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Increased but low incidence and poor survival of malignant mesothelioma in the southeastern part of The Netherlands since 1970: a population-based study

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Changes in the incidence and survival rates for malignant mesothelioma in the southeastern part of The Netherlands since 1970 were investigated, using data from the Eindhoven Cancer Registry (ECR). The exposure to asbestos in this area is presumed to be limited. Most of the mesotheliomas occurred in the pleura, where there were 119 (88%) against 15 (11%) in the peritoneum and two in the tunica vaginalis testis. Compared to other European countries, the incidence rate for the southeastern part of The Netherlands was fairly low in the second half of the 1980s. Between 1975 and 1994 the age-adjusted incidence rates (ESR) for pleural mesothelioma increased twofold (from 10 to 19 per one million person-years among men and from 2.4 to 3.8 among women). The rate for peritoneal mesothelioma remained constant. The overall relative 0.5-, 1-, and 3-year survival rates remained 68, 42, and 8%, respectively. The fourfold higher incidence rate for men compared with women reflects the fact that mesothelioma is mainly an occupational disease. In view of presumed limited exposure to asbestos and small geographical variation, the incidence of mesothelioma in the southeastern part of The Netherlands will probably remain low, despite an increase in the past decades.

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Key words: Cancer registry, incidence, malignant mesothelioma, survival.

Introduction

Malignant mesothelioma represents only 0.5% of all cancers in The Netherlands, but mortality has increased markedly since 1970 (Meijers *et al.*, 1990). The major risk factor is exposure to asbestos, the association was first noted in 1960 in South Africa (Wagner *et al.*, 1960) and confirmed in The Netherlands in 1971 (Stumphius, 1971). The latency time is usually 30–40 years (Woitowitz and Grossgarten, 1991). Changes in the incidence and survival rates for malignant mesothelioma since 1970 in the southeastern part of The Netherlands, an area with presumably limited exposure to asbestos, were investigated.

Patients and methods

Data of the Eindhoven Cancer Registry, which has collected data on patients with newly diagnosed

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cancer in the southeastern part of The Netherlands since 1955, were used. The registry covers a large part of the southeastern area of the Dutch province of North Brabant since 1960 and this complete area together with the northern part of the adjacent province of Limburg since 1970. It now has a population of almost one million inhabitants and is characterized by good access to specialized medical care provided in eight large community hospitals. Only since the 1960s has mesothelioma been considered a separate morphological entity. About 60% of all histological specimens of (suspected) mesothelioma have been reviewed by two or three experts of The Netherlands Mesothelioma Panel since 1969. Age-specific (according to 15-year age groups) and age-adjusted (ESR: European Standardized Rate) incidence rates were computed per one million person-years, according to sex, tumour site and 5-year periods of diagnosis. The ESR for the southeastern part of The Netherlands was compared to that found in other European areas using data from the European Cancer Incidence and Mortality (EUROCIM) database.

There was a combination of passive and active follow-up of all patients diagnosed up to 31 December 1992. The latest follow-up to determine vital status by the municipal population administrations occurred on 1 April 1994. Relative survival was calculated as the ratio of observed to expected actuarial rates. Expected survival rates were calculated from life tables for regional male and female populations (supplied by Statistics Netherlands) compiled according to 5-year age groups and year of diagnosis. The risk of death due to lung cancer was estimated using a program from the Finnish Cancer Registry (Hakulinen and Abeywickrama, 1985). The standard errors of survival rates were calculated according to Greenwood's (1926) formula. Patients who were diagnosed at autopsy or died within the first month of diagnosis were excluded from the survival analysis ($n = 6$; 5%).

Results

Between 1970 and 1994 136 patients with malignant mesothelioma were diagnosed: 108 (79%) men and 28 (21%) women. Most of the mesotheliomas occurred in the pleura ($n = 119$, 88%) vs 15 (11%) in the peritoneum and two in the tunica vaginalis testis. The incidence rates for malignant pleural mesothelioma have increased twofold since 1975, while those for peritoneal mesothelioma have remained constant (Table 1). Compared to other European cancer registries, the incidence of mesothelioma in the southeastern part of The Netherlands in the late 1980s was fairly low (Figure 1). The incidence rates for mesothelioma in Rotterdam (the southwestern part of The Netherlands, including Walcheren Island), western Scotland and Hamburg (the northern part of Germany) was extremely high.

