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Differences between peritoneal and pleural mesothelioma in Lombardy, Italy

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ABSTRACT

Background: We examined characteristics of peritoneal (PEM) and pleural (PLM) mesothelioma in Lombardy, Italy.

Methods: From the Lombardy Mesothelioma Registry we selected PEM (N = 300) and PLM (N = 5011) cases diagnosed in 2000–2014. We investigated asbestos exposure and presence of asbestosis or pleural plaques.

Results: Incidence rates (per 1,000,000 person-years, world standardized) of PEM were 1.2 (men) and 0.9 (women), compared with 22.6 and 8.4 for PLM.

Asbestosis (both genders) and pleural plaques (men) were more frequent among PEM cases. Occupational asbestos exposure was similar in PEM and PLM cases. We found higher proportions of PEMs employed in the asbestos cement production.

Conclusion: The higher frequency of pleural plaques in PEM cases confirm the association between asbestos and peritoneal mesothelioma. The higher proportions of asbestosis and of past employment in the asbestos-cement sector among PEM cases suggest a possible role of high exposures to asbestos in the peritoneal mesothelioma genesis.

1. Introduction

Malignant mesothelioma (MM) is a rare and lethal cancer of the serosal membranes of the body cavities. The most common site is the pleura followed by peritoneum; very rare are the pericardial mesothelioma (< 2%) and those of the tunica vaginalis testis (< 0.5%). The incidence of pleural mesothelioma (PLM) has shown a consistent increase in many industrialized countries for several decades. In recent years a slowing or leveling off of PLM rates has been observed in some countries, whereas in others the incidence is still expected to rise.

Trends in peritoneal mesothelioma (PEM) among men and women are not described as well as trends for PLM. In an analysis of 50 European and USA populations, the incidence rates of PEM in men were one order of magnitude lower than those of PLM. Age-standardized incidence rates among men range from 0.5 to about 3 cases per million of person-years. In most populations, PEM rates among women are in the range 0.2–2 per million and are lower than in men [1].

The main risk factor for MM is asbestos. According to the International Agency for Research on Cancer (IARC) all types of asbestos are human carcinogens [2]. The attributable risk of asbestos exposure was estimated up to 80% for PLM [3] whereas was lower for PEM: 58% among men and 23% among women [1].

Italy was one of the main raw asbestos producing (only chrysotile) and importing (all types of asbestos) countries until the ban in 1992. A permanent MM epidemiological surveillance system has been operative since 1993 (and was made mandatory in 2002), based on a national MM register (ReNaM – Registro Nazionale Mesoteliomi) established at the National Institute for Insurance against Accidents at Work (INAIL – Istituto Nazionale Assicurazione Infortuni sul Lavoro, Rome), which collects data from a network of 20 Regional Registries [4]. The Regional mesothelioma registry of Lombardy (North-West Italy) (RLM) was implemented in the year 2000 and currently covers a population of about 10 million residents [5].

The present study aims to examine the incidence trend and the characteristics of PEM in Lombardy, comparing to those of the PLM, based on RML data 2000–2014.

2. Materials and methods

2.1. The Lombardy mesothelioma registry (RML)

Details of the RML procedures are reported elsewhere [5]. Briefly,

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Table 1
Characteristics of subjects with malignant peritoneal (PEM) and pleural (PLM) mesothelioma, by gender, Lombardy Region Mesothelioma Registry, 2000–2014.

