RESEARCH PAPER

The Role Of Contrast-Enhanced Mri In The Evaluation Of An Infantile Capillary Hemangioma: A Case Report

Dr. Aditya Aravindakshan[1*], Dr. Karan Goyal[2], Dr. Mehak Gupta[3]

[1] Postgraduate Resident, Department Of Radiodiagnosis, Maharishi Markandeshwar Institute Of Medical Sciences & Research, Mullana, Ambala, Haryana, India.

[2] Senior Resident, Department Of Radiodiagnosis, Maharishi Markandeshwar Institute Of Medical Sciences & Research, Mullana, Ambala, Haryana, India.

[3] Postgraduate Resident, Department Of Radiodiagnosis, Maharishi Markandeshwar Institute Of Medical Sciences & Research, Mullana, Ambala, Haryana, India.

Corresponding Author: Dr. Aditya Aravindakshan, Postgraduate Resident, Department Of Radiodiagnosis, Mmimsr, Mullana, Ambala, Haryana, India. Email: adityaaravindakshan123@gmail.com

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Abstract

Infantile capillary hemangiomas are the most common benign vascular tumors of the orbit. While superficial lesions can often be diagnosed clinically, those with deep post-septal extension causing mass effect require precise cross-sectional imaging to differentiate them from aggressive pediatric malignancies and to guide vision-saving management. We present the case of a 3-month-old male infant who underwent contrast-enhanced magnetic resonance imaging (cemri) of the orbits for a rapidly growing right peri-orbital swelling. Imaging revealed a 22 x 12 x 13 mm, fairly well-defined mass that was hyperintense on t2-weighted imaging, isointense on t1-weighted imaging, and demonstrated avid homogeneous post-contrast enhancement. Crucially, the lesion exhibited both pre-septal and post-septal extraconal components, obscuring the lacrimal gland and causing mild caudal displacement of the right globe without optic nerve compression. This case highlights the indispensable role of cemri in mapping the exact anatomical extent of deep orbital hemangiomas, confidently ruling out malignant mimics such as rhabdomyosarcoma, and identifying mechanical mass effects that necessitate prompt medical intervention to prevent induced astigmatism and deprivational amblyopia.

Keywords: Capillary Hemangioma, Pediatric Neuroimaging, Magnetic Resonance Imaging, Orbital Neoplasms, Rhabdomyosarcoma Mimic.

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INTRODUCTION

Infantile capillary hemangiomas are the most prevalent benign vascular tumors of the periorbital tissues in childhood. They typically present within the first few weeks of life, undergoing a characteristic phase of rapid endothelial proliferation followed by gradual, spontaneous involution.(1) While anterior, superficial "strawberry" lesions can often be diagnosed via clinical examination alone, large hemangiomas with deep orbital extension pose a significant diagnostic and therapeutic challenge. Post-septal involvement can lead to severe, vision-threatening complications, including deprivational amblyopia, astigmatism from mechanical globe compression, and potentially optic neuropathy.(2)

Furthermore, during the rapid proliferation phase, a deep orbital hemangioma can clinically and radiologically mimic aggressive pediatric malignancies, such as rhabdomyosarcoma or metastatic neuroblastoma.(3) Contrast-enhanced magnetic resonance imaging (CEMRI) is the gold standard for delineating the exact anatomical margins, evaluating extraconal versus intraconal involvement, and establishing a definitive diagnosis without the need for a hazardous surgical biopsy.(4) We present the case of a 3-month-old male evaluated via CEMRI for a space-occupying right orbital capillary hemangioma demonstrating significant post-septal extension and globe displacement.

CASE PRESENTATION

A 3-month-old male infant was referred to the Department of Radiodiagnosis for the evaluation of a rapidly increasing swelling over the right peri-orbital region. To accurately characterize the lesion and assess its deep tissue extent, contrast-enhanced magnetic resonance imaging (CEMRI) of the orbits

was performed using standard protocols (Axial T2W, T1W, FFE, DWI; Coronal FLAIR, T2W SPIR; Sagittal T2W).

Imaging revealed a fairly well-defined mass lesion in the right peri-orbital region, measuring approximately 22 mm x 12 mm x 13 mm in its maximum cross-sectional and craniocaudal dimensions. On standard sequences, the lesion appeared hyperintense on T2-weighted images and isointense on Fluid-Attenuated Inversion Recovery (FLAIR) and T1-weighted images. Following the administration of intravenous gadolinium contrast, the mass demonstrated avid and homogeneous enhancement.

