CASE REPORT

THE RETROGRADE LEFT ATRIAL TUMOUR EMBOLISM IN THE PATIENT WITH METASTATIC EXTREMITY CHONDROSARCOMA

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The malignancy-related coagulation and secondary pulmonary embolism are common in sarcomas, whereas tumour embolism and pulmonary venous embolism are extremely rare. It is crucial to distinguish thromboembolism and tumour embolism in cancer patients. Physio pathologic basis of these two entities is also different. Knowing the type of embolism changes medical management since tumour embolism is unresponsive to anticoagulant or thrombolytic treatments. In especially patients with disseminated metastases, venous tumour embolism may occur by reaching tumour cells to the pulmonary venous circulation. This case is the fifth retrograde left atrial cardiac tumour embolisms in the literature. CT images and also follow-up images were descriptive. We report a case of a 59-year-old female patient who underwent amputation caused by extremity chondrosarcoma accompanied by clinical and radiological findings. She had multiple lung metastases and also had a right inferior pulmonary venous embolism. The embolism reached the left atrium via retrograde way during the three-month follow-up. HU value was 77 in the first CT, while 81 HU after three months. Pecking and vascular enlargement were also observed in CT. Echocardiography showed an appearance of iso-echogenic heterogenic. CT findings and HU values were compatible with tumour embolism in light of the echocardiographic findings.

Keywords: Tumour embolism; Chondrosarcoma; Cardiac embolism; Computed tomography

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INTRODUCTION

Chondrosarcoma (CS) is a malignant tumour that originated from cartilaginous tissue. It is the second most prevalent primary malignant bone tumour after osteogenic sarcoma.[1] CS has two different age peaks in the fourth to sixth decades of life. Tumour has a predilection to long bones, especially the femur. Shoulders and pelvis are other frequently influenced anatomical points.[2] The malignancies lead to pulmonary embolism (PE) by triggering hypercoagulability. The mortality rate of tumour embolism is high, and response to treatment is low. Therefore, tumour embolism has a more critical place among the types of PE.[3] Pulmonary artery embolisms constitute the majority of tumour embolisms. Intra atrial tumour embolism is one of the rare tumour complications.[4] We presented a case of a 59-year-old female patient who underwent amputation caused by extremity chondrosarcoma accompanied by clinical and radiological findings. Pulmonary venous tumour embolism and disseminated lung metastases were seen on computed tomography (CT), and it reached the left atrium via retrograde way after three months. The patient had demonstrative thorax CT findings.

CASE REPORT

The patient had been diagnosed as the left lower extremity CS in 2011 when she was 52 years old. In the same year, this extremity underwent amputation despite multimodality therapy. After the operation, the patient received intensive chemotherapy. The histopathologic diagnosis was present. She presented to the hospital with a severe headache after three years. Electroencephalography (EEG) and cranial magnetic resonance imaging (MRI) was requested. The EEG result showed the significant slow bio-cerebral activity at the left hemisphere and paroxysmal disorder in the left occipital zone. MRI was performed.

In MRI, brain metastasis in the frontal lobe, less than 1 cm in diameter, and peripheral vasogenic oedema were seen. The last MRI revealed multiple brain metastases. The brain metastasis progressed in magnetic resonance imaging (MRI) follow-up within two years. The biggest metastases were measured 4 cm in the frontal lobe and 6 cm in the parietooccipital area.

In 2015, she presented to the hospital again with complaints of severe dyspnoea, cough, weight loss, pain in her arms and chest, and difficulty speaking. The patient's general condition was moderate, conscious, partially cooperative, oriented, pupils isochoric, the sclera was natural, the conjunctiva was pale. Approximately 8×8 cm in size, protruding tumoral lesion was detected on

the right cheek. Paranasal CT showed a pathological fracture caused by zygomatic bone metastasis. Thyroid was nonpalpable and painless. The trachea was midline and mobile.

Bilaterally respiratory sounds were weak. Bilaterally fine crackles were heard. The cardiac sounds were normo-cardiac, no additional sound, no murmur. The abdomen was relaxed, no defence, no rebound, no sensitivity, no organomegaly. Bilateral costovertebral angle sensitivity negative. Bilateral lower extremity deep tendon reflexes were hypoactive. Venous doppler ultrasonography was requested. No obvious vascular pathology.

Contrast-enhanced chest CT was requested. Metastatic pulmonary dissemination in the right lower lobe of the lung was observed [Figure-1]. Also, vascular obliteration resulting from thrombus was detected in the right posterior pulmonary vein [Figure-2]. The patient received one VAC (Vincristine, actinomycin D (dactinomycin) and cyclophosphamide) regimen and radiotherapy every 3 weeks. Thorax CT was repeated postradiotherapy. It was revealed that embolism reached the left atrium after 3 months [Figure 3]. In the first CT, emboli attenuation was 77 HU±10,8 (ROI: 5 mm^2) Attenuation value of lung metastasis was found as 89±24,3 HU (ROI: 25 mm^2). In the CT taken after three months, the attenuation value of emboli was measured as 81±12,4 HU. Also, a 45x20 mm iso-echogenic heterogenous appearance was observed in the left atrium in echography. There was no evidence of cardiac metastasis. The walls of the left atrium were regular. According to these results, it was understood that the tumour embolism reached the atrium via retrograde way. The patient signed the consent form on 27.4.2015.

