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Juxtapapillary retinal capillary hemangioma: A clinical and histopathological case report

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ABSTRACT

INTRODUCTION AND IMPORTANCE: Juxtapapillary retinal capillary hemangiomas (RCHs) are vascular hamartomas that occur adjacent to the optic disc. Juxtapapillary RCHs can be found as an isolated finding or in association with Von Hippel-Lindau (VHL) disease. VHL is a dominantly inherited disease that is characterized by multiple intracranial and retinal hemangioblastomas along with benign and malignant visceral tumors. RCH is a hallmark lesion in VHL and typically presents early in the disease.

CASE PRESENTATION: We present the clinical and histopathological findings of a 15-month-old child with juxtapapillary RCH associated with exudative retinal detachment and a family history of VHL. The child presented initially at a late stage and lost to follow-up twice then came back with a blind painful eye secondary to neovascular glaucoma necessitating enucleation.

DISCUSSION: Although juxtapapillary RCHs are benign, slowly growing tumors, they pose a serious threat to central vision secondary to posterior segment complications such as intraretinal and subretinal exudation, macular edema and exudative retinal detachment and anterior segment complications such as neovascular glaucoma if left untreated.

CONCLUSION: Juxtapapillary RCHs are potentially blinding tumors if not treated in early stages given their close proximity to the optic nerve (ON) and macula.

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1. Introduction

Von Hippel-Lindau (VHL) disease is a multisystem autosomal dominant syndrome that results from a mutation in VHL gene on chromosome 3 (3p25–26). [1] VHL disease is characterized by multiple intracranial and retinal hemangiomas associated with visceral neoplasms affecting the kidneys, pancreas, adrenal glands and epididymis [2]. Retinal capillary hemangioma (RCH) is a hallmark lesion that develops in more than 60% of VHL patients and often manifests early in the disease [3]. Bilateral involvement of RCH occurs in approximately half of VHL patients [3]. RCHs can occur as solitary or multiple lesions in the retinal periphery, juxtapapillary region or on the ON head [4]. Juxtapapillary RCHs are vascular hamartomas that typically start as a small lesion in the peripapillary area, most commonly temporal to the optic disc [4]. These lesions can occur sporadically or in association with VHL disease. Although they are benign, slowly growing tumors, juxtapapillary

RCHs can cause significant visual deterioration secondary to progressive intraretinal and subretinal exudation, macular edema and exudative retinal detachment if left untreated [5,6]. Here, we report the clinical and histopathological findings of an infant with juxtapapillary RCH and a family history of VHL disease to attract the attention of ophthalmologists to the long term ocular sequelae of this disease. This case report has been prepared and reported in accordance with the SCARE criteria [7].

2. Presentation of case

A 15-month-old girl with a family history of VHL disease was referred to the pediatric ophthalmology clinic for a recent onset of esotropia in the right eye. The child had poor fixation in the right eye but was able to follow and fixate with the left eye. Esotropia of 30 prism diopters was noted in the right eye. Anterior segment examination of both eyes was unremarkable. Dilated fundus examination showed an elevated, well-circumscribed reddish tumor adjacent to the optic disc with dilated tortuous feeding vessels, total exudative retinal detachment in the right eye and normal fundus exam in the left eye. B scan ultrasonography of the right eye showed a solid vascular mass adjacent the optic disc measuring 2.8 mm in

