MÆDICA - a Journal of Clinical Medicine

CASE REPORT

MAEDICA – a Journal of Clinical Medicine
2025; 20(2): 422-427
https://doi.org/10.26574/maedica.2025.20.2.422

Pulmonary Plasmacytoma – Rare Occurrence in Multiple Myeloma: Case Presentation and Short Review of the Literature

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ABSTRACT

Multiple myeloma is a hematological malignancy mostly diagnosed in the elderly. It is characterized by a chronic evolution with alternating periods of remission and relapses. Plasmacytoma, a tumor comprised of monoclonal plasma cells, is a typical finding in multiple myeloma patients, being more frequently observed during relapses. The most involved sites are bones, kidneys, liver, skin, ear, nose and throat. Extramedullary lung plasmacytomas are a rare presentation, with an incidence of well under 5% of all plasmacytomas. The clinical manifestations are heterogeneous and depend on the affected site. Differentiating plasmacytoma from other pathologies can be challenging, with the diagnosis being established via tumor biopsy. The presence of plasmacytoma is associated with poor prognosis and is a marker of rapid disease progression.

We report the case of a 63-year-old patient diagnosed with IgA lambda multiple myeloma, stage IIIB Salmon-Durie complicated by lung plasmacytoma identified in the setting of relapse. Despite undergoing treatment, the disease exhibited an aggressive course, rapidly progressive towards death. The case underlines the rarity of pulmonary plasmacytoma and the diagnostic challenges.

Keywords: multiple myeloma, plasmacytoma, pulmonary plasmacytoma.

INTRODUCTION

Multiple myeloma (MM) is a hematological malignancy characterized by proliferation of abnormal plasma cells in the bone marrow. The clinical picture of multiple myeloma is marked with complications, such as bone lyses and pathological bone fractures, anemia, renal failure, hypercalcemia and hyperproteinemia.

A distinct presentation of malignant plasma cells are plasmacytomas, tumors comprised of these cells that can occur at any moment of evo-

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Article received on the 16th of May 2025 and accepted for publication on the 3rd of June 2025

lution in almost every organ. In fact, between 15-20% of patients present plasmacytomas at diagnosis and ~30% will develop plasmacytomas at relapse (1).

Plasmacytoma can occur without accumulation in the bone marrow microenvironment, named solitary plasmacytoma, or in addition to systemic disease. The most common sites are the vertebrae – for solitary bone plasmacytoma (SBP) – and any soft tissue, frequently in the upper airway tract, especially the sinuses – for extramedullary plasmacytoma (EMP) (2). Depending on which site plasmacytoma is located, there might be various symptoms that can alter and severely impair the quality of life of these patients, including pain or local symptoms.

Pulmonary plasmacytoma is very rare finding, being described in less than 5% of plasma cell disorders (3). Patients frequently present with dyspnea, thoracic pain and low oxygen saturation. Altered mental status is observed when patients also present pleural effusion (4).

Pulmonary plasmacytoma are difficult to diagnose, due to the rarity of this determination these cases can be confused with other more frequent types of tumors, like primary lung carcinomas, lung metastasis, lymphoma, or it can be also confused with different types of pulmonary lesions like sarcoidosis or pulmonary tuberculosis.

There are some studies that shows that the survival of patients with extramedullary disease (EMD) was significantly shorter, even if they received therapy with novel agents (5). Pulmonary plasmacytoma corelates with particularly poor prognosis, patients frequently present rapid disease progression and treatment is rarely efficient (4).

Novel agents like proteasome inhibitors were used for extramedullary disease (EMD) in multiple myeloma (bortezomib was shown to alleviate the outcome in relapsed/refractory multiple myeloma patients and carfilzomib shown limited effect), immunomodulatory drugs (IMiDs) like lenalidomide were shown to have a superior response rate than thalidomide (6) and monoclonal antibodies anti CD38 like daratumumab had limited efficacy. Autologous stem cell transplant (ASCT) as a regimen for patients with EMD had lower response rate and was not demonstrated to have any influence in overcoming the adverse prognosis. (7) ❑

CASE REPORT

We report the case of a 63-year-old woman diagnosed with stage IIIB (Salmon Durie) IgA lambda secretory multiple myeloma. At diagnosis, she presented with fatigability and bone pain. The clinical exam was normal. Her past medical history was positive for arterial hypertension and fibromatosis. Laboratory and imagistic findings at diagnosis and during evolution are summarized in Table 1.

