



Unilateral phrenic nerve palsy after chemotherapy

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Introduction

Although chemotherapeutic agents improve both disease-free and overall survival in cancer patients, treatment carries the potential for short and long-term complications. One well-known complication is neuropathy which can result from a number of chemotherapeutic agents. However, chemotherapy-induced phrenic neuropathy is rare, and here we report a case of a patient who experienced phrenic nerve palsy after chemotherapy due to multiple myeloma.

Case report

A 67-year-old male patient was diagnosed with multiple myeloma, initiating treatment with thalidomide and bortezomib. Subsequently, he underwent autologous stem cell transplantation (ASCT). Due to disease progression, he changed to lenalidomide and carfilzomib therapy followed by pomalidomide therapy, daratumumab and lenalidomide therapy.

The patient presented with chest discomfort and dyspnea in November 2023, visiting the emergency room, and subsequent investigations were done. The results of coronary angiography and echocardiogram were normal. Pulmonary function tests showed a restrictive pattern with a forced vital capacity (FVC) of 2.31L (65% of predicted) and forced expiratory volume in 1 second (FEV1) of 1.72L (65% of predicted). Chest computed tomography revealed elevation of the right diaphragm with passive atelectasis in the right middle lobe and right lower lobe, and no pulmonary abnormalities indicative of causes of respiratory distress including pulmonary thromboembolism were observed. Compared to the patient's chest x-ray (CXR) before treatment (Fig. 1), right diaphragm elevation was revealed after ASCT (Fig. 2), and aggravation was noted in recently taken CXR (Fig. 3). Maximal inspiratory pressure was reduced to 42cmH2O (45% of predicted), and the 6-minute walk test distance was 292 meters. Electromyography results suggested right phrenic neuropathy. There was no history of chest trauma or catheterization.

