# 405 CASES OF BRONCHIAL BRUSHING CYTOLOGY: AN EVALUATION

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## SUMMARY

**405 cases of bronchial brushing cytology were evaluated for its effectiveness in detecting pulmonary carcinoma. Cytohistologic findings were correlated whenever endoscopic biopsies were performed. Sputum cytological investigations were also included in this paper to examine the total diagnostic sensitivity of all the three methods combined.**

## INTRODUCTION

The value of bronchial brushing cytology in establishing the diagnosis of pulmonary carcinoma has received worldwide acceptance in the last decade, especially in the more developed nations.

In Malaysia, very few papers have been published that deal specifically with the usefulness of this method. Furthermore, only a handful of chest physicians and thoraxic surgeons are exposed to pulmonary diagnostic cytology which has the qualities of greater sensitivity, marked simplicity and a high degree of accuracy.

The purpose of this study was to demonstrate that bronchial brushing cytology can offer valuable information in the diagnosis and typing of a majority of primary carcinomas.

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## MATERIALS AND METHOD

The investigation was carried out on 405 patients who were admitted to this institution between 1980 and 1984. All of these patients underwent bronchoscopic investigations for various pulmonary disorders. The ages of the patients varied from 17–83 years with a median of 57.9; 305 were males (75.3%) and 100 females (24.7%). Racial distributions were 139 Malays (34.3%), 225 Chinese (55.6%), and 41 Indians and others (10.1%). This also reflects the same racial hospital admission ratio.

The bronchoscopic examination was performed with a flexible fiberoptic bronchoscope introduced by nasal or oral route without fluoroscopic control. Brushing cellular samples obtained were smeared on clean glass slides and fixed immediately in 95% ethanol for staining by the Papanicolaou method.

The histologic correlation studies consisted of an endoscopic biopsy in 206 cases.

The sputum of 177 patients were also examined. A total of 330 sputa were screened. The number of sputum specimens for each patient varied from one to three. The sputum was obtained before and after bronchoscopy. Two smears were prepared directly from fresh, deep-cough sputum samples, fixed in 95% ethanol and stained by Papanicolaou method.

## RESULTS

### Sensitivity for malignancy

The overall sensitivity of the method was 0.37. This was based on the findings of 150 positive brushings out of a total 405. 35 brushings were reported as inconclusive and showed only atypical cells. There were 207 negative brushings and the remaining 13 were found to be unsatisfactory.

However, the addition of sputum cytology enhanced the sensitivity slightly from 0.37 to 0.39 because of the finding of eight positive sputa among 89 cases with negative brushing samples. There were 55 positive sputa from the total 330. 17 sputa were inconclusive and 165 negative. It must be noted that as many as 93 sputa (28%) were recognised as watery saliva which were unsatisfactory. Because of this, the sputum diagnostic sensitivity was very much reduced.

### Cytologic typing accuracy

The overall cytologic typing accuracy evaluated on 62 cases was 0.79 (Table I). It was 0.88 for squamous cell carcinoma (41 cases); 0.91 for small cell carcinoma (11 cases); 0.25 for large cell carcinoma (four cases).

To evaluate the diagnostic practicability of bronchial brushing cytology, all positive brushing cases which showed presence of malignant cells were counter-checked with histology tissue reports. Out of the 102 positive brushing cases, 34 (33%) were diagnosed either negative or unsatisfactory histologically.

On the other hand, out of the total 84 cases of biopsies that showed malignancy histologically, 11 cases (13%) were reported negative or unsatisfactory by the brushing cytology method.

There were only two cases of adenocarcinoma encountered in the investigation. One was diagnosed in the brushing samples but was not biopsied. The other was detected in the tissue samples but was not recognised in the brushing smears.

Our evaluation of the final diagnostic sensitivity of all the three methods combined (sputum, brushing, biopsy) indicated an improvement. There were 170 total positive cases, raising the overall sensitivity to 0.42.

**TABLE I**
**CYTO-HISTOLOGIC CORRELATION IN 62 CASES OF POSITIVE BRUSHINGS**

| | Cytologic Diagnoses | | | | |
|---|---|---|---|---|---|
| **Histologic diagnosis** | **Squamous cell carcinoma** | **Small cell carcinoma** | **Large cell carcinoma** | **Non-specific** | **Total** |
| Squamous cell carcinoma | 36 (0.88) | 2 | 3 | – | 41 |
| Small cell carcinoma | 1 | 10 (0.91) | – | – | 11 |
| Large cell carcinoma | 1 | 2 | 1 (0.25) | – | 4 |
| Non-specific | 4 | – | – | 2 | 6 |
| Total | 42 | 14 | 4 | 2 | 62 |

Numbers in parenthesis refer to %.

## DISCUSSION

Our overall sensitivity figure of 0.37 fell below the range (0.55 to 0.87) reported from several other series.[1–4]

It is important, however, to note that we have included 28 cases of younger patients less than 35 years and an indefinite group without any visible lesions. In this series, one fungal infection, three with pulmonary tuberculosis and many non-malignant cases were also included. Another factor to be considered is that the majority of the bronchial brushing cytology investigations reported did include cellular sampling under fluoroscopic control[1,2,5,6]

In our present investigation, 11 cases had repeated bronchial brushing. There was an increase in diagnostic accuracy as malignancy was detected in three of these cases only in the repeat attempts.

The cytologic typing accuracy was similar as compared with the data reported in the literature which range from 0.70 to 0.85.[1,4] The figures for squamous cell carcinoma and small cell carcinoma are better than those reported in the literature which range from 0.78 to 0.83 and from 0.64 to 0.80 respectively.[4,7]

The usefulness of bronchial brushing cytology is clearly demonstrated by the data with particular emphasis on visible lesions at bronchoscopy It has also been confirmed that the combined usage of sputum cytology, bronchial brushing cytology and endoscopic biopsy greatly improve the overall diagnostic sensitivity.

Our sputum cytology findings reflected a rather large volume of saliva specimens being collected instead of the processable mucus (28%). This can be improved upon by better supervision whilst collecting specimens. The number of sputum smears prepared could also be increased from two to four smears allowing better diagnostic opportunities.

In our experience, there was no major discomfort or distressing complications encountered by our patients. Bronchial brushing cytology has strengthened our conviction that it is an inexpensive, quick and safe procedure that could be performed and repeated in an out-patient clinic.

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