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A CONTRIBUTION TO THE ETIOLOGY OF THE DIFFUSE MALIGNANT PLEURAL MESOTHELIOMA

Ater Siegal, Smith and Greenburg, with the "Talc Plaques" described changes in the pleura as attendant circumstances of a talcosis caused by tremolite talc, there have been especially in recent years, reports about mostly double-sized, calcifications of the pleura as a consequence of having been exposed to minerals containing fibers. Taking into account the fact that talc is often adulterated with asbestos, and that tremolite belongs to the group of amphibole asbestos, changes in the pleura caused by asbestos seem to be, as compared to other minerals, by far the most important. These were almost exclusively described in connection with asbestosis. Bohlig, Jacob and Muller claim they found it with increasing frequency and to a severe degree with a rising degree of asbestosis in asbestos workers in the area of Saxony - Thuringia. They already noted that these calcifications of the pleura do not always go hand in hand with a clear lung fibrosis.

Kiviluoto, Cartier and Anspach proved an endemic risk in asbestos with these pleural calcifications. The latter reported about 429 cases from the Dresden area, out of which 54.5% experienced a job-related exposure, 35.9% experienced a risk due to the emissions of the industries processing asbestos in Dresden. With the help of anamneses of working and living experiences, the links could be established, and could be confirmed through particles of asbestos in the saliva and through sections in some cases. At that, only in rare cases, a clear lung fibrosis could be found. In most cases, especially for people that were (risk) at because of emissions, there were no fibroid tissue reactions: only asbestos particles could be found.

In connection with being exposed to asbestos, there is not only an observation of increased carcinomata of the bronchi, but also tumors of the pleura and the peritoneum. Jacob and Bohlig had already pointed this out. In recent years, Wayner and associates described 84 cases of diffuse malignant pleural mesotheliomas in the North-Western Province of South Africa, which involved exposure to asbestos in some way. Other recent studies confirm these observations.

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It was of interest to note how frequently, beside the calcifications of the pleura that were observed in Dresden, there were also observations of such diffuse malignant mesotheliomas. For this purpose, those cases were studied that had not yet been registered with the silicosis information centre, and that could be observed in the years from 1950 to the first quarter of 1964 in the Pathological Institute and in the Clinic of Radiology of the Medical School Dresden:

All in all, 41 cases were studied in detail, out of which 12 were diagnosed by X-Ray, 20 anatomically and pathologically and (copy illegible) by both methods (see chart).

The attempt was made in retrospect to establish anamneses in detail about job and living environment from the survivors of the deceased, which often proved to be very hard. The section material from the above mentioned institute was checked under consideration of a possible exposure to asbestos for fibroid changes in the lungs and asbestos particles, since in earlier years the connection with an exposure to asbestos was not recognized.

The cases 1-6 from the period 1933-1941 can be excluded from the deliberations, since by coincidence, X-Ray films of these cases exist, but no section material is given, and no job-or-living anamnesis could be established. But these six cases demonstrate the fact that the pleural mesothelioma was by no means absent from the area around Dresden, even in the years before the war, at a time when the literature had only few reports about the occurrence of such pleural mesotheliomas, and that they could be linked to the asbestos industry that existed since before 1900.

Among the cases that were given since 1950 as diffuse malignant pleural mesotheliomas, there was to be observed:

- a.) in 9 cases, a job-related exposure to asbestos (25.7%)
- b.) in 9 cases, a risk in the living circumstances through asbestos dust (25.7%)
- c.) - 2 cases a silicosis (5.7%)
- d.) in 7 cases no exposure could be determined (20%)
- e.) in 8 cases, a discussion was entirely impossible (22.9%)

Group a includes 9 women. The ages ranged between 50 and 71 years, a median of 62.5 years. Four women were less than 60 years old. Four women worked as weavers and winders, two women worked as punchers of materials containing asbestos, one woman as a roller, and two women worked in the asbestos hose and ribbon production. The duration of exposure was two years. This woman had worked as a puncher. Two women worked for 10 and 30 years. The duration of exposure could not be determined for one woman. But there is no doubt that this woman, as a weaver, was exposed to asbestos through her job. The diagnoses were established once through X-Rays, 7 times anatomically and pathologically and once with both methods.

Five cases showed fibroid changes in the lungs and asbestos particles, two of those were clear asbestosis cases. In the other cases, the fibrosis in the lungs existed only to the slightest degree. Asbestos particles alone were found in two women; in one case neither asbestos particles nor lung fibrosis could be found. One woman is still living. No asbestos particles could be found in the saliva. From the X-Rays, there was no clear fibrosis in the sense of an asbestosis. The time between the first exposure and the observation of the pleural mesothelioma was, on the average, 37.4 years, the shortest time was 23 years, the longest 45.

