G Chir Vol. 28 - n. 11/12 - pp. 435-438
Novembre-Dicembre 2007

Peritoneal malignant mesothelioma: case report

L. TENAGLIA, L. PROIETTI[1], S. CALÌ, S. TROVATO, N. ACCURSO, C. DI STEFANO, G. CATANIA

SUMMARY: **Peritoneal malignant mesothelioma: case report.**

L. TENAGLIA, L. PROIETTI, S. CALÌ, S. TROVATO, N. ACCURSO, C. DI STEFANO, G. CATANIA

Our study reports peritoneal diffuse malignant mesothelioma (DMM) in a 43 years old male patient, with no exposure to the asbestos in his medical history; the partner of patient was also not exposed to asbestos. The exposure to X-rays was also excluded.

Different pathogenic mechanisms for the pathogenesis of a peritoneal diffuse malignant mesothelioma in this patient can be hypothesized, for example, SV40 infection and genetic susceptibility; a minimal domestic exposure to asbestos can be not excluded. Therefore, further studies in a more large number of subjects are necessary to determine whether one or all of these hypothetic pathogenic mechanisms are more significant for the develop of malignant mesothelioma.

RIASSUNTO: **Mesotelioma maligno del peritoneo: caso clinico.**

L. TENAGLIA, L. PROIETTI, S. CALÌ, S. TROVATO, N. ACCURSO, C. DI STEFANO, G. CATANIA

Viene riportato un caso di mesotelioma peritoneale diffuso maligno in soggetto di sesso maschile, di anni 43, con anamnesi negativa per pregressa esposizione ad asbesto, né occupazionale diretta né indiretta, quale ad esempio la convivenza con partner esposto, né ambientale. È stata inoltre esclusa esposizione a radiazioni ionizzanti.

Anche se non è possibile escludere un eventuale responsabilità del virus SV40, appare ragionevole ritenere che una eventuale minima esposizione ad asbesto nell'ambiente domestico e la concomitante suscettibilità genetica possano aver determinato l'instaurarsi della malattia. Pertanto ulteriori studi su larga scala sono necessari per determinare quali tra i possibili meccanismi patogenetici siano davvero responsabili dell'insorgenza di un mesotelioma maligno.

KEY WORDS: Asbestos - Peritoneal mesothelioma.
Asbesto - Mesotelioma peritoneale.

Introduction

The mesothelioma is a rare malignancy that has origin from pleura (95.5%) or peritoneum (4%); more rarely it can be localized in the pericardium or in the vaginal tunica of the testicle (1). In the USA there's an incidence of about 2,500 cases/year (2).

The diagnosis is often difficult both for clinical features, due to the necessity of a differential diagnosis of a primitive neoplasia from metastasis, and for a morphological features, because the mesothelial malignancies can be epithelial-like (tubular-papillous, nonglandular, solid), sarcomatous-like, undifferentiated or mixed forms (3-4). About the 50% of the mesothelial malignancies are epithelial-like forms, while the 25% and the 15% are respectively mixed and sarcomatous-like forms (5). The other cases are undifferentiated or specific subtypes. These subtypes are represented by desmoplastic, lymphohistiocytoid, small cells, and decidual forms (3). The tubular-papillous type of the epithelial forms have better prognosis than the sarcomatous form (6).

Diffuse pleural and peritoneal mesotheliomas, have many common characteristics, especially the histopathology and the immunophenotype (7). The clinical features and the treatment are different and depend on the localization of the neoplasia. The peritoneal tumour takes origin from the serosa and is characterized by peritoneal dissemination and presence of ascites;

Università degli Studi di Catania
A.O. "Vittorio Emanuele", Catania
Dipartimento di Chirurgia - Sezione di Chirurgia Generale ed Oncologica
[1] Dipartimento di Medicina del Lavoro e Patologie Sistemiche
Sezione di Medicina del Lavoro

when there's invasion of the bowel, the untreatable ascites determines the death. Usually, these neoplasias are confined into the abdominal cavity and they rarely invade the liver. In the advanced stages there can be pleural invasion and metastatization (8). A study based on the natural history of this pathology showed the 2/3 of the patients had only intrabdominal neoplasia, and the 78% of them died for intrabdominal disease progression (9).

The prognosis is very poor, with a survival range that approximately amount from 7 to 13 months (10). Diffused malignant mesothelioma is usually treated with palliative surgery, in order to resolve intestinal obstruction or massive ascites, radiotherapy, chemotherapy, but no therapy is really useful. Recently some clinical trials demonstrated that a multimodal therapy combining debulking surgery with peritonectomy and hypertermic peritoneal perfusion increased the survival in selected patients (10).

