

Case Report

A Simple Orbital Lymphatic Malformation Clinically Mimics Primary Conjunctival Cyst

Sasikant Leelawongs Luksanaporn Krungkraipetch

Department of Ophthalmology, Faculty of Medicine, Burapha University, Chon Buri, Thailand

Keywords

Lymphatic malformation · Conjunctival cyst · Surgery · Orbit/lachrymal gland/eye lids · Case report

Abstract

Introduction: A simple orbital lymphatic malformation usually presents with acute proptosis with ophthalmoplegia after an upper respiratory tract infection. Various treatments have been described but the lesions often recur after treatment due to their infiltrative nature. **Case Presentations:** A 6-year-old girl presented with a 5 × 10 mm translucent mass in the left inferior fornix for 3 years but she denied diplopia and visual disturbance. Orbital computed tomography with contrast emphasized the clinical findings, a nonseptated cystic lesion without enhancement in the anterior orbit. The lesion was surgically totally excised. Histopathological findings revealed an endothelial lining cyst without intraluminal cells consistent with a lymphatic malformation. In a 1-year follow-up, the lesion does not recur. **Conclusion:** The simple orbital lymphatic malformation can present as a single nonseptate cystic lesion. Pathological study should be done for the definitive diagnosis. Surgical excision can achieve a favorable outcome.

© 2024 The Author(s).
Published by S. Karger AG, Basel

Introduction

Lymphatic malformations, previously called lymphangioma, are benign hamartomas of the lymphatic system, containing disconnected, dilated lymphatic channels filled with lymph [1]. Acute enlargement of lesions from infection or intralesional bleeding after upper respiratory tract infection is usually the presenting symptom. The disruptive changes cause acute vision loss, from optic nerve compression or vascular compromise, and acute proptosis

Correspondence to:
Sasikant Leelawongs, leesasikant@gmail.com

[2]. Orbital imaging shows the characteristics of the lesions, multi-lobulated cystic lesions with rim enhancement, and the extension of the lesion [3]. Reports have shown various treatment options including observation, medical treatment, sclerotherapy, and surgical excision; however, there has still been no evidence from the randomized controlled trials for the effectiveness of treatment options due to the rarity of the disease [4].

Case Report

A 6-year-old Thai girl presented with a translucent mass in the left inferior fornix for 3 years. She had a cyst aspiration when she was 3 years old. The cyst gradually enlarged after the aspiration without exacerbation following the upper respiratory tract infection. She denied a history of ocular trauma, visual disturbance, or diplopia. She denied any history of ophthalmic disease in the family. On ophthalmic examination, the best corrective visual acuity was 20/30 right eye, and 20/50 left eye. The left lower eyelid was swollen, without any redness or tenderness. A large, non-tender, movable, translucent, cystic mass size 5 × 10 mm was found at the left inferior fornix (shown in Fig. 1). No dilated vascular anomalies around the mass existed. Conjunctival lymphangiectasia was not found. The anterior and posterior segment findings were unremarkable. Extraocular movement was full in all directions. Mass did not enlarge when performing the Valsalva maneuver. The patient's Hertel's exophthalmometry measurements were 16 mm (right side) and equally 16 mm (left side). Cyst seems to be more prominent when upgazed. The orbital computed tomography (CT) shows a single well-defined, hypodensity (14–17 Hounsfield units) mass at post-septal space over the inferior left orbit abutting globe, size 1.8 cm. After contrast injection, no enhancement was shown (shown in Fig. 2). In the bone window, bony destruction or remodeling was not seen (shown in Fig. 2). The differential diagnosis was dermoid cyst, epidermoid cyst, and simple conjunctival cyst. Complete cyst removal was done by forniceal incision under general anesthesia. Intraoperatively, the cyst was found in sub-tenon space, extending to the anterior orbit, size 10 × 8 × 3 mm (shown in Fig. 3). The cyst was removed without breaking a thin wall. The conjunctival incision was closed by Vicryl 7-0, interrupted fashion. Gross pathology revealed a thin cyst wall with clear fluid. The histopathological sections present large lymphatic channels in loose connective tissue stroma. Hematoxylin and eosin stain revealed the cyst channels are lined by endothelium without intraluminal cells (shown in Fig. 4). The definitive diagnosis is lymphatic malformation. In the 1-year follow-up period, Visual acuity was 20/30 in both eyes. The lesion did not recur. No symblepharon was seen. Extraocular movements were full (shown in Fig. 5).

