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RESEARCH ARTICLE

EXOPHTHALMOS AND BLINDNESS AS THE INITIAL MANIFESTATIONS OF METASTATIC LUNG CANCER: A CASE REPORT

Hajar El Haddar¹, Afaf Thouil¹, Mohammed Lakhal¹, Hatim Kouissmi¹ and Mahmoud Aberkane²

1. Department of Respiratory Diseases, Mohammed VI University Hospital - Faculty of Medicine and Pharmacy of Oujda, Mohammed First University Oujda, Morocco.
2. Department of Pathology, Mohammed VI University Hospital - Faculty of Medicine and Pharmacy of Oujda, Mohammed First University Oujda, Morocco.

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Abstract

Orbital metastasis is a rare manifestation of lung cancer and may occasionally be the first sign of an underlying malignancy. We report the case of a 49-year-old man who presented with acute right-sided exophthalmos, ptosis, and complete visual loss, along with respiratory symptoms that had progressed over several months, including chronic cough and general deterioration. Brain and orbital computed tomography (CT) revealed an osteolytic mass involving the right sphenoid sinus, with intracranial extension and involvement of the optic canal. Chest CT demonstrated a large right upper lobe mass causing bronchial obstruction, with associated mediastinal and hilar lymphadenopathy. Bronchoscopy with bronchial biopsies confirmed lung adenocarcinoma, and the orbital lesion was highly suggestive of metastasis based on the clinical and radiological findings. Given the advanced disease, complete visual loss, and poor general condition, palliative treatment was chosen following a multidisciplinary tumor board discussion. Three months after diagnosis, the patient died following further clinical deterioration.

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Introduction:-

Orbital metastases are rare, accounting for approximately 7% of all intraorbital tumors [1]. They most commonly originate from breast and lung cancers, with a reported incidence ranging from 0.7% to 12% [4, 6]. Ocular metastases predominantly involve the uvea, particularly the choroid, whereas orbital and optic nerve involvement are less common [5]. Orbital metastases of pulmonary origin are associated with a poor prognosis, with a reported median survival of approximately 7.4 months [2]. However, targeted therapies, particularly epidermal growth factor receptor (EGFR) tyrosine kinase inhibitors such as gefitinib, have demonstrated efficacy in patients harboring activating EGFR mutations [3]. We report a case of lung adenocarcinoma presenting with an orbital lesion highly suggestive of metastasis, which led to the diagnosis of the underlying primary lung malignancy.

Corresponding Author:- Hajar El Haddar

Address:- Department of Respiratory Diseases, Mohammed VI University Hospital - Faculty of Medicine and Pharmacy of Oujda, Mohammed First University Oujda, Morocco.

Case Presentation:-

A 49-year-old man was admitted to the emergency department with acute right-sided exophthalmos, accompanied by eyelid ptosis and complete loss of light perception. His medical history was notable for a 30-pack-year smoking history, with smoking cessation three months before presentation. He had no history of trauma or known systemic or ophthalmological disease. Three months before admission, he had developed ocular pain, diplopia, and right-sided ptosis, accompanied by decreased visual acuity. During the same period, he reported respiratory symptoms, including a chronic productive cough with hemoptysis and constrictive chest pain, which he had initially neglected. These symptoms were associated with a progressive decline in his general condition, characterised by asthenia, anorexia, and unintentional weight loss of unspecified magnitude. Clinical examination revealed a hemodynamically and respiratorily stable patient with a WHO performance status (PS) of 3. Pulmonary auscultation demonstrated decreased vesicular breath sounds over the right upper lung field. No peripheral lymphadenopathy was detected. The ophthalmological examination confirmed complete loss of light perception. Orbital examination showed right-sided exophthalmos associated with complete ophthalmoplegia [Figure 1]. The anterior segment was normal. Fundus examination revealed optic disc pallor, suggestive of optic atrophy [Figure 2]. The remainder of the physical examination was unremarkable.



Figure 1. Clinical presentation of right-sided exophthalmos.



