88
PLAINTIFF'S EXHIBIT
MAR-7

Pergamon

Ann. occup. Hyg., Vol. 38, No. 4, pp. 635–638, 1994
Elsevier Science Ltd
Copyright © 1994 British Occupational Hygiene Society
Printed in Great Britain. All rights reserved
0003–4878/94 $7.00 + 0.00

0003–4878(94)E0032–U

MESOTHELIOMA AMONG CAR MECHANICS?*

H.-J. WOITOWITZ and K. RÖDELSPERGER

(*Received* 30 *November* 1993 *and in final form* 15 *February* 1994)

Paper read at the Workshop on Health Risks Associated with Chrysotile Asbestos, held in Jersey, Channel Islands, 14–17 November 1993.

No Astract.

IN 1991 and 1992 preliminary information was given on an on-going case-control study of mesothelioma, which up to that time involved 175 cases, of whom 14 were car mechanics (WOITOWITZ and RÖDELSPERGER, 1991, 1992). This study has now been finished (WOITOWITZ *et al.*, 1994) and the final results relating to car mechanics can be reported.

Of the original 14 cases four had to be rejected, since the panel of pathologists finally classified them only as "possible mesothelioma". Ultimately out of 324 cases of mesothelioma 16 were classified as motor vehicle mechanics (according to code 421 "Kraftfahrzeug-Instandsetzer"—"motor vehicle repair worker"—of the German Federal Statistical Office). They were compared with 16 mechanics among 315 hospital controls and 12 mechanics among 182 population controls (see Table 1). The hospital controls were patients who had undergone lung resection for reasons other than mesothelioma, in most instances because of lung cancer.

Evaluation of the occupational histories of cases and controls showed that one of the mesothelioma cases and one of the hospital controls worked with locomotive engines and a second case worked with trams. A third mesothelioma patient worked in automobile production where he was exclusively involved in fitting windscreens. Among the population controls who had worked with cars one had only painted cars and another had produced car spare parts.

The motor mechanics began their employment in that capacity between 1925 and 1972, the median date being 1949 for both groups of patients and 1946 for the population controls. The duration of relevant employment was longer for controls than for cases, with median values of 5, 5.5 and 4 years, respectively. Seven of the mesothelioma cases, nine of the hospital controls and three of the population controls said that they had done brake repair work. In all three groups there were some individuals who had substantial asbestos exposure in other types of employment (e.g. in a power plant or in the ship-building industry). Only four of the mesothelioma cases, two of the hospital controls and five of the population controls had no history of asbestos exposure. Three of these four mesothelioma cases, and also two of the five

*Supported by the German Federal Ministry of Science and Technology, Project No. 01 HK 076 A6.

Table 1. Motor vehicle mechanics among 324 mesothelioma cases, 315 hospital controls and 182 populations controls. Information from occupational history

Group	Total number N	Motor vehicle mechanics N	%	Beginning of employment median value and range	Duration of employment (years) median value and range	Definitively engaged in brake service* N	%	No other asbestos exposure N	%
Mesothelioma patients	324	16	4.9	1949 (1936–1972)	4 (1–8.4)	6	1.9	4	1.2
Hospital controls	315	16	5.1	1949 (1925–1962)	5 (3–43)	9	2.9	5	1.6
Population controls	182	12	6.6	1946 (1929–1958)	5.5 (0.6–35)	3	1.6	5	2.7

*This does not mean that other mechanics were not engaged in brake service.

hospital controls and two of the five population controls, stated that they had been engaged in brake repairs.