Discussion

Most orbital tumors in pediatric populations are benign. More than half of them are cystic lesions [5, 6]. According to Shields and Shields [7], orbital cysts in childhood could be classified into cysts of surface epithelium, teratomatous cysts, neural cysts, secondary cysts, parasitic cysts, and non-cystic lesions with cystic components.

Cysts of surface epithelium comprise simple epithelial cysts (such as cutaneous epithelial cysts (epidermal), conjunctival epithelial cysts, respiratory epithelial cysts, and apocrine gland cysts), and dermoid cysts [7]. These two entities are different because dermoid cysts comprise not only epithelial linings but also skin appendages including hair, nails, and glands. Among the cysts in pediatrics, dermoid cysts are the most common, accounting for nearly half of children's orbital neoplasms and 89% of all cystic lesions [7, 8]. Common locations of



Fig. 1. A 6-year-old girl presented with left lower eyelid swelling. A 5 × 10 mm translucent mass was seen at the left inferior fornix when the lower eyelid had everted.

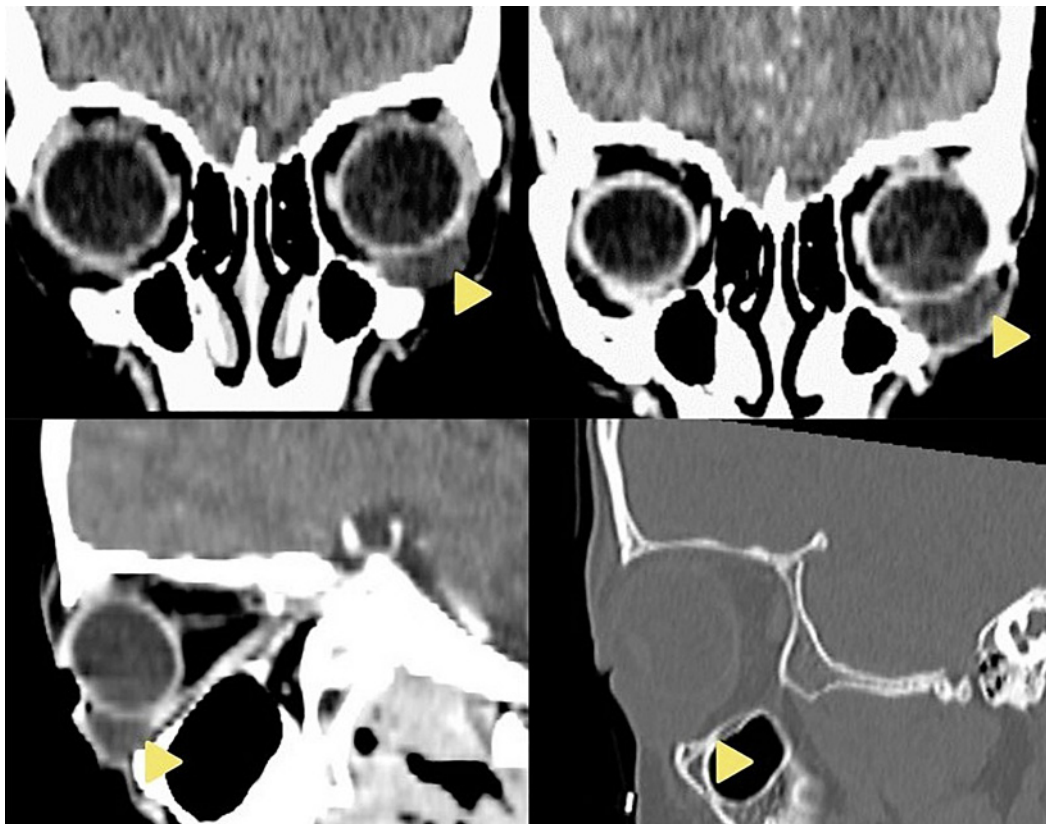


Fig. 2. Orbital CT (upper row from left to right: non-contrast, coronal view, venous phase coronal view, lower row from left to right, venous phase sagittal view, sagittal view bone window) revealed a single well-defined, hypodensity lesion at post-septal space, abutting inferior of the left globe without contrast enhancement. No bony remodeling or destruction was found.

