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A Diagnostic Surprise: - Orbital Plasmacytoma Masquerading as Unilateral Proptosis

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Abstract

Orbital plasmacytoma is a rare occurrence and has only been reported in conjunction with multiple myeloma. Around 65% of orbital plasmacytomas carry a diagnosis of multiple myeloma with them.

We report a case of a 56-year-old female who presented with left orbital proptosis, gradual diminution of vision for 2 months, along with eye pain. The patient had anemia pre-op, along with low back pain. The patient was operated, with excision of the tumor via the SOKHA (Supra orbital key hole) approach. Histopathology was suggestive of a plasmacytoma, which was subsequently confirmed by immunohistochemistry. Upon discharge, the patient underwent a bone marrow biopsy along with a PET scan, which showed the picture of Multiple myeloma. The patient received chemotherapy along with radiation. Vision improved gradually and is in regular follow up.

Keywords: Orbit, plasmacytoma, immunohistochemistry

Introduction

Plasma cell neoplasms represent a monoclonal proliferation of plasma cells that manifests as a systemic disease, such as multiple myeloma (MM), or as a localized disease, such as extramedullary plasmacytoma (EMP) or solitary bone plasmacytoma (SBP)[(1)]. Orbital involvement in multiple myeloma is very rare, with less than 50 cases reported in the literature [(2,3)]. Multiple myeloma is the 2nd most common hematologic malignancy, characterized by bony lesions, renal dysfunction, anemia, and hypercalcemia [(4)].

A less common, aggressive type of MM is known as extramedullary MM, which involves any evidence of clonal cells depositing in places outside the bone marrow soft tissues [(5)]. EMP's represent nearly 3% of plasma cell tumors, are male predominant and commonly involve the head and neck soft tissues [(6)].

A rare form of EMP, an orbital plasmacytoma, has primarily been reported in association with MM, as the disease in isolation is rare [(7)]. This orbital involvement may signify either systemic involvement or disease recurrence. Presentation with non-specific ophthalmological symptoms such as proptosis, diplopia, and periorbital swelling is observed. The lesions are usually unilateral and commonly involve the supero-temporal orbit and extra-ocular muscles, mimicking other orbital pathologies such as sarcomas or inflammatory conditions [(8,9,10,11)].

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Diagnosis includes imaging of the orbit, such as CT & MRI, to characterize the extent of the lesion, as well as biopsy for confirmation of the diagnosis [8-12].

Management depends on whether the disease is solitary or associated with multiple myeloma. Radiotherapy is the treatment of choice for solitary disease, while chemotherapy and radiotherapy are considered for systemic disease [10-12].

Here we present an unusual case of unilateral proptosis, which turned out to be orbital plasmacytoma, in an undiagnosed case of multiple myeloma.

Case Presentation

A 56-year-old female had come with a complaint of a gradual onset of left periorbital swelling, proptosis (figure 1), eye pain and diminution of vision for 2 months. On visual examination, the patient had marked left-sided proptosis, chemosis and restricted extraocular movements, especially the upward gaze. The intraocular pressure was elevated; however, the pupils and fundoscopic examination were normal. Visual acuity was mildly reduced (6/18) in the affected eye.

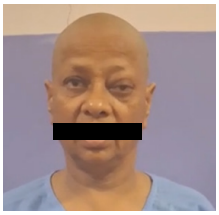
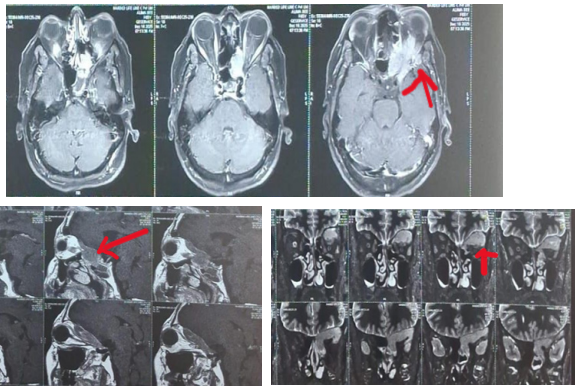


Figure 1: Left eye proptosis seen.