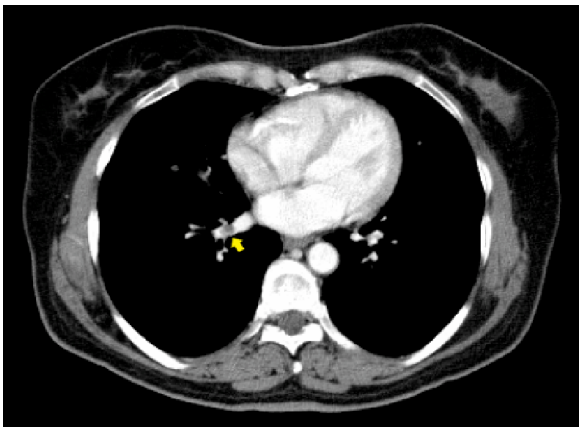

Figure-1: Disseminated tumour thrombosis in the posterior of the right lung (circle)

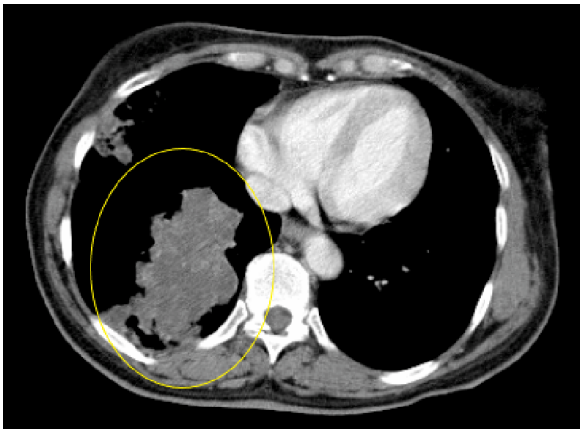

Figure-2: Hypodense thrombus inside pulmonary vein (arrow)

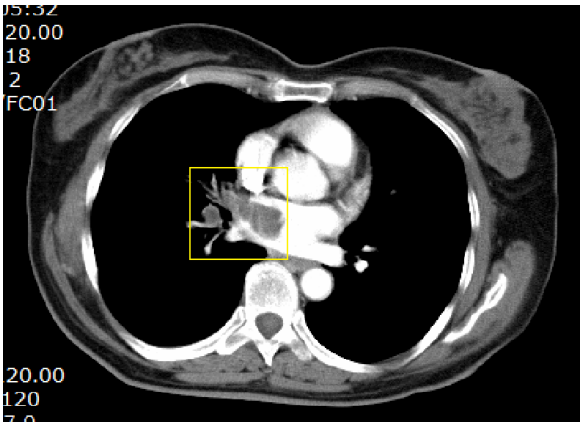

Figure-3: Left atrial thrombus invaded after 3 months to left atrium with the retrograde way (frame)

DISCUSSION

Pulmonary embolism is one of the life-threatening complications, especially in debilitated patients.[5] Pulmonary embolism is a common complication in the malignancies of brain, pancreas, gastrointestinal system, lung, pleura, colon, stomach, mucinous breast cancer, while a very rare in hematologic and breast (except mucinous) malignancies.[6–8] Sarcomas are one of the critical sources of embolism, although they constitute 1% of all tumours. Embolism is a possible finding in patients with sarcoma with signs of dyspnoea and is one of the causes of death due to sarcoma.[4] It is encountered with PE in 1.2% of patients with sarcoma. Cor pulmonale is a result of pulmonary hypertension and terminates with mortality in 0.4% of the patients.[8] The primary reason for mortality is generally pulmonary artery thromboembolism. To the best of our knowledge, no report regarding the mortality incidence of pulmonary venous thromboembolism in cancer patients.

Tumour embolism is more mortal than pulmonary thromboembolism. Determining the subtype of the emboli is essential for accurate management of treatment. There are contradictions in the articles on this subject. All embolism accompanied with malignancies has been evaluated inside the tumour embolism group in some studies. However, the embolism containing only tumour tissue should be called tumour embolism.[4,6] The average HU values of the bland clot (thrombus) are lower than the tumour embolism on CT, although the attenuation of embolism is hypodense in both conditions. The studies are very limited and a little known about the HU value of the tumour embolism. In a study based on the values of the portal vein, the mean CT attenuation value for thromboembolism was calculated as 33 HU, while as 83 HU in tumour embolism.[9] In another study, acute and chronic thromboembolism were compared. HU values were 32.2±17.0 in acute thromboembolism and 52.1±13.6 in chronic thromboembolism.

