

Polypropylene production workers and colorectal cancer in Germany: a brief report

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Abstract

Objective—A retrospective cohort study of 640 male polypropylene production workers in Germany was performed to evaluate the reported association between colorectal cancer and polypropylene.

Method—The follow up period was 1956 to 1990. Expected numbers of cancers were derived from incidence rates adjusted for age and calendar year from the Saarland cancer registry.

Results—Three colorectal cancers were identified compared with 4.0 expected (standardised incidence ratio (SIR) = 0.75, 95% confidence interval (95% CI): 0.15–2.19). For total cancers there were 27 cases in the cohort compared with 35.4 expected (SIR = 0.76, 95% CI: 0.50–1.11).

Discussion—These results do not support earlier reports of a link between polypropylene production and colorectal cancer, but are consistent with a number of recent investigations of polypropylene production workers that have reported no association with risk of colorectal cancer. Due to the small size of this and other similar studies, however, a small to moderate increase in risk cannot be ruled out.

(*Occup Environ Med* 1994;51:784–785)

Keywords: polypropylene, colorectal neoplasms, cancer

An excess of colorectal cancer has been reported among polypropylene production workers in the United States¹ and among Canadian carpet plant workers who used polypropylene in the production of synthetic fibres.² To evaluate whether an association between polypropylene and an increased risk of colorectal cancer exists, we examined workers employed in the manufacture of polypropylene in Germany.

Materials and methods

The cohort was defined as any person employed in the company's polypropylene production units for at least six months. Production of polypropylene began in 1956. Workers were followed up for incidence of cancer to 1990. Cancer incidence among the employees (including retired workers) was ascertained through a postal questionnaire

with telephone follow up. All reports of cancer were then verified by contacting the employee's physician. Rates from the Saarland tumor registry were used to calculate the expected number of cancers.³ This registry dates back to 1967, with less complete registration for the early years. Consequently, rates for the years 1971 to 1990 were used to calculate expected numbers of cancers. Five year rates adjusted for age and calendar year were used. Rates for 1971 to 1975 were used for estimation of expected cases for the period 1956 to 1970. A standardised incidence ratio (SIR), a ratio of observed to expected cases of cancer, and 95% confidence intervals (95% CI) were calculated to estimate risk.⁴ Person-years for each worker were calculated from start of work until retirement, discharge, death, or 31 December 1990.

Results

We identified 640 workers employed in the 10 polypropylene production units during the years 1956 to 1990. Of the 640 male employees, 58 were lost to follow up, of which 41 were originally from countries outside Germany. The 640 workers contributed 9112 person-years of observation. The average duration of follow up was 16 years. For all cancers combined we observed 27 cases over the study period compared with 35.4 expected (SIR = 0.76; 95% CI = 0.50–1.11). Three colorectal cancers were identified among the employees. They started employment in 1955, 1968, and 1971, and worked for 24, 22, and 23 years, respectively. All were histologically confirmed adenocarcinomas. The expected number of colorectal cancers for this cohort was 4.0 (SIR = 0.75; 95% CI = 0.15–2.19). The remaining 24 cases of cancer were distributed over numerous cancer sites, most with only one or two observed cases for most International Classification of Diseases codes.

Discussion

Although based on few observations, we found no relation between polypropylene and colorectal cancer or total cancers. Risk ratios were below unity for both colorectal cancer (SIR = 0.75) and total cancers (SIR = 0.76). Our findings do not support the original studies that led to the concern about polypropylene,^{1,2} but are consistent with an earlier report from the United States⁵ and with recent updates of the initial studies in which no continuation of risk was found after the

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Accepted 18 July 1994

occurrence of the original cluster of cases.^{6,7} In fact, further study of the Canadian carpet workers has raised doubts about whether some of the earlier workers with colorectal cancer were exposed to polypropylene.⁷ New studies of polypropylene production workers in Australia^{8,9} and the United Kingdom¹⁰ also report no association. Many of these studies, including our own, have limited statistical power, hence a small to moderate excess risk cannot be excluded. If this hypothesis were examined again in a future study, the cohort should be large and the follow up period long to ensure sufficient statistical power to detect a small increase in risk.

In summary, we found no increase in risk of colorectal cancer among German polypropylene production workers. This is consistent with a number of other recent studies that taken together argue against a causal relation between this polymer and colorectal cancer.

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