


## CASE REPORT

# Peritoneal mesothelioma associated with bladder cancer and occupational exposure to asbestos: A case report

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## Abstract

Mesothelioma is a rare tumor usually located on the pleura. In this typical location, it is closely linked to asbestos exposure. However, in other locations such as in peritoneal mesothelioma, the association to asbestos remains unusual.

## KEYWORDS

asbestos, mesothelioma, peritoneum, profession

## 1 | INTRODUCTION

Mesothelioma is a rare tumor usually located on the pleura. In this typical location, it is closely linked to asbestos exposure. However, in other locations such as in peritoneal mesothelioma, the association to asbestos is not clearly established.

We present the case of a 47-year-old man, versatile worker in a craft brickyard, who was exposed to asbestos fibers emitted from an oven used for the preparation of bricks. The patient presented with abdominal pains and a deterioration of his general condition. A CT Scan was performed showing a diffuse infiltration in peritoneal fat and an effusion of the vesical wall. The histological examination showed a peritoneal mesothelioma associated with a bladder urothelial carcinoma.

Giving the chronic exposure to the asbestos, the Tunisian workers' Compensation Authority recognized the occupational origin of the peritoneal mesothelioma.

Similarly to its pleural location and in the absence of other factors, we considered asbestos exposure as the cause of peritoneal mesothelioma.

Mesothelioma is a rare tumor that affects the cells of the mesothelium, a protective membrane that covers most

internal organs of the human body including the pleura, peritoneum, and pericardium.<sup>1</sup>

Several agents likely to induce this mesothelioma were reported such as exposure to erionitis which is a fibrous mineral whose properties are similar to those of asbestos, exposure to radiation, receiving a polio vaccine between 1955 and 1963 that was contaminated with simian virus 40 (SV40) and/or genetic susceptibility.<sup>2,3</sup>

Although the causal link between pleural mesothelioma and asbestos exposure is well established, this relationship is still controversial for peritoneal mesothelioma.

Thus, we report a case of peritoneal mesothelioma in a patient with occupational exposure to asbestos.

## 2 | CASE REPORT

A 48-year-old male with a history of active smoking for 45 pack years presented with gradual onset of generalized abdominal pain and distention associated with anorexia, asthenia, and weight loss.

The patient worked as a versatile worker in a traditional brickyard for 19 years. Centered around the oven that was

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old and worn out, his responsibilities include subsequently mixing the raw materials intended to be placed in an oven containing friable asbestos used as a thermal insulator, molding the bricks than drying them, and extracting after they cool down. At the end of the shift, he was responsible of cleaning the open with a brush that contained asbestos dust. However, the patient also reported bad industrial hygiene conditions and a lack of protective respiratory devices. Also, no medical supervision in the context of occupational medicine was provided to him. The patient did not have any exposure to other occupational or environmental carcinogens apart from smoking and asbestos exposure. In addition, he did not have any past medical or surgical history, any comorbid conditions, and any medication at the time of the presentation.

The physical examination was significant for abdominal distention without a palpable mass. The patient had computerized tomography of chest abdomen and pelvis with IV contrast which revealed, diffuse infiltration of peritoneal fat with ascites and focal effusion of the left and lateral wall of the bladder.

Histopathological examination of the biopsy samples obtained from peritoneal and bladder lesions led to the diagnosis of malignant peritoneal mesothelioma of epithelioid subtype associated with urothelial bladder cancer.

However, radiological investigations of the thorax did not reveal any signs of asbestos exposure.

The patient was treated with hyperthermic intraperitoneal chemotherapy based on 5-fluoro-uracil and cisplatin and six sessions of systemic chemotherapy with etoposide dosed at 100 mg per session and endoscopic treatment of his bladder tumor.

