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Case Report

Malignant Pleural Effusion Secondary to Clear cell Renal Cell Carcinoma- A Case Report

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Abstract

Renal cell carcinoma is the most common renal neoplasm. Its presentation is often very occult, and it may be discovered incidentally. It may present with the classic symptoms of back pain, flank pain, haematuria, or hypertension. Renal cell carcinoma may also present with malignant pleural effusion at diagnosis; however, it is very rare. Pleural effusion secondary to renal cell carcinoma constitutes only about 1% to 2% of all malignant pleural effusions. We report a case of 55-year-female who was a known case of right side Renal cell carcinoma post operated and on chemotherapy suddenly presented in emergency department with breathlessness and chest pain. Chest X-ray demonstrated right-sided moderate pleural effusion; computed tomography (CT) reported bilateral effusion in the pleural cavity. CT-guided pleural thoracocentesis was performed. Cytology and cell block morphology showed clear cell type malignant tumor, leading to diagnosis of clear cell carcinoma in pleural fluid secondary to clear cell renal cell carcinoma. The study aim to discuss the Malignant pleural effusion secondary to Clear cell Renal cell carcinoma.

Keywords: Renal cell carcinoma, pleural effusion, clear cell carcinoma, metastases.

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Introduction

Pleural effusions are defined as a buildup of fluid between the pleura and lung parenchyma. They occur secondary to a myriad of pathologies. Malignant pleural effusions are a subset of pleural effusions that may occur secondary to solid tumors like those of the breast and lung.[1] Renal cell carcinoma (RCC) is a solid tumor that may lead to malignant pleural effusion. Only 1-2% of malignant pleural effusions are secondary to RCC. Due to the high vascular nature of this tumor, distant site metastasis is very common with the lung being the most common site. Pleural metastasis is very rare.[2]

The presentation of renal cell carcinoma as pleural effusion is uncommon and little is reported in the literature. Metastasis to the pleura, along with pleural effusion, is a late event in the course of malignancy.[3] Renal cell carcinoma may spread by direct

invasion, lymphatic spread, or direct hematogenous dissemination. The exact mechanism of pleural metastases or the development of pleural effusion is not known; however, the mechanism is thought to be via lymphatics or through vertical plexus of veins.[3] In RCC, the presence of a malignant pleural effusion signifies stage IV disease and carries a poor prognosis. The five-year survival rate for such patients is 54% for resectable metastases and 29% for non-resectable cases.[4] Therefore, the goals of therapy for patients who present with stage IV disease such as malignant pleural effusion should prioritize quick symptomatic relief. The study aim to discuss the Malignant pleural effusion secondary to Clear cell Renal cell carcinoma.

Case Report

A 55-year-old female presented at the Emergency department with complaints of breathlessness and chest pain since 3 days. Patient was known case of right-side renal cell carcinoma with lymphnode metastasis. Right nephrectomy was done 3 months back and she was currently on chemotherapy (Sunitinib). She was noted to be hypoxic with an oxygen saturation of 89% on pulse oximetry. A Lab testing was pertinent for an elevated creatinine of 1.89 mg/dL, D-dimer of 3818 and serum amylase of 147 U/L. A chest X-ray demonstrated right side moderate pleural effusion, left CP angle blunting. Ultrasonogram of abdomen showed Fatty liver grade 2, acalculous cholecystitis, left renal cellulitis and mild hydroureteronephritis. Further inquiry was done with CT that showed bilateral pleural effusion with underlying dependent atelectasis in superior and posterior basal segment of bilateral lower lobe of lung. Sections of the CT scan showed nodular thickening of the pleura. Multiple Mediastinal lymphadenopathies with suspicious necrotic centre was also noted. CT guided thoracocentesis was done and around 100ml of hemorrhagic fluid was drained out and sent for further investigation. The pleural fluid smears were highly cellular with neoplastic epithelial cells arranged in clusters (Figure 1). The cells were round to polygonal with preserved cellular border, clear cytoplasm and mild nuclear atypia (Figure 2) in background of scattered mesothelial cells, few cyst macrophages, mixed inflammatory cells and RBCs. The cell block confirmed the diagnosis of Clear cell renal carcinoma (Figure 3, Figure 4).

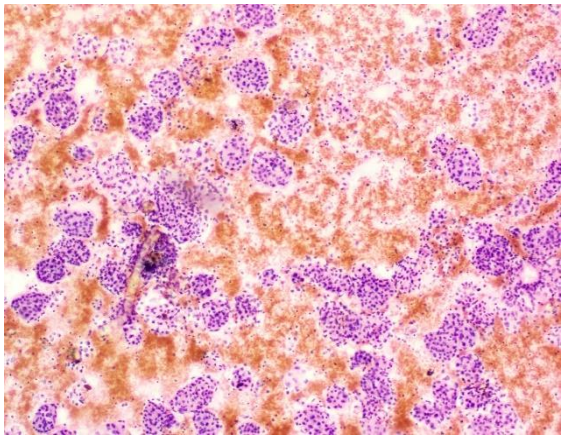

Figure 1: - Cytology smear showing neoplastic cells in clusters(H&E;10X)