Anatomically, the mass was predominantly pre-septal but extended deep to involve the post-septal extraconal compartment within the superior portion of the orbit. The superior, lateral, and lacrimal glands were not separately visualized, being obscured by the lesion. The mass caused mild but distinct caudal displacement of the right eye globe. Bilateral optic nerves and the optic chiasma demonstrated normal signal intensity. The retrobulbar fat, extraocular muscles, cavernous sinuses, and Meckel's caves were unremarkable, and no intracranial extension was noted. Based on the characteristic MRI signal intensities and enhancement pattern, a radiological diagnosis of infantile capillary hemangioma with post-septal extension was established.

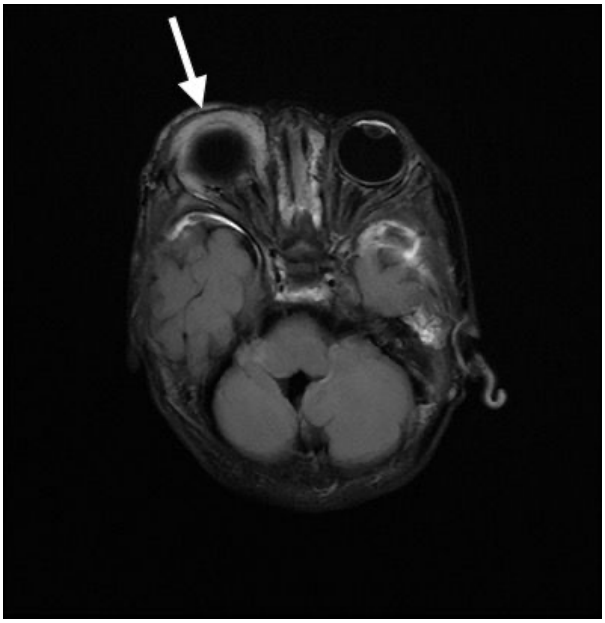

Figure 1: Axial T2-weighted MRI demonstrating a hyperintense mass in the right peri-orbital region (arrow) with post-septal extraconal extension.

Figure 2: Coronal T1-weighted contrast-enhanced MRI revealing avid, homogeneous enhancement of the lesion.

DISCUSSION

Infantile capillary hemangiomas (ICH) are characterized by a period of rapid cellular proliferation during the first year of life. While anterior lesions are easily diagnosed clinically, deeper orbital lesions lacking a superficial cutaneous component rely entirely on cross-sectional imaging for diagnosis and staging.[3] In this case, CEMRI was crucial not only to define the anatomical extent of the lesion but also to confidently exclude aggressive pediatric malignancies.

Radiologically, the primary differential diagnosis for a rapidly expanding pediatric orbital mass includes rhabdomyosarcoma, lymphatic malformations (lymphangiomas), and metastatic neuroblastoma. On MRI, capillary hemangiomas classically present as lobulated, solid masses that are isointense to muscle on T1-weighted images and markedly hyperintense on T2-weighted images, often demonstrating prominent internal vascular flow voids if the lesion is large enough.[4,5] Following contrast administration, they exhibit avid and homogeneous enhancement, as clearly demonstrated in our patient. This distinguishes them from rhabdomyosarcomas, which typically show more heterogeneous enhancement and may exhibit adjacent bony destruction, and from lymphatic malformations, which characteristically present with macrocystic spaces and fluid-fluid levels without solid, homogeneous enhancement.[5]

Beyond differentiating benign from malignant pathology, the critical role of MRI in this case was

mapping the post-septal extraconal extension and identifying the resultant mass effect. Although capillary hemangiomas are histologically benign, their anatomical location can render them functionally devastating. The mild caudal displacement of the right globe observed in this 3-month-old poses a severe risk for developing induced astigmatism and secondary deprivationalamblyopia.[2] Historically, asymptomatic capillary hemangiomas were managed with observation due to their natural history of spontaneous involution. However, cross-sectional imaging findings of post-septal extension, globe displacement, or optic nerve compression are absolute indications for prompt medical intervention.[6] The current first-line treatment for vision-threatening orbital hemangiomas is systemic beta-blocker therapy, specifically oral propranolol, which rapidly accelerates tumor involution and relieves mechanical compression.[6,7] By utilizing CEMRI to map the deep orbital involvement, clinicians can confidently initiate systemic therapy without subjecting the infant to an unnecessary and highly morbid biopsy.

CONCLUSION

This case illustrates the indispensable role of contrast-enhanced MRI in the evaluation of deep orbital capillary hemangiomas. While the rapid growth of these lesions can clinically mimic aggressive pediatric sarcomas, their classic MRI features such as T2 hyperintensity and avid homogeneous enhancement that allow for a confident, non-invasive diagnosis. Furthermore, MRI accurately maps critical post-septal extension and globe displacement, providing the essential radiological evidence required to rapidly initiate systemic beta-blocker therapy and prevent irreversible vision loss in the pediatric patient.

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