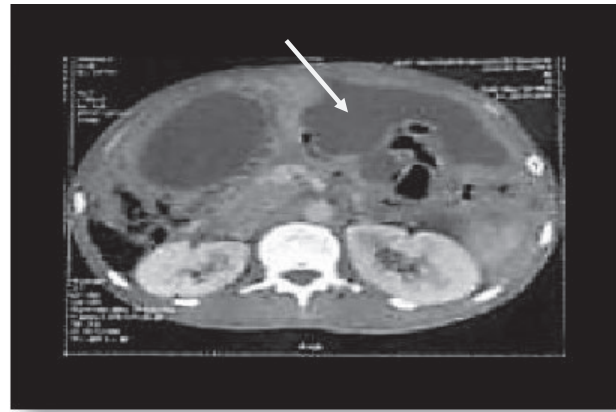
The initial evaluation was marked by a partial improvement of its general state. Since, the patient was lost to follow-up and he did not have any repeat scans after the treatment. On the other side and in the absence of medical coverage at work, he resumed his usual professional activity.

Approximately 3 years later, the patient was hospitalized for continuous, slowly worsening abdominal pain.

Total body positron emission tomography (PET) showed diffuse epiploic mesenteric infiltration associated with peritoneal thickening and a significant ascites evoking a recurrence of peritoneal mesothelioma (Figures 1, 2 and 3). No signs of recurrence of the bladder tumor were objectified.

The patient benefitted again from hyperthermic intraperitoneal chemotherapy with the same initial protocol (5 fluoro-uracil and cisplatin). The clinical course was marked by a slight improvement (onset of pain reduction) and stabilization of the radiological image.

The patient was referred to a department of occupational pathologies to study the accountability of this illness to his profession.



**FIGURE 1** Tomography of chest abdomen and pelvis showing diffuse infiltration of peritoneal



**FIGURE 2** Tomography of chest abdomen and pelvis showing diffuse epiploic mesenteric infiltration



**FIGURE 3** Tomography of chest abdomen and pelvis showing a significant ascites

Tunisian Judicial Authority recognized the occupational origin of mesothelioma considering the chronic asbestos exposure.

### 3 | DISCUSSION

Malignant peritoneal mesothelioma (MPM) is a rare disease whose evolution remains fatal.<sup>4</sup> Its epidemiology is complicated because of the possible geographical and temporal variations. In all mesotheliomas, peritoneal mesothelioma occurs, in order of frequency, the second place after pleural location.

In addition, peritoneal malignant mesothelioma accounts for 10 to 30% of malignant mesotheliomas with an annual incidence estimated at 1 in 500 000 in France and 1 in 200 000 in certain regions of Europe (Italy).<sup>5</sup> It occurs preferentially in the middle ages with an average age ranging from 47 to 60.5 years.<sup>6</sup>

Three forms of mesothelioma are described with different physiopathology, morphology, and prognosis: diffuse malignant mesothelioma, well-differentiated papillary mesothelioma, and multi-cystic mesothelioma. Among the malignant mesotheliomas, three types are individualized: diffuse epithelioid mesothelioma (the most common) as observed in our case, sarcomatoid mesothelioma, and biphasic mesothelioma.<sup>6</sup>

For the treatment and in the absence of consensual therapeutic management,<sup>7</sup> the treatment has long been palliative. Currently, a more aggressive therapeutic management of peritoneal mesothelioma has emerged and has considerably modified the prognosis of the pathology. It combines cytoreductive surgery, hyperthermic intraperitoneal chemotherapy (HIPEC), and systemic chemotherapy.

Regarding HIPEC, the protocols are not standardized. Several regimens have been proposed based on mono or ploy-chemotherapy with mitomycin C, cisplatin, doxorubicin, 5-fluoro-uracil with comparable results.<sup>8,9</sup>

For systemic chemotherapy, several agents have been used ( etoposide, cisplatin, gencitabine, vinorelbine, raltitrexed Pemetrexed...) with poor response rates. Etoposide had shown its efficacy in the treatment of pleural mesothelioma, by analogy it was proposed in the management of peritoneal mesothelioma.<sup>11</sup>

