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Case Review

Asymptomatic Testicular Carcinoma Presenting with Metastatic Pulmonary Symptoms: Case Based Review

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Abstract

A 24 year old male presented with hemoptysis and chest pain of one month. Chest x-ray and thorax CT revealed multiple nodules in both lungs. PET/CT showed high ^{18}FDG uptake in all pulmonary nodules and at the right anterior testis. ß-HCG was 201.744 IU while PSA and AFP levels were within physiologic limits. Bronchoscopic examination revealed normal findings. Cytologic examination of BAL was negative. BAL culture did not grow any organisms including bacteria, mycobacteria, or fungus. Scrotal ultrasonography demonstrated a small heterogenic parenchymal area with calcifications at the left testis. Left orchiectomy was performed with a preliminary diagnosis of testis carcinoma. Histopathologic examination of the resected specimen revealed regressed germ cell testis tumor.

Our case displays crucial features for the diagnostic implications in regard to clinical presentation concerning both patient symptoms and the indistinct CT and nuclear imaging patterns. CT was non-diagnostic while PET/CT showed high tracer activity in the right testis consistent with malignancy while ultrasonography disclosed a subtle and inconspicuous image for a probable malignancy in the left testis. Clinicians should be aware that advanced imaging modalities as CT and PET/CT can lead to misleading and equivocal findings while ultrasound may exhibit barely distinct but not highly accurate sensitivity in regressed germ cell testis tumors.

Keywords: *Testis Carcinoma; Regressed Germ Cell Testis Tumor; Germ Cell Tumor; Diagnosis*

Introduction

Testis carcinoma is the most common solid malignancy effecting young males between 15 and 35 years of age. The incidence is approximately 1% of all male cancers [1]. Germ cell tumors account for almost 95% of these malignancies. They may present with one dominant histologic pattern or with a multiple histologic types. For treatment purposes, testis tumors are evaluated in two main categories as pure seminoma and non-seminoma germ tumors. They usually present as a nodule or painless swelling in one testicle that may be noted incidentally or with a dull pain in the scrotum [2]. Presenting metastatic manifestations of testicular cancer are encountered in approximately 10% of the patients. Symptoms of advanced disease may vary with the site of metastasis [3-5].

Diagnosis is usually suspected by physical examination, laboratory investigations, CT, nuclear, and ultrasonographic imaging, and subsequently confirmed by histopathological examination of the biopsy or the resected tissue. We present a case of regressed germ cell testis

tumor admitted with pulmonary metastasis revealing indistinct CT and PET/CT imaging findings with barely decisive ultrasonographic manifestations for malignancy.

Case Report

A 24 year-old male was admitted for hemoptysis and right sided pleural chest pain of one month. The patient did not respond to antibiotic treatment of clarithromycin of 10 days. Personal and family history did not reveal any disease of concern. Physical examination exhibited normal findings. Blood count and serum biochemistry showed mean values except for a mildly elevated CRP of 25 mg/ml. Chest x-ray displayed multiple pulmonary nodules in both lungs. Chest CT revealed multiple well defined diffuse nodules with a diameter between 2 and 4.4 cm in both lungs (Figure 1). As indicated by the age of the patient and imaging findings, etiology of a possible malignancy metastasized to lung, primarily a testicular carcinoma, was the initial diagnosis. Serum PSA and AFP were normal while β-HCG level was very high (200.174 mIU/mL) suggesting the presence of germ cell tumor.

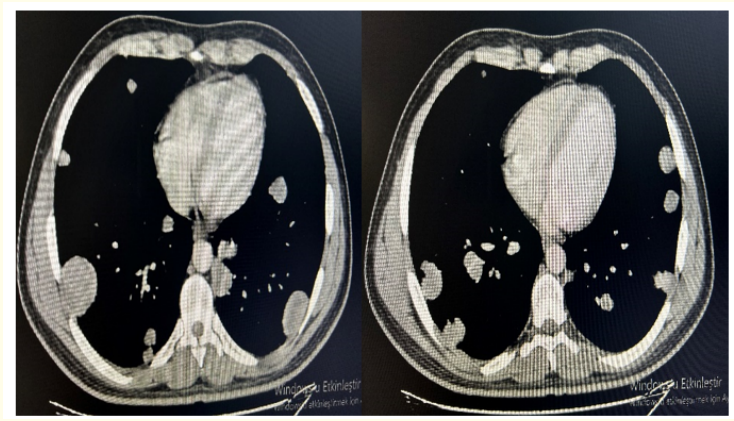

Figure 1: *Chest CT revealing multiple well-defined pulmonary nodules in both lung parenchyma.*

