

Eyelid Pilomatrixomas: A Case Report and Comprehensive Literature Review

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Abstract

Pilomatrixomas are rare, benign tumors of the hair follicle that can be found all over the body and, rarely, the eyelid. Despite their benign nature, pilomatrixomas can be misdiagnosed due to their similarity to other eyelid conditions. Diagnosis can be challenging and requires a combination of clinical skills, imaging studies, and histopathology. As a result, a comprehensive understanding of their presentation and management strategies is essential for healthcare providers. Herein, the unusual case of a 13-year-old female patient with a rapidly progressive eyelid pilomatrixoma is presented. A comprehensive review of the current literature regarding eyelid pilomatrixomas was performed. This literature review aims to synthesize existing research and case studies related to pilomatrixomas of the eyelid, focusing on their etiology, differential diagnosis, treatment options, and potential complications.

Categories: Dermatology, Ophthalmology, Oncology

Keywords: case report, eyelid pilomatrixoma, eyelid tumor, pathology of pilomatrixoma, pilomatrixoma, systematic literature review

Introduction

Eyelid masses are common in the pediatric population. The differential is broad and might include chalazion, dermoid cyst, vascular malformation, lipoma, fibroma, xanthogranuloma, and even malignant lesions, including rhabdomyosarcoma [1-4]. These pathologies can be difficult to differentiate clinically and often require a combination of clinical exam findings, imaging, and pathology to acquire a definitive diagnosis [5].

Pilomatrixomas are rare, benign tumors of the hair follicle that account for approximately 0.5-1% of all eyelid lesions [1,6]. These tumors are believed to occur secondary to localized mutations in hair matrix cells, and are typically secondary to spontaneous mutations [5]. Approximately 75% of cases are linked to mutations in CTNNB1, a regulator of the β -catenin/TEF-1 complex, which promotes cellular proliferation [7,8]. Unlike typical hair matrix cells, matrical cells in pilomatrixomas fail to properly form into the hair shaft [9]. Rarely, patients with multiple pilomatrixomas have a genetic syndrome such as Gardner syndrome, myotonic dystrophy, or Rubinstein-Taybi syndrome [10]. Most patients will present with a firm, mobile, and painless subcentimeter subcutaneous lesion of the head or neck. The overlying skin may be unchanged, erythematous, or blue in color [11]. Imaging with ultrasound (US) or CT shows a well-defined hyperechoic or calcific nodule [12]. Currently, there are few retrospective studies and many case reports evaluating eyelid pilomatrixomas. However, there is no comprehensive literature review and overall analysis of this pathology.

This paper includes a discussion of the case of a 13-year-old female patient with a presentation that was initially concerning for a rhabdomyosarcoma based on imaging but was ultimately confirmed to be a pilomatrixoma. It also includes a comprehensive literature review of the available literature regarding eyelid pilomatrixomas.

Despite their benign nature, pilomatrixomas can be misdiagnosed due to their similarity to other eyelid conditions. As a result, a comprehensive understanding of their clinical presentation, histopathology, and management strategies is essential for healthcare providers. This literature review aims to synthesize existing research and case studies related to pilomatrixomas of the eyelid, focusing on their etiology, diagnosis, treatment options, and potential complications. By doing so, it seeks to enhance awareness and improve clinical practices surrounding this unique cutaneous tumor, ultimately promoting better patient outcomes in managing eyelid lesions.

Case Presentation

A 13-year-old female patient with a history of multiple lipomas on her back and arms but no other past medical history presented to the emergency department for a two-month history of left upper eyelid

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swelling. She had no family history of cancers or tumors. The patient had no other systemic abnormalities, and her labs were all normal. The lesion had grown rapidly in recent days, and her eyelid became red and painful. She had pain with supraduction but denied vision changes or diplopia. On exam, her visual acuity was 20/20 in both eyes, intraocular pressure was normal, and supraduction was limited in both eyes, likely secondary to pain. She had left upper eyelid ptosis and a large, well-circumscribed, subcutaneous mass extending from her eyebrow to the eyelid crease that was firm and tender to palpation. The external photograph of the lesion is shown in Figure 1.



