

tened wire loop. A few minutes are allowed for the serum to be partially absorbed by the agar. The agar with its layer of serum is then inoculated and incubated at 37° C. (98.6° F.) for from 7 to 9 hours. Four cubic centimeter of isotonic sodium chloride is added to the agar, and—by means of a rotary motion of a flattened wire loop—the growth is separated from the agar and mixed into the saline solution, the larger clumps of growth being broken up in this process. The mixture is filtered through cotton cloth, after which a measured amount is placed in a vaccine bottle. Sufficient 5% phenol is added to make a 0.5% phenol concentration in the final product. The vaccine is used as soon after preparation as possible.

As to specific methods of cancer immunization, the skin has always played an eminent role, according to Ulenhut and Seiffert (1925). Cancer immunity is not a serologic but a cellular phenomenon.⁵ The

vaccine is given intradermally as superficially as possible, never under the skin, at weekly intervals, at first in doses of 0.01 to 0.02 cc. which are increased to 0.05 cc. or more.

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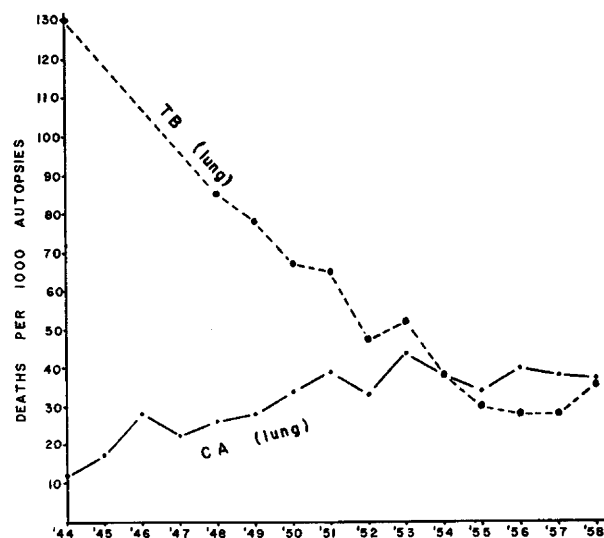
One Factor in Increase of Bronchial Carcinoma

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IT IS WELL established by clinical studies and by postmortem findings that the incidence of bronchial carcinoma has increased sharply in recent years. Many theories have been advanced to account for this increase. Doll¹ summarized possible etiological factors in 1953 for England, which included atmospheric pollution, after-effects of influenza, and smoking. Burney² has recently enlarged on the subjected influence of smoking. The relative merits of any of the theories being discussed in this paper are only to present some data from autopsies during the last 15 years from the Pathological Institute of the University of Graz. About 2,000 autopsies are done each year from the province of Steirmark, population about 1,500,000. All ages and classes of people are represented, and, likewise, all diseases.

The data were taken from 26,546 autopsies done from 1944 through 1958. The same increase in lung cancer was found as reported from other areas. In 1944, 22 cases of bronchial carcinoma were found in 1,820 post mortem examinations, while in 1959 83 cases were found in 2,249 autopsies. The largest number occurred in 1956, when 91 cases were revealed in 2,229 autopsies. The number of bronchial carcinomas for each year is represented in the figure.

During this interval of 15 years, mortality from tuberculosis also showed some remarkable changes. In 1944 the 1,820 autopsies included 236 deaths



Decline in deaths from tuberculosis accompanying increase in deaths from bronchogenic carcinoma.

from tuberculosis, as illustrated by the broken line in the figure. The rapid decrease during the war years was due to death removing the susceptible population as a result of war conditions. A more gradual decrease occurred from 1948 to 1955, probably as a result of improved methods of treatment. Hence, in 1955, out of 1,965 autopsies, tuberculosis caused only 58 deaths. In this same year, for the first time more deaths were recorded from cancer of the lung than from tuberculosis. The same was

From the Pathological Institute, University of Graz.

true for the succeeding years. This does not necessarily mean, however, that more deaths occur from cancer of the lung than from tuberculosis, as persons with tuberculosis might not be hospitalized and, hence, would not come to autopsy. The figure shows that a great reduction in tuberculosis is occurring in Graz, as elsewhere.

