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## Case report

# Myelomatous pleural effusion-A case report

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## ARTICLE INFO

### Article history:

Received 25 August 2011

Accepted 26 August 2011

### Keywords:

Multiple Myeloma

Myelomatous pleural effusion

Pleural plasmacytoma

## ABSTRACT

Multiple myeloma is a malignant proliferation of plasma cells, predominantly involving the bone marrow and skeletal system. Pleural effusions are rarely associated with multiple myeloma and most often signify a concurrent disease process, e.g. amyloidosis.<sup>1,2</sup> Malignant myelomatous pleural effusions are even more unusual, occurring in less than 1% of cases of multiple myeloma.<sup>1</sup>

Here we report the case of a patient with multiple myeloma presenting with a myelomatous pleural effusion at disease recurrence.

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## 1. Case report

A 66-year old female was diagnosed with multiple myeloma in June 2009. At diagnosis she had an IgG kappa paraprotein of 95.6 g/L and bone marrow histology showed 90% infiltration with plasma cells. She completed 8 months of Cyclophosphamide, Thalidomide and Dexamethasone (CTD) chemotherapy following which her end-of-treatment bone marrow trephine biopsy showed no detectable plasma cells and her paraprotein had reduced significantly to 6.8 g/L. She remained in remission until November 2010 when it was noted that her IgG paraprotein was steadily rising (46.2 g/L). However, repeat bone marrow trephine biopsy at this time did not show any evidence of disease recurrence.

In December 2010 the patient presented to hospital with a one week history of shortness of breath and right sided chest pain. Chest radiography confirmed a large right sided pleural effusion (Fig. 1). An intercostal drain was inserted and 2 L of blood-stained pleural fluid drained. Biochemical analysis of the pleural fluid confirmed that it was an exudate, (protein 34, LDH 924, glucose 3.4), and further pleural fluid was sent for culture and cytology.

A staging CT, (neck, chest, abdomen and pelvis), performed following drainage of the pleural fluid, revealed marked right sided pleural thickening (Fig. 2). Radiologically the CT appearances were consistent with a mesothelioma. A CT guided pleural biopsy was performed 10 days later. The patient had become increasingly dyspnoeic again and her CT images at this time showed marked progression of the pleural thickening with recurrence of the pleural

effusion. Following the pleural biopsy the patient had an indwelling tunnelled chest drain inserted allowing her effusion to be drained on a weekly basis in the community.

Unexpectedly, the histology from the pleural biopsy was consistent with a pleural plasmacytoma and not a primary pleural malignancy. Furthermore, the cytology from the pleural fluid confirmed the presence of plasma cells.

The diagnosis of myelomatous pleural effusion secondary to a pleural plasmacytoma was made in this patient. This is an unusual site for disease recurrence in multiple myeloma and was undoubtedly the source of this patient's previously unexplained rising paraprotein.

The patient was commenced on second-line chemotherapy, (Cyclophosphamide, Velcade (Bortezomib) and Dexamethasone; CVD), to which she initially had a good response. The pleural fluid did not re-accumulate for several weeks and her tunnelled chest drain was removed. However in March 2011 she returned with increasing shortness of breath and right-sided pleuritic chest pain. A CT pulmonary angiogram confirmed the presence of a pulmonary embolus and demonstrated a marked increase in the right-sided pleural thickening. The patient was anticoagulated and in view of her progression on second-line chemotherapy was given high dose Melphalan with Dexamethasone. The use of Melphalan appears to have halted the progression of her pleural plasmacytoma at present, however, it remains to be seen whether this chemotherapy regime will be successful in the long term.

## 2. Discussion

The development of pleural effusions in multiple myeloma is unusual. Kintzer et al. reported the incidence of pleural effusions in

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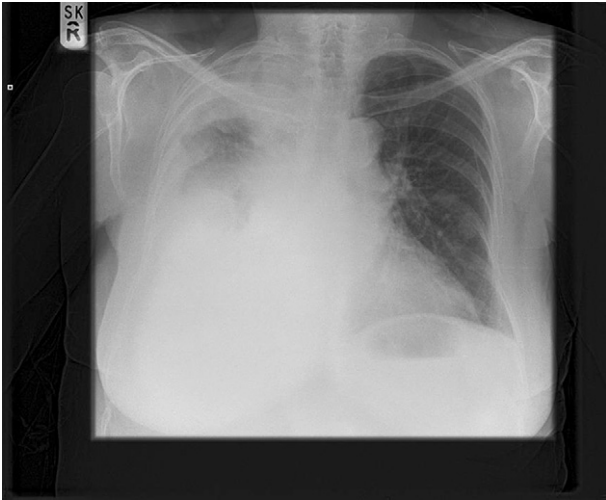


