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A Rare Case of Seminoma with Brain Metastasis and Lung Metastasis

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ABSTRACT

Seminoma is a malignant germ cell tumor most commonly arising in the testes, typically affecting young males. Although seminoma is highly treatable with a survival rate above 95% in early stages, distant metastasis, particularly to the brain and lungs, is extremely rare. This case report highlights a rare instance of seminoma with both brain and lung metastases in an 18-year-old male. An 18-year-old male presented with chest pain, hemoptysis and severe headaches. Physical examination revealed scrotal swelling and normal genitalia. Investigations, including CT of the chest and brain, identified multiple necrotic lung nodules and hemorrhagic brain metastases. A scrotal ultrasound confirmed a testicular tumor and the patient underwent radical orchidectomy. Histopathology confirmed the diagnosis of seminoma. Five days post-surgery, the patient developed altered sensorium and brain imaging revealed metastatic lesions with a midline shift. Management and Outcome: The patient received a multidisciplinary approach to treatment, including BEP (Bleomycin, Etoposide, Cisplatin) chemotherapy and supportive care for brain metastasis. The brain metastases were initially managed with steroids to reduce cerebral edema. The patient demonstrated improvement after chemotherapy, with partial remission of lung metastasis and stabilization of neurological symptoms. This case represents a rare and aggressive form of seminoma with brain and lung metastasis, highlighting the importance of early detection and individualized treatment strategies. Brain metastases in seminoma are extremely rare and require a multidisciplinary approach, including surgery, chemotherapy and potentially radiotherapy. Long-term follow-up is crucial in managing such rare presentations. Seminoma, although highly treatable, can metastasize to distant organs such as the brain and lungs, as seen in this rare case. Among young males with testicular tumors, brain metastasis should be considered, especially when neurological symptoms arise. Early intervention and aggressive treatment are key to improving patient outcomes in metastatic seminoma.

INTRODUCTION

Seminoma is a malignant germ cell tumor that arises primarily in the testicles, though it can also originate in extra-gonadal sites such as the mediastinum or retroperitoneum. Seminomas typically occur in young men, especially between the ages of 15 and 34 and account for around 50% of all testicular germ cell tumors. While seminomas are highly treatable and have an excellent prognosis when diagnosed early, with survival rates exceeding 95%, metastatic seminoma, especially with brain or lung involvement, is exceptionally rare and poses a significant clinical challenge[1,2].

Seminoma spreads primarily via lymphatic and hematogenous routes, with the retroperitoneal lymph nodes being the most common site of metastasis. Distant metastases to organs such as the lungs or brain are unusual and typically suggest a more advanced stage of the disease. Treatment protocols include a combination of surgery, chemotherapy and radiation, depending on the extent of metastasis. While seminoma's response to therapy is generally favorable, cases with brain and lung metastases present more complexities in management and prognosis[3].

Case Presentation:

Patient Demographics and Initial Complaints: An 18-year-old male presented to the outpatient department with complaints of chest pain that had persisted for one week. The chest pain was associated with one episode of hemoptysis. Additionally, the patient reported severe headaches that had started five days prior to the hospital visit. There was no history of trauma, significant weight loss, or other systemic symptoms.

Clinical Examination: On physical examination, the patient exhibited distinct physical characteristics:

Height: 119cm (dwarfism noted).

Weight: 38kg.

Vital Signs: Pulse rate was 72 beats per minute and blood pressure was 120/80 mmHg, both within normal limits.

Upon Further Examination:

External Genitalia: The penis appeared normal, but there was a palpable scrotal swelling suggestive of testicular involvement.

Chest Examination:

Inspection: The chest appeared symmetrical with the trachea in the midline.

Palpation: There was decreased tactile fremitus on the left side, specifically in the infra-mammary, infra-axillary, scapular and infra-scapular regions.

Percussion: A dull percussion note was present in the same areas, indicating possible fluid accumulation.

Auscultation: Breath sounds were diminished in the left infra-scapular region, with reduced vocal resonance in the left infra-mammary, infra-axillary, scapular and infra-scapular areas. No added sounds such as wheezing or crackles were noted.

Preliminary Investigations: Routine blood investigations were within normal limits, ruling out any immediate systemic causes for the symptoms.

Chest X-ray (CXR): A left-sided pleural effusion was detected.

CT Chest: Revealed multiple bilateral heterogeneously enhancing necrotic nodules, with the largest measuring 39 x 36 mm located in the right lower lobe of the lung, consistent with lung metastasis. Moderate pleural effusion was also noted on the left side.

Ultrasound (USG) Scrotum: Findings were suspicious for a testicular tumor, prompting further evaluation.

Intervention: Based on the suspicion of testicular cancer, the patient underwent an orchidectomy. The excised testicular mass was sent for histopathological evaluation.

Histopathological Examination (HPE): The histopathology report confirmed the diagnosis of seminoma, a malignant germ cell tumor originating from the testicles.

Progression During Hospital Stay: Five days after the orchidectomy, the patient experienced a sudden deterioration in his neurological status, presenting with altered sensorium. His Glasgow Coma Scale (GCS) score was assessed at 9/15, indicating moderate impairment of consciousness. This raised suspicion of possible brain involvement.