FIGURE 1: External photograph of the eyelid lesion

The patient's fundus exam was normal. Magnetic resonance imaging (MRI) of the brain and orbit with contrast showed a 2.5-cm enhancing upper eyelid tumor just anterior to the superior orbital rim, which appeared to originate from the frontalis muscle and was read as concerning for rhabdomyosarcoma (Figure 2).



FIGURE 2: An axial T1 fat-saturated MRI of the orbit showing a large heterogeneous mass on the left eyelid

MRI: magnetic resonance imaging

After discussing with oncology the patient was taken to the OR urgently for an incisional biopsy. During surgery, the mass was poorly adherent to the surrounding tissue and easily removed completely using gentle, blunt dissection. The gross specimen showed soft, white grains of calcification throughout the lesion (Figure 3).

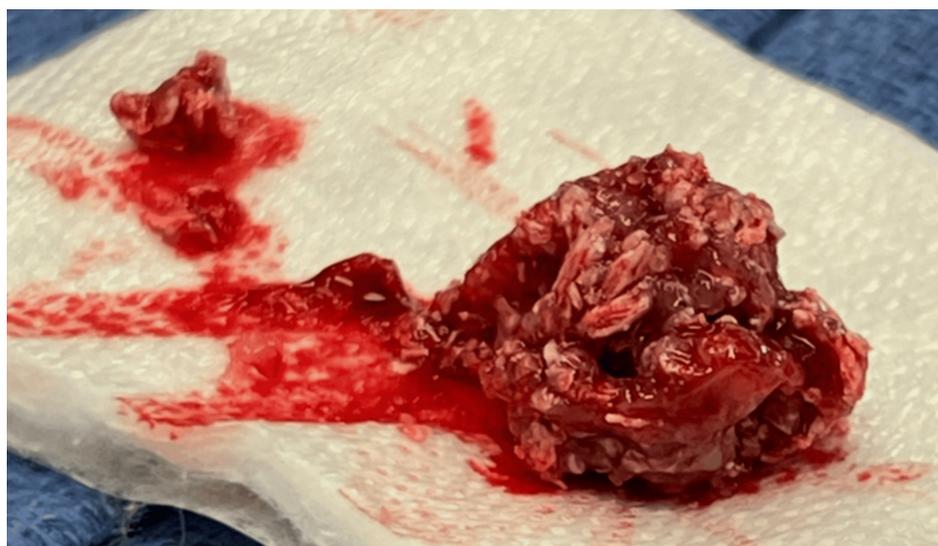


FIGURE 3: Gross specimen of the mass of the left upper eyelid

Histopathological analysis revealed basaloid areas, focal calcifications, inflammation with foreign body giant cell reactions, and shadow (ghost) cells, consistent with pilomatrixoma (Figure 4).