Figure 2. Fundus photograph of the right eye showing optic disc pallor.

Brain and orbital CT revealed a poorly defined osteolytic soft-tissue mass centred on the right sphenoid region. The lesion had irregular margins and showed heterogeneous enhancement following contrast administration. It measured approximately 28×20 mm and extended intracranially to the ipsilateral basifrontal and temporal regions. Anteriorly, the lesion extended into the optic canal and was in close contact with the infiltrated optic nerve and the ipsilateral lateral rectus muscle, findings consistent with the observed grade I exophthalmos. Medially, it involved the right cavernous sinus, which retained normal density, and was in contact with the intracavernous segment of the internal carotid artery, which remained patent, as well as the right lamina papyracea [Figure 3]. In addition, a poorly defined, isodense nodular mass measuring 15×9 mm was identified in the left hemipons, showing contrast

enhancement [Figure 4]. Taken together, these findings were suggestive of intracranial and orbital secondary lesions.

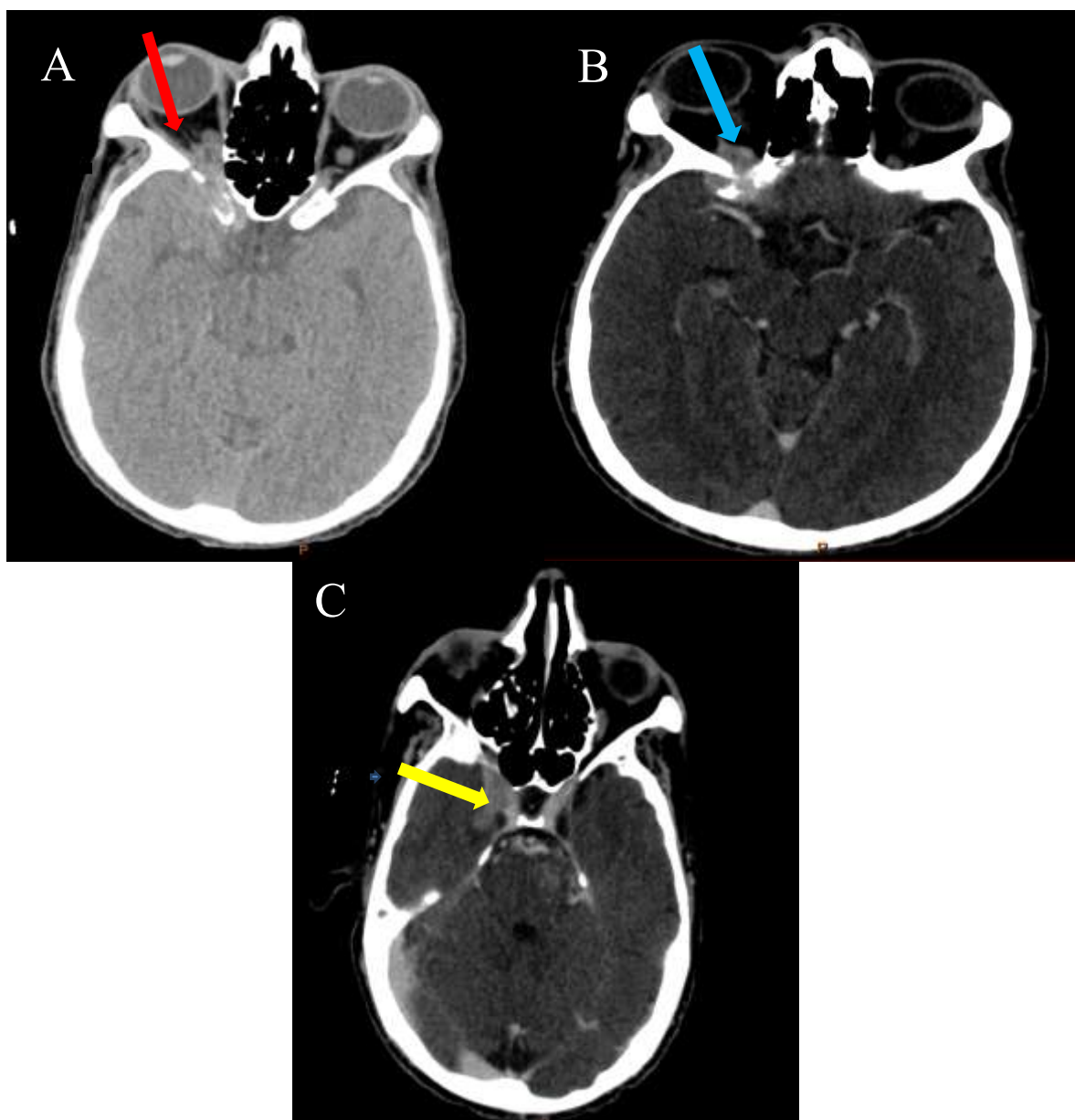