Group (b) consists of four men, between 55 and 80 years old. The median age was 64.4 years. Further, part of this group are five women, between the ages of 54 and 70. The average age being 59.6 years. They had lived either in close propinquity to the Dresden asbestos factory, or they were employed in a shop close the factory, without being exposed to asbestos through their own occupations.

The diagnosis was established in four cases through the section alone, in five cases the X-Ray diagnosis could be confirmed through a section. Of the four men, the only case of a slight lung fibrosis and some individual asbestos particles, were that of an 80 year old man, who had lived for 50 years close to an asbestos factory, and had been employed in a drapery factory close by, where already many cases of pleural plaques had been detected. Only two cases of the five women showed a slight fibrosis of the lungs with asbestos particles, in one case asbestos particles alone could be observed, in two cases there were no signs of an asbestosis. In five cases, living or employment close to the asbestos factories alone point to an exposure to asbestos.

Where groups (c) and (d) are concerned, it should be noted that it is surely striking that two men at the age of 59 and 62 show a pleural mesothelioma in connection with a silicosis, which so far, could not be observed for cases of silicosis within the range of the silicosis information centre Dresden. In one case, the diagnosis for a pleural mesothelioma was confirmed by a pathological-anatomical test. One of the men was employed in an ore-mine, one worked in the area of the Elbsandstone. In seven cases, however, five men and two women, not evidence could be found. One woman, however, worked in a shop in which asbestos had been used for the purpose of insulation. But neither direct contact nor occupation at such a working facility could be confirmed. Here, the diagnosis of pleural mesothelioma is confirmed in four cases through a section. The age of the men was between 43 and 63 years, a median of 55.5 years. The ages of the women was 22 and 55 years.

The group (e) consists of four women and four men. The diagnosis was established through X-Ray in one case, in seven cases through sections, but there was no evidence for exposure to asbestos.

The women were between 55.9 and 67.7 year old, a median of 60.6 years. The men ranged from 51.7 to 69.8 years in age, an average of 59.2 years. Based on the 27 cases of a diffuse malignant pleural mesotheliomas, which have been seen in the pathological institute of the Medical School in Dresden, the pathology of this tumor is to be discussed in detail, Mesotheliomas are understood to be tumors that have their beginning in the covering cells (mesothelium, mesothelial cells) of the serous membranes (pleura, pericardium, peritoneum, tunica vaginalis coelum testis). In their developmental history, they go back to the cells that line the common body cavity, from which the pleura-pericardium-and abdominal cavities develop. These cells have the capacity to develop either in the direction of epithelium or of connecting tissue, which is the reason why the mesotheliomas are divided into carcinomatose or sarcomatous forms - according to Giese. In the older literature, there are many synonyma for such tumors, as pleural endotheliosis, pleural sarcoma, perithelioma, tumor of the covering cells or pleuroma (Kerinner and Glaser: Witte).

In our cases, no organ other than the pleura could be considered for the location of the primary tumor. The pleural mesothelioma was located on the right 18 times, and on the left nine times. They were exclusively diffuse malignant mesotheliomas, with the lungs being surrounded by tumor tissue in layers of up to several centimeters in thickness. In 12 cases, metastases existed in the lymph nodes, with the thoracic lymph nodes being almost invariably affected. Only in two cases there was lymphangitis of the lungs. In fifteen cases, there was a tumor infiltration into the neighboring organs (lungs, heart, chestwall, diaphragm, mediastinum, spine, lymph nodes, liver). In the same number of cases a hematogenous metastasing of the organ (lungs, heart, liver, kidney, adrenal gland, pancreas, intestines, thyroid gland, spleen, spine, skin) was observed.

Fifteen times a spreading of the tumors into another serous cavity (heart, peritoneum), especially the pericardium, could be seen. In two cases there was the impression of an isolated pericardium mesothelioma. Once the tumor had spread into the opposite pleural cavity, in which case the possibility of a double-sided pleural mesothelioma offers itself. Haematoma of the pleura, in part of a hemorrhagic character, existed 14 times, but was not always followed by a compression atelectasis. A special localization of the tumor through certain lung sections could not be determined.

The histological studies were based on the sections of tumor and lung tissue which had been prepared in the customary manner and had been dyed with hematoxylin-eosin. Formalin was used for the fixation. The sections were in part frozen cuts, in part paraffin cuts. If the rough distinction into carcinomatous and sarcomatous forms is followed, the following results can be established:

Among the pleural mesotheliomas, 15 sarcomatous forms were found and 11 carcinomatous forms, in one case there were no sections available. At a close study of the lung tissue, for the 27 diffuse malignant mesotheliomas of the pleura, 11 cases of lung fibrosis could be observed, mostly only to a slight degree, or asbestos particles were noticed. In eight cases, asbestos particles with interstitial lung fibrosis could be observed, with the fibrosis in six cases only being slightly developed. In two cases, a clear fibrosis was established. Three times, a more or less great quantity of asbestos particles could be traced in lungs, in part encapsuled in gigantic foreign substance cells, and not linked with a fibrosis. In no case were the asbestos particles found directly in the tumor tissue, but sometimes immediately subpleurally, (ill 1).

