.7%)	5(83.3%)

DISCUSSION

Fibreoptic bronchoscopy is a useful technique not only for localization & evaluation of tumour but also in assessment of response to treatment and placement of catheters for intraluminal brachytherapy. Endoscopic appearance, cell type and diagnostic success are interrelated features. Each bronchoscopist, using his own experience, can associate particular endo-

bronchial findings to the diagnostic techniques, which has the best potential for success. Ikeda² gave some insight into the relationship existing between bronchoscopic findings, bronchial location and histopathologic classification but not between endoscopic morphology and diagnostic efficacy. Correlation between endoscopic morphology, histopathological classification and diagnostic accuracy has been

quantified in a retrospective study.³ To evaluate this correlation, 158 patients finally diagnosed as bronchogenic carcinoma were studied; of these, 114 (72.1%) had endoscopically visible lesions. Endoscopically visible lesions have been reported in 58-90% of patients with bronchogenic carcinoma.⁵⁻¹⁰ Of the 114 endoscopically visible lesions, 79% were centrally located. Most lesions had tumour or infiltrative morphology followed by necrotic morphology. These findings were in agreement with others.³ Squamous cell carcinoma was the most frequent cell type followed by small cell type and adeno-carcinoma. Squamous cell carcinoma has also been reported as most frequent cell type in some studies.^{3,11,12} While others have reported a high prevalence of adeno-carcinoma.¹³ Squamous cell carcinoma and small cell carcinoma were mostly centrally located and had tumour like morphology while adeno-carcinoma and large cell carcinoma were mostly peripherally located and had infiltrative or compressive morphology. Similar findings were also reported by other workers.^{3,5}

The overall yield of forceps biopsies and brush biopsies were 71% and 52.6%, respectively with a combined yield of 78.9%. The results of forceps biopsy in our series are higher than a study from Nepal where it is 47.61%¹⁴ but lower than those of 83%,⁸ 85.7%,¹² 97%⁷ and 98%¹⁰ in other studies. On correlation of diagnostic yield of forceps and brush biopsies with bronchial location, histological classification and endoscopic morphology, it was observed that forceps biopsies were more productive in central lesions. Similar findings are from American study describing 96% yield for central tumour & 75% yield for peripheral tumour¹⁵ while brush biopsies were more productive in peripheral lesions. Forceps biopsies were more effective in tumour like morphology and less effective in necrotic and infiltrative morphology while brush biopsies were more effective in aspecific and infiltrative morphology. Similar results were also reported by others.³ In another study from America best result with forceps biopsy were obtained when tumour was visible i.e. 85%.¹⁶ Thus it is concluded that visible characteristics and location of lesions at bronchoscopy can help in

anticipating the diagnosis and histological type of bronchogenic carcinoma. It also guides the appropriate diagnostic procedures i.e. more forcep biopsies for tumour like morphology, more brush biopsies for infiltration and aspecific lesions while more number of forceps and brush biopsies for necrotic and compressive lesions.

REFERENCES:

- 1 Sackner M.A. *Bronchofibrescopy. Am. Rev. Respir. Dis.* 1975;111:62-88.
- 2 Ikeda S. *Atlas of Flexible Bronchoscopy. Germany: Georg Thieme Verlag, 1974.*
- 3 Bucheri G, Barberis P, Delfino M.S. *Diagnostic, morphologic and histopathologic correlates in Bronchogenic carcinoma. Chest.* 1991;99:809-814.
- 4 Sobin L.H, Yesner R. *Histologic typing of lung tumours; Geneva: World Health Organisation, 1981.*
- 5 Ikeda S, *Flexible bronchoscopy. Ann. Otol. Rhinol. Laryngol.* 1970;79:916-923.
- 6 Pandey J.N, Sharma S.K, Tandon M, Verma K, Guleria J.S. *Fibreoptic bronchoscopy in the diagnosis of malignant lesions of the lung. A 3 years experience. Ind. J. Chest Dis. Allied Sci.* 1982;24:244-250.
- 7 Zavala D.C. *Diagnostic fibreoptic bronchoscopy techniques and results of biopsy in 600 patients. Chest.* 1975;68,12-19.
- 8 Funahasi A, Browne T.K, Houser W.C, Thanika I.J. *Diagnostic value of bronchial aspirate and post bronchoscopic sputum in fibreoptic bronchoscopy. Chest.* 1979;76:514-517.
- 9 Shure D, Astarita R.W. *Bronchogenic carcinoma presenting as an endobronchial mass: Optimal number of biopsy specimens for diagnosis. Chest.* 1983;865-867.
- 10 Martini M, McCormick P.M. *Assessment of endoscopically visible bronchogenic carcinoma. Chest.* 1978;73, 718-720.
- 11 Jindal S.K, Dhand R, Malik S.K, Dutta B.N, Gupta S.K. *Experience with fibreoptic bronchoscopy in lung cancer. Ind. J. Chest Dis. Allied Sci.* 1982;24,239-243.
- 12 Kulpati D.D.S, Kumar V, Heera H.S, Chauhan M.R. *Role of Flexible fibreoptic bronchoscopy in endoscopically visible bronchogenic carcinoma. Ind. J. Chest Dis. Allied Sci.* 1985;27:207-210.
- 13 Vincent R.G, Pickren J.W, Lane W.W. *The changing histopathology of lung cancer: A review of 1682 cases. Cancer.* 1977;39,1647-54.
- 14 Agarwal A, Ghotekar LH, Garbyal RS, Mittal VP, Chokhani R. *Evaluation of pulmonary malignancies in Kathmandu Velly and role of bronchoscopic technique in diagnosis of such cases. J Ind. Acad Clini Med* 2003;4:127-133
- 15 Popovich J Jr, Kvale PA, Eichenhorn MS, Radke JR, Ohorodnik LM, Fine G. *Diagnostic accuracy of multiple biopsies from flexible fibreoptic bronchoscopy. A comparison of central versus peripheral carcinoma. Am Rev Respir Dis.* 1982;125:521-3.
- 16 Lundgren R, Bergman F, Angstrom T. *Comparison of transbronchial fine needle aspiration biopsy, aspiration of bronchial secretion, bronchial washing, brush biopsy and forcep biopsy in the diagnosis of lung cancer. Eur J Respir Dis* 1983,64:378-385.