Figure 3. Brain CT showing axial (A–C) and coronal views of a right sphenoidal osteolytic soft-tissue lesion with heterogeneous contrast enhancement (blue arrow), involvement of the cavernous sinus (yellow arrow), and extension into the extraconal space and right optic nerve (red arrow).

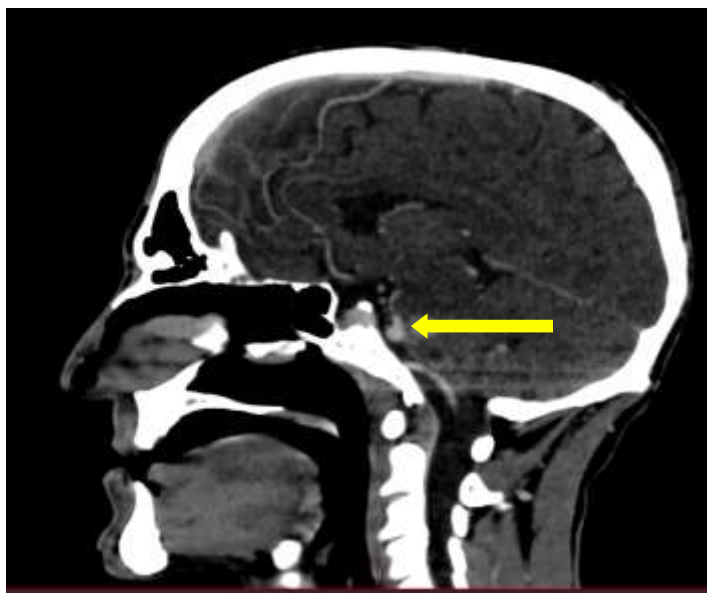


Figure 4. Sagittal brain CT image showing a left hemipontine nodular mass consistent with a pontine metastasis (yellow arrow).



Figure 5. Anteroposterior chest radiograph showing a cavitary lesion in the upper third of the right hemithorax..

Chest CT revealed a right hilar and upper lobe tumor with irregular margins and heterogeneous contrast enhancement, measuring approximately 91×85 mm. The mass involved the posterior segmental bronchus of the right upper lobe and extended into the right upper lobe bronchus, resulting in bronchial obstruction. A small right-sided pleural effusion was also noted [Figure 6]. The lung parenchyma showed reticulomicronodular opacities with interlobular septal and non-septal thickening, suggestive of lymphangitic carcinomatosis [Figure 7].