Concerning the roentgenology of the pleura mesothelioma, it should be stated that there is no sign for a circumscribed tumor of the pleura. The diffuse form of the pleura mesothelioma, with which we are concerned in our cases, on the other hand shows, at least in its further course, characteristic symptoms. The basal pleura has to be regarded as the main location of origin. A shadow, that is clearly limited towards the cranium and runs almost horizontally and cannot be separated from the diaphragm and which remains there even after the tapping of a hematoma, has to be part of the pleura. The x-ray examination should always be started by x-rays on various levels as well as by a careful transillumination. If these methods do not result in a final conclusion, a pleuroscopy and pleuroscopic biopsy should be performed.

In most cases, the tumor spreads in the beginning at the lateral thorax wall in the area of the lower range. The x-ray then shows a clearly limited, quite frequently slightly irregular shadow above the lower lateral thorax wall and the diaphragm (ill 2). This result looks entirely the same as a callosity in the pleura or a capsuled-in hematoma of a different genesis. For this beginning stage of a diffuse pleura mesothelioma - as for all results gained from x-rays, a careful collecting of the anamnesis and a general examination of the patient have to be performed. Behind the picture of a callosity of the pleura, which cannot be linked with any other form of disease, a malignancy has to be suspected. If the callosity of the pleura shows already in the beginning phase the clear formation of an uvula towards the lung, the diagnosis can be made, at this stage also, quite easily by x-ray (ill 3).

In the further course, which is in most cases fast and malignant, the tumor spreads first at the lateral thorax wall, and goes in most cases hand in hand with extensive hemorrhagic hematomas.

In this stage, the x-ray will show, sometimes only after the hematoma is tapped, the wide shadow areas, which are characteristic for the diffuse pleural mesothelioma, and which frequently reach to the tip of the lung, and which are located at the lateral thorax wall. These shadows cannot be separated from the thorax wall during transillumination, and they show the typical shape, which is described in the literature as garland - or curtain shape. (ill 4-6)

In the final stages, the tumor spreads also into the pleura of the lower and upper mediastinum, and it shows at this location the same changes of the pleura that are close to the heart, it quickly spreads to the pericardium. Due to the unfortunate localization these patients arrive at exitum before the tumor can spread to the area of thoracic pleura. These cases, which occur rarely, then create the impression of an isolated mesothelioma of the pericardium, as it was seen in a similar way in the two cases that were mentioned above.

Discussion

Today, there are no doubts anymore about the link of an asbestosis of the lungs and a carcinoma of the bronchi, which was also reflected in the insurance law. Thus, an asbestosis linked with a carcinoma of the bronchi is recognized as a job-related disease which entitles the worker to workman's compensation. In recent months, the reports about a linkage of diffuse malignant pleural mesotheliomas with lung asbestosis have become more frequent. Such tumors, which are otherwise very rare, were observed, most of all, after job-related exposure. In recent times, Wagner and associates reported, as mentioned above, about 84 such tumors, for which also a non-job related risk has to be taken into consideration. Jacob and Bohlig already pointed out that an increased number of serosa tumors could be observed not in frequency in connection with an asbestosis. First reports of a pleural mesothelioma in connection with an asbestosis in Germany date back to Wedler. Unfortunately, this report did not study the cases - which are given in the chart as number 1-6. Possibly, the connection between the asbestos dust exposure could have been established even then, especially even in our cases this connection was only established in retrospect. Mesotheliomas after an exposure to asbestos are, in the overwhelming number of cases, located in the pleura, rarely in the peritoneum. In the area of the silicosis information center Dresden, several cases of peritoneal tumors were registered after an exposure to asbestos in a job-related context.

There can be no precise information about the frequency of the mesothelioma in the pleura. It should be mentioned, though, that out of 21,541 sections within the period from 1950 to the first quarter of 1964, 27 cases were observed.

Just as the pleural calcifications usually did not show a simultaneous lung fibrosis, our studies show also that there is no connection between the degree of the changes in the lungs due to asbestosis and the occurrence of mesothelioma of the pleura. Only in two cases was there a clear asbestosis. Through anamnesis a connection with exposure to asbestos dust could be established in 18 cases. Beside the nine that were exposed to the asbestos dust on the job, the nine cases from the neighborhood of asbestos factories can be, with great probability, traced back to an exposure of asbestos dust. The finding of asbestos particles in four cases can be taken as a sure proof such a non-job related asbestos risk.