Fiberoptic bronchoscopy was normal. Culture of BAL fluid did not grow any organisms. Cytologic examination was negative for any inflammatory or malignant cell pattern. Preliminary diagnosis was germ cell tumor of the testis. Physical examination of the testes with bimanual examination of the scrotal contents was completely normal in regard to size, contour, and consistency of the normal testis without any nodule or painless swelling of one testicle. PET/CT displayed pulmonary nodules revealing a SUVmax value between 7.6 and 8.6 compatible with metastasis (Figure 2) along with a focal increased ^{18}FDG uptake in the right anterior testis area (Figure 3). Testis ultrasonography identified microlithiasis defined as five hyperechogenic foci with a 3 mm diameter at the lower pole of the left testis and bilateral anechoic lesions at the lower poles of both epididymis in a single cross-sectional ultrasound image. The patient underwent urgent left orchiectomy with an uneventful recovery following surgery. Histopathologic examination of the resected left orchiectomy specimen was compatible with regressed germ cell tumor of the testis. Final diagnosis was regressed germ cell testis tumor with multiple metastatic pulmonary nodules.

Discussion

Testis cancer is the most common solid malignancy effecting the young males between of 15 and 35 years accounting for only 1% of all male malignancies [1]. It is also one of the most curable of solid neoplasms due to remarkable treatment advances that may yield five-year

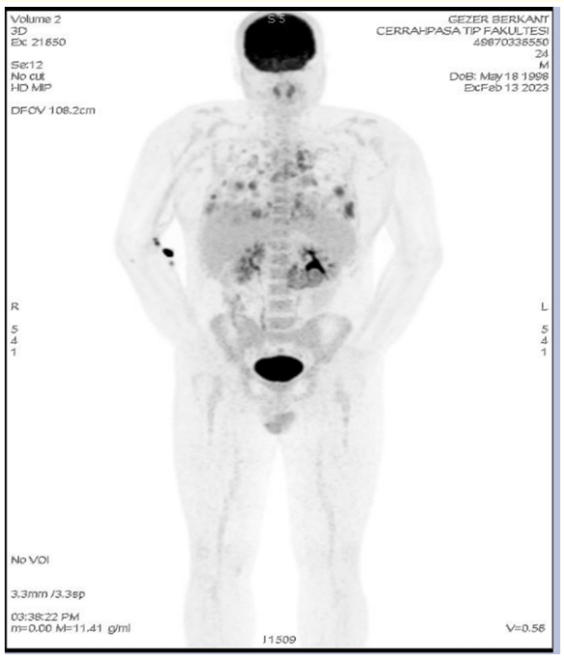

Figure 2: *PET/CT displaying high ^{18}FDG uptake in the pulmonary nodules.*

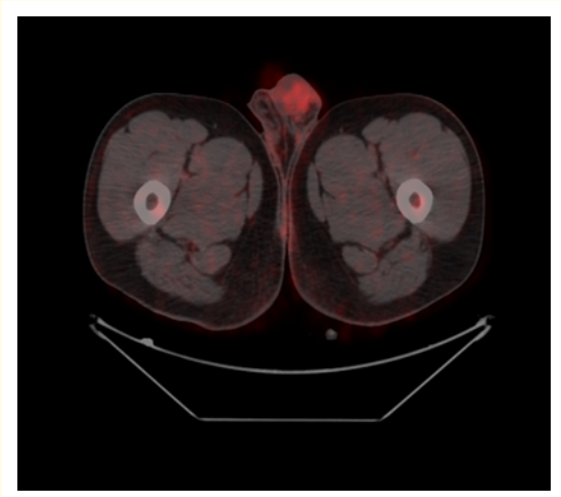

Figure 3: *PET/CT revealing high ^{18}FDG uptake in the right testis.*

survival rates in almost 95% of the patients [6]. Testis tumors usually present as a nodule or painless swelling of one testis while approximately 30 - 40% of patients may complain of a dull ache or heavy sensation in the lower abdomen, perianal area, or scrotum. Acute pain