Lung tissue analysis was available for two of the mesothelioma cases and for one of the hospital controls (RÖDELSPERGER *et al.*, 1993, see Table 2). For mesothelioma

TABLE 2. LUNG TISSUE ANALYSIS OF MESOTHELIOMA CASES AND HOSPITAL CONTROLS, ENGAGED AS MOTOR VEHICLE MECHANICS. THE ANALYTICAL SENSITIVITY IS DEFINED AS CONCENTRATION PER FIBRE

No.	Status	Analytical sensitivity	Lung dust fibre concentration $L \geq 5\ \mu m$ $\times 10^3\ f\ g^{-1}$ (dry) Chrysotile	Amphibole	Other minerals
1	Case	22	0	0	0
2	Case	14	0	282	0
3	Control	25	1.630	0	76

patient No. 1 no fibres longer than 5 μm were found. Since 1972 he had worked for 8 years as a car mechanic and was engaged in brake repair work during this time. There was no suggestion of any other asbestos exposure.

For mesothelioma patient No. 2 characteristic amphibole fibres longer than 5 μm were observed. He had worked as a car mechanic for only 1 year in 1940 and had been a Luftwaffe pilot from 1941 to 1945; he had no known asbestos exposure from other employment.

Control patient No. 3 had numerous long chrysotile fibres but no amphibole fibres. He had worked as car mechanic from 1934 to 1939. From 1945 to 1950 he was a prisoner of war in Russia where he had to arc-weld steel structures and to install glass fibre insulation. Subsequently he is assumed to have had no further occupational exposure to asbestos.

CONCLUSIONS

From these results there is no evidence that car mechanics are exposed to an increased risk of mesothelioma even if they do brake repairs, but asbestos exposure in other employment is an important confounding factor, so that if there is a mesothelioma risk for car mechanics but it were small it would not be detectable. The absence of fibres in the lung tissue analysis for one of the mesothelioma cases—despite his employment for 8 years as a car mechanic, repairing brakes—does not exclude the possibility that, decades before, chrysotile fibres were active at the target cells. On the other hand, it is doubtful that the amphibole and chrysotile fibres, in the lung tissue of two other patients, can be related to their employment as car mechanics.

[For the discussion of the issues raised in this and the other allied papers see pp. 407–425.]

REFERENCES

RÖDELSPERGER, K., WOITOWITZ, H.-J., BRÜCKEL, B., ARHELGER, R., RÖMER, W., POHLABELN, H. and JÖCKEL, K.-H. (1993) Fall-Kontroll-Studie an Mesotheliompatienten zum Gehalt anorganischer Fasern im

Lungenstaub. Vortrag auf dem Kolloquium Faserförmige Stäube: Vorschriften, Wirkungen, Messung, Minderung. Kommission Reinhaltung der Luft in VDI und DIN Fulda, 7–9 September 1993, VDI-Berichte 1075, pp. 253–267. VDI-Verlag, Düsseldorf.

WOITOWITZ, H.-J. and RÖDELSPERGER, K. (1991) Chrysotile asbestos and mesothelioma. [Letter to the Editor.] *Am. J. ind. Med.* 19, 551–553.

WOITOWITZ, H.-J. and RÖDELSPERGER, K. (1992) Chrysotile asbestos, mesothelioma and garage mechanics: Response to Dr Wong. *Am. J. ind. Med.* 21, 453–455.

WOITOWITZ, H.-J., HILLERDAL, G., CALAVREZOS, A., BERGHÄUSER, K. H., RÖDELSPREGER, K., JÖCKEL, K.-H. *et al.* (1994) Multizentrische und multidisziplinäre Untersuchungen zur Analyse von Risiko- und Einflußfaktoren des diffusen malignen Mesothelioms. Schriftenreihe der Bundesanstalt für Arbeitsschutz, Wirtschaftsverlag NW, Bremerhaven.

TWO BY TWO TABLE CALCULATION

Title: Mesothelioma in Garage Mechanics
Woitowitz and Rodelsperger (1994) Ann Occup Hyg
"Exposed" = motor vehicle mechanics

	Cases	Controls	Total
Exposed	16	28	44
Nonexposed	308	469	777
Total	324	497	821

RR = 0.8701299

Chi-square = 0.0750711

Lower Limit = 0.3216605

Upper Limit = 2.3538047

[TBL-2X2.WQ1] © [meta analysis]