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CASE REPORT

Non-Surgical Management of Recurrent Naso-Orbital Hemangiomas with Bevacizumab: A Case Report

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Abstract: In this case report, we describe a 21-year-old man with recurrent hemangiomas in his left eye socket and nasal cavity. Traditional surgeries were unsuccessful, so we used Bevacizumab, a drug that inhibits blood vessel growth. This approach significantly reduced the tumor size and stopped frequent nosebleeds. Over two years, the tumor remained controlled without major side effects, suggesting Bevacizumab as a promising non-surgical treatment for recurrent hemangiomas.

Keywords: Bevacizumab, orbital hemangioma, vascular endothelial growth factor, treatment efficacy

Introduction

Orbital cavernous hemangioma is the most common benign orbital lesion in adults, frequently occurring in the left orbit.[1] For symptomatic hemangiomas, the primary treatment method is surgical excision. Despite advancements in endoscopic transnasal excision techniques for intraconal or medial orbital hemangiomas, complications and recurrence remain significant challenges. This report introduces a novel therapeutic strategy for recurrent naso-orbital hemangiomas using Bevacizumab, an inhibitor of vascular endothelial growth factor (VEGF), demonstrating the potential of non-surgical approaches for treating recurrent, refractory naso-orbital hemangiomas.This case is among the first to document Bevacizumab's use for naso-orbital hemangiomas, highlighting its novel potential as a non-surgical treatment for recurrent vascular tumors in difficult anatomical sites.

Case Report

We encountered a 21-year-old male who initially underwent open surgical excision at age 7 for left-sided proptosis and incomplete eyelid closure, with histopathological confirmation of hemangioma. Eight years ago, he presented to the rhinology department with left cheek swelling. A CT scan revealed a cystic-solid mass in the maxillary sinus, involving the left alveolar bone and dental roots, and compressing the inferior rectus muscle, indicating expansive growth of the tumor. A transoral gingivobuccal approach was used to excise the tumor, with pathology again confirming a hemangioma. Postoperatively, the left nasal cavity began to bleed intermittently, with minor and infrequent episodes until one month before admission when epistaxis became severe and uncontrollable.

Enhanced sinus MRI revealed an irregular mass in the left orbit and nasal cavity, with maximum dimensions of 1.37 cm x 2.87 cm in the orbit and 1.62 cm x 3.49 cm in the nasal cavity, both showing heterogeneous enhancement (Figure 1). Blood tests indicated anemia (hemoglobin 105 g/L; normal range: 115–150 g/L). Vision and ocular motility were normal. Following evaluation, surgical treatment was performed using a combined endoscopic transethmoidal and transconjunctival orbitotomy approach for hemangioma excision. However, at the two-week postoperative follow-up, tumor recurrence was noted, protruding from the ethmoid sinus into the nasal cavity.

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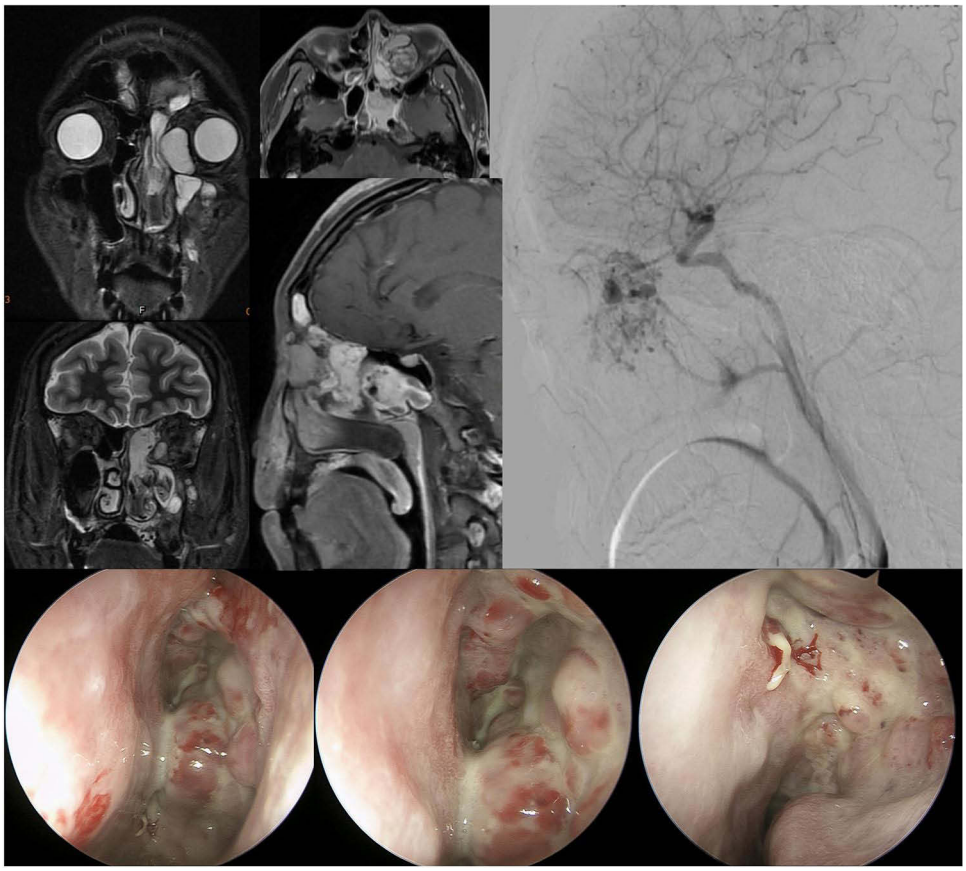