	Men				Women			
	PEM		PLM		PEM		PLM	
	N	%	N	%	N	%	N	%
Total	156	100	3279	100	144	100	1732	100
Age at diagnosis								
Median (Min-Max)	66.7	28.8–95.0	70.5	24.5–99.6	67.9	33.2–95.6	73.6	38.5–102.2
P-Value[a]	*0.0002*				*< 0.001*			
Age at diagnosis								
20–49	12	7.7	103	3.1	13	9.0	43	2.5
50–54	12	7.7	118	3.6	6	4.2	41	2.4
55–59	13	8.3	226	6.9	13	9.0	89	5.1
60–64	25	16.0	421	12.8	19	13.2	152	8.8
65–69	27	17.3	591	18.0	24	16.7	239	13.8
70–74	26	16.7	728	22.2	26	18.1	328	18.9
75–79	24	15.4	567	17.3	17	11.8	363	21.0
80–84	13	8.3	322	9.8	21	14.6	280	16.2
85+	4	2.6	2	6.2	5	3.5	197	11.4
P-Value[a]*	*0.003*				*< 0.001*			
Diagnosis								
Definite	132	84.6	2704	82.5	116	80.6	1313	75.8
Probable	14	9.0	247	7.5	14	9.7	155	9.0
Possible	10	6.4	328	10.0	14	9.7	264	15.2
P-Value[a]	*0.30*				*0.20*			
Morphology[b]								
NOS (90503)	15	9.6	172	5.3	20	13.9	99	5.7
Fibrous (90513)	2	1.3	288	8.8	7	4.9	77	4.4
Epithelioid (90523)	110	70.5	1962	59.8	88	61.1	1074	62.0
Biphasic (90533)	18	11.5	449	13.7	21	14.6	148	8.6
Unknown	11	7.0	408	12.4	8	5.6	334	19.3
P-Value[a]	*< 0.001*				*< 0.001*			
Previous radiotherapy	4	2.6	34	1.0	3	2.1	77	4.4
P-Value[a]	*0.09*				*0.28*			
Interview								
Patient	80	51.3	1933	59.0	60	41.7	787	45.4
Relative	66	42.3	1195	36.4	70	48.6	825	47.6
Not Performed	10	6.4	151	4.6	14	9.7	120	6.9
P-Value[a]	*0.26*				*0.39*			

a PEM vs PLM, from chi-squared (categorical variables), Fisher's exact (radiotherapy) or Mann-Whitney (age) test.
b ICD-O (International Classification of Diseases for Oncology, Third Edition) codes in parentheses.
Abbreviations: NOS, not otherwise specified; PEM, peritoneal mesothelioma; PLM, pleural mesothelioma

the RML since 2000 collects incident MM cases reported among Lombardy residents by more than 100 hospitals in the region MM. Diagnosis is established on a case-by-case basis considering all available information. Cases are classified as "definite" (histological diagnosis of MM, possibly with immuno-histochemical confirmation), "probable" (usually, cytology suggesting MM plus imaging), "possible" (positive imaging). Completeness of reporting is periodically verified using other sources, including pathology, hospital admission (within and outside Lombardy), mortality, cancer registry, and the INAIL databases. Based on revision of chest CT scans, available for 95% of cases, the RML also records the concomitant presence of asbestosis and pleural plaques.

MM patients (or their next-of-kin) are then interviewed by trained personnel using a standardized questionnaire. Information is collected on patients' lifetime occupational and residential history and on cohabitants' occupations and activities (in particular, whether the cohabitant(s) used to bring dirty work clothes at home). Home-related activities involving potential asbestos exposure are also investigated. Lifetime asbestos exposure is finally classified as "occupational" (definite, probable, or possible), "para-occupational" (i.e., related to the cohabitants), "home-related" (i.e., related to activities performed within the house), or "environmental" (residence in vicinity of asbestos industries). For subjects with several exposure sources, asbestos exposure is classified according to this hierarchy: occupational > para-occupational > environmental > home-related. Subjects without any identified asbestos exposure are classified into the "unknown" exposure category. Subjects not interviewed or with insufficient information at interview falls in the category "no information/not classified". Information on previous radiotherapy treatment is collected through examination of clinical records and interview.

2.2. Statistical analysis

For this study, we selected from the RML database all PEM and PLM cases diagnosed between 2000 and 2014, the years in which completeness of case collection has been verified.

Potential differences in individual, clinical and exposure characteristics between PLM and PEM cases were investigated using chi-squared or Fisher's exact test. We calculated year- and gender- specific crude and age-standardized incidence rates (ASR) of PLM and PEM using the Segi's standard world population. Time trends were analyzed using age-adjusted Poisson models. Population data were downloaded from the Italian National Institute of Statistics (ISTAT – Istituto Nazionale di Statistica) (http://demo.istat.it/). Data management and statistical analyses were performed with Stata 14 (StataCorp. 2015).