Currently, the asbestos is considered the more important aetiological factor of the pleural and peritoneal mesothelioma. Between several types of asbestos, the crocidolite (the blue asbestos) and the amosite (the tawny asbestos) are much more powerful of chrysotile (the white asbestos) in causing this neoplasia. The greater carcinogenicity of two amphibole asbestos versus the asbestos of serpentine has been explained because rectilinear amphibolyc fibres easier take lymphatic way and go into the pleural tissue than fibres of serpentine which are characterized by longitudinal or axial curves. In particular, the peritoneal mesothelioma seems to be correlated to the exposure to the crocidolite (11). As for what is happening in Europe and in various countries as the Great Britain (12), in Italy there's a great increase of this disease related to a wide spread of the asbestos especially in the 50's and 60's.

From 1988 to 1992 the total number of the deaths for pleural and peritoneal mesothelioma in Italy has been 2700 in the male population and 1519 in female (approximately 2:1) (13).

In the casuistry of the COR (Centro Operativo Regionale) in Puglia (Italy) from 1980 to 1997, it has been noticed that the sure exposures to asbestos correspond to 36.8% of the cases of mesothelial malignancies, the probable ones to 0.9%, the possible ones to 24.5%, the indirect ones to 5.9%; at last in 15% of the cases there is'nt document of any exposures (14). According to recent studies the percentage of mesothelioma in absence of exposure to asbestos is equal or inferior to 1 or 2 cases/year for every million persons (15, 16).

Therefore we consider interesting our case of peritoneal mesothelioma in a young man for whom no exposure to asbestos could be evidenced.

Case report

A 43 years old man was admitted to hospital on August 2006 with a quite subcontinuos pain, firstly localized in the right hypochondrium, but recently diffuse to whole abdomen, with fever (about 37°C), irregular alvus and abdominal meteorism. He suffered from asthenia and inappetence. Moreover, he referred a loss of weight of about 8 kg in the last 3 months. He had a medical history characterized by an appendectomy and a varicocelectomy.

The ultrasonography showed hepatic steatosis and a hypoechogenic mass of about 4 cm of diameter under the inferior pole of the spleen. A CT scan showed a hypo-dense, polilobated, solid mass with a cranium-caudal extension of about 7,5 cm, adjacent to the tail of the pancreas; no presence of lymphadenomegaly.

On admission he underwent to routinely serologic examinations and to an abdominal MR. That confirmed the data reported in the previous CT scan. Therefore, we decided to perform a surgical procedure.

Through a bilateral subcostal incision, we found a diffuse peritoneal carcinosis and a large neoplastic mass growth from the spleen to the lower abdominal quadrants. The frozen sections showed neoplastic cells of an adenocarcinoma. Therefore we renounced radical surgery.

The patient was discharged in 6th day after a regular postoperative course. The definitive histological examination showed an epithelial-like tumour with partially solid and papillary structures and other free neoplastic elements in the ascites. The morphologic and immunophenotypical reports were compatible with the diagnosis of a peritoneal malignant mesothelioma.

Discussion

Many epidemiological studies have well documented the relationship between exposure to asbestos and mesothelioma (17). Malignant mesothelioma is considered a "target" neoplasia of exposure to asbestos (18), even if, in spite of the association with past exposure, only someone of people develops the disease after exposure. Asbestos is considered the most important aetiological factor for this neoplasia, but cases of pleural mesothelioma have been observed in apparently not exposed subjects (19-20), maybe due to the misunderstanding of the exposure, that sometimes can pass unnoticed both to the patient than to the doctor. It is important to consider that for the mesotelioma onset, low and very low doses of asbestos too have pathogenic potentiality, as described by Selikoff in 1978 (The triggering dose can be small, in sure cases extraordinarily small.) (21).

Recent medical publications assert that "all the available informations indicate that mesothelioma, with this characteristic of independence from the amounting inhaled asbestos, differs not only from the other diseases provoked from the asbestos (asbestosis and pulmonary cancer) but also from all the other tumours from cause or concomitant cause, professional or not (chromium, from hydrocarbons,

from tobacco, etc.) for which there is a clear relation dose/answer".