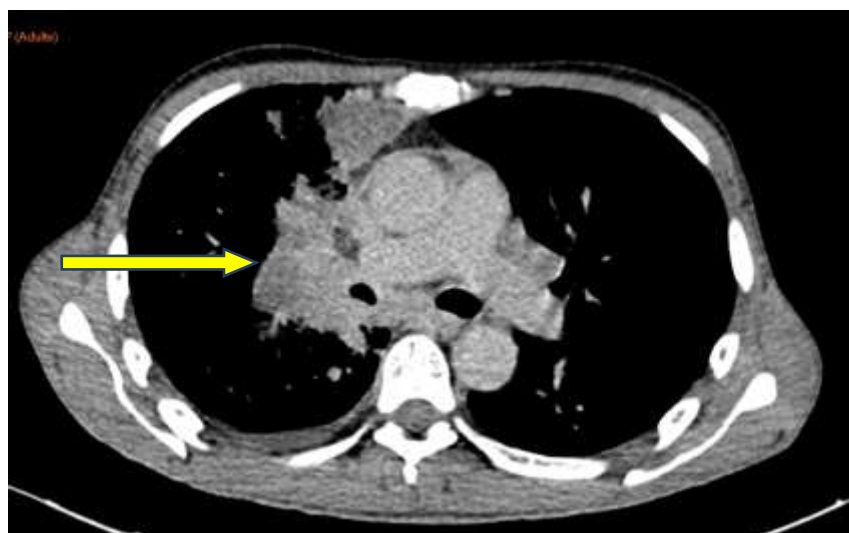


Figure 6. Axial chest CT image showing a right hilar and pulmonary mass with heterogeneous contrast enhancement, causing obstruction of the right upper lobe bronchus (yellow arrow), with an associated small right pleural effusion.

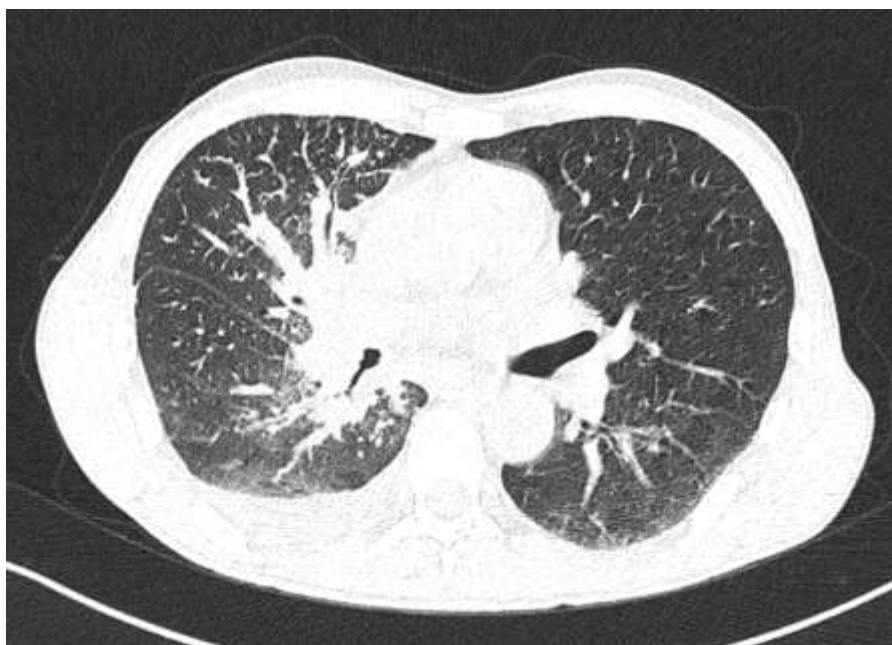


Figure 7. Axial chest CT image showing diffuse reticulomicronodular opacities with interlobular septal thickening, suggestive of lymphangitic carcinomatosis.

Bronchoscopy revealed complete obstruction of the right upper lobe bronchus and early tumor growth at the entrance to the right lower lobe bronchus [Figure 8]. Histopathological examination of bronchial biopsies confirmed lung adenocarcinoma [Figure 9].