The patient received six cycles of VCD regimen (cyclophosphamide, bortezomib, and dexamethasone) and she obtained a very good partial response (VGPR). At the time of treatment initiation, monoclonal antibodies, such as daratumumab, were not included in the national health insurance reimbursed treatment protocols. During treatment, she developed multiple and severe infectious complications, amongst which several pulmonary infections, including pneumonia, upper acute respiratory tract infections and two episodes of acute urinary tract infections. Due to the patient's history of multiple recurrent infections, autologous stem cell transplantation was not considered a clinical option, as the risk of a fatal peri-procedural infectious complication was deemed too high. After induction therapy, obtaining a VGPR, the patient received maintenance treatment with lenalidomide and dexamethasone for two years, according to national treatment protocols.

Two years after completing first line treatment and under maintenance therapy, as presented above, the patient was admitted to our department with a thoracic tumoral lesion, bradylalia and bradypsychia. The laboratory results revealed severe anemia (hemoglobin 6.2 g/dL) and severe hypercalcemia (calcemia 15 mg/dL). The bone marrow aspirate revealed 68% myelomatous plasma cells.

Given the previously presented results (the complete evaluation is presented in Table 1), it was deemed that the disease had relapsed. Regarding the new thoracic lesion, the computed tomography (CT) scans aspect was suggestive of plasmacytoma (Figure 1A). However, due to the severity of the clinical presentation, with severe neurological symptoms, severe anemia and severe hypercalcemia, a tumor biopsy could not be performed.

TABLE 1. Laboratory and imagistic at diagnosis and during evolution

Findings (normal range)	At diagnosis	At first progression (after VCD and maintenance)	At second progression (after DKd)
CBC			
WBC (4-10 x 10^3/mm^3)	6 x 10^3/mm^3	4.5 x 10^3/mm^3	3.5 x 10^3/mm^3
HGB (12-14 g/dL)	7.7 g/dL	6.2 g/dL	6.9 g/dL
PLT (150-400 x 10^3/mm^3)	56 x 10^3/mm^3	182 x 10^3/mm^3	100 x 10^3/mm^3
ESR (5-10 mm/h)	100 mm/1 h	72 mm/1 h	100 mm/1 h
Blood biochemistry			
Calcium (8.8-10.6 mg/dL)	11.4 mg/dL	15 mg/dL	7.7 mg/dL
Albumin (3.5-5.2 g/dL)	2.4 g/dL	2.8 g/dL	2.6 g/dL
Proteins (6.6-8.3 g/dL)	11.9 g/dL	9.92 g/dL	10.16 g/dL
Creatinine (0.51-0.95 mg/dL)	2.31 mg/dL	1.2 mg/dL	1.51 mg/dL
Uric acid (2.6-6.0 mg/dL)	10.5 mg/dL	7.9 mg/dL	12 mg/dL
LDH (0-247 U/L)	168 U/L	136 U/L	375 U/L
Beta-2 microglobulin (1.09-2.53 mg/L)	-	7.82 mg/dL	-
Protein electrophoresis and immunofixation	IgA and lambda monoclonal bands	IgA and lambda monoclonal bands	IgA and lambda monoclonal bands
Serum Ig and FLC			
IgA (0.7-4 g/L)	78 g/L	8.35 g/L	>8.46 g/dL
IgG (7-16 g/L)	2.5 g/L	4.95 g/L	11.58 g/dL
IgM (0.4-2.3 g/L)	0.16 g/L	0.31 g/L	0.49 g/dL
Kappa FLC (1.7-3.7 g/L)	0.57 g/L	-	-
Lambda FLC (0.9-2.10 g/L)	1.66 g/L	-	-
FLC ratio	1.56	-	-
Urinary FLC			
Kappa (0-7.1 mg/L)	14 mg/L	-	-
Lambda (0-3.9 mg/L)	6070 mg/dL	-	-
Urinary FLC ratio	433.57	-	-
Bone marrow	74% plasma cells	68% plasma cells	62% plasma cells
Whole-body CT scan	Bone lysis – T12 and L1 vertebrae, pelvic bones, and scapulae	Progression of osteolytic lesions; tumoral masses at the thoracal wall	Progression, new tumors and lyses, lung involvement

CBC=complete blood count; CT=computed tomography; DKd=Daratumumab, Carfilzomib, dexamethasone; ESR=erythrocyte sedimentation rate; FLC=serum free light chain; HGB=hemoglobin; LDH=lactate dehydrogenase; PLT=platelets; VCD=Bortezomib, Cyclophosphamide, Dexamethasone; WBC=white blood cells.