orbital dermoid cysts are superotemporal quadrant; on the contrary, conjunctivae are not a common location, only 5% reported in the series of orbital dermoid [9, 10]. The most common cystic lesion of conjunctivae is the epithelial cyst [11]. The translucent cyst lined by non-keratinized stratified squamous or cuboidal epithelium without dermal appendages, usually located at the inferior fornix [5–7]. However, the primary conjunctival epithelial cysts are not common, arising from abnormal separation of conjunctival epithelium during embryogenesis [12]. The secondary type is usually caused by ocular trauma or previous surgery [12]. The severe disfigurement of the face and eyes could be found in orbital teratomatous cysts and

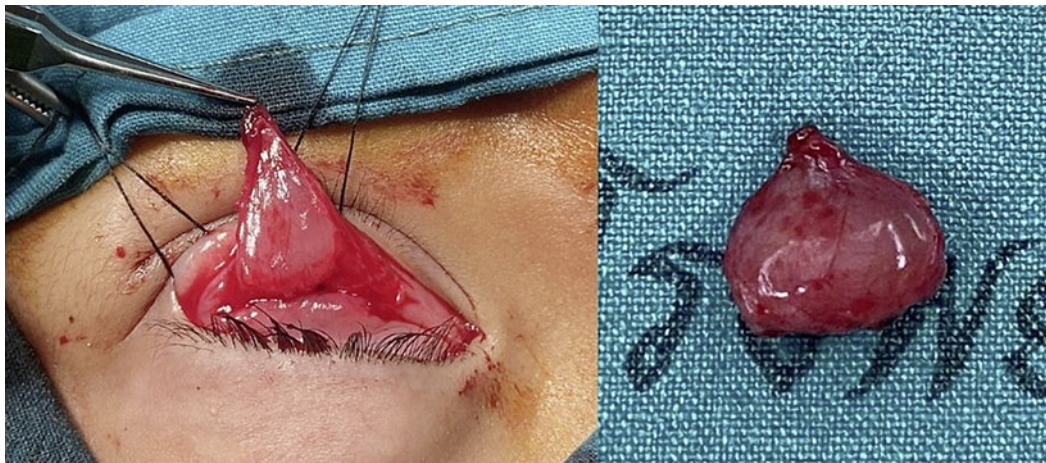


Fig. 3. Intraoperative findings show a cystic lesion located in sub-tenon space, extending to the anterior orbit. The lesion was removed without rupturing the cyst wall, size 10 × 8 × 3 mm.

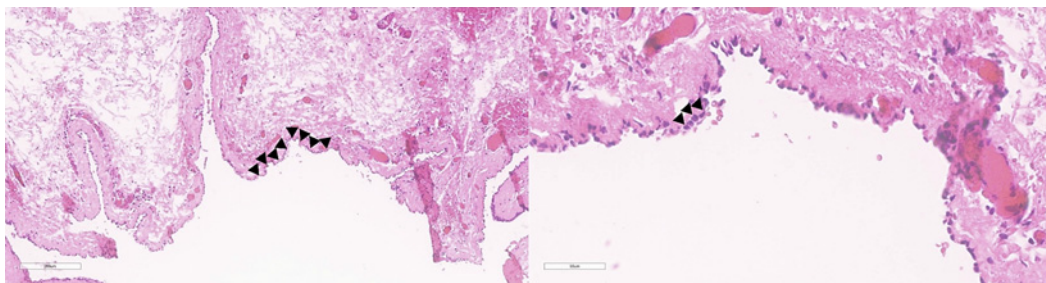


Fig. 4. Hematoxylin and eosin staining 10× (left) shows cyst channels, lined by endothelium without intraluminal cells, consistent with simple lymphatic malformation. 40× (right) shows endothelial cells lining.