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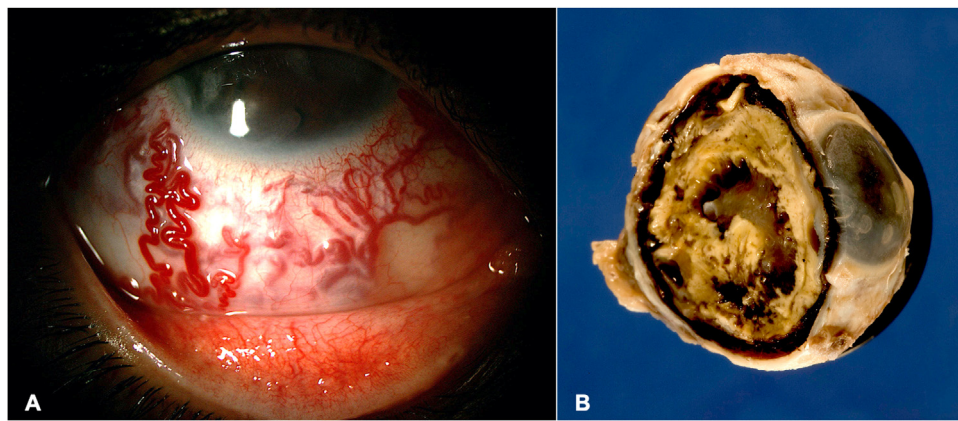


Fig. 1. A: The clinical appearance of the dilated tortuous conjunctival and episcleral blood vessels in the right eye. B: The gross appearance of the cut surface of the enucleated globe showing opaque cornea, and posterior cavity vascular mass.

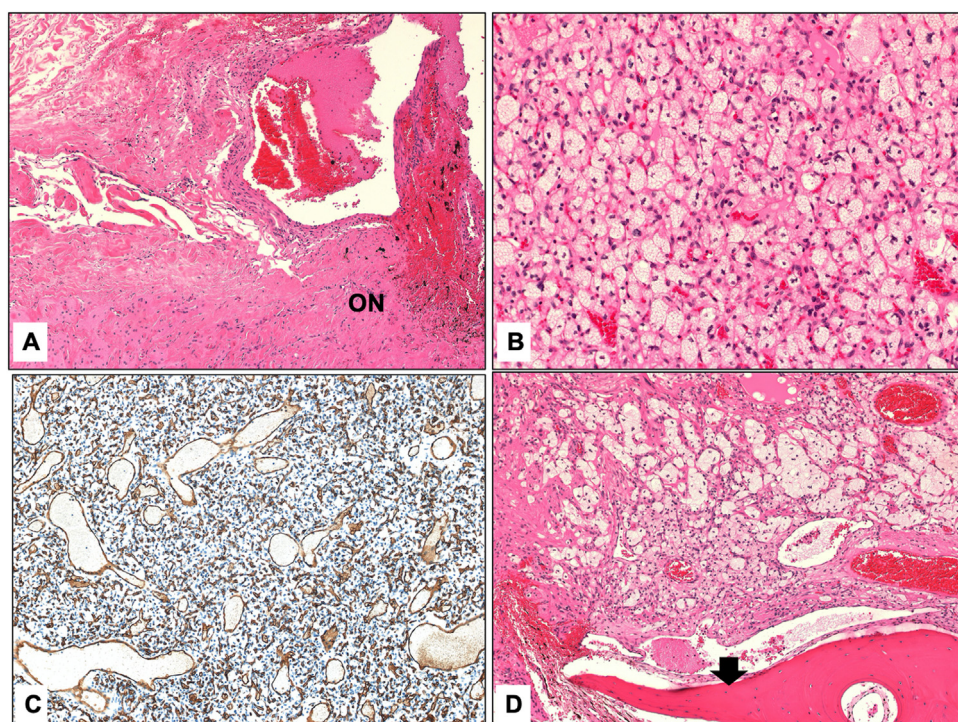


Fig. 2. A: The peripapillary hemangioblastoma adjacent to the optic nerve (ON) with hemorrhage and detached retina (Original magnification $\times 100$ Hematoxylin and eosin). B: Involvement of the retinal tissue by abnormal vessels with formation of foamy histiocytes due to long standing hemangioblastoma (Original magnification $\times 200$ Hematoxylin and eosin). C: The abnormal vessels outlined by vascular endothelial marker (Original magnification $\times 100$ CD34). D: The hemangioblastoma with adjacent bone formation (black arrowhead) representing phthisis bulbi changes (Original magnification $\times 100$ Hematoxylin and eosin).