may emerge as the presenting symptom in 10% of the patients. Presenting manifestations attributable to metastatic disease may emerge in about one tenth that vary with the site of metastatic foci. Unique clinical and imaging profile of this patient that has not been reported previously makes our case exclusive in terms of its contribution to the literature.

Preemptively, our patient did not have any symptoms related to a primary testis tumor. Secondly, and most importantly, CT and PET/CT manifestations revealed extremely equivocal findings for the presence of a primary testis malignancy. Among the laboratory findings, only the high ß-HCG value indicated testis carcinoma due to the fact that serum beta-hCG concentrations above 10,000 units/mL occurred only in germ cell tumors [7,8]. Clinical findings suggestive of metastatic disease were the presence of hemoptysis and lateral chest pain along with existence of multiple nodules on the chest X-ray and thorax CT. Hemoptysis, although rare in metastatic disease, has been reported in testis cancer metastasis [9-11]. Other metastatic manifestations such as cough, dyspnea, anorexia, nausea, vomiting, or gastrointestinal hemorrhage, lumbar or bone pain, and unilateral or bilateral lower extremity swelling due to iliac or caval venous obstruction or thrombosis that may be observed in testicular carcinoma [12-14] were not present in our patient. Among the imaging modalities, only the scrotal ultrasonography revealed extremely ambiguous findings barely compatible with a testis tumor that contradicted with the CT and PET/CT findings in regard to malignancy.

While CT is the imaging modality of choice for initial local metastases in the retroperitoneal lymph nodes, false-negative rates as high as 44% have been described [15]. Occult micrometastases are responsible for most of these false negatives, as evidenced by a retroperitoneal relapse rate of 20% to 25% in males with clinical stage I disease who have not undergone retroperitoneal lymph node dissection [16,17]. Likewise, PET/CT reveals limited utility in the diagnosis or the initial staging of patients with testicular germ cell tumors due to the high incidence of false negative results [18,19]. Bilateral scrotal ultrasound can distinguish intrinsic from extrinsic testicular lesions with a high degree of accuracy and sensitivity that can detect intratesticular lesions as small as 1 to 2 mm in diameter [20]. In our case, ultrasonography identified a testicular tumor that could not be visualized with other advanced imaging modalities including CT and PET/CT but revealed quite ambiguous and barely sensitive findings that could easily be overlooked.

When the patient symptoms are evaluated, an extremely wide differential diagnostic profile emerges for the clinician because hemoptysis and chest pain may occur as manifestations of many other diseases, primarily the lung. Advanced imaging interventions have put forward indistinct findings for testis carcinoma in this case. The crucial hallmark was the presence of equivocal and ambiguous manifestations revealed by CT and PET/CT for the diagnosis of regressed germ cell testis tumor. Scrotal ultrasonography, on the other hand, detected and set forth the diagnostic features of a testicular tumor but which were also extremely equivocal and indistinct. However, when compared with other imaging methods, testicular ultrasound emerged as the most sensitive diagnostic modality for the regressed germ cell testis tumors.