On general examination, the patient was anemic, with a haemoglobin of 5.9g/dl; preoperative blood transfusion was performed, and the patient was stable.

MRI revealed an intra-orbital enhancing lesion in the superior-medial region of the left orbital wall, with proptosis. The lesion was Hypointense on T1-Weighted imaging and Hyperintense on T2-Weighted imaging (figures 2, 3 & 4). Involvement of the superior rectus, superior oblique and optic nerve was present. There was involvement of the orbital and ethmoid sinuses. CT Scan showed an enhancing soft tissue lesion along the superior-medial wall of the left orbit causing proptosis, with mass effect on the optic nerve and superior extra-ocular muscles with the lesion superiorly abutting the sub frontal bone. There is involvement of the orbital apex (figure 5), with involvement of the adjacent ethmoid sinus, suggestive of possible trans-spatial spread.



Figures 2,3 & 4: MRI showing the lesion as Hypointense on T1W and Hyperintense on T2W imaging (RED Arrow).

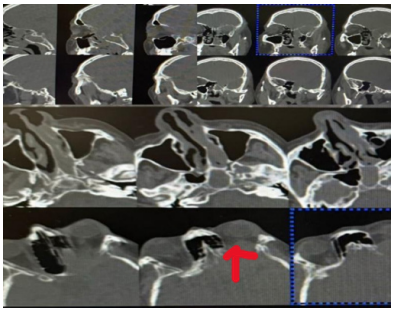
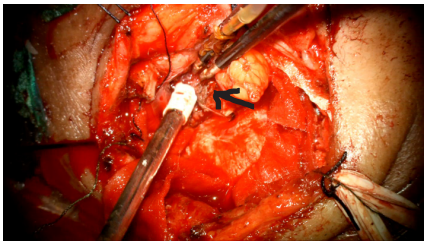


Figure 5: Bone window of CT Scan showing involvement of the orbital apex causing proptosis(RED Arrow).

Patient was then posted for surgery, which was done via left supra-orbital key-hole approach (SOKHA) with position and incision marking seen below in figures 6 and 7. Intra-operatively, the tumor was found to be extra-dural, pink to purplish in colour, highly vascular, and to have eroded the bony margins shown in figure 8 below.



Figures 6 & 7: SOKHA approach incision marking on patient.



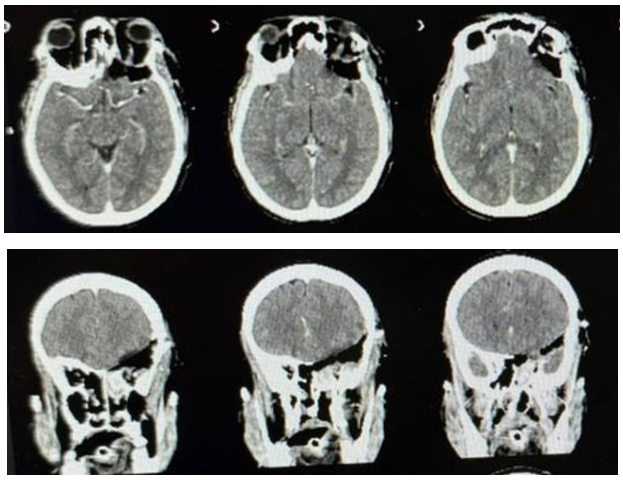
Figures 8: Intra-operative photo showing the left orbital tumor

Post operatively there was complete excision of the tumor as visible in the post-op scans which are shown below in figures 9 and 10.

The specimen was sent for histopathological evaluation (HPE) seen in figures 11, 12 and 13, which, interestingly, revealed a plasmacytoma. Immunohistochemistry studies and staining were carried out at TATA Hospital, which showed CD138+ and MUM1+ staining, with kappa restriction as seen in figures 14 and 15.