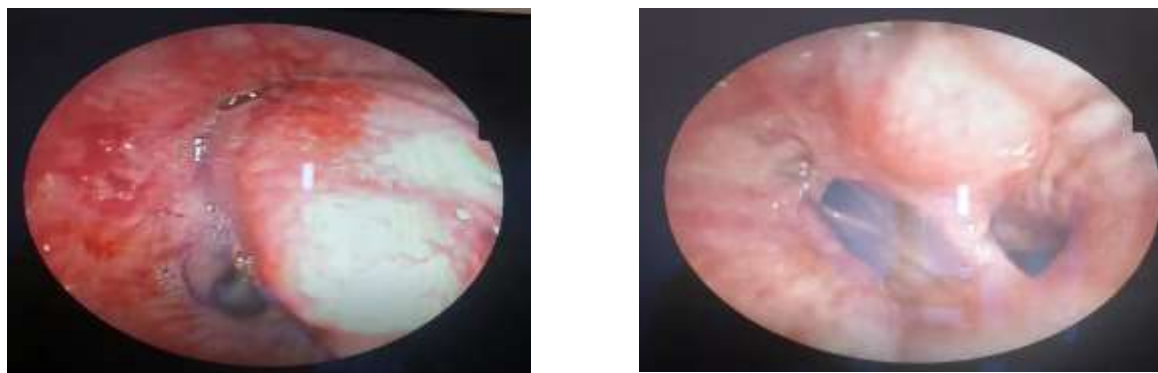


Figure 8. Bronchoscopic findings:

- (A) complete obstruction of the right upper lobe bronchus;**
(B) early tumor growth at the entrance to the right lower lobe bronchus.

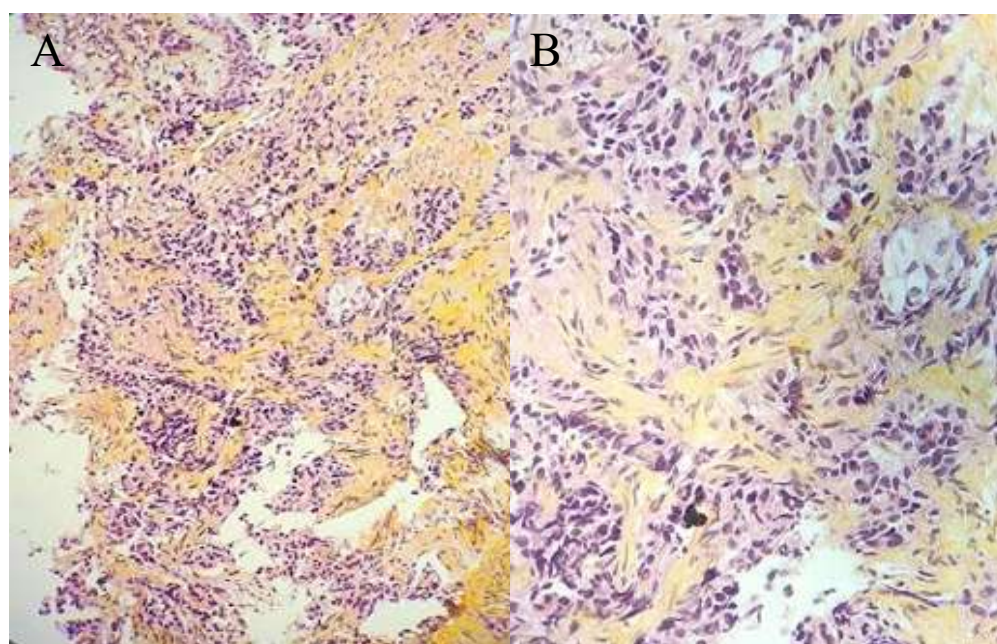


Figure 9. Histological sections showing:

- (A) carcinomatous proliferation arranged in solid clusters, trabeculae, and nests within a fibroinflammatory stroma (hematoxylin-eosin-saffron [HES], ×200); and**
(B) markedly atypical tumor cells with irregular, hyperchromatic nuclei and abundant eosinophilic cytoplasm (hematoxylin-eosin-saffron [HES], ×400).

The abdominopelvic and skeletal staging work-up revealed hepatomegaly with multiple hypodense lesions demonstrating a “bull’s-eye” enhancement pattern. It also showed a pancreatic tail mass with peripancreatic lymphadenopathy, as well as a suspicious left retroperitoneal nodule suggestive of metastatic involvement. Moderate-volume ascites, consistent with peritoneal carcinomatosis, was also noted [Figure 10], was also noted [Figure 10].