According to the literature, men are more prevalent for the pleura mesotheliomas without any traces of asbestos. The cases, for which an exposure to asbestos could not be proven - apart from the cases that go hand in hand with silicosis are nine men and six women. Therefore, our numbers seem to coincide with the findings of the literature. But, there was not in every case lung tissue, especially tissue from the basal lung parts, available for a detailed study. In this context, the study by Thompson should be mentioned, who in describing seven cases of mesotheliomas, without a roentgenologic hint, could also macroscopically, at first, not find any lung asbestosis in the autopsies. Only the careful histological study of the basal lower lobe areas showed in six cases an asbestosis of the lungs with a sufficient number of asbestos particles. The sections from other parts of the lungs did not show any asbestosis and generally speaking, no particles of asbestos either. The author points out especially, that in the majority of cases, the find of a basal asbestosis is overlooked.

The more frequent occurrence of the pleural mesothelioma of the right side, which is stressed by some authors, can be confirmed by us. The literature lists as the duration of the development for a mesothelioma as 20-40 years or more. The patients of pleural mesotheliomas of our study, for which the retrospective anamnesis contained usable information have on the average, a 37.4 latency time from the beginning of the exposure to asbestos to the finding or their death. The shortest time was 23 years, the longest 45. Only women experienced job-related exposure. This circumstance can be explained with the fact that there are more women employed in the departments with a risk factor in the asbestos-processing industry. The time of latency from the beginning of the exposure to the occurrence of death for the patients that were at risk because of propinquity exposure was at approximately 42 years, that means, it is not notable higher than for job-related exposures. The median age of all deceased at 60.7 years in all groups, comes close to the report of Caughey (2. copy almost illegible) and associates who listed 53.5 years.

Two (illegible) mesotheliomas of the pleura were found in connection with a silicosis. It does not seem appropriate to deduct certain conclusions from that. Certain parallels should be pointed out. Thus Hurwitz and Lieben and McBride found calcifications of the pleura also in connection with silicosis. Stephanopoulos found the same after exposure to marble dust. But we could not so far in our area, observe calcifications of the pleura after exposure to such silicone dusts.

The question about the cause of the mesotheliomas of the pleura with asbestosis raises the basic problem of the oncogenesis overall. A mechanical as well as a chemical affect of the asbestos would be conceivable, also in those cases where no lung reaction in the sense of an asbestosis could be observed. The theory by Kiviluoto should be especially mentioned. He sees the capacities to sink and float of the fibers of different lengths as the cause, which was confirmed by Anspach, based on his comparative studies of the frequency of

asbestosis and pleural plaques with the local situation of the individual asbestos firms. It seems that the lighter, shorter, more easily flying fibers can pass the lungs without reaction, as per the tests by Vorwald and Associates, and can cause plaques and pleura mesotheliomas in the sense of Kiviluoto's theory. Leicher places the main responsibility for the occurrence of tumors in asbestosis on the mechanical lesions of the tissue. The long latency times could be explained with the continuous slight mechanical effect. Animal tests confirm the oncogenic effect of the asbestos. There were several occurrences where through intra-pleural application of suspension of asbestos dust pleural mesotheliomas were created. (Wagner) The studies and reports in the literature allow the conclusion that job-related cancer of the asbestos workers. It seems justified to include this tumor, with existing asbestosis, in the compensation obligation according to number 28 of our regulations about information and compensation obligations for job-related diseases from November 14, 1957. The conditions do not yet seem to be given under which it would be recognized as a job-related disease, for those cases where, after exposure, no lung fibrosis or only asbestos particles could be proven. We think, further, that extensive studies and discussions are necessary, the same for the problem of the bronchial carcinoma and asbestos exposure without lung fibrosis in the sense of only a slight asbestosis. In any case, Bohlrig is justified in pointing out that the existence of pleural reactions without lung fibrosis opens new ideas about the pathogenesis of the asbestosis and about the discussion of the job-related cancer of the asbestos workers, and opens new perspectives which may even appear somewhat heretic. Furthermore, the risk through emission in the neighboring environment of the asbestos factories has gained further relevance.

Summary

Out of 44 cases of diffuse malignant pleural mesotheliomas, 35 were studied in a detailed analysis. In 18 cases an exposure to asbestos could be proven, either job-related or outside the job. In eleven cases, fibrotic reactions of the lungs and asbestos particles were found in the sections.

