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# Black Pleural Effusion: A Unique Presentation of Metastatic Melanoma

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**Key Words**
Black pleural effusion · Melanoma · Metastasis · Thoracentesis

**Abstract**
Metastatic melanoma is a rare form of skin cancer, but one that comes with a high mortality rate. Pulmonary involvement is frequently seen in metastatic melanoma with only 2% of malignant melanoma patients with thorax metastasis presenting with pleural effusions. Herein, we report an extremely rare case of black pleural effusion from thoracic metastasis of cutaneous malignant melanoma. A 74-year-old man with known metastatic melanoma presented with a 1-month history of worsening lower back and hip pain and was found to have extensive osseous metastatic disease and multiple compression fractures. The patient underwent an uneventful kyphoplasty; however, the following day, he became acutely hypoxic and tachypneic with increased oxygen requirements. Radiographic evaluation revealed new bilateral pleural effusions. Bedside thoracentesis revealed a densely exudative, lymphocyte-predominant black effusion. Cytological examination showed numerous neoplastic cells with melanin deposition. A diagnosis of thoracic metastasis of malignant melanoma was established based on the gross and microscopic appearance of the pleural fluid. To the best of our knowledge, this is the first reported case of black pleural effusions secondary to metastatic melanoma in the United States. Despite the rarity of this presentation, it is important to determine the etiology of the black pleural effusion and to keep metastatic melanoma as a differential diagnosis.




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## Introduction

Skin cancer is the third most common malignancy worldwide with over 2 million cases reported annually. Melanoma accounts for less than 2% of all cases, yet it carries the highest mortality [1]. Its initial presentation varies from a single localized cutaneous lesion to a rapidly invasive disease affecting multiple organ systems. Despite advances in treatment, metastatic melanoma has recently seen a rapid increase in incidence [2]. Metastatic spread occurs in up to 30% of cases and in most instances involves the lungs [3] but can also involve subcutaneous tissue, lymph nodes, bone, and liver [4]. Independent of site, metastatic melanoma carries a very poor prognosis with a 10-year survival of less than 10% [5]. Here, we present an unusual manifestation of metastatic melanoma in the form of a black pleural effusion.

## Case Presentation

A 74-year-old male with metastatic melanoma to the liver and bone presented with worsening lower back and hip pain for 1 month. Computed tomography imaging of the lumbar spine revealed extensive osseous metastasis and multiple compression fractures. The patient underwent an uneventful balloon kyphoplasty of the T11, L2, and L4 vertebrae.

The day after his kyphoplasty, the patient became progressively hypoxic and tachypneic and required high levels of supplemental oxygen. Radiographic imaging of the chest revealed large bilateral pleural effusions, which had not been present on prior imaging. Systemic anticoagulation and intravenous diuretics were initiated, yet the patient's respiratory status did not improve.

Bedside ultrasound-guided thoracentesis was performed with drainage of 1,900 ml of opaque black-colored pleural fluid (fig. 1). Examination of the fluid was consistent with an exudative pleural effusion (pH 7.188; glucose 42 mg/dl; lactate dehydrogenase: 11,938 U/l; protein: 3.8 g/dl). Cell count revealed 74% large mononuclear cells containing deeply basophilic cytoplasm and macrophages containing blue granules. Fluid cytology revealed many melanin-containing neoplastic cells consistent with metastatic melanoma (fig. 2). Additionally, Gram stain and both bacterial and fungal cultures of the pleural fluid were negative.

The patient's respiratory status vastly improved over the next 48 h and he no longer required supplemental oxygen. He remained hemodynamically stable and was discharged home with instructions to follow up with his oncologist.

## Discussion

Pleural effusions are found in a variety of medical conditions including heart failure, infections, malignancies, and trauma. Diagnosis of new pleural effusions is often achieved by thoracentesis. A further distinction between exudative and transudative fluid helps narrow the differential diagnosis [6]. Exudates are commonly found in inflammatory processes including infection, whereas transudates are a result of increased hydrostatic pressure such as in cirrhosis, heart failure, and nephrotic syndrome.