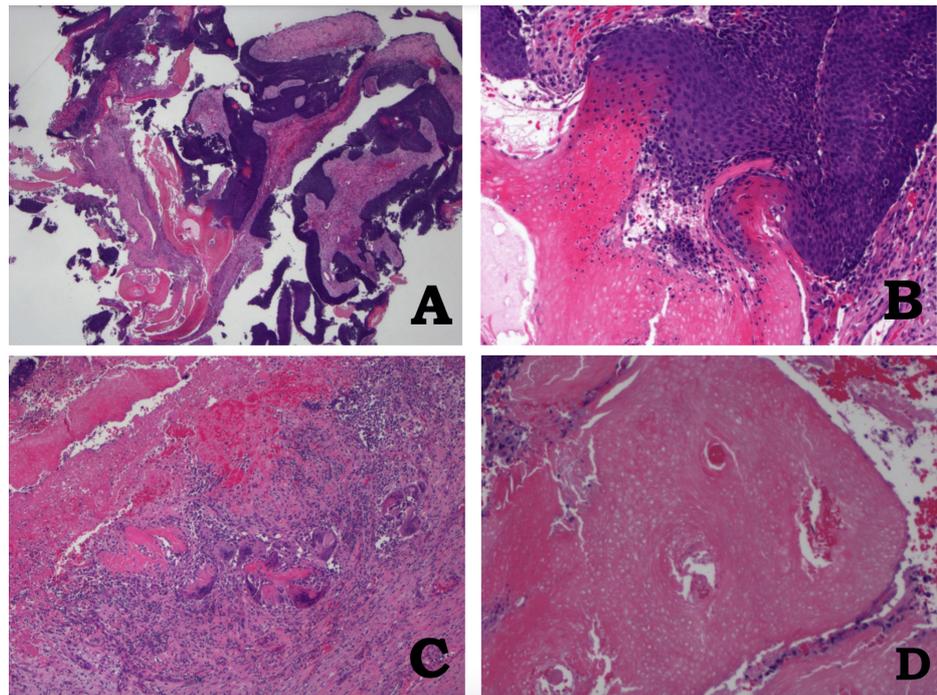


FIGURE 4: Pathology photographs of a lesion on the left upper eyelid. (A) Low magnification, panoramic view of the lesion, showing basaloid cells, eosinophilic cells (ghosts or shadow cells), and stromal fibrosis (H&E, 12.5 \times). (B) Basaloid cells (upper right) gradually or abruptly merged with keratinizing eosinophilic cells (also known as ghosts or shadow cells, lower left) (H&E, 100 \times). (C) Stroma with chronic granulomatous inflammation; foreign-body multinucleated giant cell reaction to keratin is seen (H&E, 40 \times). (D) Higher magnification of eosinophilic cells. The basaloid cells have become shadow/ghost cells, without nuclei (H&E, 100 \times)

H&E: hematoxylin and eosin

After the resection, erythromycin ointment was prescribed four times a day over the lesion for 10 days. The incision site healed well with no complications. The patient did not require further treatment, and no recurrence was identified after six months.

Discussion

Methods

A comprehensive literature search was conducted using electronic databases, including PubMed, Google Scholar, Ovid, and the Loma Linda electronic library. The search terms included "pilomatrixoma", "eyelid pilomatrixoma", and "eyelid tumors". The search was limited to articles published in the English language or formally translated into English and focused primarily on studies from the last two decades (2000-2024) to ensure current relevance. However, four studies were included from the late 1900s. Thirty-eight articles regarding pilomatrixomas of the eyelid were reviewed. Two articles were excluded from the study because we could not access the full articles, which included patient demographic information. Studies that did not clearly specify the location of the pilomatrixoma as being in the eyelid were excluded. Relevant data were extracted from the selected articles, including authorship, year of publication, study design, sample size, demographic information of patients, clinical characteristics, diagnostic modalities, treatment approaches, and reported outcomes. These data were systematically organized to facilitate comparative analysis.

Literature review

In this study, 36 case reports [2,4,9,11,13-36], series [37-39], and retrospective studies [1,5,40-43] were reviewed, which include a total of 232 patients diagnosed with pilomatrixoma of the eyelid. These studies included 28 case reports, two case series, and six retrospective studies. They most commonly occur on the head and neck, with only about 11%-17% occurring in the periorbital region [12,15]. They occurred most commonly in the first decade of life but can occur at any age (Figure 5).