CHART: OBSERVED PLEURA MESOTHELIOMA

NAME:	AGE AT DIAGNOSIS OR DEATH	CALENDAR YEAR OF DEATH	DIAGNOSE GIVEN ROENTGENOLOGICALLY/PATHOLOGICALLY/ANATOMICALLY
a.) asbestos particles			Duration of job-related exposure
b.) fibrosis of the lung			job-related/neighborhood/none
slight "			no discussion possible
asbestosis			
	(no. 19)	1924-1928	manufacturing of asbestos hoses
	(no. 28)	weaver before 1919	
	(no. 29)	1930-1937, 1940-1943	weaver, winder
	(no. 30)	before 1930 asbestos weaver, more precise occupation not known	job related exposure col.
	(no. 31)	1936-1945	miner in ore-mine
	(no. 34)	1921-1922	puncher
	(no. 35)	1928-1929	puncher
	(no. 36)	1918-1963	winder
	(no. 37)	1940-1942	weaver
	(no. 40)	1920-1945	puncher
		1946-1951	winder

Tabelle. Beobachtete Pleurenverhältnisse

Nr.	Name	I	II	Alter bei Ereignis oder Tod	Ereignis- jahr des Falles	Häufigkeit		als Anstalts- körperverletzt, in Folge des Lagers	Exposition			Beob. Expositionsdauer
						einseitig	beidseitig		beruflich	Verkehr	sonst	
1	H., H.	+	-	73	1933	+	-	-	-	-	-	keine Exposition möglich
2	H., A.	-	-	70	1939	-	-	-	-	-	-	keine Exposition möglich
3	H., M.	-	-	72 ^{10/12}	1939	+	-	-	-	-	-	keine Exposition möglich
4	Z., H.	+	-	62	1947	+	-	-	-	-	-	keine Exposition möglich
5	N., H.	-	+	46	1941	+	-	-	-	-	-	keine Exposition möglich
6	H., T.	-	-	70 ^{1/12}	1941	-	-	-	-	-	-	keine Exposition möglich
7	V., H.	-	-	70 ^{1/12}	1947	+	+	0	-	+	-	1949—1950
8	H., M.	+	-	70 ^{1/12}	1952	+	-	-	-	-	-	Handarbeiten, Nähmaschine
9	L., F.	+	-	43 ^{1/12}	1952	+	-	-	-	-	+	-
10	P., K.	+	-	33 ^{11/12}	1952	-	+	0	-	-	-	keine Exposition möglich
11	W., R.	-	+	22 ^{1/12}	1953	+	-	-	-	-	+	-
12	L., O.	+	-	34 ^{10/12}	1953	-	+	0	-	-	+	-
13	Z., A.	-	+	63 ^{1/12}	1955	-	+	0	-	-	-	keine Exposition möglich
14	B., F.	+	-	61 ^{1/12}	1958	+	-	-	-	-	-	keine Exposition möglich

15	P., P.	+	-	47	1958	-	+	0	-	-	-	1959—1960
16	H., H.	-	+	57	1958	+	+	+	-	-	-	1959—1960
17	H., M.	+	-	70	1958	-	+	+	-	+	-	1959—1967
18	H., M.	+	-	58 ^{1/12}	1958	-	+	+	-	+	-	1959—1960
19	N., M.	-	+	60 ^{1/12}	1958	-	+	+	+	-	-	1959—1960 Arbeit in Haushaltverwaltung
20	P., E.	-	+	53 ^{1/12}	1957	+	+	0	-	-	-	keine Exposition möglich
21	D., F.	-	+	67 ^{1/12}	1957	+	+	0	-	-	-	keine Exposition möglich
22	F., M.	+	-	51 ^{1/12}	1958	-	+	0	-	-	-	keine Exposition möglich
23	P., F.	-	+	54	1958	+	+	0	-	-	+	-
24	B., H.	-	+	58	1958	+	+	0	-	+	-	1959—1960
25	G., R.	+	-	55 ^{1/12}	1958	-	+	0	-	+	-	1959—1960
26	K., D.	-	+	58 ^{1/12}	1958	-	+	0	-	-	-	keine Exposition möglich
27	A., O.	+	-	61 ^{1/12}	1958	+	-	-	-	-	+	-

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Zur Abklärung des diffusen miliären Pleura Mesothelioms

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Tabelle (Fortsetzung)

Nr.	Name	J	I	Alter bei Erst- diagnose oder Tod	Kalender- jahr des Todes	Diagnose gesichert		a) Asbest- körperchen, b) Fibrose der Lunge	Exposition			Beruf, Expositionsdauer
						histogro- logisch	patholo- gisch- morphologisch		beruflich	Verkehrs- verkehr	sonst	
29	H., E.	-	+	62/10	1960	-	+	+ gering +	+	-	-	vor 1919 Webern
30	L., P.	-	+	60/10	1961	-	+	0 0	+	-	-	1920-1937, 1940 bis 1943 Webern, Wickern
31	P., M.	-	+	104/10	1962	-	+	+ Atherosklerose +	+	-	-	vor 1930 als Arb. Nährer Beruf un- bekannt
32	V., P.	+	-	62/10	1962	-	+	Nachweis	Frühberuf			1938 - 1945 Haarer im Erstberuf
33	P., A.	+	-	62/10	1962	-	+	0 0	-	-	+	-
34	K., H.	+	-	54/10	1962	+	+	0 0	-	-	+	-
35	H., L.	-	+	38	1962	+	-	-	+	-	-	1921-1922 Stanzern
36	K., P.	-	+	38	1962	+	+	+ gering +	+	-	-	1928-1929 Stanzern
37	J., M.	-	+	67/10	1963	-	+	+	+	-	-	1916-1963 Spiborn
38	P., M.	-	+	70/10	1963	-	+	+	+	-	-	1940-1942 Webern

