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Malignant Cells in Sputum

The examination of sputum smears for malignant cells was introduced in more or less its present form by L. S. Dudgeon and C. H. Wrigley[1] in the mid-1930s. It has become a widespread and generally reliable diagnostic method.

As well as establishing a diagnosis of carcinoma of the lung the cytologist can also identify the histological type. The degree of reliability achieved in centres maintaining high standards can be seen in a report by N. C. Oswald and colleagues[2] from St. Bartholomew's and the Brompton Hospital, covering 2,545 cases of lung cancer. Specimens were reported either to contain malignant cells or not, without any "suspicious" category to confuse the figures. Malignant cells were found in the first specimen examined in 41% of cases of carcinoma of the lung, and with each additional specimen there was an increment of successful diagnoses. Because one does not continue looking for something after it has been found, tables relating positive results to the number of examinations are artificial, but in this and other series it appears that three specimens of sputum (not saliva) will disclose or confirm the diagnosis in two cases out of three. False positives in this series did not exceed 0·7% of all positive reports, and since some of these may turn out to have cancer on longer follow-up the figure could be still lower. Malignant cells are often demonstrable in cases with small lesions and from peripheral as well as central tumours. In this series 48% of cases with peripheral tumours were given positive reports.

Oswald and colleagues emphasize the importance of examining the sputum in confirming the diagnosis in inoperable cases, so that further tiresome or painful investigations can be avoided. This is in fact the most important achievement of the method, since in the whole series there were only three radiologically invisible carcinomas, and we are not told how long the patients survived without recurrence.

By analogy with carcinoma of the cervix uteri it might be supposed that screening, at least of the smoking population, would show many cases of carcinoma in situ of the bronchus. When O. Auerbach and his colleagues[3] reported that a careful postmortem study of the bronchi showed carcinoma in situ in 74% of people who smoked at least one package daily, it looked as if the search for this lesion might produce embarrassingly large returns. This has not happened. Genuine bronchial carcinoma in situ is now usually thought to be very much rarer than the changes they recorded, and attempts at screening have produced low yields. In a Veterans' Administration study,[4] six-monthly screening over a three-year period of 14,067 men by radiography and sputum examination disclosed 73 patients with bronchial carcinoma, but none were still alive five years after treatment. A smaller Chicago study[5] on 3,123 heavy smokers and 955 non-smokers is perhaps more encouraging. It resulted in the discovery of two cases of squamous carcinoma in situ which were removed by lobectomy, but no follow-up had been done at the time of publication.

In population screening for cervical lesions the various "preinvasive" states greatly outnumber unsuspected invasive cancers in previously unscreened persons, supposedly because of the much longer duration of the former. If carcinoma in situ preceded carcinoma of the bronchus by a number of years, the majority of positive sputum reports ought to be apparently false, and only declare themselves correct some years later after the disease has become invasive. Cases of that sort turn up in any large series, and have been published in twos and threes, along with cases in which the early lesion was successfully identified and removed.[6 7] But they are a minute proportion of the whole, and it seems probable that squamous carcinoma of the bronchus is generally preceded not by a prolonged stage of carcinoma in situ analogous to that of the cervix uteri but rather by squamous metaplasia, which would be too common and anatomically widespread for resection to be feasible.[8]

The examination of sputum smears is laborious, and they require skilled interpretation. At present it takes about 45 minutes per "negative" case. Even if automation becomes possible, population screening seems likely to be uneconomic. The large outlay would be better spent on prevention, since the commonest form of this disease is almost confined to people who deliberately inhale the carcinogen. Cytological examination of sputum will remain as a valuable, and sometimes indispensable, diagnostic method for use on patients who are already under investigation for lung cancer.

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