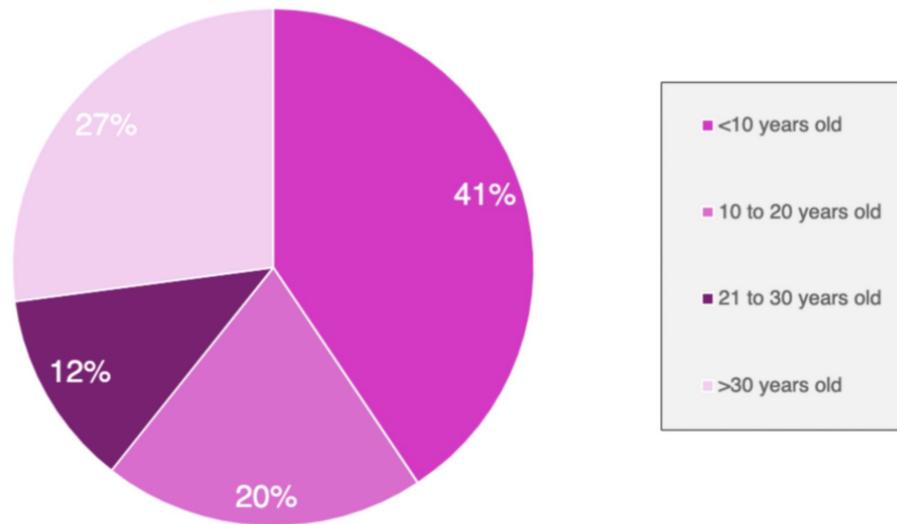


FIGURE 5: Age of patients with pilomatrixoma in percentiles recorded in the literature

Pilomatrixomas were more likely to occur in women (120/198) than in men (78/198). Not every author recorded gender; it was only recorded in 198 cases. The gender distributions of the recorded patients with pilomatrixoma are shown in Figure 6.

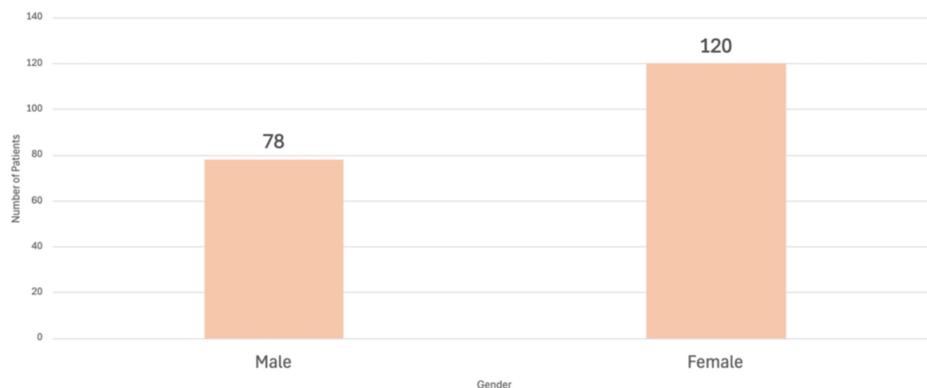


FIGURE 6: Gender of patients with eyelid pilomatrixomas recorded in the literature

Most tumors were 5-10 mm measured as the largest diameter, and only 13 of the tumors were found to be greater than or equal to 2 centimeters in diameter. Rajabi et al. recorded the largest tumor as 7 cm × 10 cm [16]. A graph of the largest diameter of the pilomatrixoma reported in the literature is shown in Figure 7. One hundred twenty-nine patients in the literature had measurements of the tumor recorded.

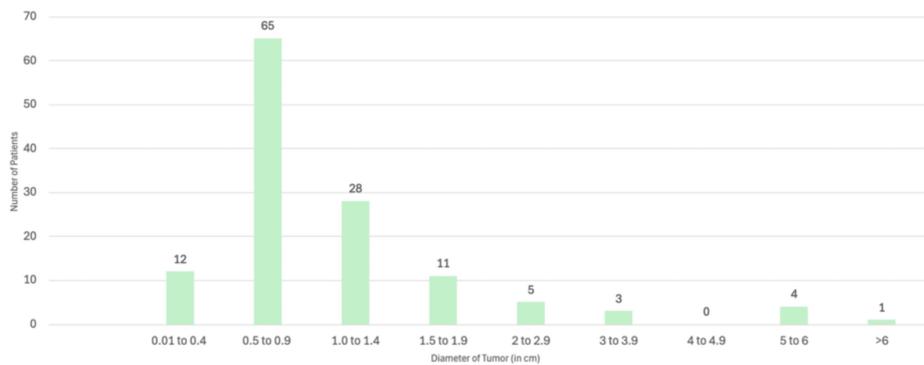


FIGURE 7: Graph showing the sizes of eyelid pilomatixomas using the largest diameter of the tumor recorded in the literature

A common theme among different authors was the difficulty of correctly diagnosing pilomatixoma clinically. In all the papers that discussed a preoperative differential diagnosis, only 17.1% of the time did the initial evaluating clinician include pilomatixoma in the differential or presumptive diagnosis before obtaining pathology results.