Post-operatively, the patient had improvement in vision & there was resolution in the swelling and proptosis (figure 16).

The patient was then referred to Tata Hospital for further management upon receiving the HPE Report with Immunohistochemical findings. As the patient had low haemoglobin levels and bony pain in the form of low back pain, she was subjected to bone marrow biopsy, PET SCAN & MRI Scan. The bone marrow biopsy was s/o myeloma, and the MRI AND PET CT were s/o multiple signal alterations involving multiple vertebrae and pelvic bones with moderate grade FDG uptake in multiple lytic bony lesions s/o multiple myeloma.



Figures 9 & 10: Post-operative scan showing complete excision of the left orbital lesion.

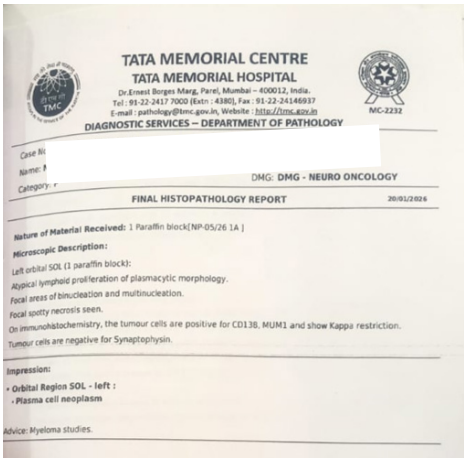
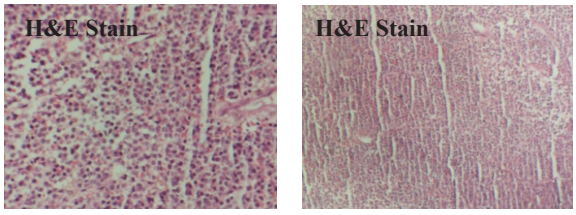
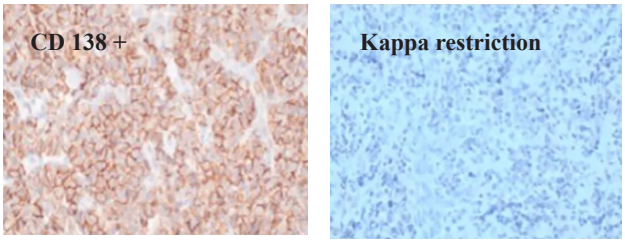

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NIC-2232
DIAGNOSTIC SERVICES – DEPARTMENT OF PATHOLOGY
DMG: DMG - NEURO ONCOLOGY
FINAL HISTOPATHOLOGY REPORT
20/01/2026
Nature of Material Received: 1 Paraffin block(NP-05/26 1A)
Microscopic Description:
Left orbital SOL (1 paraffin block):
Atypical lymphoid proliferation of plasmacytic morphology.
Focal areas of binucleation and multinucleation.
Focal spotty necrosis seen.
On immunohistochemistry, the tumour cells are positive for CD138, MUM1 and show Kappa restriction.
Tumour cells are negative for Synaptophysin.
Impression:
• Orbital Region SOL - left :
• Plasma cell neoplasm
Advice: Myeloma studies.

Figure 11: HPE report with Immunohistochemistry studies.



Figures 12 & 13: HPE stained slides showing sheets of plasma cell infiltrate.



Figures 14 & 15: Showing IHC findings of CD138+ and kappa restriction.



Figure 16: Showing resolution of proptosis.

On protein immunofixation electrophoresis, an IgG Kappa monoclonal protein was seen. Also, in the FISH technique, 1q amplification (t(4;14)) was observed, a high-risk factor for multiple myeloma.