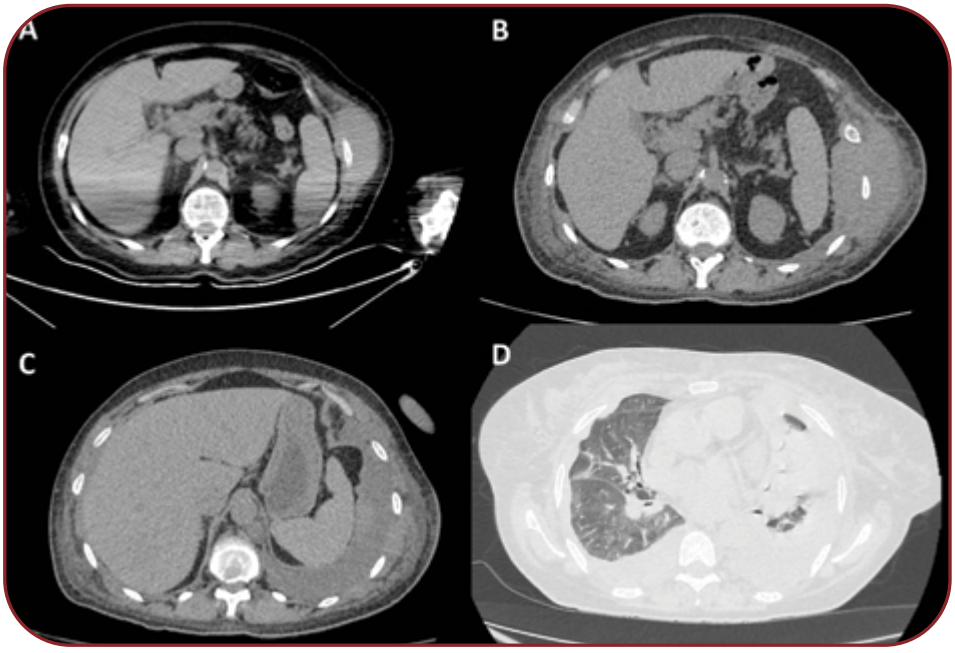

FIGURE 1. Computed tomography (CT) scans of a patient with extramedullary plasmacytoma. **A.** Whole-body low-dose CT scan, first relapse. Iodophil lesions at the level of the left thoracic wall, the largest measuring 70/40 mm; multiple extra-pulmonary and extra-pleural macronodules; macronodules are also described adjacent to the T8-9 vertebrae and ribs. **B, C, D.** CT scans, after second relapse. **B, C.** Progression of the previously described tumors, largest lesion measuring 99/53 mm. **D.** Bilateral pleural effusion with parenchymal atelectasis, and areas of alveolitis in the right lower lobe.

Given that daratumumab has been approved meantime to be used in first line and relapsed/refractory setting, treatment was initiated with the daratumumab, carfilzomib, and dexamethasone (DKd) regimen. Supportive treatment for the hypercalcemia was initiated with zolendronic acid and it resolved in two days. The anemia was partially corrected after starting the DKd treatment and after two units of packed red blood cells transfusions. After stabilization of the first relapse, the patient went on to receive a total of seven cycles of the DKd regimen.

After the seventh cycle, the patient came to the emergency room with hypotension, dyspnea and altered consciousness. Clinical examination revealed absent breath sounds at the lung bases and hypoxemia. The CT scan revealed progression of the preexisting lung lesions and occurrence of new osteolysis and extra-pleural tumoral masses (Figure 1B, C), and secondary pulmonary lesions (Figure 1D).

The evolution was rapidly unfavorable, with acute respiratory failure, acute kidney failure and severe hyperkalemia. The patient was admitted in the intensive care unit for three days, where she had a favorable evolution under continuous positive airway pressure therapy, vasopressor support and fluid and electrolyte correction with a short period of recovery. After being transferred to the hematology department, the patient developed severe abdominal pain, anuria, uncontrolled arterial hypertensions and sinus tachycardia. We tried to do a minimal salvage therapy with Bortezomib and Dexamethazone, but we only administer two doses, without any response. After the second dose, the patient decided to stop any treatment. ❑

DISCUSSION

Extramedullary plasmacytoma can occur in virtually any tissue or organ, but most commonly are observed in soft tissues. Although rare, thoracic involvement has been reported in patients with multiple myeloma in the form of a lung mass, diffuse reticulonodular infiltration, multiple pulmonary nodules, lymphadenopathy and mediastinal mass, tracheobronchial infiltration and nodular pleural thickening with pleural effusion (1, 8). Pleural plasmacytomas are extremely rare and account for around 5% of extramedullary disease in MM patients (9) These cases often present rapid evolution with an unfavorable prognosis and are frequently refractory to treatment (9).

