Scand J Work Environ Health 1989;15:440—442

Mesothelioma among Swiss furniture workers

Drs Minder and Vader (1) have shown, on the basis of Swiss mortality data, that furniture workers are a high-risk group for pleural mesothelioma. An increased risk for this occupation had already been suggested by the incidence statistics from Connecticut (2) and Denmark (3). The paper by Drs Minder and Vader is based mainly on information taken from death certificates, namely, the coded data on occupation and the diagnosis of underlying cause of death. From our experience, we would like to add some qualifications.

Occupational titles are not sufficient for proving the presence or absence of exposure. A detailed occupational history is essential, especially with a tumor like mesothelioma, whose latency after first exposure to asbestos generally exceeds two to four decades. Occupational information on death certificates is often not representative for occupations held earlier in life. Even the titles of earlier occupations may not reveal former exposures met at the workplace or during leisure activities.

The Zürich Group for Research on Pneumoconiosis has accumulated a series of 160 carefully investigated cases of pleural mesothelioma (4). In this series, the diagnosis of mesothelioma has always been con-

firmed by autopsy. The lungs have been investigated for asbestos mineralogically.

Fifteen of the 160 mesotheliomas have occurred in furniture workers (9.4 %). The percentage of furniture workers among occupationally active Swiss men amounts to 1.9 % (1). The difference in the percentages is not explainable by selection bias and parallels the relative risks calculated by Drs Minder and Vader (1). In contrast to their descriptions we found asbestos in the lungs of 14 of the 15 furniture workers. Six had worked some time in workshops for railway car construction and repair. We have described a cluster of mesothelioma cases in these workshops (5).

Three of the cases analyzed by Drs Minder and Vader could be identified within the Zürich cancer register. One among them could be traced as having formerly been employed in a production factory for refrigerators where asbestos was widely used. Another man had owned a workshop for inside installations and fittings. Another furniture worker who died from mesothelioma (not included in Drs Minder and Vader's study but found in the Zürich cancer register) had worked in the locomotive industry; another, who died from carcinoma of the colon, had asbestosis. From our experience the occupational title "furniture worker" implies an increased probability of former exposure to asbestos. Such workers may have had direct or indirect contact with asbestos from their own or other's activities at their workplaces, like other workers connected with the construction industry (3). Apart from the zeoliths in some villages of Anatolia, asbestos is the only agent whose connection with mesothelioma has been proved epidemiologically. In view of the high relative risk due to asbestos, it seems highly improbable that another factor should be found to have been involved in the mesothelioma excess among Swiss furniture workers.

Drs Minder and Vader have based their analysis on code 163.0 of the eighth revision of the International Classification of Diseases (malignant tumors of the pleura). The Swiss version of this revision of the International Classification of Diseases (6) uses a fifth digit for documenting the type of tumor. "Pleural mesothelioma" is generally coded as "16307." Two of the cases reported by Drs Minder and Vader were coded as "16301." This would mean "carcinoma of the pleura" and is, from our experience, not specific for mesothelioma. Moreover, and more important, confirmation of the diagnosis "mesothelioma" is difficult and requires verification by autopsy or on surgically removed tissue. Only one of Drs Minder and Vader's cases in the Zürich register had an autopsy done; in the other two cases the diagnosis, based on needle biopsies only, was found to be compatible with mesothelioma.

The cancer registries of Geneva and Zürich have investigated the reliability of the code "163.0" in Swiss death certificates. According to the Geneva registry (7), 23 men died from 1970 to 1985 from pleural mesothelioma. Only 15 were also documented as such on their death certificates. Eight of 23 (35 %) were false negatives, four of whom were indicated as having died from lung carcinoma. On the other hand, nine of the 24 cases given the 163.0 code of the International Classification of Diseases on their death certificates (37.5 %) were false positives, two of whom were found to be lung cancers in the register.

In the canton of Zürich, 33 men died from 1980 to 1983 from pleural mesothelioma (8). Only 27 of the cases were documented as such on the death certificate. Six of the 33 cases were false negatives, four of which had been misdiagnosed as lung cancer. The rate of false positives was 12 of 39 (31 %). The distribution of diagnoses in the "false positives" ascribed by the death certificate to mesothelioma is interesting. In four cases, only a cytological examination was found by the registry; three died from lung cancer. In three other cases of lung cancer the diagnosis mesothelioma could not be fully excluded.

Zürich and Geneva are cantons with a relatively high frequency of autopsies (30 % for men). For Switzerland as a whole the autopsy rate is lower and the rates of false negative and false positive mesothelioma cases is probably higher than in Zürich or Geneva. One main problem is the differentiation of mesothelioma from lung cancer. This differentiation is important before the risk of mesothelioma is quantified.

Therefore the risk estimates of Drs Minder and Vader (1) must be viewed as crude from the information on both occupation and mesothelioma diagnosis. We would like to add a technical detail, ie, the 203 deaths presented by Drs Minder and Vader as pleural mesothelioma among men between the ages of 30 and 74 years occurred within seven years, the result being a mortality figure of 2.3/100 000 per year, which is more in line with the general incidence figure given by Drs Minder and Vader at the beginning of their paper (1.5/100 000).