39	K., H.	+	+	70/10	1963	-	+	+	-	-	-	1923 - 1925
40	N., J.	+	-	60/10	1963	-	+	+	keine Exposition möglich			-
41	W., K.	-	+	60/10	1964	-	+	+ gering +	+	-	-	1920-1945 Stanzern, 1946-1951 Wickern bis 1945
42	M., B.	-	+	66	-	+	+	+ gering +	-	+	-	-

Wickern 1 Frau und in der Asbestmine durch und Asbeststaubexposition 2 Frauen, bzw. häufigste die Expositionsdauer betrug bei 6 Frauen bis zu 5 Jahren. Die kürzeste Expositionsdauer betrug 1 Jahr. Diese Frau hatte als Stanzern gearbeitet, 2 Frauen waren 10 Jahre und 20 Jahre tätig. Bei einer Frau konnte die Expositionsdauer nicht festgestellt werden. Es besteht jedoch kein Zweifel, daß diese Frau als Webern gearbeitet. Asbest beruflich exponiert war. Die Diagnose wurde nach eingehendster Untersuchung histologisch, anatomisch und funktionell durch Untersuchungsverfahren festgestellt. In 6 Fällen waren fibroblastische Langzeitveränderungen und Asbestkörperchen gesehen, davon 2 fibroblastische Asbestkörperchen. Bei der Langzeitform nur geringgradig ausgeprägt. Asbestkörperchen allein fanden sich bei 2 Frauen; in einem Falle konnten weder eine Langzeitform noch Asbestkörperchen gefunden werden. 1 Frau litt noch im Spätstadium an Asbestkörperchen nicht nachgewiesenen veränderten Bindegewebsveränderungen. Die Zeit zwischen der ersten Exposition und der Feststellung des Pleura-Mesothelioms betrug im Durchschnitt 17,4, die kürzeste 2, die längste 45 Jahre.

Bei der Gruppe b) handelt es sich um 4 Männer im Alter zwischen 55 und 69 Jahren. Im Durchschnitt betrug das Alter 64,4 Jahre. Weiter gehören dazu 5 Frauen im Alter zwischen 54 und 70 Jahren. Im Durchschnitt 60,6 Jahre. Sie hatten entweder in unmittelbarer Nähe einer Asbestfabrik gewohnt oder waren in einem anderen, in der Nähe der Dresdener Asbestfabrik befindlichen Betrieb ohne berufliche Asbestexposition tätig gewesen. Die Diagnose wurde durch Biopsie als gutartig gestellt. Drei kamen die histologischen Diagnose durch eine Biopsie ergab. Von den 4 Männern zeigte nur ein möglicher Mann, der in der Nähe einer Asbestfabrik 30 Jahre gewohnt und auch in einer in der Nähe befindlichen Gießerei tätig war.

In der schon zahlreichen Fälle mit Pleuraplasten gefunden wurden gew. beiderseits, eine geringe Lungenvergrößerung und einzelne Adenokörperchen. Bei den 5 Frauen wurde 2mal eine geringe Fibrose mit Adenokörperchen gesehen, 1mal konnten nur Adenokörperchen nachgewiesen werden. 2mal fanden sich keine Zeichen einer Adenose. In 5 Fällen steht demnach nur das Vorhandensein oder Abwesen in der Nähe von Adenokörperchen für eine Exzision gegenüber Aden.

Zu den Gruppen a) und d) ist zu sagen, daß es immerhin auffallend ist, daß bei 2 Männern im Alter von 60 und 62 Jahren in Verbindung mit einer Silikose ein Pleuramembranellum zu beobachten, das bei Silikosefällen im Bereich der Riliquerichthungsstelle Vorhanden in Verbindung mit einer Silikose lieber noch nicht beobachtet werden konnte. Imal liegt pathologisch anatomisch eine Beistätigung der Diagnose Pleuramembranellum vor. Von den Männern arbeitete 1 im Erzbergbau, 1 im Eisenbahnbau. In 7 Fällen, bei 5 Männern und 2 Frauen, konnte jedoch keinerlei Belastung nachgewiesen werden. Allerdings hat 1 Frau noch in einem Betrieb gearbeitet, in dem Arbeit zu heftigen Arbeiten verwendet wurde. Es konnte jedoch ein direkter Kontakt sowie eine Beteiligung an einem solchen Arbeitsplatz nicht bestätigt werden. Hier ist die Diagnose Pleuramembranellum 4mal durch Sektionen bestätigt. Das Alter der Männer lag zwischen 43 und 63 Jahren, im Durchschnitt bei 55,5 Jahren. Das Alter der Frauen betrug 22 und 55 Jahre.