Review

Diagnosis of regressed germ cell tumors is a diagnostic challenge for the clinician due their suppressed or blunted pathologic features that extremely decrease the diagnostic sensitivity and specificity of imaging modalities. These tumors reveal spontaneous complete or partial regression and usually present as metastasis, residual testicular germ cell tumor or both [21,22]. They constitute approximately 3% of all testis tumors with a median age of diagnosis is between 28 and 32 years while 10% of retroperitoneal germ cell tumors have a regressed testicular primary [21]. Metastatic symptoms emerge as the common initial manifestations in the liver, lung, bone, and brain that occur as the most frequent sites of metastasis. The patients are usually discovered with metastatic disease in the absence of a palpable testicular mass [21-23]. Elevated serum ß-HCG levels are the most consistent laboratory finding. Ultrasonographic features of regressed germ cell tumor are microlithiasis (> 0.2 cm) or microlithiasis (< 0.2 cm), loss of testicular homogeneity, nonspecific hyperechoic or hypoechoic lesions, and testicular atrophy [21,23,24]. CT may reveal false-negative rates as high as 44% [15] due to micrometastases that usually lead to this as disclosed by a retroperitoneal relapse rate of 20% to 25% in males with clinical stage I disease without retro-

peritoneal lymph node dissection [16,17]. PET/CT also displays a limited diagnostic additive value in the diagnosis for regressed germ cell testis tumors due to the high incidence of false negative consequences [18,19].

In line with the clinical findings revealed by our case, the following manifestations carry an extremely crucial criteria in terms of diagnosis for regressed germ cell testis tumors. The first distinctive point is that whether metastatic or not, clinical manifestations of such tumors are equivocal for diagnosis. Second, basic radiologic imaging may point out to metastatic testis tumor that requires a wide spectrum of assessment for differential diagnosis with other more common malignant diseases. Third, CT and PET/CT may solely reveal metastasis concerning any kind of malignancy with unsensitive conclusions for the primary tumor. Fourth and of paramount importance, scrotal ultrasonography may display specific imaging manifestations for regressed germ cell testis carcinoma that still necessitates an extremely meticulous assessment due to frequently observed equivocal or uncertain manifestations concerning primary testis.

As demonstrated by our case, the contribution of even the most advanced imaging modalities to initial diagnosis may be negligible in regressed germ cell testis tumors. CT and PET/CT appear to display equivocal diagnostic accuracy both for determining a diagnostic pathway or for a final diagnosis frequently leaving the clinician in a dead-end for these tumors. The main hallmark for this issue is that the radiological reflection of the regressed histopathological tumor structure lacks the specific malignant features for diagnosis because the characteristic malignant tissue aspects or components are not present due to suppression. It should definitely be kept in mind that imaging may be the most ineffective or inaccurate intervention in the diagnosis of regressed germ cell tumors other than scrotal ultrasonography. Due to the regressed histopathological structure, even ultrasonography may not provide adequate contribution to the diagnosis in such tumors and may reveal recondite or obscure findings. As the viable tumor tissue is replaced by fibrosis the diagnostic sensitivity of imaging modalities decrease in a progressive fashion. The greater the fibrotic pattern and scar tissue development in these tumors, the lower the diagnostic yield of imaging modalities debouch.

Conclusion

Although the patient history of our case manifests a wide differential diagnostic profile, it at least indicates the presence of a presumptive malignancy due to hemoptysis along with the pleural chest pain by metastatic lesions. Chest X-ray and thorax CT may suggest lung metastasis of testicular carcinoma, especially if the patient age is concerned. Our case justifies that it is plausible to reach a preliminary diagnosis of testis carcinoma with patient history and radiologic assessment that may lead the clinician noticeably to proceed in an orthodox track. On the other hand, testis ultrasonography emerges as the most definitive diagnostic intervention. Even if the scrotal ultrasonography displays equivocal findings, it carries a great potential for leading the clinician in the most accurate diagnostic pathway as delineated by our patient. Clinicians should bear in mind that CT, PET/CT and scrotal ultrasonography imaging may display dubious or indistinct findings in regressed germ cell test tumors. This significant loss of diagnostic sensitivity and specificity emerges due to the decreased viable tumor tissue and increased tumor regression. It is clearly evident that the diagnostic yield of CT, PET/CT and ultrasonography is significantly compromised in regressed germ cell testis tumors.

Author Contributions

Cuneyt Tetikkurt designed the diagnostic assessment score and wrote the case report.

Başak Toksöz constructed the bronchoscopic findings.

Bilun Gemicioğlu prepared the laboratory and pulmonary function test results.

Conflicts of Interest

All authors declare do not have any conflicts of interest relevant to this case report.

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