The patient was then started on chemotherapy with a plan for radiation therapy due to the presence of an extramedullary plasmacytoma (EMP) along with multiple myeloma (MM). The patient was then started on Injection Bortezomib and Dexamethasone as part of the chemotherapy regimen. The patient was then started on radiation therapy, where 10 cycles have been undertaken to date. At the 3-month follow-up, the patient remained clinically stable, with continued improvement in ocular symptoms and bony pain, and no evidence of disease progression.

Discussion

Multiple myeloma (MM) is a systemic plasma cell malignancy characterized by the expansion of a clonal plasma cell population within the bone marrow. The clinical spectrum is broad and may range from relatively indolent disease to rapidly progressive, multisystem involvement. Classical manifestations arise from the effects of the malignant plasma cell clone and its products on the bone marrow, skeleton, kidneys, and immune system. Anemia, renal dysfunction, hypercalcemia, and osteolytic skeletal lesions constitute some of the most important clinical manifestations. However, the disease is not invariably confined to the marrow compartment. With disease progression or the acquisition of more aggressive biological characteristics, plasma cells may establish deposits in tissues outside the bone marrow, resulting in extramedullary disease [4].

Extramedullary involvement is clinically important because it represents a distinct pattern of disease behavior and may be associated with a more aggressive clinical course. Such lesions can arise in a variety of soft tissues and organs and may occasionally constitute the initial manifestation that brings the patient to medical attention. Orbital involvement is particularly uncommon and may create a substantial diagnostic dilemma because the orbit is affected by a wide range of neoplastic, inflammatory, infectious, vascular, and metastatic conditions. Consequently, an orbital plasmacytoma may initially be considered to be a primary orbital tumor rather than an expression of an underlying systemic plasma cell disorder.

Plasmacytoma refers to a localized collection of monoclonal plasma cells, which may occur either within bone or in soft tissue. Extramedullary plasmacytoma (EMP) represents the latter form and is distinct from an isolated osseous plasmacytoma and from systemic MM. The distinction is clinically important because the presence of systemic marrow involvement fundamentally alters both treatment strategy and prognosis.

Orbital plasmacytomas are rare, accounting for approximately 1% of cases of MM in reported series [5]. They may develop through extension from an adjacent osseous lesion or may predominantly involve the soft tissues of the orbit. Because of the limited space within the orbit, even a relatively small lesion can produce marked local symptoms.

The clinical presentation is consequently determined more by the anatomical location and relationship of the lesion to the globe, extraocular muscles, optic nerve, and orbital contents than by the biological characteristics of the tumor itself. Proptosis is a common consequence of an expanding orbital mass, while visual impairment may occur because of compression or displacement of the globe, optic nerve involvement, vascular compromise, or distortion of the normal orbital anatomy.

In our patient, progressive orbital swelling, proptosis, and diminution of vision represented the dominant clinical manifestations. Such symptoms naturally direct the initial diagnostic consideration toward more common orbital pathologies. The unusual clinical location and absence of an immediately apparent systemic diagnosis made recognition of the lesion as an extramedullary manifestation of MM particularly challenging.

The differential diagnosis of an orbital mass is extensive and includes benign and malignant neoplasms, inflammatory conditions, infections, vascular lesions, and secondary deposits. Depending on the precise anatomical compartment involved, possibilities may include lymphoma, sarcoma, meningioma, metastasis, chondrosarcoma, inflammatory pseudotumor, idiopathic orbital inflammation, and other rare neoplasms [5,9–11].

This overlap in clinical presentation represents one of the major difficulties in diagnosing orbital plasmacytoma. The symptoms of proptosis, orbital swelling, pain, and visual deterioration are not sufficiently specific to identify a plasma cell neoplasm clinically. Even radiological findings may not always provide a definitive distinction between plasmacytoma and other orbital masses.

The possibility of a plasma cell disorder should therefore be considered when an orbital lesion occurs in association with unexplained systemic findings. In particular, anemia, renal impairment, hypercalcemia, pathological fractures, multiple skeletal lesions, or an abnormal serum protein profile should increase suspicion of an underlying plasma cell dyscrasia.