Malignant myelomatous pleural effusion caused by the pleural infiltration of malignant plasma cells is seen in less than 1% of cases and may develop due to the extension of plasmacytomas of the chest wall, invasion from adjacent skeletal lesions, or lymphatic obstruction secondary to lymph node infiltration (10, 11). It may also develop due to the direct implantation of tumor nodules on the pleura, *i.e.*, pleural plasmacytomas (10, 11).

When evaluating a pulmonary plasmacytoma, the modality of choice for staging extramedullary lesions is positron emission tomography-computed tomography (PET-CT), because it can reveal metabolic active lesions (12). Also, whole body magnetic resonance imaging (MRI) can be used for solitary plasmacytoma or solitary bone lesions, that can provide high contrast resolutions between extensions of marrow involvement and surrounding soft tissue (13). Both methods allow for early and accurate diagnosis, playing a critical role in patient outcome. When evaluating a suspected pulmonary plasmacytoma, other diagnostic studies include bone marrow aspirate or biopsy to confirm the grade of involvement, serum and urine electrophoresis with immunofixation, and the most important evaluation is biopsy of the suspected lesion with histopathological and immunochemistry tests.

The differential diagnosis of pulmonary plasmacytomas is hindered by the fact that these tumors can present as a solitary lung nodule, diffuse infiltration of the parenchyma, which are very difficult to distinguish from other types of pulmonary lesions. In such cases, the diagnosis is established through tumor biopsy, followed by histopathological and immunohistochemical examination. However, as we presented in this case report, when the patient's condition does not allow for a biopsy to be performed the differential diagnosis must rely on imaging findings and clinical symptomatology. One cause could be a primary or metastatic lung cancer, but often the images are different – the presence of spiculated or irregular margins in lung cancer can make the difference. Also, there are symptoms that can be related to lung cancer, like persistent cough, hemoptysis, weight loss and dyspnea. Pulmonary metastasis usually present nodules or

masses that often have a history of cancer with another localization. Other lung diseases which are included in the differential diagnosis are pulmonary infections like tuberculosis, lung abscesses or fungal infections. These entities are often associated with fever, persistent cough and sputum production, while imaging results describe caverns, consolidations or nodules with surrounding pulmonary parenchyma inflammatory findings. Infectious etiologies for pulmonary masses can be confirmed with microbiological studies such as cultures, or PCR testing. Other condition that can be mistaken with pulmonary plasmacytoma are granulomatous conditions, mainly sarcoidosis, that is often associated with bilateral lymphadenopathy and reticular opacities, or pneumonia that shows consolidation – in this case, serological tests and characteristic patterns on imaging studies are of use to determine the diagnosis.

In the evaluation of this case, we were not able to perform PET-CT or whole-body MRI. However, the patient underwent a whole-body low dose CT scan that revealed lytic lesions and pulmonary involvement. There were several pleural tissue masses in all rib arches bilaterally, extra-pleural and extrapulmonary tissue masses with extension into the lateral chest wall, as well as mixed-type bone structure modifications at the rib level and lytic type modification at the level of the T12 and L1 vertebral bodies. After couple of weeks, when the patient becomes very unstable hemodynamic, we repeated the CT scan that showed dimensional and numerical progression of the tissular masses previously described, bone lysis in all pelvic bones, intramuscular tissue masses in the left iliopsoas and gluteus medius muscles, tissue mass encasing the posterolateral contour of the aorta.

Due to the unfavorable location of the pulmonary mass and the patient's rapidly deteriorating condition following second relapse, a biopsy, which would have provided a definitive diagnosis, was deemed impossible. But we were able to perform a bone marrow aspirate that revealed medullary infiltration of 68% with myeloma plasma cells. While serological confirmed the initial results from the initial diagnosis of MM with immunofixation positive for monoclonal IgA and lambda light chains, with also a high beta-2-microglobulin.

This particular case highlights the crucial role of diagnostic imaging in differentiating pulmonary plasmacytoma from other potential pulmonary pathologies. Given the non-specific clinical presentation, imaging evaluations become an essential component in the diagnostic algorithm. By using advanced imaging techniques, clinicians can determine not only the location and size of the plasmacytoma but also assess other signs of systemic disease involvement. (14)

In frontline treatment, daratumumab was not available for our patient, but this option was also under discussion because of previous infectious complications during a less intensive regimen such as VCD. Autologous hematopoietic stem-cell transplantation (ASCM) consolidation could be a good option to improve the response, but the patient did not tolerate more intensive therapy. The maintenance therapy was a chance for the patient to control the disease for a two-year period, and relapse with high-risk disease with pulmonary plasmacytoma was a challenge, because usually extramedullary plasmacytoma is considered high risk disease, and DaraKD regimen is one of the regimens recommended in this setting after frontline treatment – the International Myeloma Working Group (IWGM) recommendation for first relapse with lenalidomide-refractory disease (15). The rapid outcome after a short response suggests that extramedullary plasmacytoma in R/R setting has been associated with a more genomic instability and rapid loss of response, without offering the time to plan an ASCT after second line. Our case sustains the idea of importance of using the more effective regimen including ASCT in the frontline treatment, to avoid the occurrence of more aggressive disease in relapse setting. ❑