In summary, Drs Minder and Vader have shown Swiss mortality statistics to be a sensitive tool for the ascertainment of occupationally associated tumor risks, albeit the deficiencies in the documentation of both occupation and cause of death. But for the quantification of risks and the specification of etiologies, exact approaches are needed, ie, detailed investigation of cause(s) of death and the exposure history of each individual case.

References

1. Minder CE, Vader J-P. Malignant pleural mesothelioma among Swiss furniture workers: a new high-risk group. Scand J Work Environ Health 1988;14:252—6.
2. Teta MJ, Lewinsohn HC, Meigs JW, Vidone RA, Mowad LZ, Flannery JT. Mesothelioma in Connecticut 1955—1977, occupational and geographic associations. J Occup Med 1983;25:749—56.
3. Olsen JH, Jensen OM. Occupation and risk of cancer in Denmark: an analysis of 93 810 cancer cases, 1970—1979.

Scand J Work Environ Health 1987;13(suppl 1):91 p.
4. Rüttner JR, Wälchli P, Vogt P, Christen B. Asbesttypen, Lungenstaubanalyse, Expositions- und Latenzzeit maligner Mesotheliome in der deutschen Schweiz. Der Pathologe, in press.
5. Rüttner JR, Reber P, Schüler G, Spycher MA, Stolkin I, Wälchli P. Endemie von Pleuramesotheliomen in Eisenbahnwaggonbau- und -reparaturbetrieben. Arbeitsmed Sozialmed Präventivmed 1985;20:128—30.
6. Eidgenössisches Statistisches Amt. Internationale Klassifikation der Krankheiten und Todesursachen. Ergänzt fur den schweizerischen Gebrauch ab 1969 (8.Revision). Bern: Eidgenössisches Statistisches Amt, 1970
7. Raymond L, Gubéran E. Fréquence du mésothéliome d'après les données de mortalité, à Genève. Poster, XIVe réunion du groupe pour l'épidemiologie et l'enregistrement du cancer dans les pays de langue latine, Vevey 1989.
8. Forster T. Epidemiologie des Pleuramesothelioms im Kanton Zürich 1980—1983. Dissertation from the Zürich Cancer Registry, Zürich 1987.

G Schüler, MD, MPH,[1] JR Rüttner, MD[2]

[1] Cancer Registry of the Canton of Zürich, Department of Pathology, University Hospital, CH—8091 Zürich, Switzerland.
[2] Zürich Group for Research on Pneumoconiosis, CH—8044 Zürich, Switzerland.

Authors' reply

While we agree with large parts of Dr Schüler and Professor Rüttner's letter, it nevertheless seems necessary to restate our position on some of the issues.

While a collection of well-documented and investigated mesotheliomas, such as the set assembled by the Zürich Group for Research on Pneumoconiosis, is invaluable for many purposes, we do not believe that it is particularly suited to the estimation of relative risks. A statement like "the difference of percentages is not explainable by selection bias . . ." certainly needs substantiation before it can be accepted. There is strong reason to believe that this set of mesothelioma cases is "loaded" with respect to cases caused by asbestos since the primary task of this group and the associated laboratories is to search for and document asbestos in lung tissue for cases of occupational exposure. Our analysis, based on death certificates, on the other hand, while not allowing such an exact definition of mesotheliomas, certainly does not suffer from the selection bias in favor of asbestos cases.

A more important point is that the analysis of the seven cases (all deaths between 1979 and 1982 inclusive of furniture makers with the primary cause mesothelioma found in our study) is not altered by the presentation of Dr Schüler and Professor Rüttner's. The cases they are talking about occurred after 1982 and thus were not investigated by us. There remain therefore at least three cases for which lung tissue was investigated and no asbestos was found. It needs to be discussed whether another factor is responsible for some of the mesotheliomas (or mesothelioma-like neoplasms) found in our study. Our point was that this issue cannot be laid aside lightly, and we see no reason to alter this position.

It is hardly necessary to state that an extreme specificity of cause of death is not necessary, and indeed not advisable, in studies based on official death statistics because of the limited quality of mortality statistics and the fact that the inclusion of false cases will reduce relative risks. When there are relative risks remaining after a diagnosis is broadened, the true relative risk for the specific diagnosis is probably larger than the reported risk. Wider classes are used to catch most mesotheliomas, also those which are slightly misclassified. Investigation of the quality of the diagnosis of mesothelioma, as has been done for the Geneva and Zürich cancer registers and reported on by Dr Schüler and Professor Rüttner, tends to support our type of analysis. In comparison with the data of other countries, Swiss mortality statistics seem to be fairly good on mesothelioma, with perhaps a slight overuse of this category.

We agree with the assessment of our risk estimate as "crude"; first estimates usually are. With regard to the last paragraph of Dr Schüler and Professor Rüttner's letter, we would like to restate that it was not our intention to find new etiologies, but rather to check out whether, in Switzerland, there were the same risk groups or some additional risk groups for mesothelioma as in other countries. It seems that we have found evidence that furniture makers are at an increased risk of mesothelioma. We also believe that the question is unanswered of whether this increased risk is caused by asbestos only or, in addition to asbestos, also by an agent related to wood dust exposure and agree that determining the answer would merit a large, comprehensive, and more exact investigation than can be achieved with mortality statistics.

Christoph E Minder, PhD, John-Paul Vader, MD

Department of Social and Preventive Medicine
University of Berne
Finkenhubelweg 11
CH—3012 Berne Switzerland