In the present case, the associated anemia proved to be an important systemic clue. Although anemia is common and nonspecific, its presence in a patient with an unusual orbital mass should prompt consideration of a systemic disorder rather than restricting the evaluation to the orbit alone.

Anemia in MM most commonly results from replacement of normal hematopoietic marrow by the expanding plasma cell population, although additional mechanisms may contribute. In the present patient, the hematological abnormality initially did not necessarily establish a diagnosis of MM. However, when considered alongside the orbital lesion, it provided an important reason to broaden the diagnostic evaluation. This underscores the importance of considering plasma cell dyscrasias in the differential diagnosis of orbital masses, especially in patients with cytopenia[10,11].

The systemic work-up performed after surgical treatment demonstrated extensive bone marrow infiltration. This finding established that the orbital lesion was not an isolated extramedullary plasmacytoma but part of a systemic plasma cell neoplasm.

This sequence of events illustrates an important clinical lesson. The diagnosis of an unusual extramedullary lesion should prompt clinicians to determine whether it represents a localized process or the first clinically apparent manifestation of systemic disease. Failure to perform this evaluation may result in a diagnosis of an apparently isolated orbital tumor while the underlying plasma cell malignancy remains unrecognized.

Accordingly, once plasmacytoma is identified histologically, systemic evaluation should be undertaken where appropriate. This may include hematological assessment, serum and urine monoclonal protein studies, serum free light-chain measurement, renal function and calcium assessment, skeletal imaging, and bone marrow examination. The precise extent of evaluation should be guided by the clinical context and the findings of the initial pathological assessment.

Histopathology and the importance of tissue diagnosis….

Because the radiological and clinical manifestations of orbital plasmacytoma overlap with those of several other orbital tumors, tissue diagnosis is central to establishing the diagnosis. Histopathological examination identifies the plasma cell population and allows subsequent immunohistochemical characterization.

The pathological distinction between a plasma cell neoplasm and other round-cell or poorly differentiated tumors may require a combination of morphological assessment and immunohistochemical studies. Demonstration of plasma cell markers together with evidence of monoclonality can support the diagnosis. When interpreted in conjunction with bone marrow findings and systemic investigations, these results allow the orbital lesion to be appropriately classified within the spectrum of plasma cell disorders.

In our case, histopathological examination was particularly important because the initial clinical presentation did not specifically suggest MM. The tissue diagnosis provided the basis for subsequent systemic evaluation, which demonstrated extensive marrow involvement. Thus, pathology functioned not simply as a means of identifying the orbital tumor but as the pivotal investigation that connected the local lesion to a systemic malignant process.

The development of extramedullary deposits in MM has important biological implications. The bone marrow provides a specialized microenvironment that supports the survival and proliferation of malignant plasma cells. When plasma cells acquire the ability to survive independently of this environment and infiltrate peripheral tissues, the disease may demonstrate a different pattern of behavior.

Extramedullary disease is therefore more than an unusual anatomical manifestation. It may indicate a plasma cell clone with enhanced migratory capacity, tissue infiltration, and resistance to conventional treatment. For this reason, identification of an extramedullary deposit should prompt careful assessment of the overall disease burden.

An orbital presentation is particularly important in this regard because the local lesion may be clinically conspicuous while the systemic disease remains relatively occult. In the present patient, the orbital manifestation served as the dominant clinical problem, whereas the extensive marrow involvement became evident only after systemic evaluation.

The role of surgery in plasma cell neoplasms differs from that in many primary orbital tumors. Complete oncological excision is not necessarily the principal objective when the orbital lesion represents part of systemic MM. Nevertheless, surgery can have several important indications.

First, tissue acquisition may be necessary when the diagnosis is uncertain. Second, reduction of tumor volume may relieve mechanical symptoms such as proptosis, orbital pressure, or visual compromise. Third, surgery may be appropriate for a localized lesion that can be removed safely without unacceptable functional or cosmetic morbidity.

