CASE REPORT

THORACIC LIPOSARCOMA IN AN END STAGE RENAL DISEASE PATIENT

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Liposarcoma arising in the thoracic cavity is a rare entity. It is usually found in the retroperitoneal space and the extremities. No case of thoracic liposarcoma in a patient suffering from the end-stage renal disease has been reported in the literature. We herein present the first case of thoracic liposarcoma in a patient suffering from the end-stage renal disease. Metabolic disturbances, increased use of erythropoietin and increased diagnostic workup attributes to greater risk of cancer in patients suffering from renal failure. A chemotherapeutic drug, Trabectedin has been approved for advanced liposarcoma. Prognosis of such tumours depends on the size, location, and their histological subtype.

Keyword: End-stage renal disease, Erythropoietin, Liposarcoma, Thoracic cavity, Trabectedin

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INTRODUCTION

Soft tissue sarcomas are a group of solid cancers, which have origin from mesenchymal cells. Based on histology, there are almost 50 subtypes of soft tissue sarcomas with liposarcoma representing 20–30% of soft tissue tumours in adults.[1] The most common site for liposarcoma is the retroperitoneum whereas extremities being the second most common site for liposarcoma.[2] Rarely, they are found in other areas like gastrointestinal tract and thoracic cavity. In the literature, no case of thoracic liposarcoma has ever been reported in a patient suffering from the end-stage renal disease. We at this moment present the first case of a thoracic liposarcoma in a 51-year-old Hispanic male suffering from the end-stage renal disease. Informed consent was taken from the patient.

CASE REPORT

A 51-year-old Hispanic male with a history of hypertension, diabetes, dyslipidaemia and end-stage renal disease and past surgical history of resection of a chest mass in 1985 presented for a nephrology consultation for a possible renal transplant evaluation. On physical examination of the patient, a right-sided chest mass was noted which patient reported being present there since he was young, biopsied in Mexico and reported to be a benign lipoma resected in 1985. The patient reported this mass to be extending and increasing in size.

In May 2016, CT scan was performed which showed a subcutaneous mass noted to be highly vascularized with some fat and calcification (Figure-1). Because of highly vascularity of the mass, a biopsy was avoided. Dimensions of the mass were noted to be 18.4×13.6×15.7 cm. Furthermore, the mass was found to be extending into latissimus dorsi with some extensions to the ribs but with no invasion (Figure-2). PET scan performed in June 2016 revealed a mild tracer uptake in the right chest wall mass along with 7 mm pulmonary nodule and a small right thyroid nodule with mild uptake. The patient underwent an angiogram that showed a long thoracic artery which was markedly enlarged and dilated and not consistent with any arteriovenous (AV) malformation or haemangioma but a possible sarcoma (Figure-3A). In August 2016, embolization of lateral thoracic artery through interventional radiology was done supplying the right chest mass (Figure-3B). The patient had no complication post-embolization (Figure-3C).

A day later, the patient underwent surgery for the right chest mass with resection of 6th, 7th and 8th rib and recreation of the chest wall with methyl methacrylate and complex closure of the chest wound. Intraoperative trans-oesophageal echocardiogram showed left ventricular ejection fraction to be 50–60% with normal right ventricular function and no significant valvular abnormalities. The patient had unremarkable clinical and post-operative course and was discharged home in stable condition.

The pathology showed nodules of capillary-sized vessels with intervening venous channels seen diffusely infiltrating adipose tissue and adjacent skeletal muscle fibres. The vascular malformation involves multiple tissue planes- subcutis, skeletal muscle and underlying bone. The vascular malformation extends between bony trabeculae with interspersed areas of maturing trilineage haematopoiesis. The venous nature of this malformation is implied by the presence of a variable amount of well-differentiated smooth muscle in the vessel walls, the absence of an internal elastic lumina, and lumina containing erythrocytes. Hypocellular areas around vessels noted. Lobular architecture and neoplastic adipocytes in the periphery of these lobules noted. Single clear fat vacuoles noted. Vessels of capillary or venular proportions are also

notably present throughout within this vascular proliferation in close association with adipose tissue. The surrounding skeletal muscle fibres and nerve fibres are unremarkable. Focal scar formation is noted in the overlying skin. Arborizing, plexiform capillary network with thin-walled vessels, and single clear fat vacuoles appear to be consistent with myxoid liposarcoma.