Two other important changes took place during the 15-year interval. First of all, the average age of patients who died from tuberculosis was increasing. In 1944, the average age at death was 38 years, while in 1957 it was 54 years. In other words, the tubercular patient was approaching the "cancer age" before death. The second change was the frequent association of tuberculosis with a malignancy. For many years it has been known that malignancies are not common in patients with tuberculosis. In 1946, for the first time, tuberculosis appeared in 7 of 52 patients with bronchial carcinoma. In each year thereafter, the two diseases were associated. Figures are not available for all the years, but in 1948 apparently the peak was reached, when 21% of the patients with bronchiogenic carcinomas had associated tuberculosis. Apparently, as the incidence of tuberculosis decreases, there is less likelihood of the association of the two diseases.

The question immediately arises whether there has been an association of other malignancies with tuberculosis, as the tubercular age rose. Our data did not bear this out. Cancer of the stomach was more frequent than any malignancy over the 15-year period studied. In 1947 only two cases of tuberculosis were found in 68 patients with cancer of the stomach, an occurrence of 3%. During the peak years of tuberculosis, one finds an occasional case of malignancy from various organs, but they are unusual. This is not due to a lack of age in the tubercular group, since several malignancies such as leukemia and cancer of the uterus are frequent at early ages.

If other institutions with a large number of autopsies can confirm our observation, it appears that there are two diseases competing for the same person: tuberculosis at an early age and bronchogenic carcinoma as he grows older. At least three factors seem important in the detection of the association: (1) a high incidence of tuberculosis at a relatively advanced age, (2) a high

incidence of bronchogenic carcinoma, and (3) routine autopsy on a large population. It should be expected that countries with a high incidence of tuberculosis would have a low incidence of bronchogenic carcinoma and vice versa, unless other factors are present.

Our data indicate that a large increase in bronchogenic cancer can be expected as the death rate from tuberculosis decreases. At the turn of the century, the United States had about 200 deaths per 100,000 from tuberculosis. If the same proportion of the population is susceptible to tuberculosis today, and if 20% of this same population is susceptible to bronchogenic carcinoma, then 40 per 100,000 might succumb to lung cancer when tuberculosis is eradicated. This, of course, is conjecture, but it illustrates that a further increase in bronchogenic carcinoma may be expected. In order to make this preliminary report brief and to the point, details of observations on the 868 cases of bronchogenic carcinoma and further discussion will be presented in a later publication.

Summary

A review of 26,546 autopsies revealed 868 cases of bronchogenic carcinoma. Since the advent of chemotherapy, patients with tuberculosis are living long enough to develop cancer. Apparently cancer of the lung is far more prevalent than other malignancies in deaths from tuberculosis. The data suggest that one factor in the increase of bronchogenic carcinoma is that persons who previously would have died from tuberculosis are alive today.

Addendum

After this paper was completed for publication Dr. Alf Westergren³ found 100 cases of primary pulmonary cancer in which one-third of the patients had an associated pulmonary tuberculosis.

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GALEN IN ROME.—Galen was hardly thirty years of age when he came to Rome, but he soon rose in the esteem and affection of the patricians. He obtained favour with the Consul Boethus, the Praetor Sergius Paulus and even the Emperor Severus. But, as we have already said, cruel experiences awaited him. His great superiority as a man, as well as his good fortune, made him many enemies among his colleagues, who misrepresented and libelled him. At last, after long struggling courageously against his detractors, and full of bitterness, he set out again on his travels.—C. G. Cumston: *Introduction to History of Medicine: From Time of Pharaohs to End of Eighteenth Century*, New York, Alfred A. Knopf, 1926.