Many scientific studies assert that in the genesis of this tumour, some individual characteristics are more important than others to made some subjects much more receptive than others to the carcinogenic action of the asbestos on the pleura and peritoneum (22). The individual susceptibility seems to have a primary role in the pleural genesis of malignant mesothelioma (23). Therefore the case we described could be explained by this pathogenic hypothesis. Exposing sources are present everywhere, like the indoor and outdoor pollution, specially from brakes and clutches of the older cars, and the building materials used until the 70's. It is also important the inner pollution of public buildings, due to the asbestos fibre released in the building materials for its antifire and insulating qualities. Such materials have been used for the isolation especially in schools, hospitals, theatres, cinemas, in the conditioning systems, ships. In domestic atmosphere there can be present objects containing asbestos as old gas heater, some domestic appliances, insulators placed behind heaters in kitchen, gloves, etc. There are also the pollution of the hinterland industrial areas where is a great use of the asbestos, the not controlled dispersion from rubbish dumps, natural or produced pollution from industrial or mining drainages, demolitions and removals of materials containing asbestos, erosion of roofs, sheds, etc., or release from the ducts in concrete asbestos in the drinkable water. The pollution of life atmosphere, even if less than that in job atmospheres, can represent an important problem for the human health related to the high number of persons who can be exposed and to the timing of the exposure. They have been estimated in 0,2-3,7 for 100,000 the number of the deaths for pulmonary tumour and mesothelioma due to one exposure to 0,001 asbestos fibres for millilitre (1 air/l fibre) inhaled in scholar age beginning from 10 years old in scholastic atmosphere for 5 years using as medium age of life 75 years. Generally the atmosphere pollution is three-fold smaller of the limit established in job atmospheres, but even if the level appears low, however that does not mean that it can be ignored.

We must remember that even the WHO has recognized the impossibility to characterize a threshold value of asbestos fibre concentration in the air under which there isn't any risk. There have been alarms of the ultrafine fibre presence in the lung of subjects only exposed to the pollution of life's atmosphere (24).

The exposure to radiations, a risk factor for pleural mesothelioma (25), is not to be considered as a possible aetiological agent because our patient has not had any treatment like this. For what concern radiations, we have found in literature many cases of mesothelioma in patients who had been subordinates to radiating therapy for neoplasias, but a recent study made by Neugut et others (26) on 250,000 patients with breast cancer and Hodgkin' s disease, 255 of which had been subordinate to radiotherapy, has shown a relative risk to develop mesothelioma after thoracic radiotherapy of 1.6 with a IC to 95% of 0.2-5.6 not statistically significant. Without radiating therapy the relative risk has turned out of 0,9% (0.2-2.2). This excludes a relation between irradiation of the chest and mesothelioma.

For what concern alimentary habits, other risk factor for mesothelioma, our patient used Mediterranean diet and he did not have any preferences for foods like tomatoes, carrots, broccoli and spinach (27). In literature the risk of development of mesothelioma due to a particular type of diet remains uncertain.

It is not possible to exclude an eventual contamination from virus SV40, that empowers the carcinogenic action of asbestos (28). This agent would carry out its action not by the integration in the DNA of the mesothelial cells, but with an episomal mechanism. Such observations take origin from the fact that studies has demonstrated that the intrapleural injection of SV40 is capable to induce a malignant mesothelioma in the 100% of animals from experiment independently from the exposure to the asbestos (29).

The statistical data, available today, are contrasting and they do not permit conclusions, probably because no study has never had a sufficiently long follow-up to evidence malignancies characterized from long latent periods; no case control study finished (30). The remarkable contribution of biomolecular data suggests the possibility of a aetiopathogenic association between SV40 and asbestos in malignant mesothelioma.

In conclusion, the case we reported of a peritoneal mesothelioma without evident exposure to asbestos, places not few problems as regards the possible aetiological relation. In the absence of other risk factors like exposure to radiations, contamination from SV40 and particular diet, it appears quite reasonable to think that the eventual minimal exposure to asbestos in domestic atmosphere and the concomitant genetic susceptibility can be responsible of the disease.

This case, like others described in literature (31), make other studies necessary, in order to improve the knowledge of the relationship between the natural and unnatural causes in development of the neoplasia.