Figure 1 Imaging studies upon patient admission illustrating the extent of the hemangioma, external carotid angiography depicting the blood supply to the hemangioma, and endoscopic views of the hemangioma within the nasal cavity.

A second endoscopic resection under general anesthesia was performed, yet the hemangioma recurred in the nasal cavity two weeks postoperatively. Despite two surgeries within 40 days, accompanied by significant intraoperative bleeding and transfusion, the rapid recurrence rendered further surgical excision unfeasible. Angiography considered embolization, but it was deemed high-risk due to the hemangioma's blood supply from the maxillary and ophthalmic arteries (Figure 1).

Given the rapid postoperative recurrence and the infeasibility of embolization, intratumoral injection of Ranibizumab, guided by nasal endoscopy, was initiated. Injections (0.2 mL each) were administered at the tumor bulge every two months, totaling four injections. Pre-injection imaging showed maximum dimensions of 1.39 cm x 2.93 cm in the orbit and 2.21 cm x 4.16 cm in the nasal cavity (Figure 2A). After the fourth injection, enhanced sinus MRI revealed tumor reduction to 1.24 cm x 2.77 cm in the orbit and 2.51 cm x 1.52 cm in the nasal cavity (Figure 2B). Despite gradual tumor shrinkage, frequent nasal bleeding and persistent anemia necessitated a shift to intravenous Bevacizumab (5 mg/kg, every two months). After one month, epistaxis reduced and ceased after two treatments, with normalization of hemoglobin levels. One year of treatment showed significant tumor reduction to 0.78 cm x 2.17 cm in the orbit and 0.42 cm x 0.67 cm in the nasal cavity (Figure 2C). During the treatment period, continuous monitoring, including electrocardiograms, liver and kidney function tests, coagulation studies, and blood analyses, showed no adverse events. Two-year follow-up indicated stable tumor control with no epistaxis and MRI showing tumor dimensions of 0.75 cm x 2.17 cm in the orbit and 0.32 cm x 0.39 cm in the nasal cavity (Figure 2D).