An initial characteristic of pleural fluid that sometimes may be overlooked is its gross macroscopic appearance. White or milky effusions are suggestive of purulent infections like empyema or chylothorax, whereas serous or yellow effusions are usually transudative in nature. Hemorrhagic pleural effusions appear blood tinged and are classically associated with hemothorax and malignancy. While yellow and red effusions are common findings,

black effusions are exceedingly rare. To date, there have been only 8 total cases of black pleural fluid reported [7]. Etiologies have included fungal infections due to *Aspergillus niger* or *Rhizopus oryzae* and charcoal-containing empyema.

Furthermore, only 2 previous cases have been attributable to metastatic malignant melanoma. We present the third such case including the first case of black pleural effusions caused by metastatic melanoma seen in the United States. In the 2 prior cases, the patients similarly had a known diagnosis of malignant melanoma and presented with chest pain, breathlessness, and cough. Drainage of pleural fluid and cytological analysis revealed melanin-containing malignant cells [8, 9]. The black color of pleural effusions in metastatic melanoma is caused by the presence of melanocytes in the pleural fluid. In our case, pleural cytology similarly revealed abundant melanocytes. Additionally, the low pH and glucose levels were consistent with a large tumor burden.

Despite the rarity of this presentation, our case illustrates that it is important to determine the etiology of the black pleural effusion and to keep metastatic melanoma as part of the differential diagnosis. Metastatic melanoma carries a very poor survival rate, and efforts must be made to diagnose this disease as early as possible. Diagnostic delay can lead to severe complications, most notably death. Although in our patient the diagnosis had already been established, this case demonstrates that the finding of a black pleural effusion in an undiagnosed patient should create a high index of suspicion for melanoma.

## Statement of Ethics

Informed consent was obtained from the patient, and our institution approved the writing of this case report.

## Disclosure Statement

The authors report no conflicts of interest related to this work.

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**Fig. 1.** Black pleural fluid obtained from ultrasound-guided thoracentesis.

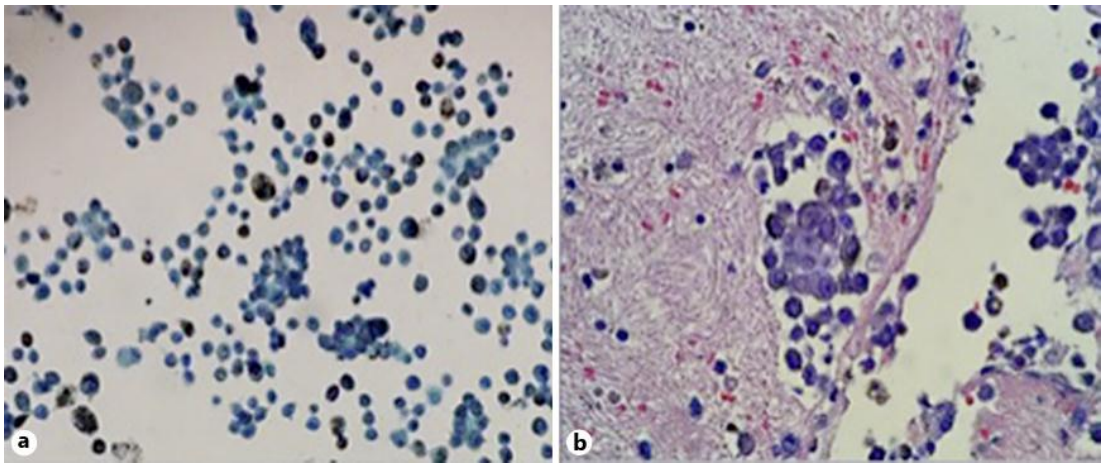


**Fig. 2.** Pleural fluid smear showing numerous melanin-containing neoplastic cells consistent with metastatic melanoma on Diff-Quick cytological stain (**a**) and hematoxylin and eosin stain on cell block (**b**). 200–400×.