In the present case, all three considerations were relevant. Surgical intervention was undertaken to obtain a definitive diagnosis, reduce the orbital tumor burden, and improve the patient's local symptoms. The procedure therefore served both diagnostic and therapeutic purposes.

The choice of the supraorbital keyhole (SOKHA) approach provided a minimally invasive route to the lesion while permitting adequate cytoreduction. An important additional advantage of this approach was the potential for a favorable cosmetic result. This consideration is particularly relevant in orbital surgery because postoperative deformity or a conspicuous surgical scar may have a substantial psychosocial impact.

The objective in such cases should therefore be viewed as maximal safe cytoreduction rather than aggressive resection at the expense of orbital function. The extent of resection must be individualized according to the relationship of the lesion to the globe, optic nerve, extraocular muscles, orbital apex, and other critical structures.

Why surgery alone is insufficient in systemic disease?....

Although local excision can substantially reduce the orbital tumor burden, it cannot eradicate the underlying plasma cell clone when systemic MM is present. This distinction is central to understanding the management of the present case.

A patient with systemic marrow infiltration may harbor additional microscopic or clinically occult disease despite complete removal of the visible orbital mass. Consequently, local surgery should not be interpreted as definitive treatment for MM. Instead, it forms one component of an overall treatment plan directed at both the symptomatic orbital lesion and the systemic malignancy.

This distinction also explains why the diagnosis of systemic disease following surgery substantially changes subsequent management. Once marrow involvement has been demonstrated, systemic therapy becomes essential rather than optional.

Multimodal treatment in the present case….

Our patient subsequently received multimodal therapy consisting of corticosteroids, systemic chemotherapy, and radiotherapy following surgical excision. This treatment strategy was based on the recognition that the orbital lesion represented an extramedullary component of systemic MM rather than an isolated orbital plasmacytoma for which systemic treatment is more effective than local therapy alone, particularly for reducing the risk of relapse[4,5].

Systemic therapy is particularly important in this setting because it addresses the underlying clonal plasma cell population throughout the body. Corticosteroids have an established role in plasma cell disorders and are commonly incorporated into systemic treatment regimens. Chemotherapy or other systemic antimyeloma therapy provides broader disease control, while radiotherapy can be used to achieve local control of residual or symptomatic extramedullary disease.

Previous literature supports the concept that multimodal therapy should be tailored according to the anatomical and systemic characteristics of the lesion. Alexiou et al.[13] emphasized that plasmacytomas associated with destructive bone involvement may require a combination of treatment modalities rather than relying exclusively on surgery or radiotherapy. Their observations support an approach in which local disease control is integrated with management of the underlying plasma cell disorder.

Similarly, Galieni et al. [14] demonstrated that surgical treatment may be appropriate for selected lesions that are readily accessible and amenable to complete excision. Their observations also highlighted the prognostic significance of a monoclonal component at diagnosis.

These findings are particularly relevant to orbital disease because the decision to operate cannot be based solely on the presence of a tumor. The surgeon must simultaneously consider the patient's systemic disease status, the functional importance of the orbit, the possibility of optic nerve compromise, the extent of local invasion, and the anticipated benefit of cytoreduction.

Prognostic implications….

The presence of extramedullary disease in MM is generally regarded as an adverse clinical feature, particularly when associated with extensive systemic disease or other markers of aggressive biology. The prognosis depends on several factors, including the extent of marrow involvement, cytogenetic and molecular characteristics, treatment response, number and distribution of extramedullary lesions, and the ability to achieve durable systemic disease control.

From the perspective of the orbital lesion, local control remains important because progression within the confined orbital compartment can rapidly compromise vision and ocular function. However, durable control ultimately depends on adequate treatment of the systemic plasma cell disorder.