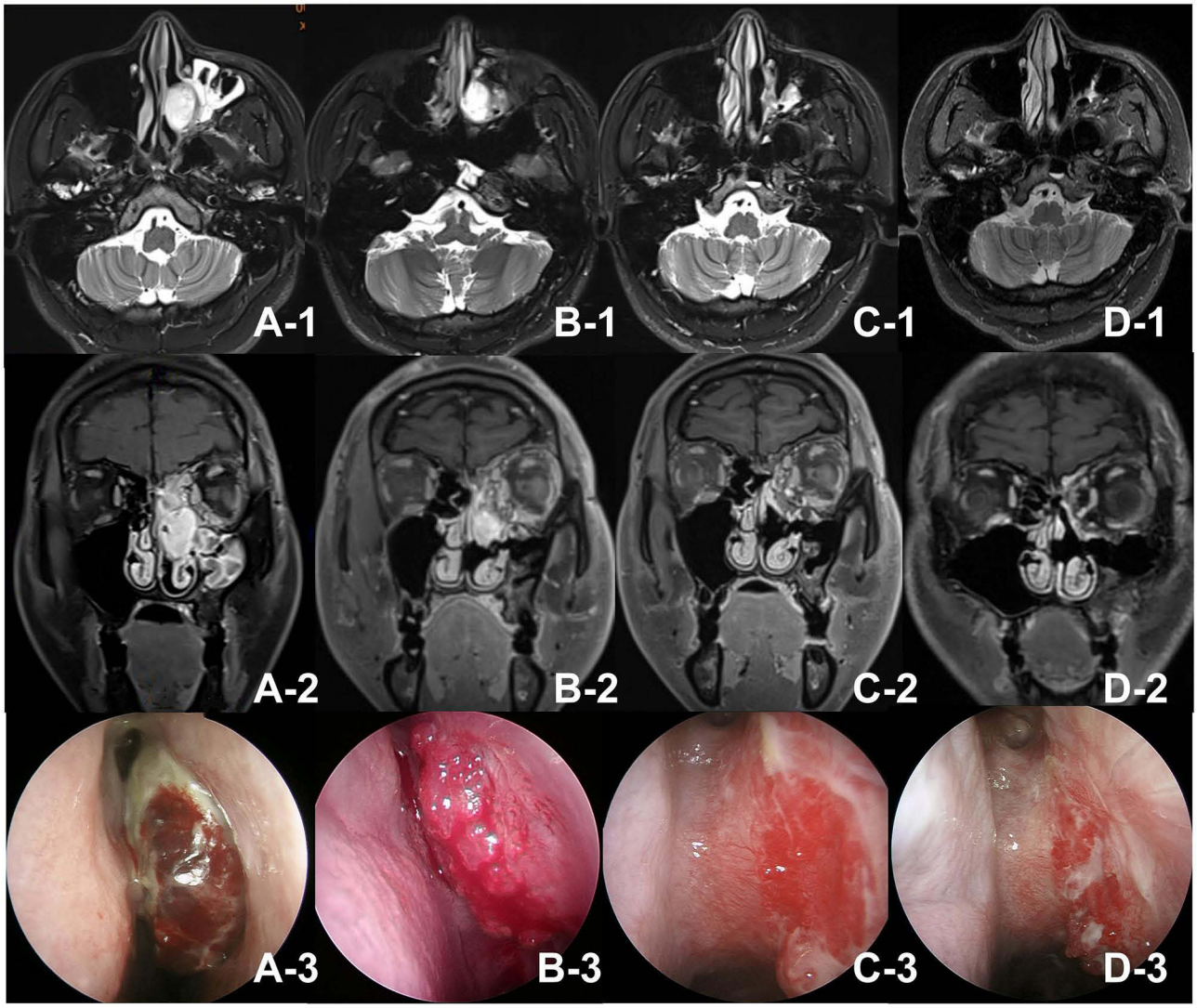

Figure 2 A1-A3: Imaging and endoscopic appearances before intratumoral injection of Ranibizumab. B1-B3: Imaging and endoscopic appearances after Ranibizumab treatment (before Bevacizumab therapy). C1-C3: Imaging and endoscopic appearances following one year of continuous Bevacizumab therapy. D1-D3: Imaging and endoscopic appearances at the two-year follow-up.

Discussion

VEGF is a key factor promoting angiogenesis, essential for the growth of many tumor types, including orbital hemangiomas.[2–4] Anti-angiogenic therapy has been validated in prospective studies for vascular anomalies.[5] Previous studies suggest that most orbital hemangiomas express VEGF receptors, indicating a potential target for non-surgical treatment.[6,7] Bevacizumab is a recombinant humanized monoclonal antibody that exerts its therapeutic effects by binding to VEGF-A, thereby preventing its interaction with receptors on the surface of endothelial cells, which inhibits angiogenesis. This mechanism reduces angiogenesis and vascular permeability, limits the tumor's blood supply, and induces tumor regression, making it particularly effective for highly vascularized lesions such as hemangiomas.[8] Bevacizumab is widely used in retinal vascular diseases and has demonstrated significant efficacy in treating various vascular anomalies. Multiple studies have confirmed the crucial role of VEGF in promoting angiogenesis, including its importance in head and neck squamous cell carcinoma. For instance, Dumitru and Raica discussed the impact of VEGF on tumor angiogenesis and introduced a splice variant of VEGF as a potential anti-angiogenic target, further underscoring the relevance of targeting VEGF in the treatment of vascular tumors.[9,10] These insights highlight the therapeutic potential of Bevacizumab in managing diseases driven by abnormal angiogenesis, such as naso-orbital hemangiomas, by providing

a novel approach that directly addresses the underlying vascular pathology.This case report demonstrates the novel and successful application of Bevacizumab in treating recurrent, refractory naso-orbital hemangiomas, highlighting its potential as an effective non-surgical alternative when traditional methods fail. By inhibiting VEGF, Bevacizumab significantly reduced the aggressive recurrence of the tumor and improved clinical outcomes without severe side effects. This result underscores the feasibility of Bevacizumab in managing challenging hemangiomas and emphasizes the importance of exploring targeted therapies in oncology. Future research should focus on evaluating the long-term safety and efficacy of Bevacizumab across a broader range of hemangiomas and similar vascular anomalies, aiming for more comprehensive integration into clinical practice. This case contributes to the growing body of evidence supporting targeted therapies and provides a basis for further investigation into their application in complex hemangioma cases, potentially revolutionizing their management.

Conclusion

Bevacizumab has shown significant potential in treating recurrent, refractory naso-orbital hemangiomas, offering a new effective therapeutic option for cases with high recurrence risk post-surgery.

Ethics Statement

This case report has been approved by the Ethics Committee of Shandong Provincial ENT Hospital, Ethics Approval Number: XYK20200704. The patient has provided written informed consent for the publication of the case details and accompanying images.

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We thank the patient for granting permission to publish this information.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

Competing interests: All the authors declare that they have no conflicts of interest that relate to the research described in this paper.

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