HU value of embolism is respectively tumour embolism > chronic thromboembolism > acute embolism.[10] However, this ranking is a simple classification. The attenuation value is altered according to the ratio of thrombus cell/malignant cell and timing. In other words, the thrombus is not composed of tumour cells. The ratio of tumour cells in the thrombosed blood affects HU. Also, attenuation of the primary tumour affects the attenuation of embolism due to this tumour. For example, tumours with low HU values lead to embolism with low HU values. If the thrombus is old, the HU value increase. This topic is open to further studies. In our case, HU values were compatible with tumour embolism.[4,6]

In the autopsy series, 8% of tumour emboli were found to be directly associated with death. The rate of tumour embolism detection is 22% in post-mortem series, and it is much higher than clinical detection. Among soft tissue tumours, retroperitoneal ones mostly metastasize. Chondrosarcomas are the most common tumour embolism reason in the bone sarcoma group.[4]

Chondrosarcomas are tumours resistant to chemotherapy and radiation therapy. Excision of the tumour or even amputation is preferred.[6] The subtypes are central, peripheral, and juxtacortical (periosteal) types.[11] Although chondrosarcomas are among the causes of embolism, pulmonary artery embolism constitutes the majority of embolism cases. In the literature published up to 2014, tree cases are left atrial, one case right atrial thirteen cases are pulmonary artery embolism.[4,6] We searched in PubMed with the following keywords, between 2014 and 2020; 'tumour embolism' [All Fields] OR 'atrial embolism' [All Fields] OR 'cardiac embolism', two case reports were found that published on this topic. One of these cases is the right atrial, and the other is left atrial embolism. In our case, the emboly retrograde reached the left atrium. Our case is fifth left atrial tumour embolism.

Pulmonary arterial tumour embolism occurs resulting from blockage of vascular structures by clumps or fragments separated from the tumour.[12] The mechanism in pulmonary venous embolism is completely different than arterial embolism. As is known, bronchi and arterial structures sit in the central part of the secondary pulmonary lobules and lymphatic and venous structures in the interstitial spaces. In disseminated metastasis or lymphangitis carcinomatosis, tumour cells filling the interstitial space reach the venous space from this area. It may accumulate in the pulmonary veins and cause pulmonary venous thromboembolism. It can continue to the heart via retrograde way over time. Therefore, cardiac tumour embolism can be seen in the left atrium in patients with lung metastases, as in our case. Since the right atrium is connected to the vena cava, the right cardiac embolism is more likely in patients with systemic metastases in regions other than the lung.[13] However, this physio-pathological mechanism is the only theory. Arterial or venous in both cases, cardiac tumour embolism is extremely rare.

CT is the gold standard in the diagnosis of tumour embolism. Chest X-ray is commonly used, but the rate of false negativity is very high. Lung perfusion scan and thoracic echography are other used methods. The sign of the pulmonary vascular pecking and progressively increasing of the vessel in size distinguish to tumour embolism from venous thrombosis in CT. Vascular pecking finding depends on the hardness of the clots. Since bland thrombus is morphologically soft, they cannot make a concave protrusion, even they become chronic and organized in this area. Tumour embolism acts like a malignant mass, creating a more compact appearance. It pushes the vascular wall like a mass and expands it. Bland thromboembolism takes the same shape of the vein. In our patient, the right posteroinferior pulmonary vein calibration was 10 mm in size. After 3 months, it measured 14 mm. It was evidence of tumour embolism. The pecking sign was clear in the CT image.

Recently, the benefit of PET-CT in distinguishing tumour embolism from thromboembolism has been discussed. However, there is no consensus in the subject of using in practice.[14]

In tumour embolism, there is usually no response to anticoagulant therapy or thrombolysis.

Even, it is contraindicated due to the high risk of haemoptysis. However, anticoagulant therapy is tried in all cases initially. Unresponsiveness to anticoagulant therapy is the reason for suspicion of tumour embolism. Chemotherapy is the first treatment choice for chemo-sensitive tumours. However, since chondrosarcoma is resistant to chemotherapy, embolectomy is the main strategy.[4]

As a result, venous tumour embolism is a rare condition in bone sarcomas and CS. This phenomenon is physio-pathologically different from tumour-related pulmonary thromboembolism or pulmonary arterial tumour embolism. It can reach heart via retrograde. The samples have been limited only a few cases. It should be distinguished from cardiac tumours and thromboembolism by the treatment approach is different. CT is of critical importance in this regard. Radiological signs such as HU values, vascular enlargement, pecking sign are useful for diagnosis. Our case is a descriptive example showing retrograde spread radiologically.

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