Table 1. Trends in age-specific and age-adjusted (ESR) incidence, per one million person-years

Period	*n*	Age (years) 30–44	45–59	60–74	75+	Pleural ESR	*Peritoneal ESR*
Men							
1970–74	6	–	7	26	–	2.9	*1.5*
1975–79	17	–	24	44	99	10.2	–
1980–84	14	5	10	49	–	6.8	*0.6*
1985–89	26	7	31	35	46	11.2	*1.5*
1990–94	45	2	37	84	143	19.3	*2.0*
Women							
1970–74	1	–	–	–	–	–	*0.9*
1975–79	1	2	–	–	–	0.5	–
1980–84	6	4	5	–	12	2.4	*0.5*
1985–89	8	2	5	7	25	3.3	–
1990–94	12	2	7	27	8	3.8	*0.1*

Survival rates for mesothelioma were poor. Six patients (5%) were diagnosed at autopsy or died within one month of diagnosis. Between 1970 and 1992 the overall relative 0.5-, 1- and 3-year survival rates remained constant at 68%, 42% and 8%, respectively. There was no significant difference between men and women. Survival for peritoneal mesothelioma (79% alive at 1 year, standard error 28%) seemed better than for pleural mesothelioma (38% alive at 1 year, standard error 10%).

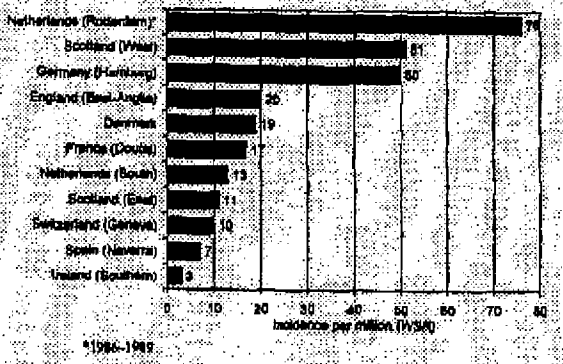

Figure 1. Age-standardized incidence rates (ESR) for mesothelioma in Europe (1985–89, males).

Discussion

Whereas incidence of mesothelioma increased twofold, about one in every 40 patients with cancer of the lower respiratory tract in the southeastern part of The Netherlands has a mesothelioma nowadays, compared to one out of every 120 patients in the 1970s. A small part of this proportional increase can be explained by the decreasing incidence of lung cancer among men since the mid-1980s (Janssen-Heijnen *et al.*, 1995). Initial misdiagnosis of mesothelioma may have been common and was probably attributable to misclassification of adenocarcinoma of the lung, breast, ovary, stomach, kidney, or prostate that can metastazise to the pleura (Walz and Koch, 1990). Peritoneal mesotheliomas can be confused with adenocarcinomas arising from any abdominal organ. Nonetheless, it is not likely that diagnostic trends explain the recent increase in recorded rates to any large extent, because the experts of The Netherlands Mesothelioma Panel reviewed a large proportion (± 60%) of the histological specimens of (suspected) mesotheliomas collected since 1969. About 15% of all reviewed specimens could not be classified as a malignant mesothelioma. The incidence of mesothelioma in the southeastern part of The Netherlands was fairly low compared to other European cancer registries, presumably because of the limited exposure to asbestos. Although low, the incidence rates for pleural mesothelioma for men (especially elderly men) have increased twofold since 1975. This might be explained by possible migration of men who were exposed to asbestos while employed in the shipbuilding industry from the southwestern to the southeastern part of The Netherlands. The extent of this migration is unknown.

The very high incidence rates for the southwestern part of The Netherlands – which includes the Walcheren Island and the Rijnmond shipbuilding area (Damhuis and van Gelder, 1993), western Scotland and the northern part of Germany, probably reflect the high exposure to asbestos due to shipbuilding. The high incidence of mesothelioma in Western Australia (almost 30 per million) is attributed to the crocidolite mine at Wittenoom (Leigh *et al.*, 1991). Asbestos remains the predominant cause of pleural, peritoneal, and probably epididymal mesothelioma (McDonald and McDonald, 1978; Muscat and Wynder, 1991; Iwatsubo *et al.*, 1998), although this association was stronger for pleural mesothelioma (Spirtas *et al.*, 1994). After legal measures to prevent or reduce exposure to asbestos were introduced in The Netherlands, unfortunately not until 1977, the import of asbestos decreased dramatically. Given the mean latency time of 30–40 years, incidence rates for malignant mesothelioma among Dutch men will probably increase until 2015–2020 (Burdorf *et al.*, 1997). The peak in incidence rates of malignant mesothelioma among men is expected to be reached before the year 2000 in the USA (Price, 1997), whereas this would be 2020 in Britain (Peto *et al.*, 1995).

Between 1970 and 1992 the prognosis for patients with mesothelioma remained poor, being similar to the southwestern part of The Netherlands, the USA and Canada (Ribak and Selikoff, 1992; Van Gelder *et al.*, 1994).

We conclude that in view of the presumably limited exposure to asbestos, the incidence of mesothelioma in the southeastern part of The Netherlands will probably remain low, despite the increase in the past few decades.

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