The most common location for the periorbital tumor was the upper eyelid or eyebrow, with 73%-81% of the cases of pilomatixoma reported in the literature found on the upper eyelid or brow [40,43]. This is likely due to the presence of more hair follicles in that area [5].

Interpretation

Pilomatixomas are rare, benign tumors of the hair matrix cells, with an estimated prevalence of 1% of all benign skin lesions [1]. There are currently no published guidelines on the workup of a pilomatixoma. The clinical case described above is a great example of the typical presentation of an eyelid pilomatixoma. It occurred in a female, which is the more common gender for presentation. It occurred in her second decade of life, which is slightly older than the average presentation. It occurred right below her eyebrow, which is the most common location for eyelid pilomatixomas. The most unusual aspect of the above presentation is the size of the lesion, which was much larger than the average.

The eyelid lesion described above was initially concerning for a different diagnosis, which is quite common for this lesion. The difficulty in diagnosis occurs for several reasons. First, it is infrequently suspected due to the rarity of the lesion. Second, a pilomatixoma can masquerade as several other more common lesions, including chalazions, cysts, and other tumors.

Clinical findings may result in a diagnosis, particularly for a classic presentation in a typical location. However, the clinical picture is not always enough. Other modalities utilized when the clinical picture is not straightforward include US, fine needle aspiration (FNA), CT, positron-emission tomography, MRI, and biopsy. These methods have variable efficacy rates in diagnosing a pilomatixoma. According to Lim et al., US resulted in a diagnosis 76% of the time [12]. Generally, on US, the pilomatixoma is described as an ovoid, well-defined, heterogeneous, hyperechoic subcutaneous mass with or without posterior shadowing [12]. Typical CT imaging findings of pilomatixoma will show a well-circumscribed mass with calcifications present [7,12]. Han et al. reported that FNA with cytology resulted in a diagnosis 71% of the time. However, this modality commonly misdiagnosed findings for carcinoma [44]. Frequently, the diagnosis relies on biopsy. Siadati et al. describe the pathological features of eyelid pilomatixoma. Pathology will show a well-circumscribed multilobular lesion, occasionally with a pseudocapsule. The lesion is biphasic. In the periphery, there are basophilic matrical cells with large nuclei. More centrally, the matrical cells lose their nuclei, and the cytoplasm becomes eosinophilic. At this point, the matrical cells have transitioned into "shadow cells," which are a key feature of pilomatixomas [1]. The body mounts a reaction to these shadow cells, often resulting in giant cells within the lesion. Calcification and ossification are also common [5]. The differentiation between aggressive pilomatixomas and the malignant form, pilomatix carcinoma, can be difficult; however, pathology typically shows greater anaplasia and an infiltrating border [45,46].

The treatment for the vast majority of cases in this review was complete excision. Recurrence rates after excision are low at approximately 2% [47]. According to Jones et al.'s review of pilomatixomas, recurrence can occur any time from months to decades later [48]. Thus, actual recurrence rate may be higher due to inadequate follow-up period. Rarely, recurrence may be a sign of malignant transformation [47].

Due to the rarity of this tumor, no large retrospective studies have been published to date, with the largest study including only 77 patients [40]. Only one other study had a sample size larger than 20 [41]. Limitations

to this review include potential publication bias due to only the unusual presentations of eyelid pilomatrixomas being published and inherent variability in reporting across different studies.