Fig. 1. CXR showing right pleural thickening and pleural effusion.

patients with multiple myeloma as 6%.<sup>1</sup> Furthermore, pleural effusions presenting in multiple myeloma are seldom a direct consequence of the myeloma itself, more often the result of a concurrent disease process or coexisting illness, (e.g. cardiac failure secondary to amyloidosis, pulmonary embolism, pneumonia or a second malignancy).<sup>1,2</sup> Indeed, malignant myelomatous pleural effusions are rarely observed, occurring in less than 1% of cases.<sup>1</sup>

Myelomatous pleural effusions may arise from either; extension of plasmacytomas of the chest wall, invasion from adjacent skeletal lesions, direct pleural involvement by myeloma (pleural plasmacytoma) or following lymphatic obstruction secondary to lymph node infiltration.<sup>2–4</sup>

The presence of an IgA paraprotein is most commonly associated with myelomatous pleural effusions, (in up to 80% of cases in some studies).<sup>2,4</sup> The case reported here is unusual in that the patient had an underlying IgG paraprotein.

The development of myelomatous pleural effusions is frequently a late complication of the disease and is associated with poor

prognosis, with previous studies reporting median survival of less than 4 months.<sup>5,6</sup>

It is interesting to note that in our case, histological analysis demonstrated an immature population of plasma cells. This may be an important contributory factor underlying the development of myelomatous pleural effusions and may explain the aggressive nature of myelomatous disease that presents in this way. Indeed Nonomura et al. discussed the aggressive nature of myeloma associated with extramedullary disease, demonstrating rapid disease progression and treatment resistance.<sup>7</sup>

The development of extramedullary plasmacytomas (EMPs) in the context of pre-existing multiple myeloma occurs infrequently with only 5% of patients with EMPs having coexisting multiple myeloma.<sup>8,9</sup>

Pleural involvement in multiple myeloma, as demonstrated in our case, is all the more unusual.<sup>10</sup> In a review of English literature, only 10 cases have been described previously, (to the best of our knowledge).<sup>9–18</sup>

Thalidomide remains the first-line treatment for multiple myeloma in the UK. Although the efficacy of thalidomide in refractory multiple myeloma has been demonstrated,<sup>19</sup> several studies have reported EMPs to be less responsive to thalidomide,<sup>18,20</sup> although more recent studies suggest greater synergistic efficacy using a combination of thalidomide and dexamethasone.<sup>20</sup> Indeed in this case, our patient relapsed despite treatment with thalidomide. Our experience suggests that pleural involvement with myeloma cells is associated with an aggressive course which is poorly responsive to first or second-line therapies used in conventional myeloma treatment.

### 3. Conclusion

The incidence of myelomatous pleural effusions in multiple myeloma is rare, often signifying a poor prognostic outlook following an aggressive natural course. The case discussed here reinforces that we should not become complacent when investigating pleural effusions in patient's with a history of multiple myeloma. Consideration of myelomatous pleural effusions in such cases will aid rapid diagnosis and initiation of treatment in this aggressive form of the disease.

### Conflict of interest

No conflict of interests declared.

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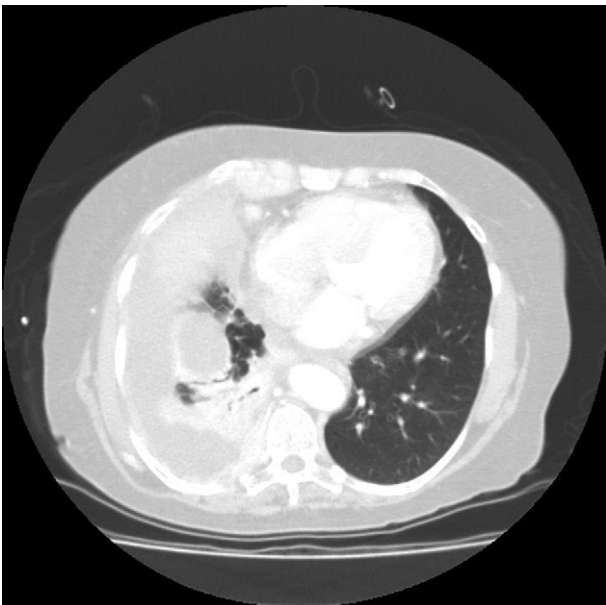


Fig. 2. CT chest showing marked pleural thickening of the right hemithorax.

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