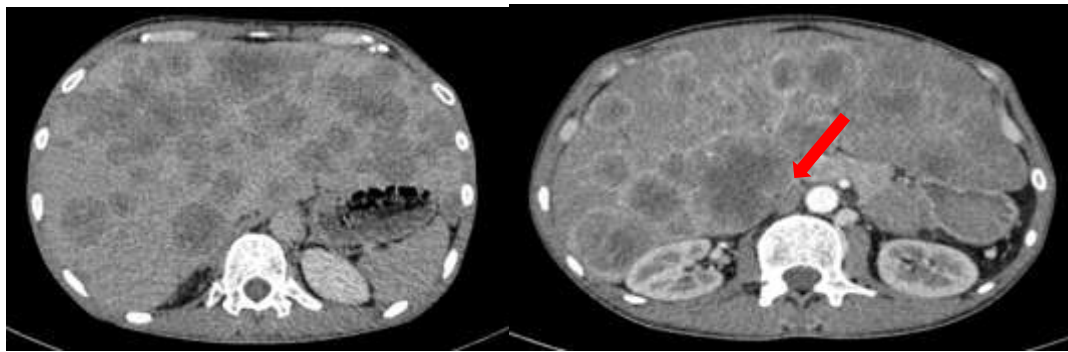


Figure 10. Abdominal CT scan, axial sections, showing:
(A) Portal venous phase: hepatomegaly with multiple hypodense lesions showing a “bull’s-eye” enhancement pattern, suggestive of metastases;
(B) Arterial phase: pancreatic tail mass (red arrow) with moderate-volume ascites, consistent with peritoneal carcinomatosis.

Following discussion at a multidisciplinary team (MDT) meeting involving pulmonologists, radiologists, pathologists, radiation oncologists, and thoracic oncologists, a diagnosis of metastatic lung adenocarcinoma was established, with secondary lesions involving the brain, lungs, pleura, lymph nodes, pancreas, and liver, as well as an orbital lesion highly suggestive of metastasis and imaging findings suggestive of peritoneal carcinomatosis. Given the advanced stage of the disease and the patient’s deteriorating general condition, palliative care was initiated, including symptomatic pain management. Palliative radiotherapy was planned for the orbital lesion but could not be performed because of further clinical deterioration. The patient died three months after diagnosis.

Discussion:-

Orbital metastases, although rare, may represent the initial manifestation of an underlying malignancy, particularly lung cancer. They account for approximately 3–7% of orbital lesions and approximately 10% of orbital tumors. The most common primary sites include the breast (39–48%), prostate and cutaneous melanoma (12% each), lung (8%), and kidney (7–11%) in White populations. In approximately 11% of cases, the primary tumor remains unknown at the time of diagnosis, as reported by Adenis and Dourlhes (1998) [14]. Adenocarcinoma is the predominant histological subtype among orbital metastases, accounting for approximately 65% of cases [11–13]. As the incidence of lung cancer increases, clinicians may encounter orbital metastases more frequently [4, 7].

Goldberg and Rootman (1990) reported that orbital metastases of pulmonary origin predominantly occur in men and are associated with a younger mean age at presentation (51 years) than orbital metastases from breast cancer [15]. Most orbital metastases remain asymptomatic for a prolonged period; however, blurred vision or decreased visual acuity may represent initial presenting symptoms [8]. The most common clinical features include displacement of the globe (65.2%), exophthalmos (63%), increased orbital pressure (54.3%), diplopia (54.3%), and restricted ocular motility (52.2%) [10]. In nearly 30% of cases, orbital involvement may represent the first manifestation of an undiagnosed primary malignancy [9].

In orbital metastases of pulmonary origin, lesions are often larger. Isolated exophthalmos may suggest a retrobulbar location without extraocular muscle involvement, whereas ptosis associated with diplopia may indicate infiltration of the extraocular muscles. Such involvement is consistent with hematogenous dissemination, which has been reported in 24% of cases [16–18]. Other presenting features may include ophthalmoplegia, decreased visual acuity due to orbital apex involvement (approximately 5% of cases), and orbital pain in an inflammatory context, often secondary to osseous involvement (approximately 5% of cases). Osseous involvement is common in certain orbital metastases, particularly those originating from the prostate, kidney, breast, or thyroid. These metastases may be associated with osteolytic lesions, whereas prostatic metastases are more commonly osteoblastic [19].