neural cysts. These 2 entities could be ruled out from the differential diagnosis. Orbital parasitic cysts are a rare condition, often found in children and young adults who live in endemic areas of cysticercosis and echinococcosis. Without tissue pathological findings, orbital parasitic cysts are difficult to distinguish from other types of cysts [7]. Radiological findings provide more information about the details and location of the cysts. Secondary cysts from adjacent structures such as mucocoele and dentigerous cysts could be identified after orbital imaging [7]. Lastly, non-cystic lesions with cystic components are the groups of lesions consisting of both benign such as lymphatic malformation, orbital varix, optic glioma, and malignant such as adenocarcinoma of lacrimal glands, rhabdomyosarcoma [7].

Clinical findings in this case have been presented since preschool age without any aggravated by upper respiratory tract infection which is not common presenting symptoms of lymphatic malformation. The colorless translucency cyst could be found in primary conjunctival epithelial cysts, conjunctival dermoid cysts, and epidermoid cysts. Orbital CT was done because of the shorter study time, compared to magnetic resonance imaging, sedation was not required, for evaluating the extension of the lesion and bone changes before surgery. On radiological findings, hypodensity mass emphasized the differential diagnosis from clinical examination, nonseptate single cystic lesion. Hounsfield unit range 14–17 is consistent with a cyst. Surprisingly, the definitive diagnosis from histopathological findings is a simple macrocystic lymphatic malformation.



Fig. 5. In a 1-year follow-up period, no recurrent mass was found. The inferior fornix is normal, with no symblepharon.

Lymphatic malformations, previously called lymphangioma are the benign hamartoma of the lymphatic system, containing disconnected, dilated lymphatic channels filled with lymph [1, 13]. Head and neck are reported as common locations of this disease entity. Simple lymphatic malformations and combined lymphatic-venous malformations are accounted for 1–4% of all orbital lesions [13]. Currently, there is no data on the incidence of simple orbital lymphatic malformation. Due to inaccurate and controversial terms of vascular anomalies, the International Society for the Study of Vascular Anomalies (ISSVA) classification was established by combining histopathological, radiological, genetic, and molecular aspects of these anomalies [14]. This classification has been applied in this article owing to more understanding of vascular anomalies between multidisciplinary teams.

Because lymphatic channels and venous system share the same anatomical location and mesodermal origin, combined lymphatic-venous malformations usually occur more than simple lymphatic malformation. Lymphatic endothelium is differentiated from venous endothelium. Later, lymphovenous valves are formed by the lymphatic endothelial cells to separate the lymphatic system from the venous system [15, 16]. Error in sequestration had been believed to be the pathophysiology of this lesion which was influenced by the incomplete maturation of PROX1 positive endothelial cells or abnormal migration of PROX1 positive endothelial cells to abnormal site. A new concept of the pathogenesis of lymphatic malformation has been established, the somatic mutation. The histopathological evidence shows that positive somatic mutation cells are found only in the affected area.

Various treatment options for lymphatic malformation are reported, including observation, medical treatment, sclerotherapy, and surgical excision. Spontaneous regression of macrocystic lymphatic malformations has been reported [17, 18]. Numerous systemic medicines are described as efficacious treatments for lymphatic malformations such as sirolimus and sildenafil. Few case series and case reports show that complete resolution has occurred only in microcystic lymphatic malformation [19]. Sclerotherapy is performed by injection of sclerosing agent into lesions, aiming to create inflammation and scar within the cyst to reduce size. A systematic review of interventions for orbital lymphangioma revealed only 2 prospective interventional studies. One reported 51% radiological complete resolution in macrocystic lymphatic malformation after sclerotherapy by sodium tetradecyl sulfate injection, another showed 92% of patients who underwent sclerotherapy by bleomycin injections had lesion size reduction of more than 60% in greatest diameter [20]. The total excision is ideally the lowest recurrent rate; in the real world, recurrence has been seen in 71.4% in a mean follow-up time of 7.2 years [21]. The reason is the difficulty of the complete excision due to their infiltrative nature. Many considerations are required when choosing the