References

1. Kerrigan SA, Turnnir RT, Clement PB, et al. Diffuse malignant epithelial mesotheliomas of the peritoneum in women: a clinicopathologic study of 25 patients. Cancer. 2002; 94: 378-385.
2. Price B. Analysis of current trends in United States mesothelioma incidence. Am J Epidemiol. 1997; 145:211-20.
3. Battifora H, McCaughey WTE. Tumours of the serosal membranes. In: Atlas of tumor pathology. Third series. Fascicle Washington, DC: Armed Forces Institute of Pathology, 1995.
4. Weiss SW. World Health Organization, International Histological.Classification of Tumours. Histological typing of soft tissue tumours. 2nd edition. Berlin: Springer-Verlag, 1994.
5. Kannerstein M, Churg J. Progress in surgical pathology. Vol II, 1980; 19-20.
6. Johansson L, Linden CJ. Aspects of histopathologic subtype as a prognostic factor in 85 pleural mesotheliomas. Chest. 1996; 109: 109-114.
7. Trupiano JK, Geisinger KR, Willingham MC, et al. Diffuse malignant mesothelioma of the peritoneum and pleura, analysis of markers. Mod Pathol. 2004; 17:476-481.
8. Kannerstein M, Churg J. Peritoneal mesothelioma. Hum Pathol. 1977; 8: 83-94.
9. Antman KH, Blum RH, Greenberger JS, et al. Multimodality therapy for malignant mesothelioma based on a study of natural history. Am J Med. 1980; 68: 356-362.
10. Sebbag G, Yan H, Shmookler BM, et al. Results of treatment of 33 patients with peritoneal mesothelioma. Br J Surg. 2000; 87: 1587-1593.
11. F.Pofi, S.Zaffina; P.Modugno, G.Ardito, F.Vinci. A proposito di un caso di mesotelioma peritoneale. Acta Mediterranea Volume 13,N2 spe. Palermo 1997.
12. Peto J., Decarli A., La Vecchia C., et al.: The European mesothe-lioma epidemic. Br. J. Cancer, 79, 566-572, 1999.
13. M.Di Paola, M Mastrantonio,M Carboni,S.Belli,M.Grignoli, P.Comba, M.Nesti La Mortalità per tumore maligno della pleura in Italia negli anni 1988-1992 Istituto Superiore di Sanità Rapporti Istisan 1996.
14. M. Musti, L. Palanà D. Cavone Il registro Nazionale dei Mesoteliomi – Casistica del mesotelioma in Puglia Acta Medica Mediterranea Vol. 13, n.2 spec. 1997.
15. Hillerdal G. Mesothelioma cases associated with non-occupational and low dose exposures. Occup Environ Med 1999;56(8):505-13.
16. McDonald AD, McDonald JC. Malignant mesothelioma in North America. Cancer 1980;146:1650-6.
17. Mossman BT, Gee JBL: Asestos related diseases. N. Engl J Med, 320: 1721-1730, 1989.
18. Rutstein DD, Mullan RJ, Frazier TM, Halperin WE, Melius JM, Sestito JP. Sentinel Health Events (occupational): a basis for physician recognition and public health surveillance.Am J Public Health. 1983 Sep;73(9):1054-62.
19. McDonald JC, McDonald AD: Epidemiology of mesothelioma from estimated incidence. Prev Med, 6: 426-446, 1977.
20. Spirtas R, Heineman EF, Bernstein L, Beebe GW, Keehne JR, Stark A, Harlow BC, Benichou J: Malignant mesothelioma;attributable risk of asbestos exposure. Occup Environ Med, 00: 804-811, 1994.
21. Selikoff IJ: Mortality experience of insulation workers in the United States. Ann NY Acad Sci, 330:91-116, 1979.
22. Huncharek M Non asbestos related diffuse malignant mesothelioma. Tumori, 88:1-9,2002.
23. Viana NJ, Polan A: Non -occupational exposure to asbestos and malignant mesothelioma in females. Lancet, 2: 521-522, 1978.
24. Dodson RF, Atkinson MA, Levin JL. Asbestos fiber length as related to potential pathogenicity: a critical review. Am J Ind Med. 2003 Sep;44(3):291-7.
25. Sanders CL. Pleural mesothelioma in the rat following exposure to 239PuO2. Health Phys. 1992 Dec;63(6):695-7.
26. Neugut AI, Ahsan H, Antman KH: Incidence of malignant pleural mesothelioma after thoracic radiotherapy. Cancer, 80: 948-950, 1997.
27. American Health fundation. Proceeding of a workshop on new developments on dietary fat and fiber in carcinogenesis (optimal types and amounts of fat or fiber). Prev. Med, 16:499-495, 1987.
28. Viana NJ, Polan A: Non -occupational exposure to asbestos and malignant mesothelioma in females. Lancet, 2: 521-522, 1978.
29. Gazdar AF, Carbone M . Molecular pathogenesis of malignant mesothelioma and its relationship to simian virus 40. Clin Lung Cancer. 2003 Nov;5(3):177-81.
30. Cristaudo A, Foddis R, Bigdeli L, Vivaldi A, Buselli R, Guglielmi G, Guidi M, Ottenga F. SV40: a possible co-carcinogen of asbestos in the pathogenesis of mesothelioma? Med Lav. 2002 Nov-Dec; 93(6): 499-506.
31. Proietti L, Migliore M, Polosa R, Comba P, Circo C, Di Maria GU. Malignant pleural mesothelioma in housewives in the province of Catania] Recenti Prog Med. 2004 Jul-Aug;95(7-8):365-8.