In der Gruppe e) sind 4 Frauen und 4 Männer einzuzählen. Die Diagnose wurde 1mal röntgenologisch, 7mal durch Sektionen gestellt, jedoch konnten Hinweise auf eine Exzision gegenüber Arbeit nicht gefunden werden. Das Alter der Frauen lag zwischen 55,9 und 67,7, im Durchschnitt bei 60,6 Jahren, das der Männer zwischen 61,7 und 69,8, im Durchschnitt bei 65,8 Jahren.

An Hand der 27 Fälle von diffusen malignen Pleuramembranellen, die im pathologischen Institut der Medizinischen Akademie Breslau gesehen werden sind, mit auf die Pathologie dieses Tumors näher eingegangen werden.

Unter Mesotheliomen werden Tumoren verstanden, die ihren Ausgang von den Deckzellen (Mesothelien, Mesothelzellen) der serösen Hauto (Pleura, Peritoneum, Tunica vaginalis testis) nehmen. Sie werden entwicklungsgemäßlich von den Zellen hergeleitet, die die gemeinsame Leibeshöhle (Cavum) auskleiden, aus der sich Pleura-, Peritoneal- und Bauchhöhle entwickeln. Diese Zellen besitzen die Fähigkeit, sich sowohl in Richtung Epithel als auch in Richtung Bindegewebe zu differenzieren, weshalb man nach Quess die Mesotheliome in carcinomatöse und sarcomatöse Formen einteilt. Im alten Schrifttum existieren für derartige Tumoren zahlreiche Synonyma, wie Pleura-

Krebs, Pleuracarcinom, diffuse Pleura Fibroblasten Pleuracarcinom, Peritheliom, Interpleurischmeloid oder Pleuritis (Kraus und U. 1924; Verre).

In unseren Fällen kamen keine anderen Organe als die Pleura als die des Primärtumors in Frage. Das Pleuramembranellum war überall rechts und links lokalisiert. Es handelte sich ausschließlich um diffuse maligne Mesotheliome, wobei die Lunge selten, aber meist wenig von Tumorgewebe bis zu mehreren Zentimeter Dicke umgeben war. In 12 Fällen bestanden Lymphknotenvergrößerungen, wobei die thorakalen Lymphknoten fast regelmäßig befallen waren. Nur einmal wurde eine Lymphknotenvergrößerung der Lunge beobachtet. Eine Tumordiffusion der Nachbarorgane (Lunge, Herz, Brustwand, Zwerchfell, Mediastinum, Wirbelsäule, Lymphknoten Leber) bestand 1mal, in der gleichen Zahl der Fälle konnte eine hämatogene Organmetastasierung (Lunge, Herz, Leber, Niere, Nebennieren, Pankreas, Darm, Schilddrüse, Milz, Wirtel, die Haut) festgestellt werden.

1mal konnte eine Tumorausbreitung in andere seröse Höhlen (Hirnhaut, Peritoneum), vornehmlich im Hirnhautgebiet, gesehen werden. In 2 Fällen bestand der Einbruch eines isolierten Peritheliom-Mesothelioms. 1mal hatte sich der Tumor in die gegenwärtige Pleurahöhle ausgebreitet, während jedoch auch an die Möglichkeit eines doppelseitigen Pleuramembranells zu denken war. Pleuramembranellum, zum Teil von hämatogenen Charakter, bestanden 1mal, jedoch nicht regelmäßig mit einer Kompressionsreaktion im Gefolge. Eine besondere Lokalisation des Tumors aller beschriebenen Lungenschnitten konnte nicht festgestellt werden.

In histologischen Untersuchungen ergaben an Hand der morphologisch angefertigten und mit Mäntelungsfärbung gefärbten Schnitte von Tumoren und Lungenparaffinen zur Fixation wurde Formalin verwendet. Es handelt sich zum Teil um (Hefen-, teils um Paraffinschnitte, falls man der genauen Einteilung der Mesotheliome in carcinomatöse und sarcomatöse Formen, an ergibt sich folgendes Bild. Unter den Mesotheliomen fanden wir 15 carcinomatöse und 11 sarcomatöse Formen. In 1 Fall waren keine Präparate mehr vorhanden. Bei genauerer Durchsicht des Lungenpräparates konnten bei den 27 diffusen malignen Mesotheliomen der Pleura in 11 Fällen eine Lungenfibrose, meist geringen Grades, oder Adenokörperchen gefunden werden. Adenokörperchen mit interstitieller Lungenfibrose wurden 8mal gefunden, wobei die Fibrose in 6 der Fälle nur geringfügig entwickelt war. Zweimal wurde eine deutliche Adenose festgestellt. Die Adenokörperchen in der Lunge war mehr oder weniger reichlich Adenokörperchen, z. T. in Form von körnerförmigen Einschlüssen, ohne Fibrose nachgewiesen werden. Niemals wurden die Adenokörperchen direkt im Tumorgewebe gefunden, manchmal jedoch unmittelbar subpleural (Abb. 1)

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Abb. 1. Pleuraplethorax mit pleuraler Ergussung. Pleuralraum ist mit pleuraler Ergussung gefüllt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt. Die Pleuralwand ist verdickt.