appropriate treatments for lymphatic malformations. First, anatomical location is crucial for the plan of management. If the lesions are in the posterior of the orbit or adjacent to vital structures, they would be challenging to reach to the lesion and vulnerable to visual morbidities. On the other hand, located in the anterior orbit is easier to approach the lesions. Second, types of lymphatic malformations, macrocystic or microcystic lesions, microcystic lesions are more difficult for sclerotherapy and surgical treatment, but they have good responses to sirolimus [20]. Third, symptoms and signs, if the lesions do not cause visual disturbance, diplopia, or severe proptosis, observation can be a good choice. In this case, complete excision is done because the conjunctival cyst has been the clinical diagnosis. The location of the cyst is in the anterior orbit and undemanding to approach without causing ocular complications. Total lymphatic malformation removal would give a favorable outcome which is the lowest rate of recurrence [21]. Pathological findings confirm a diagnosis of simple lymphatic malformation, a large single endothelial lining without intraluminal cells.

This case report shows the favorable outcome of complete excision of lymphatic malformation without causing complications; however, there are not many of the lesions could be excised. Clinical manifestation of the simple lymphatic malformation could be mimicking the conjunctival cyst. The limitation of this case report is a retrospective recall from parents about the details of the first cyst aspiration, and how the procedure had been done when it has recurred because it had been performed at another hospital. Further genetic pathological study would give a better understanding of the pathogenesis of the lymphatic malformations. The CARE Checklist has been completed by the authors for this case report, is attached as online supplementary Material (for all online suppl. material, see <https://doi.org/10.1159/000540126>).

Summary

Orbital lymphatic malformation could be presented as a nonseptate cystic lesion mimicking a single conjunctival cystic lesion. Complete excision is recommended for the macrocystic lymphatic malformations located in the anterior orbit. A pathological study should be done to confirm the diagnosis.

Acknowledgments

The authors would like to thank Chingchai Methaphat for proofreading the article.

Statement of Ethics

This study was reviewed and approved by Burapha University Institutional Review Board (BUU-IRB), HS032/2566. Written informed consent was obtained from the participant and her parent for publication of the details of her medical case and accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

Sasikant Leelawongs, MD: conceptualization, data curation, methodology, writing – original draft, and writing – review and editing and Luksanaporn Krungkraipetch, MD: supervision.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material. Further, inquiries can be directed to the corresponding author.