thickness with low internal reflectivity and total exudative retinal detachment. Orbital computed tomography (CT) scan with contrast showed an extensive retinal detachment and a 3×4 mm markedly enhancing intraocular mass adjacent to the optic disc of the right eye suggestive of a hemangioblastoma. Brain CT scan with contrast showed a 3 mm, strongly enhancing mass in the left cerebellopontine angle suggestive of a vascular origin. CT scan of the abdomen with contrast showed no visceral abnormalities. Based on the family history, clinical presentation and radiological findings, the patient was diagnosed as VHL disease. The patient lost follow-up for 4 years. At the age of 5 years, the patient presented with loss of vision in the right eye with no light perception and her visual acuity in the left eye measured 20/30. The intra-ocular pressure (IOP) in both eyes was normal. Fundus examination showed that the right eye tumor has significantly increased in size. Orbit

and brain CT scan with contrast was repeated and showed that the vascular tumor has increased in size and was filling half of the right globe. The previously noted vascular lesion in the left cerebellopontine angle disappeared. The patient lost follow-up again for another 8 years, then she presented to the Emergency Room with severe pain and redness of that eye at the age of 14 years. Examination of the right eye showed neovascular glaucoma with IOP of 48 mmHg, very dilated tortuous conjunctival and episcleral blood vessels, aggressive iris neovascularization, dense cataract with no view of the posterior pole (Fig. 1a). The patient continued to have pain and redness in the right eye over several visits due to the high IOP despite being on anti-glaucoma medications. Because of her pain, redness and poor visual potential, the patient underwent enucleation of the right globe at the age of 25 years. The enucleated globe measured $22.5 \text{ mm} \times 22 \text{ mm} \times 22 \text{ mm}$ with

a 4-mm optic nerve posteriorly and hazy cornea anteriorly and no further details of the anterior chamber (Fig. 1b). Histopathological examination of the globe showed irregular corneal epithelium, absent bowman's layer and mild alteration of the normal stromal architecture. Descemet's membrane was intact with moderately attenuated endothelium. The anterior chamber angle on both sides was completely obliterated by adherent iris tissue representing peripheral anterior synechia. The iris also showed extensions of a thin fibrovascular membrane along the anterior surface representing iris neovascularization associated with atrophy of the iris pigmented epithelium. A calcific cataract, which was surrounded by lens capsule with multiple folds, was adherent to the back surface of the iris. The posterior cavity showed atrophic ciliary body and choroid, as well as total exudative retinal detachment. The whole cavity of the globe was filled by a vascular mass originating from the peripapillary tissue adjacent to the ON head composed of numerous capillaries and blood vessels of variable sizes (Fig. 2A). Collection of multivacuolated lipid-laden cells with areas of hemorrhage and abnormal retinal vessels were also seen (Fig. 2B). The vascular proliferation in the posterior vascular mass were outlined by CD34 stain (Fig. 2C). Bone formation was seen along the choroid representing osseous metaplasia of the retinal pigmented epithelium (Fig. 2D). Intervening areas of fibrous tissue representing fibrous metaplasia of the retinal pigmented epithelium were also seen. The overall histopathological appearance and the immunohistochemical staining were consistent with juxtapapillary RCH adjacent to the ON head associated with exudative retinal detachment, old hemorrhage, and phthisical changes.

3. Discussion

Von Hippel-Lindau (VHL) disease is an autosomal dominant disorder causing various forms of benign and malignant tumors affecting multiple body organs, including the eye [1]. The most common ocular lesions are peripheral RCHs. Less frequently, hemangioblastoma can affect the ON head itself or the retina adjacent to the nerve (juxtapapillary) [4]. Often, patients with VHL initially present with RCH prior to other tumors in the body. The probability of the development of such lesions increases yearly in patients with VHL, reaching a risk of 80 % for patients older than 80 years of age [8]. RCHs may occur in the presence or absence of VHL disease. The case we are presenting has occurred within the context of a previously diagnosed VHL disease. Our patient had clinical evidence of an optic nerve-related vascular lesion in the right eye since her initial presentation at the age of 15 months, however, the exact location and tissue diagnosis of the RCH was not confirmed until the affected eye was enucleated.