Abb. 2. Pleuralraum mit pleuraler Ergussung. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt. Die Pleuralwand ist verdickt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt.

Zur Röntgenologie des Pleuraplethorax ist anzumerken, daß es bei pleuraler Ergussung zu einer Verdrängung des Lungens nach unten und außen kommt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt. Die Pleuralwand ist verdickt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt.

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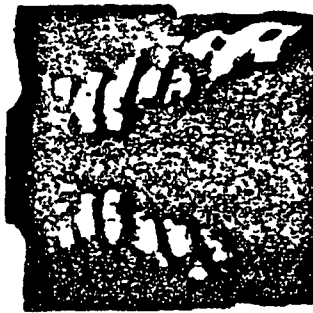


Abb. 3. Pleuralraum mit pleuraler Ergussung. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt. Die Pleuralwand ist verdickt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt.

Nach einer Überdilatation des Pleuralraums ist die Röntgenologie des Pleuraplethorax anzumerken, daß es bei pleuraler Ergussung zu einer Verdrängung des Lungens nach unten und außen kommt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt. Die Pleuralwand ist verdickt. Die Ergussung ist reichlich mit Erythrozyten und Leukozyten durchsetzt.

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Abgrenzung des Kragens, die für das diffuse Pleuramembranbecken charakteristisch ist, bis zur Lungenapex hin reichenden an der lateralen Thoraxwand lokalisierten scharf begrenzten, isolierten Abschnügelungen.



Abb. 3. R. P., 30 J. Thoraxröntgenaufnahme. P. s. Membran Abschnügelung des linken Thoraxwand mit Ausbuchtung zum isolierten Kragensabschnitt.



Abb. 4. Thoraxröntgenaufnahme. P. s. 30 J. 30 J. Thoraxröntgenaufnahme. P. s. Membran Abschnügelung des linken Thoraxwand mit Ausbuchtung zum isolierten Kragensabschnitt.

flächen erkennbar. Diese Abschnügelungen können sich auch bei Durchleuchtung nicht von der Thoraxwand trennen und haben das typische in der Literatur als glattwandförmig, auch als gestreiftenförmig beschriebene Aussehen (Abb. 4-6).

In den Endstadien breitet sich der Tumor auch in der Pleura des anderen und oberen Mediastinums weiter aus und zeigt hier entsprechende Veränderungen. Nimmt die Geschwindigkeit ihren Bewegungspunkt von den lateralen Abschnügelungen der lateralen Pleura dann greift sie schnell auf das Perikard über, der ungenügenden Lokalisation wegen kann diese Pathologie als maligne vor es zur Ausbreitung der Tumor auf die Perikardiale Thoraxwand Pleura kommt. Diese war selten vorkommenden Fälle erstehen dann den Pleura durch einen isolierten Perikardialabschnitt, wie es ähnlich in den oben genannten zwei Fällen gesehen werden ist.



Abb. 5. Thoraxröntgenaufnahme. P. s. 30 J. Thoraxröntgenaufnahme. P. s. Membran Abschnügelung des linken Thoraxwand mit Ausbuchtung zum isolierten Kragensabschnitt.

Diskussion

Für den engen Zusammenhang einer Lungenabszesse und dem Pleuramembranbecken heute keine Zweifel mehr, was auch im Vergleich mit seinen Nachbarn gesehen hat. Es wird eine Verbindung mit einem Pleuramembranbecken als entscheidend zur richtigen Beurteilung von diffusen malignen Pleuramembranbecken mit der Lungenabszesse. Derartige Tumoren, die im Pleuramembranbecken vorkommen, werden von allen nach heftiger Exposition beobachtet. In letzter Zeit haben Warren u. Mitchell, wie oben schon erwähnt wurde über 30 Fälle dieser Tumoren berichtet, bei denen auch eine außerordentliche Gefäßbildung in Pleura beobachtet wurde. Jones und Raman haben schon darauf hin, daß eine Häufung von Sekundären im Zusammenhang mit einer Abszesse nicht selten zu beobachten war. Erste Mitteilungen eines Pleuramembranbeckens in Verbindung mit einer Abszesse geben in Deutschland auf Wenzel zurück. Dieser ist entsprechend dieser Mitteilung den in der Tabelle unter Nr. 1-6 aufgeführten Fällen nicht nachgegangen worden. Möglicherweise hätte sich schon damals ein Zusammenhang mit einer Abszesse manifestieren können, was doch auch in unseren Fällen ein

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