Exposure to asbestos is the main risk factor for pleural mesothelioma. However, this causality is not clearly established for peritoneal mesothelioma and the debate concerning the mechanism of exposure of peritoneal cells to asbestos remains open. On the other hand, several studies have established a relationship between asbestos exposure and peritoneal mesothelioma.<sup>12</sup>

The latter usually it appears as a tumor secondary to primary source of malignancy pleural mesothelioma. Inhaled asbestos fibers in the lungs would be transported by the lymphatic system to the abdominal cavity, or enter directly into the digestive tract after ingestion. Cancer cells from the primary source could also become mobile and spread through the lymphatic system to other areas, causing metastases.<sup>13</sup>

In our patient, pleuro-pulmonary lesions were not observed in thoracic radiological investigations, which could be related to a direct mechanism of exposure to asbestos fibers.

The link between peritoneal mesothelioma and asbestos exposure has been described previously among workers in different jobs.

In the literature, the age of patients ranged from 45 to 75 years. Job tenure ranged from 7<sup>14</sup> to 40 years.<sup>15</sup> Our patient was working for 19 years before the onset of his illness.

The main occupations were as follows: a hairdresser using hair dryers emitting asbestos dust,<sup>16</sup> a mine worker,<sup>15</sup> a former soldier,<sup>17</sup> and a worker in buildings handling asbestos cement.<sup>14</sup>

Besides asbestos exposure, these patients with peritoneal mesothelioma had no other risk factors.

The association of the bladder carcinoma and the peritoneal mesothelioma in the same patient is exceptional. This situation was previously reported in a 75-year-old man with significant occupational exposure to asbestos. In this case, the bladder tumor appeared 5 years before peritoneal mesothelioma.<sup>17</sup> In our case, the diagnosis of urothelial carcinoma was concomitant with that of peritoneal mesothelioma.

This association could signal a possible relationship between exposure to asbestos classified as a certain carcinogen for humans by the International Agency for Research on Cancer (IARC)<sup>18</sup> and bladder cancer.

Nevertheless, the histological type is different for two tumors identified which eliminates the hypothesis of peritoneal mesothelioma metastasized in the bladder. Similarly, the presence of active smoking in our patient would be the most implicated etiological factor in bladder cancer.

Another association with renal carcinoma with clear cells described by Candura SM in 2016.<sup>14</sup>

The modalities of expression of the disease were abdominal pain as was the case for our patient, hemorrhagic ascites,<sup>19</sup> a cutaneous nodule,<sup>17</sup> or a fortuitous finding.<sup>20</sup> Chrysotile was the form of asbestos most implicated in the occurrence of peritoneal mesothelioma. There was no documented exposure to products containing amphiboles.<sup>21</sup>

About the histological type, diffuse malignant mesothelioma of the epithelioid type was the most common type and no case of pure sarcomatoid mesothelioma was reported<sup>16</sup> Nevertheless, two cases of biphasic mesothelioma were reported by Candura SM and Cabibi D, respectively.<sup>14-22</sup>

Finally, our observation is similar to the cases described in the literature from standpoint of exposure to asbestos, the time of onset of the disease, the absence of other risk factors and the histological type revealed.

Regarding occupational origin, peritoneal mesothelioma is recognized in our country by our system of compensation as an occupational disease, once the criteria for recognition are established.

## 4 | CONCLUSION

Peritoneal malignant mesothelioma is a rare tumor, for which the etiological role of asbestos exposure is very likely.

Thence, and in front of the rapidly developing nature of this tumor, making early detection difficult, setting up collective and individual technical protection proves essential.

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None.

## CONFLICT OF INTEREST

None.

## AUTHOR CONTRIBUTIONS

DB: drafted the manuscript and performed literature search. NM: drafted the manuscript and performed literature search. HBS: performed literature search. DC: provided images and performed literature search. NL: supervised the study and approved the manuscript. IY: supervised the study and approved the manuscript.

## INFORMED CONSENT

Informed consent was obtained for this case.

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