In our patient, ocular symptoms preceded the diagnosis by approximately two months. The limited space within the orbit may account for the early clinical manifestations of tumor growth. The rapid progression observed in this case highlights the potential for symptomatic orbital metastases to be associated with rapid clinical deterioration [21–23]. CT provides a more accurate assessment of osseous structures and can identify metastases within the orbital fat, most commonly in the extraconal space. Magnetic resonance imaging (MRI), however, remains the preferred

imaging modality for characterizing orbital lesions, providing superior soft-tissue contrast while avoiding exposure to ionizing radiation [21, 22, 24]. Orbital metastases typically demonstrate contrast enhancement and may be either well circumscribed or diffuse. Approximately 60% are located within the extraconal space, with osseous involvement reported in 70% and intracranial extension in nearly 50% of cases [20].

In our patient, imaging findings were consistent with an osteolytic metastasis involving the sphenoid bone, with orbital and intracranial extension. The lesion extended into the orbit, likely involving the lateral extraconal space and infiltrating the lateral rectus muscle. The observed blindness was likely attributable to compressive and infiltrative optic neuropathy resulting from tumour extension into the optic canal. The ophthalmoplegia was likely related to extension into the cavernous sinus and optic canal region, resulting in involvement of the ocular motor nerves and optic nerve, consistent with involvement of the orbital apex cavernous sinus complex. Fluorodeoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) is useful for identifying the primary tumour and assessing the extent of systemic disease. Diagnosis relies on imaging combined with histological confirmation. Open biopsy is indicated for atypical orbital lesions or in the absence of a known history of malignancy, whereas fine-needle aspiration biopsy (FNAB) represents a less invasive alternative when the lesion is accessible or a systemic malignancy is already known [25]. However, orbital biopsy carries a risk of complications, including injury to the globe, optic nerve, or vascular structures. In frail patients, imaging findings may be sufficient to suggest a metastatic origin, thereby avoiding an invasive procedure, as in our patient. The indication for biopsy should therefore be guided by a careful assessment of the benefit–risk balance [1, 26].

The management of orbital metastases of pulmonary origin is primarily palliative, aiming to control tumour progression and preserve visual function. Systemic therapy is an important component of treatment, while radiotherapy is commonly used for local control, with reported response rates of up to 79% and vision preservation rates of nearly 80% [21]. Radiation doses generally range from 30 to 50 Gy. Surgery is reserved for selected cases, mainly for symptomatic relief [21]. In our patient, given the established blindness, marked deterioration in general condition, and advanced metastatic disease, the multidisciplinary team opted for palliative management. Palliative radiotherapy to the orbital lesion was considered but could not be performed because of further clinical deterioration. Overall survival remains limited and varies according to the primary tumour and the extent of disease. While survival may exceed two years in selected patients receiving active treatment, it is particularly poor in patients with lung cancer, with median survival reported to range from four to six months according to the review by Palmisciano et al. Similarly, our patient experienced rapid clinical deterioration and died three months after diagnosis. These findings highlight the poor prognosis associated with orbital metastases, particularly when the primary tumour is of pulmonary origin [27, 28].

Conclusion:-

Although rare, orbital metastases may be the first manifestation of an underlying primary malignancy, particularly lung cancer. Therefore, atypical orbital symptoms should raise suspicion for metastatic disease and prompt early systemic evaluation.

Abbreviation:-

CT: Computed tomography

EGFR: Epidermal growth factor receptor

FDG-PET/CT: Fluorodeoxyglucose positron emission tomography/computed tomography

FNAB: Fine-needle aspiration biopsy

HES: Hematoxylin–eosin–safran

MRI: Magnetic resonance imaging

PS: Performance status

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