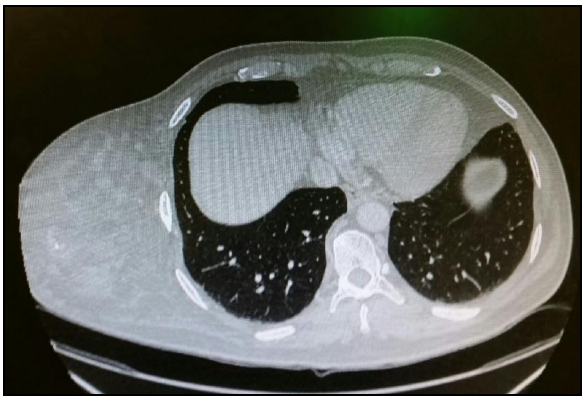

Figure-1: CT- Scan Image of the right chest mass.

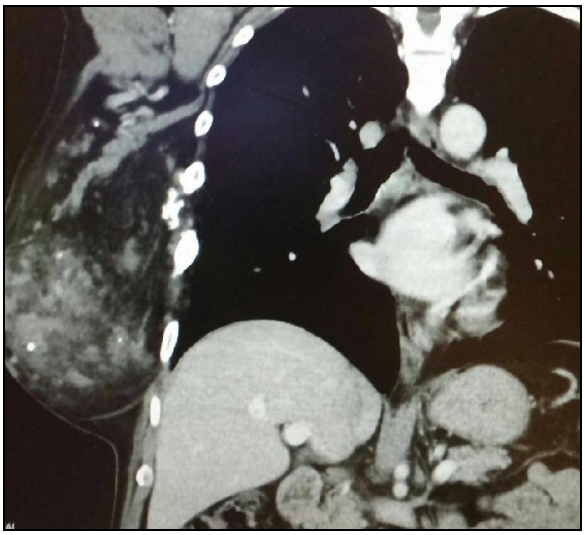

Figure-2: Frontal view for cross sectional view of the right thoracic mass demonstrating extension to the ribs but no invasion.

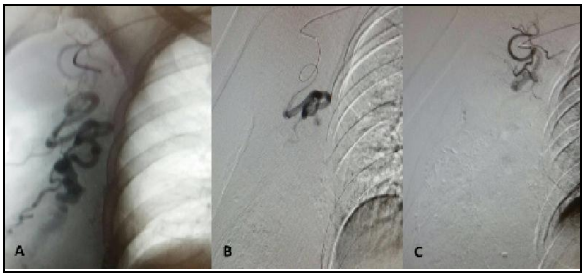

Figure-3. A- Angiogram of long thoracic artery prior to embolization, B- Embolization of lateral thoracic artery through interventional radiology, C- Angiogram of lateral

DISCUSSION

The onset of liposarcoma is most common between fifth to seventh decades.[3] Because of expansile growth pattern rather than the infiltrative pattern of such tumours, they present with nonspecific symptoms despite their large size. Pain can be an initial symptom for liposarcoma in the chest wall if the nerve is invaded. Our case had a painless presentation despite its large size and proximity to the chest wall. There was an extension into the adjacent latissimus dorsi muscle and ribs, but no invasion was seen.

Our case is the first case of thoracic liposarcoma in a patient with the end-stage renal disease. Despite such a large size and the recurrence, our patient had a good outcome which makes our case noticeable. Differential diagnosis in our case includes lymphoma and lipoma. Due to the presence of some fat, high vascularity and absence of homogeneity on computed tomography (CT) images, lymphoma was ruled out.[4] Lipomas give homogeneous fatty signals on imaging and are easily identified. Calcification may occur in lipomas but is more commonly found in liposarcoma. Liposarcoma appears heterogeneous because of the underlying necrosis, calcification, soft tissue components and vascular changes.[5] Currently, there are four clinical subtypes of liposarcoma, i.e., pleomorphic, myxoid, well-differentiated and dedifferentiated liposarcoma.[6] Due to high vascular nature of the mass in our case, subtyping was not possible.