References

- 1 Boon LM, Vikkula M. In: Wolff K, Goldsmith LA, Katz LI, Gilchrist BA, Paller AS, Leffell DJ, editors. Fitzpatrick's Dermatology in general medicine. 2008. Vascular anomalies. 7th ed. New York, NY, USA: McGraw-Hill Professional Publishing. p. 1651–66.
- 2 Wiegand S, Eivazi B, Bloch LM, Zimmermann AP, Sesterhenn AM, Schulze S, et al. Lymphatic malformations of the orbit. Clin Exp Otorhinolaryngol. 2013;6(1):30–5. <https://doi.org/10.3342/ceo.2013.6.1.30>
- 3 Mishra A, Alsawidi K, Abuhajar R, Ehtuish EF. Orbital venous-lymphatic malformation: role of imaging. Oman J Ophthalmol. 2009;2(3):141–2. <https://doi.org/10.4103/0974-620X.57316>
- 4 Rootman DB, Diniz SB, Cohen LM. Clinical assessment and lesion-specific management of orbital vascular malformations. J Neurol Surg B Skull Base. 2021;82(1):116–28. <https://doi.org/10.1055/s-0040-1722702>
- 5 Castillo BV Jr, Kaufman L. Pediatric tumors of the eye and orbit. Pediatr Clin North Am. 2003;50(1):149–72. [https://doi.org/10.1016/s0031-3955\(02\)00115-3](https://doi.org/10.1016/s0031-3955(02)00115-3)
- 6 Świerczyńska M, Filipiek E. Benign tumors of the orbit in children and adolescents: clinical and histopathological analysis. Klin Oczna. 2021;123(2):85–9. <https://doi.org/10.5114/ko.2021.105632>
- 7 Shields JA, Shields CL. Orbital cysts of childhood: classification, clinical features, and management. Surv Ophthalmol. 2004;49(3):281–99. <https://doi.org/10.1016/j.survophthal.2004.02.001>
- 8 Cavazza S, Laffi GL, Lodi L, Gasparrini TG, Tassinari G. Orbital dermoid cyst of childhood: clinical pathologic findings, classification and management. Int Ophthalmol. 2011;31(2):93–7. <https://doi.org/10.1007/s10792-011-9419-y>
- 9 Shields JA, Kaden IH, Eagle RC Jr, Shields CL. Orbital dermoid cysts: clinicopathologic correlations, classification, and management. The 1997 Josephine E. Schueler Lecture. Ophthalmic Plast Reconstr Surg. 1997;13(4):265–76. <https://doi.org/10.1097/00002341-199712000-00007>
- 10 Shields JA, Bakewell B, Augsburger JJ, Donoso LA, Bernardino V. Space-occupying orbital masses in children: a review of 250 consecutive biopsies. Ophthalmology. 1986;93(3):379–84. [https://doi.org/10.1016/s0161-6420\(86\)33731-x](https://doi.org/10.1016/s0161-6420(86)33731-x)
- 11 Panda A, Arora R, Mohan M. Cystic lesions of conjunctiva. Ann Ophthalmol. 1987;19(2):60–2.
- 12 Robb RM, Elliott AT, Robson CD. Developmental conjunctival cyst of the eyelid in a child. J AAPOS. 2012;16(2):196–8. <https://doi.org/10.1016/j.jaapos.2012.02.001>
- 13 Wilde C, Vahdani K, Thaug C, Rose GE. Presenting features for developmental cysts of the orbit. Eye. 2023;37(2):309–12. <https://doi.org/10.1038/s41433-022-01929-3>
- 14 ISSVA classification. Available from: <https://www.issva.org/classification> (accessed on January 7, 2022).
- 15 Elluru RG, Balakrishnan K, Padua HM. Lymphatic malformations: diagnosis and management. Semin Pediatr Surg. 2014;23(4):178–85. <https://doi.org/10.1053/j.sempedsurg.2014.07.002>
- 16 Boscolo E, Coma S, Luks VL, Greene AK, Klagsbrun M, Warman ML, et al. AKT hyper-phosphorylation associated with PI3K mutations in lymphatic endothelial cells from a patient with lymphatic malformation. Angiogenesis. 2015;18(2):151–62. <https://doi.org/10.1007/s10456-014-9453-2>
- 17 Phang MJ, Courtemanche DJ, Bucevska M, Malic C, Arneja JS. Spontaneously resolved macrocystic lymphatic malformations: predictive variables and outcomes. Plast Surg. 2017;25(1):27–31. <https://doi.org/10.1177/2292550317693815>

- 18 Kato M, Watanabe S, Kato R, Kawashima H, Iida T, Watanabe A. Spontaneous regression of lymphangiomas in a single center over 34 years. *Plast Reconstr Surg Glob Open*. 2017;5(9):e1501. <https://doi.org/10.1097/GOX.0000000000001501>
- 19 Shoji MK, Shishido S, Freitag SK. The use of sirolimus for treatment of orbital lymphatic malformations: a systematic review. *Ophthalmic Plast Reconstr Surg*. 2020;36(3):215–21. <https://doi.org/10.1097/IOP.0000000000001518>
- 20 Patel SR, Rosenberg JB, Barmettler A. Interventions for orbital lymphangioma. *Cochrane Database Syst Rev*. 2019;5(5):CD013000. <https://doi.org/10.1002/14651858.CD013000.pub2>
- 21 Russin JJ, Rangel-Castilla L, Kalani MY, Spetzler RF. Surgical management, outcomes, and recurrence rate of orbital lymphangiomas. *J Clin Neurosci*. 2015;22(5):877–82. <https://doi.org/10.1016/j.jocn.2014.11.002>