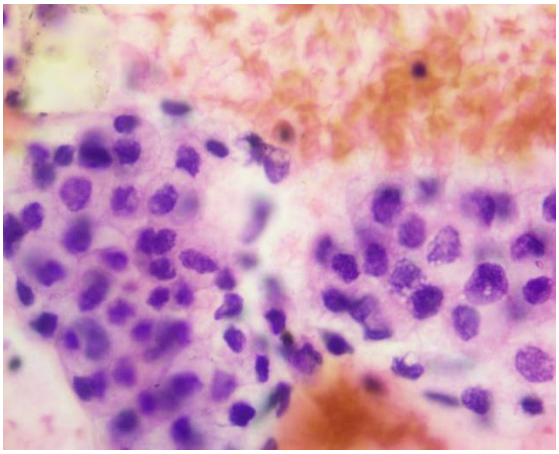

Figure 2: - Cytology smear showing round to polygonal cells with preserved cellular border, clear cytoplasm and mild nuclear atypia(H&E;40X)

Discussion

Renal cell carcinoma (RCC) belongs to a heterogenous cancer group arising from

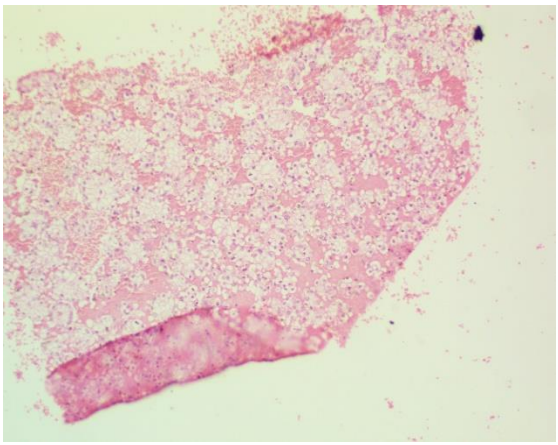

Figure 3: - Cell block showing malignant neoplastic cells in nested architecture (H&E ;10X)

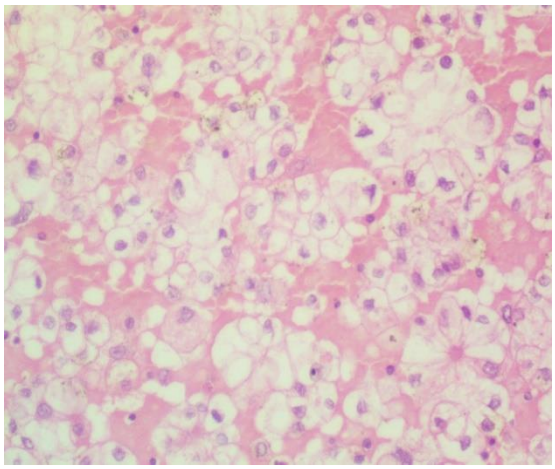

Figure 4: - Cell block showing cohesive, fairly uniform cells with clear cytoplasm with round central or eccentric nuclei and prominent nucleoli (H&E;40X)

renal tubular epithelial cells. [5] It may present with the classic triad of flank pain, haematuria and abdominal mass. More commonly, it presents without any symptoms and is detected incidentally in up to 50% of patients. [1] While lung is the most common metastatic site for renal cell carcinoma, metastasis solely to the pleura without the involvement of lung parenchyma is very rare.[6] When complicated with pleural effusion patients may present with chest pain usually accompanied by shortness of breath and hypoxia. Only 1-2% of malignant pleural effusions are secondary to RCC, making it a very rare phenomenon. [2] Our patient presented with breathlessness and chest pain due to underlying effusion.

Different subtypes of RCC are described, each one with different histology, genetic features and distinct response to therapy resulting in a variable clinical outcome. Most frequent RCC subtypes are clear cell (ccRCC, ~70–80% cases), papillary cell (pRCC, ~10–15% cases, and chromophobe renal cell carcinoma (chRCC, ~5% cases).[7] Another rarer type of RCC is represented by that with sarcomatoid features. [8,9]

ccRCC derives from epithelial cells of the proximal convoluted tubule in the nephron and it is histologically characterized by cells with clear cytoplasm. [7] ccRCC is the most common subtype and it accounts for a large part of mortality observed in RCC. ccRCC is hereditary for 2–3% of cases, particularly affecting subjects with an alteration of the von Hippel–Lindau (VHL) gene. [10] Indeed, ccRCC is characterized by a high proliferation rate compared to the other subtypes and it often metastasizes in the lungs, liver, bones and, for about 15%, in lymph nodes. [11]

Both pRCC and chRCC are less aggressive than ccRCC and display a better prognosis.[11] Clear cell renal cell carcinoma (ccRCC) is the most common variant, characterized by high aggressiveness, invasiveness and metastatic potential, features that lead to poor prognosis and high mortality rate. In addition, diagnosis of kidney cancer is incidental in the majority of cases, and this results in a late diagnosis, when the stage of the disease is advanced and the tumor has already metastasized. Furthermore, ccRCC

treatment is complicated by its strong resistance to chemo- and radiotherapy. [5]

Conclusion

Malignant pleural effusion secondary to RCC without involving lung parenchyma is very rare phenomenon. The malignant pleural effusion in patient with RCC indicates advanced stage of the disease (Stage 4). This case emphasizes the importance of knowing the correct clinical history as the neoplastic cells had bland morphology and would have led to a misdiagnosis of mesothelial hyperplasia. It is also important for the clinicians to keep broad differential diagnosis when patient presents with pleural effusion.

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