A high cancer incidence was observed within five years of initiating haemodialysis, in a large national study, in patients with end-stage renal disease reported in 2015.[7] It is estimated that this difference is due to detail medical workup of such patients in the outpatient settings leading to a diagnosis of cancer and due to increased survival of the end-stage renal disease patients due to haemodialysis.[8] Dialysis caused immune dysfunction of the body, and prolonged interaction of cancer risk factors like alcohol and tobacco with the body increases the chances of cancerous growth.[9] Erythropoietin is also used commonly in patients with end-stage kidney disease to treat anaemia. This also supports the hypothesis that soft tissue sarcomas may arise after prolonged use of erythropoietin. Erythropoietin causes angiogenesis which potentiates tumour growth.[10] Metabolic derangements also increase as the patient tends to grow older which make their body susceptible to cancer. Immunosuppressive effects of uraemia because of poor creatinine clearance in ESRD just like our patient may potentiate the development of tumour growth. As our patient was diagnosed with Lipoma

after biopsy of the mass in Mexico when he was very young, it is unclear whether this mass was a transformation from lipoma to liposarcoma. Malignant transformation of benign soft tissue lesions is very rare although some studies have suggested that genetic and molecular abnormalities may accelerate the transformation of lipoma into liposarcoma.[11] Our patient was ESRD on HD for almost 12 years. The increase in size of the right sided chest mass may prove the fact that uraemia may increase the risk of malignant transformation. Either suppressing surveillance of tumour or growth factors expression by immunosuppressive medications can also accelerate the growth of such soft tissue tumours.

CT imaging is the most cost-effective and efficient modality for diagnosis of liposarcoma. The appearance of liposarcoma on the CT scans can vary from being discrete solid to highly vascular or fat-containing lesions. Recently, a new technique involving four-dimensional computed tomography (4DCT) has been introduced to access the adhesion of liposarcoma to its adjacent organs.[12] Deep inspiratory breath holds are not required in identification using this technique in comparison to magnetic resonance imaging which requires deeper inspirational breath hold.[13] Angiography is significant for detection of vessels that supply the tumour and their relationship with adjacent organs. It is also helpful if CT scan is non-conclusive about the location of liposarcoma.[14] Our case revealed an enlarged lateral thoracic artery with the help of an angiogram which did not specify any AV malformation. Since high vascularity of tumour in our case was found in the enlarged lateral thoracic artery, our patient underwent embolization before surgery to prevent blood loss.

Surgery was performed in our case for liposarcoma. Extra care needs to be taken if the soft tissue mass is highly vascular just like our case. To restore support to the thoracic cage as well as providing overlying coverage in our patient, recreation of the chest wall with methyl methacrylate and complex closure of the chest wound was performed. Trabectedin, an alkaloid agent, has been approved for use in patients with soft tissue sarcomas who fail first-line treatment. This drug binds to DNA creating specific sequencing to stop gene activation and induces brutal double-stranded breaks in the DNA molecule causing the arrest of the cell cycle.[15] In a study of the pharmacokinetics of trabectedin in haemodialysis patients with recurrent myxoid type liposarcoma, the results illustrated that the elimination half-life of the patient was twofold decreased in comparison to a patient with normal renal functions suggesting that removal of trabectedin from the body was not impaired but in fact increased in such patients.[16] Recently clinical trials are being conducted for the assessment of Brostallicin, Palbociclib, Selinexor, and Pazopanib for the treatment of advanced and metastatic liposarcoma. In future, novel agents for the treatment of such condition are expected to increase.

The overall prognosis of liposarcoma varies on a case to case basis. Based on our understanding, important prognostic factors include the size of the tumour, histological subtype, and its dissemination. Due to highly vascular nature of the tumour in our case, we were unable to perform a biopsy before surgery. Despite such a large size of the chest mass in our case, there was no noticeable metastasis or involvement of the mediastinal structure reported. Our patient had an unremarkable clinical stay in the hospital and was discharged without any complication.

CONCLUSION

Liposarcoma arising in the thorax is very rare. Increased risk of cancer in end-stage renal disease is attributed to metabolic derangements, improved survival, increased diagnostic and clinical work up and due to a side effect of medications like erythropoietin. Various treatment modalities like Trabectedin for the treatment of liposarcoma have been approved, and the arsenal for treatment is expected to increase in future. Regular workup should be done to monitor the side effects of anti-cancer drugs because metabolic derangements can be potentiated in patients with the end-stage renal disease. Re-evaluation of targeted cancer screening practices should be considered. Further studies are warranted for establishing suitable therapeutic algorithms for the patients with ends stage renal disease suffering from cancer.

Conflict of Interest: None of the authors declare any conflict of interest.

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