CONCLUSIONS

Although EMP are not uncommon entities and specific treatment options are available, this case of a rare pulmonary plasmacytoma highlights the diverse clinical presentations that can arise and reinforces the need for personalized patient management. Furthermore, the rapid clinical deterioration in this case, which limited the ability to complete all diagnostic investigations, emphasizes the importance of a detailed medical history, careful clinical assessment and regular reevaluations. Another parti-

cularity of the case consists in the localization of the plasmacytoma, in an area frequently interested in other pathologies (primary malignancies, metastasis, pulmonary infections, granulomatous diseases, etc.), which made the differential diagnosis very difficult in this instance. Early recognition and thorough investigation of any new symptoms are essential for timely identification and management of potential complications. ❑

Conflicts of interest: none declared.
Financial support: none declared.

References

1. **Rosiñol L, Beksac M, Zamagni E, et al.** Expert review on soft-tissue plasmacytomas in multiple myeloma: definition, disease assessment and treatment considerations. *Br J Haematol* 2021;194:496-507.
2. **Fletcher CDM.** *Diagnostic histopathology of tumors. 3*. London: Churchill Livingstone. 2007.
3. **Duggal RK, Ramachandran KA.** Multiple myeloma with extra-medullary dissemination in the lung. *JIACM* 2002;3:93-95.
4. **Thomas A, Thambi S, Narayanan G, et al.** Myelomatous Pleural Effusion: A Case Series. *Asian Pacific Journal of Cancer Care* 2023;8:793-796. https://doi.org/10.31557/apjcc.2023.8.4.793-796.
5. **Usmani SZ, Heuck C, Mitchell A, et al.** Extramedullary disease portends poor prognosis in multiple myeloma and is over-represented in high-risk disease even in the era of novel agents. *Haematologica* 2012;97:1761-1767.
6. **Rosiñol L, Cibeira MT, Bladé J, et al.** Extramedullary multiple myeloma escapes the effect of thalidomide. *Haematologica* 2004;89:832-836.
7. **Kumar L, Gogi R, Patel AK, et al.** Multiple myeloma with extramedullary disease: impact of autologous stem cell transplantation on outcome. *Bone Marrow Transplant* 2017;52:1473-1475. doi: 10.1038/bmt.2017.165.
8. **Saha R, Bhattacharya A, Deb J, et al.** Multiple myeloma presenting as thoracic plasmacytoma – two rare cases. *Egypt J Chest Dis Tuberc* 2014;63:267-271.
9. **Yeoh KW, Thitsar SM, Master Z, et al.** Pleural plasmacytomas – the role of radiotherapy. *Br J Haematol* 2020;190:e160-e162. doi: 10.1111/bjh.16770.
10. **Touzeau C, Moreau P.** How I treat extramedullary myeloma. *Blood* 2016;127:971-976. doi: 10.1182/blood-2015-07-635383.
11. **Tang RR, Wang Y, Liang CN, et al.** Multiple extramedullary plasmacytomas of the trachea and pharyngeal tissue: a case report and literature review. *OncoTargets Ther* 2019;12:1433-1437. doi: 10.2147/OTT.S190362. Published 2019 Feb 20.
12. **Rachh S, Puj K, Parikh A.** 18F-FDG PET/CT in the Evaluation of Solitary Extramedullary Plasmacytoma: A Case Series. *Asia Ocean J Nucl Med Biol* 2021;9:56-61. doi: 10.22038/AOJNMB.2020.49226.1335.
13. **Chantry A, Kazmi M, Barrington S, et al.** Guidelines for the use of imaging in the management of patients with myeloma. *Br J Haematol* 2017;178:380-393. https://doi.org/10.1111/bjh.14827.
14. **Guha A, Vijan A, Agarwal U, et al.** Imaging for Plasma Cell Dyscrasias: What, When, and How? *Front Oncol* 2022;12:825394. doi: 10.3389/fonc.2022.825394.
15. **Laubach J, Garderet L, Mahindra A, et al.** Management of relapsed multiple myeloma: recommendations of the International Myeloma Working Group. *Leukemia* 2016;30:1005-1017. https://doi.org/10.1038/leu.2015.356.