Further Investigations:

CT Brain: The scan revealed multiple ill-defined heterogenous hypodense areas in both frontal lobes and the right parietal lobe, accompanied by significant surrounding edema. The findings were concerning for hemorrhagic metastases, with evidence of a midline shift of 13mm to the left side due to mass effect. These findings indicated that the seminoma had metastasized

to the brain, complicating the clinical scenario.

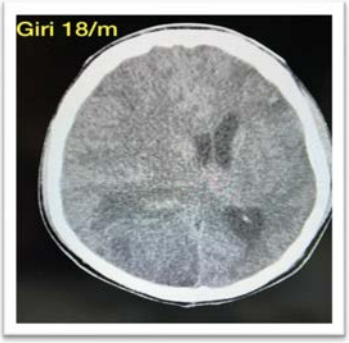
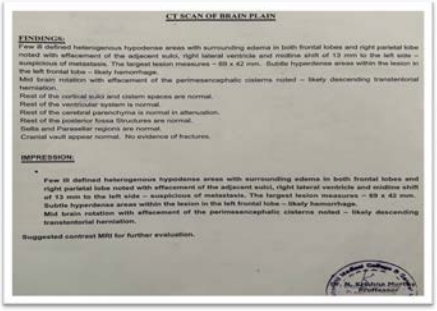


Fig 1: CT Brain


CT SCAN OF BRAIN PLAIN

FINDINGS:

Rest of the cortical sulci and cistern spaces are normal.
Rest of the ventricular system is normal.
Rest of the cerebral parenchyma is normal in attenuation.
Rest of the posterior fossa Structures are normal.
Sella and Parasellar regions are normal.
Cranial vault appear normal. No evidence of fractures.

IMPRESSION:

Suggested contrast MRI for further evaluation.

Fig 2: CT Brain

RESULTS AND DISCUSSIONS

Seminoma is a malignant germ cell tumor, predominantly affecting young men, with the testes being the most common primary site. It is known for its high curability, particularly when diagnosed at early stages. However, in rare cases, seminomas can metastasize to distant organs, as seen in this patient who developed both lung and brain metastases. The case presented highlights a rare and aggressive course of seminoma, emphasizing the need for prompt diagnosis and multidisciplinary management[3].

The initial symptoms of chest pain, hemoptysis and headaches in this patient were indicative of advanced disease, which was confirmed by imaging that revealed pulmonary nodules and pleural effusion. Lung metastasis in seminoma is not uncommon in advanced stages, but the presence of brain metastasis, especially hemorrhagic in nature, is extremely rare. The lung involvement, characterized by necrotic nodules, suggested a high metastatic burden, contributing to the patient's systemic symptoms. Brain metastases, although rare in seminomas, significantly alter the disease course due to the potential for neurological deficits and complications like hemorrhage, as seen in this case[4,5].

The histopathological confirmation of seminoma following the orchidectomy is consistent with typical diagnostic approaches for testicular cancer. Elevated tumor markers, particularly ß-hCG, also supported the diagnosis, as seminomas are often associated with mild elevations in ß-hCG but not AFP. The patient's subsequent neurological decline and CT brain findings of multiple hemorrhagic metastases further complicated the prognosis. Brain metastases in seminomas are particularly challenging because they are often associated with a poorer prognosis, despite the tumor's overall chemosensitivity[6].

This case underscores the importance of aggressive treatment for metastatic seminoma, including surgery, chemotherapy and possibly radiotherapy. The standard BEP (Bleomycin, Etoposide and Cisplatin) chemotherapy regimen is highly effective in treating advanced seminomas, including those with metastatic spread. However, the development of brain metastasis often necessitates the use of additional treatments such as stereotactic radio surgery or whole-brain radiation. In this case, the brain metastases were managed with supportive care initially, but the significant mass effect and midline shift suggested a need for more aggressive intervention[7,8].

This case also highlights the importance of close surveillance in patients with testicular cancer, as early detection of metastases can dramatically improve outcomes. The rarity of brain metastasis in seminoma presents a diagnostic challenge and clinicians must maintain a high index of suspicion in patients presenting with neurological symptoms, even in the absence of a known primary brain lesion. Given the young age of the patient, this case serves as a reminder of the need for early intervention and long-term follow-up to monitor for recurrences or late-onset metastases, which can occur even in tumors with favorable prognoses like seminoma[9,10].

CONCLUSION

This case of seminoma with brain metastasis is extremely rare, with an incidence of brain metastasis in seminoma being as low as 0.0005%. While seminoma is typically a highly treatable malignancy with favorable outcomes, this case demonstrates its potential to metastasize to distant organs, including the brain and lungs, especially in advanced stages. Among young males presenting with testicular tumors, brain metastasis, though uncommon, should still be considered as part of the differential diagnosis, particularly when neurological symptoms arise. Early detection and aggressive multidisciplinary treatment are crucial in managing such rare cases of metastatic seminoma, as timely intervention can significantly improve outcomes. Vigilance in long-term follow-up is essential to monitor for recurrences or late-stage metastasis. This case underscores the importance of personalized treatment strategies tailored to managing advanced and rare presentations of seminoma to optimize patient outcomes.

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