Lung Cancer in Greenland — Selected Epidemiological, Pathological, and Clinical Aspects*

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Summary. One hundred and seven cases of lung cancer were first diagnosed among indigenous Greenlanders during the 25 years from 1955 to 1979. Compared with the Danish population, relative risk of lung cancer among male Greenlanders increased from 0.4 in 1955–1959 to 1.1 in 1975–1979. Relative risk among women increased from 0.7 to 2.1. The age-adjusted rate for women during the period 1975–1979 is one of the highest on record. This increase in lung-cancer risk followed a sharp rise in the use of cigarettes in the general population. An association with cigarette consumption was also suggested by tumor histology and location. A synergistic role of other risk hazards is possible. Local factors arising from previous tuberculosis involvement may have favored lung cancer development in men. More than 2/3 of the cases of lung cancer diagnosed between 1955 and 1974 were brought to medical attention because of clinical symptoms although most of the population was screened annually or biannually for tuberculosis. Intervention through screening had little impact on the overall very low survival rate.

Key words: Lung cancer — Epidemiology — Eskimo — Greenland

Introduction

International comparisons of incidence, sex ratio, and time trend of lung cancer show wide variations. In most countries, the epidemiology of this cancer reflects the epidemiology of smoking, including the interaction of smoking habits with different occupational exposures (Frank 1978; Hoover 1978; Wynder and Hecht 1976). However, there are some racial and ethnic differences that appear to form

* This work has been supported by Sygekassernes Helsefond (Grant no. H 11/51–76) and by Michaelsen Fonden

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0171-5216/82/0104/0295/$2.20
exceptions to this general rule and that may be indicative of a genetically determined susceptibility or response to nontraditional exposure. Chinese women in Singapore and Hong Kong exhibit a very high incidence of lung cancer with high rates of adenocarcinoma apparently unrelated to smoking (Chan and MacLennan 1977; Law et al. 1976; MacLennan et al. 1977). These findings are consistent with reports of high lung-cancer risk among Chinese in California, Hawaii, and in all the United States (Arellano et al. 1972; Fraumeni and Mason 1974).

The general pattern of malignant diseases in these Chinese populations shows certain similarities to the cancer profile reported among indigenous Greenlanders (Nielsen et al. 1977, 1979; Nielsen and Hansen 1979). Thus, it seemed of interest to elucidate the occurrence of lung cancer in Greenland, which up till now had not been studied. This paper presents epidemiological, pathological, and clinical features of this particular cancer diagnosed among indigenous Greenlanders during the 25-year period from 1955 to 1979.

Material and Methods

The population of indigenous Greenlanders, the world's largest population of Eskimo descent, increased from 25,000 in 1955 to 41,000 in 1979. The population structure and health services have been described in previous publications (Nielsen et al. 1977, 1978). Greenland is divided into 16 medical districts, each with a small hospital. In addition, Dronning Ingrids Hospital is a central referral facility where lung resection as a treatment for cancer has been carried out since 1960.

This study formed part of an investigation of the total cancer occurrence based on records of all inpatients and outpatients treated at Greenland hospitals and at referral hospitals in Denmark prior to 1975. Lung cancers were defined as those with International Classification of Disease numbers 162 and 163 (7th revision). Records of patients with lung cancer first diagnosed between 1955 and 1974 were examined for medical and demographic information. Information on lung cancers diagnosed during the last 5 years of the study period from 1975 to 1979, was obtained from pathology reports, files at the Danish Cancer Registry, and records at Dronning Ingrids Hospital. In a few cases, supplementary information was obtained from district hospitals.

The Danish Ministry for Greenland's Statistical Office supplied vital statistical data. An expected number of lung cancers was calculated for each 5-year period by applying sex-specific and age-specific incidence rates from Denmark (Clemmesen 1965, 1969, 1974, 1977) to the Greenland population. The deviation of observed-to-expected ratios was tested for statistical significance (Bailar and Ederer 1964). Age-specific rates and incidence rates age-adjusted to the "world population" (Doll 1976) were calculated for the three periods 1955 – 1964, 1965 – 1974, and 1975 – 1979.

All cases histologically verified between 1960 and 1979 were reexamined and reclassified according to the criteria of WHO (Kreyberg et al. 1967). Histological material was not available prior to 1960. Reclassification of the only two microscopically confirmed cases from that period had to be based on detailed descriptions in the pathology reports.

Data on tumor spread at the time of diagnosis was sufficiently detailed to allow staging into two categories with reasonable certainty: (1) regional disease with tumor located in one lung and maximum spread to mediastinal, hilar, and bilateral supraclavicular lymph nodes, and (2) advanced disease with distant metastases beyond these regions.

One-year and 5-year survival rates, based on follow-up to January 1, 1980, were calculated for patients with cancer diagnosed between 1955 and 1974. Survival was measured from the date either of the first X-ray film or the microscope sample on which cancer was recognized.

Because of the somewhat limited material used for information in cases diagnosed between 1975 and 1979, histories of previous pulmonary tuberculosis and smoking habits were analyzed only from 1955 to 1974. A history of previous pulmonary tuberculosis was accepted when the original diagnosis was based on (1) positive results of bacterial culture, (2) roentgenological findings without bacterial verification that responded well to specific antituberculous medication, (3) "healed" changes evidenced on the first X-ray in the form of inactive fibrotic lesions with characteristic appearance and localization.