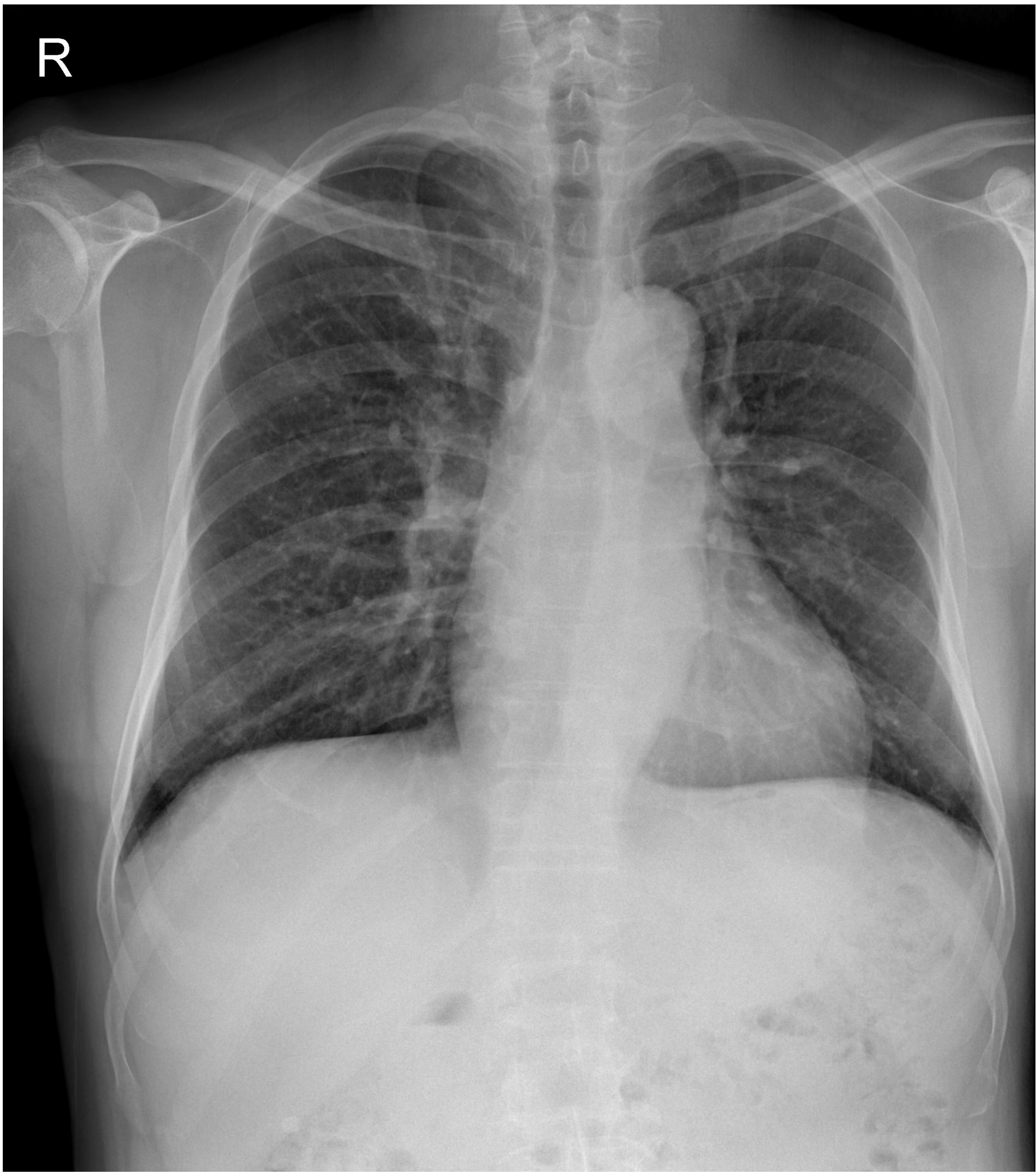


Figure 1. Chest PA before chemotherapy

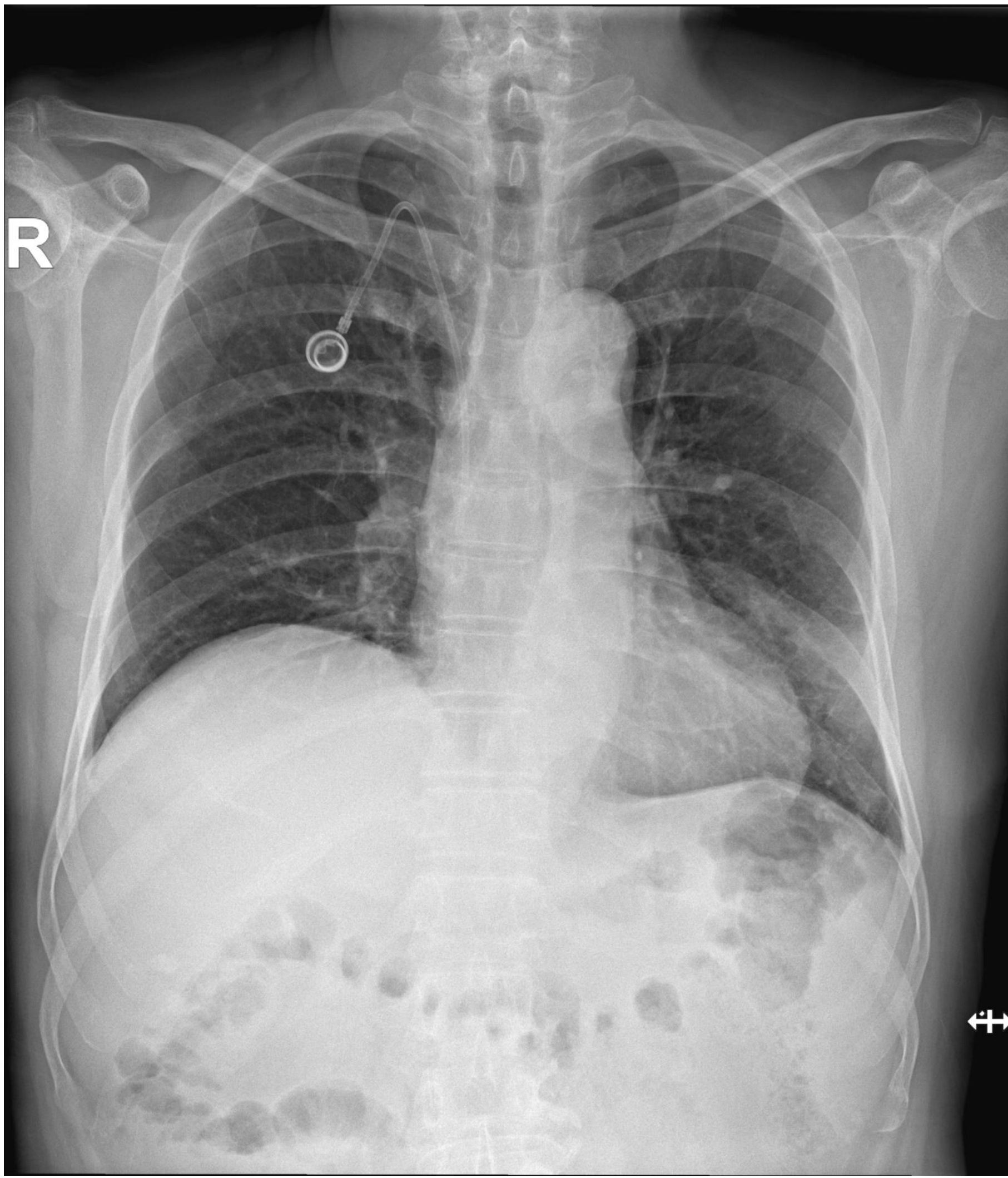


Figure 2. Chest PA at the time of ASCT

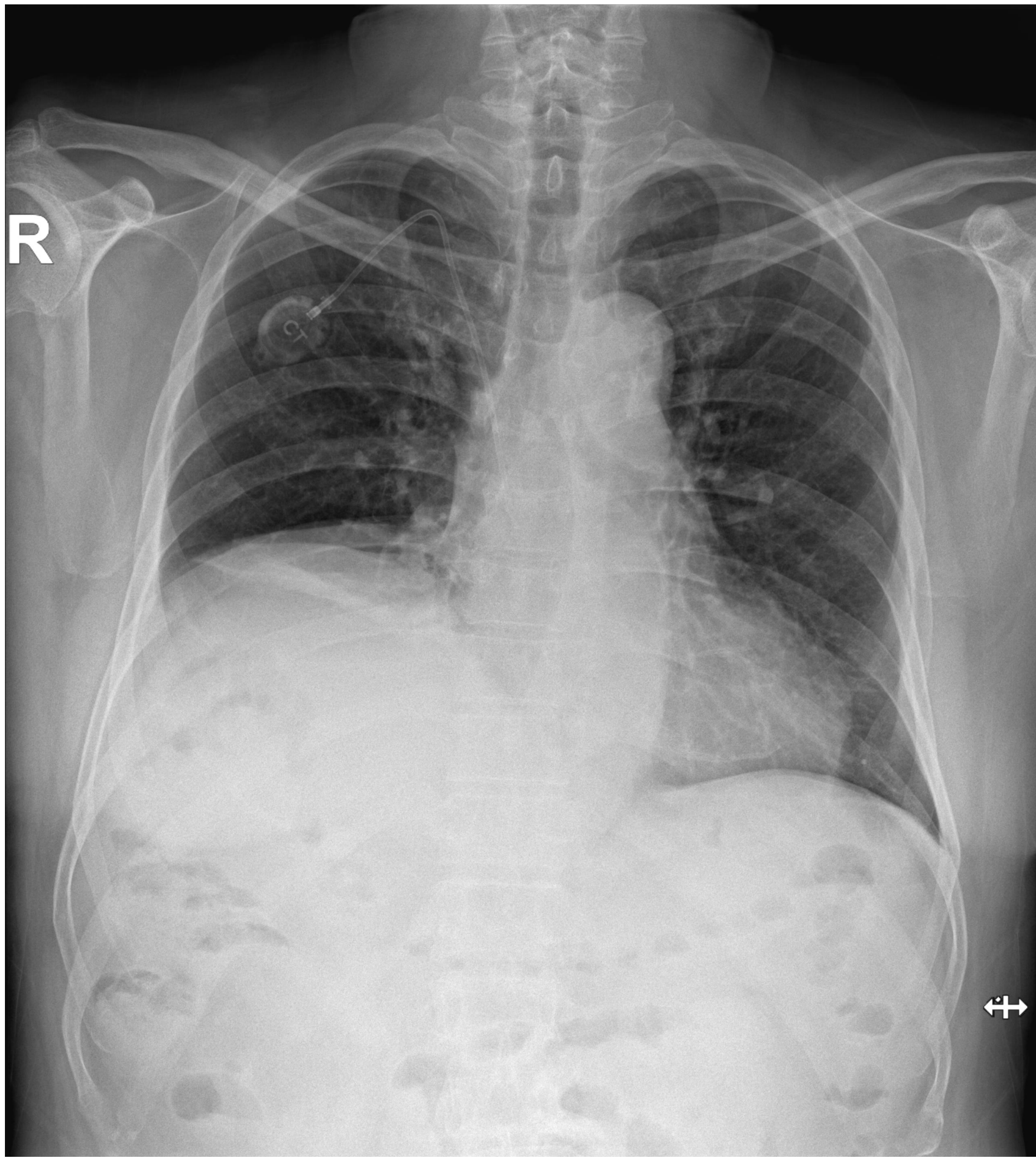


Figure 3. Current chest PA

Discussion

Phrenic nerve neuropathy and diaphragmatic dysfunction can occur from a variety of causes. It most commonly occurs due to direct neoplastic invasion of the phrenic nerve or due to iatrogenic injury during surgery. It can also occur due to infectious neuritis, trauma, and neurologic disorders such as Guillain-Barré Syndrome. Also, there was a case report of phrenic nerve palsy following the use of thalidomide and bortezomib, the chemotherapeutic agents. In our case, the right diaphragm elevation was observed at patient's CXR after use of thalidomide and bortezomib. It seems likely that unilateral phrenic nerve palsy occurred as a result of neuropathy induced by chemotherapy. While exceptionally rare, phrenic nerve neuropathy should be considered in the differential diagnosis of dyspnea in cancer patients, particularly following chemotherapy initiation.