This distinction is important when interpreting the response of an orbital plasmacytoma. Improvement in proptosis or visual symptoms following surgery or radiotherapy represents successful local control but does not necessarily indicate eradication of the systemic disease. Continued hematological assessment and appropriate surveillance are therefore necessary.

Importance of multidisciplinary management….

The management of an orbital plasmacytoma associated with MM extends beyond a single surgical specialty. The anatomical complexity of the orbit necessitates careful coordination between neurosurgeons or skull-base surgeons, ophthalmologists, neuroradiologists, and pathologists. Once systemic plasma cell disease is identified, hematology-oncology becomes central to treatment planning, while radiation oncology may contribute to local disease control.

Such multidisciplinary collaboration is particularly important when the lesion threatens vision. The priorities are not simply removal of the mass but preservation of optic nerve function, ocular motility, globe position, and acceptable cosmesis while simultaneously controlling the underlying malignancy.

In our case, the combination of surgical cytoreduction followed by systemic and radiation treatment reflects this multidisciplinary principle and allowed the local orbital problem to be addressed without losing sight of the systemic nature of the disease.

What makes our case unusual & significant?....

The present case is clinically significant because the orbital lesion represented an unusual presentation of an otherwise systemic plasma cell malignancy. The patient's initial symptoms were predominantly local—orbital swelling, proptosis, and visual deterioration—while the underlying marrow disease was not initially apparent from the presenting orbital complaint.

The associated anemia subsequently provided an important clue and prompted broader investigation. Histopathological examination of the orbital lesion then established the plasma cell nature of the mass, and bone marrow examination demonstrated extensive systemic involvement. Thus, the diagnostic pathway progressed from a localized orbital presentation to recognition of a systemic hematological malignancy.

Another notable feature was the use of the SOKHA approach for tumor cytoreduction and symptom relief. The approach provided access to the lesion while addressing the cosmetic considerations inherent to orbital surgery. Subsequent multimodal treatment addressed both the local and systemic components of the disease.

This sequence emphasizes a broader clinical lesson: the anatomical presentation of a malignancy does not necessarily reflect the extent of the underlying disease. An orbital mass may represent the most visible component of a systemic plasma cell disorder, and local treatment should therefore be accompanied by appropriate systemic evaluation.

Conclusion

Orbital plasmacytoma represents an exceptionally rare extramedullary manifestation of multiple myeloma and poses a significant diagnostic challenge because of its ability to mimic a wide spectrum of benign and malignant orbital pathologies. This case highlights the importance of maintaining a high index of suspicion when evaluating patients with rapidly progressive proptosis or atypical orbital masses, particularly in the absence of a definitive diagnosis on initial imaging. Early histopathological confirmation through tissue biopsy remains the cornerstone for establishing the diagnosis and differentiating plasmacytoma from other neoplastic and inflammatory lesions. Timely multidisciplinary collaboration among ophthalmologists, radiologists, neurosurgeons, hematologists, and radiation oncologists is pivotal in optimizing patient outcomes. In the present case, surgical excision provided prompt relief of orbital symptoms and facilitated definitive diagnosis, while subsequent multimodal therapy comprising corticosteroids, systemic chemotherapy, and radiotherapy resulted in favorable local and systemic disease control. Recognition of this rare clinical entity is of paramount importance, as orbital involvement may represent the first manifestation of underlying multiple myeloma. Early diagnosis not only enables prompt initiation of appropriate systemic therapy but also has the potential to preserve vision, reduce disease-related morbidity, and improve overall prognosis.

Declarations

Ethics approval and consent to participate: Not applicable. Formal ethical approval was not required for this case report as per our institutional guidelines.

Consent for Publication: Written informed consent was obtained from the patient for publication of this case report along with the accompanying clinical details and images.

Availability of data and material: All the relevant data supporting the findings of this case report have been included in the manuscript. Any further information may be obtained from the corresponding author upon request for the same.

Competing interests: The authors declare that they have no competing interests.

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