Juxtapapillary RCHs are characterized by an unpredictable progressive clinical course. Considering the close proximity of the juxtapapillary RCHs to the ON and macula, they pose a serious threat to central vision as the tumor enlarges resulting in intraretinal and subretinal exudation, macular edema, and exudative retinal detachment, which were evident in our patient upon investigations at her initial presentation and progressed even further over time [5,6]. Anterior segment complications such as neovascular glaucoma and cataract are rare but have been reported to occur in the late stages of the disease which were also evident in our patient prior to enucleation [2,9].

Juxtapapillary RCHs have three possible growth patterns [4]. The more common growth pattern occurring in VHL disease is the endophytic pattern, in which tumors extend from the anterior surface of the optic disc and grow into the vitreous and are therefore more evident clinically. These tumors appear as red-orange, well-demarcated, elevated and smooth lesions. They are known to have a poorer prognosis as they are more likely to be associated with poor

visual acuity [4,8]. Exophytic tumors grow in the outer layers of the retina and present clinically as orange, nodular well-defined lesions. Sessile tumors grow in the middle layers of the retina and present clinically as gray-orange flat lesions. Exophytic or sessile juxtapapillary RCHs are difficult to diagnose clinically and can be misdiagnosed as unilateral papilledema, papillitis, choroiditis, choroidal neovascularization or choroidal hemangioma [10]. We believe that the lesion in our patient was endophytic according to the clinical description of the lesion initially, its progression, and the eventual histopathological findings of retinal detachment, old hemorrhage and foamy histiocytes.

Histopathologically, RCHs are characterized by capillary-like fenestrated vascular channels surrounded by foamy cells with well-defined large intracytoplasmic lipid vacuoles [11]. In our case, the patient had these typical histopathological findings along with osseous metaplasia of the retinal pigmented epithelium due to the chronicity of the condition resulting in a blind eye with phthisical changes. The diagnosis of VHL disease is established primarily by clinical findings of multiple RCHs as well as the other systemic conditions of VHL and by the presence of a positive family history of the disease, which was known in our case. Gene testing may be performed to confirm the diagnosis if needed [2]. It is recommended that patients with VHL or a history of RCH undergo an annual comprehensive ophthalmic examination including dilated fundus exam to monitor the development of new lesions or the progression of existing ones [12]. Moreover, systemic evaluation is recommended to rule out life-threatening complications associated with VHL disease [2]. Our patient presented initially at a late complicated stage with poor vision and was unfortunately lost to follow up twice, therefore the ideal management regimen was not followed in her case.

4. Conclusion

We reported the clinical and histopathological findings of a juxtapapillary RCH as part of VHL disease since infancy with positive family history of this condition. If untreated, juxtapapillary RCHs can lead to severe vision loss secondary to subretinal and/or intraretinal exudation, and exudative retinal detachment. These posterior segment complications together with possible anterior segment neovascular glaucoma seen in the end-stage of the disease will cause marked morbidity. Ophthalmologists should be aware of the systemic and ocular associations of VHL disease for early detection and appropriate management aiming to decrease mortality and maintain useful vision.

Declaration of Competing Interest

The authors report no declarations of interest.

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Ethical approval

This case report has been approved by the Research Department at King Khaled Eye Specialist Hospital. The information was obtained and reported in a manner that was compliant with the standards set forth by the Health Insurance Portability and Accountability Act, and the Declaration of Helsinki as amended in 2013.

Consent

General informed written consent was obtained from the patient which includes permission for anonymous use of photos and for reporting.

Author contribution

Rakan Al-Essa: Review of chart, literature review and first draft of the case report.

Hala Helmi: Literature review and first draft of the case report.

Hind Alkatan: Study design, histopathological examination and final tissue diagnosis, taking images, and overall review for editing of the manuscript as the corresponding author.

Azza Maktabi: Histopathological review of slides and clinical images.

Registration of research studies

Not applicable.

Guarantor

Hind M. Alkatan, MD.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at <https://doi.org/10.1016/j.ijscr.2021.01.014>.

References

- [1] W.G. Kaelin, Molecular basis of the VHL hereditary cancer syndrome, *Nat. Rev. Cancer* 2 (9) (2002) 673–682, <http://dx.doi.org/10.1038/nrc885>.
- [2] A.D. Singh, C.L. Shields, J.A. Shields, Von Hippel-Lindau disease, *Surv. Ophthalmol.* 46 (2) (2001) 117–142, [http://dx.doi.org/10.1016/S0039-6257\(01\)00245-4](http://dx.doi.org/10.1016/S0039-6257(01)00245-4).
- [3] W.T. Wong, E. Agrón, H.R. Coleman, et al., Clinical characterization of retinal capillary hemangioblastomas in a large population of patients with Von Hippel-Lindau disease, *Ophthalmology* 115 (1) (2008) 181–188, <http://dx.doi.org/10.1016/j.ophtha.2007.03.009>.
- [4] C.M. McCabe, H.W. Flynn, C.L. Shields, et al., Juxtapapillary capillary hemangiomas: clinical features and visual acuity outcomes, *Ophthalmology* 107 (12) (2000) 2240–2248, [http://dx.doi.org/10.1016/S0161-6420\(00\)00422-X](http://dx.doi.org/10.1016/S0161-6420(00)00422-X).
- [5] M.A. Magee, A.J. Kroll, P.L. Lou, E.A. Ryan, Retinal capillary hemangiomas and von Hippel-Lindau disease, *Semin. Ophthalmol.* 21 (3) (2006) 143–150, <http://dx.doi.org/10.1080/08820530500350712>.
- [6] M. Munteanu, I. Zolog, Retinal capillary hemangioma, *Oftalmologia* 51 (2) (2007) 52–55, [http://dx.doi.org/10.1016/s0161-6420\(01\)00758-8](http://dx.doi.org/10.1016/s0161-6420(01)00758-8).
- [7] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, for the SCARE Group, The SCARE 2020 guideline: updating consensus surgical Case REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [8] E.R. Maher, J.R.W. Yates, R. Harries, et al., Clinical features and natural history of von hippel-lindau disease, *QJM* 77 (2) (1990) 1151–1163, <http://dx.doi.org/10.1093/qjmed/77.2.1151>.
- [9] S. Chen, E.Y. Chew, C.C. Chan, Pathology characteristics of ocular von Hippel-Lindau disease with neovascularization of the iris and cornea: a case report, *J. Med. Case Rep.* 9 (1) (2015) 66, <http://dx.doi.org/10.1186/s13256-015-0539-2>.
- [10] J.D. Gass, R. Braunstein, Sessile and exophytic capillary angiomas of the juxtapapillary retina and optic nerve head, *Arch. Ophthalmol.* 98 (10) (1980) 1790–1797, <http://dx.doi.org/10.1001/archophth.1980.01020040642011>.
- [11] C.C. Chan, A.B.D. Collins, E.Y. Chew, Molecular pathology of eyes with von Hippel-Lindau (VHL) disease: a review, *Retina* 27 (1) (2007) 1–7, <http://dx.doi.org/10.1097/01.iae.0000244659.62202.ee>.
- [12] L.A. McGrath, H.S. Mudhar, S.M. Salvi, Hemangioblastoma of the optic nerve, *Surv. Ophthalmol.* 64 (2) (2019) 175–184, <http://dx.doi.org/10.1016/j.survophthal.2018.10.002>.

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