Conclusions

Pilomatrixomas are a rare cause of eyelid lesions. They commonly occur within the first decade of life and are more common in women. They are typically small, well-circumscribed, slow-growing masses found most commonly on the upper eyelid or brow. Pilomatrixomas of the eyelid are difficult to diagnose, particularly when the presentation is atypical, and the diagnosis of pilomatrixoma is often overlooked due to its rarity. It is important to consider pilomatrixoma in the differential diagnosis of eyelid lesions and masses. Treatment consists of complete surgical excision. Although uncommon, recurrence is the most common complication. Future research might include further investigating risk factors, pathogenesis, and more long-term analysis of recurrence rates following excision.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Georgia L. Schafer, Katie Topping

Acquisition, analysis, or interpretation of data: Georgia L. Schafer, Krista Thompson

Drafting of the manuscript: Georgia L. Schafer, Krista Thompson

Critical review of the manuscript for important intellectual content: Georgia L. Schafer, Katie Topping

Supervision: Katie Topping

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References

1. Siadati S, Campbell AA, McCulley T, Eberhart CG: Clinicopathological features of 19 eyelid pilomatrixomas. *Ocul Oncol Pathol.* 2022, 8:30-4. [10.1159/000520219](https://doi.org/10.1159/000520219)
2. Seitz B, Holbach LM, Naumann GO: Pilomatrixoma of the eyelids--clinical differential diagnosis and follow-up. Report of 17 patients. [Article in German]. *Ophthalmologe.* 1993, 90:746-9.
3. Sharifi M: Embryonal rhabdomyosarcoma of upper lid in 15-year-old patient. *Case Rep Ophthalmol Med.* 2014, 2014:157053. [10.1155/2014/157053](https://doi.org/10.1155/2014/157053)
4. Alturkistany W, Alrajeh M, Alsheikh O: A rapidly growing pedunculated pilomatrixoma of the eyelid. *Oman J Ophthalmol.* 2023, 16:136-8. [10.4103/ojo.ojo_79_22](https://doi.org/10.4103/ojo.ojo_79_22)
5. Levy J, Ilsar M, Deckel Y, Maly A, Anteby I, Pe'er J: Eyelid pilomatrixoma: a description of 16 cases and a review of the literature. *Surv Ophthalmol.* 2008, 53:526-35. [10.1016/j.survophthal.2008.06.007](https://doi.org/10.1016/j.survophthal.2008.06.007)
6. Huang YY, Liang WY, Tsai CC, Kao SC, Yu WK, Kau HC, Liu CJ: Comparison of the clinical characteristics and outcome of benign and malignant eyelid tumors: an analysis of 4521 eyelid tumors in a tertiary medical center. *Biomed Res Int.* 2015, 2015:453091. [10.1155/2015/453091](https://doi.org/10.1155/2015/453091)
7. Sharma B, Xu X, Xu N, Bajracharya M, Gupta M, Yuan Q: Imaging features of eyelid pilomatrixoma. *Adv Comput Tomogr.* 2014, 3:15-7. [10.4236/act.2014.32003](https://doi.org/10.4236/act.2014.32003)
8. Pilomatrixoma (pilomatricoma). (2024). Accessed: March 18, 2025: <https://emedicine.medscape.com/article/1058965-overview?form=fpf>.
9. Charles NC, Kim ET: Ossifying pilomatrixoma of the eyelid. *Ophthalmic Plast Reconstr Surg.* 2020, 36:e147-9. [10.1097/IOP.0000000000001674](https://doi.org/10.1097/IOP.0000000000001674)
10. Pilomatricoma. (2012). Accessed: May 11, 2025: <https://medlineplus.gov/download/genetics/condition/pilomatricoma.pdf>.
11. Rosa N, Lanza M, Cennamo G, Accardo M: Pilomatrixoma of the eyelid. *J Dermatol Case Rep.* 2008, 2:21-3.
12. Lim HW, Im SA, Lim GY, et al.: Pilomatricomas in children: imaging characteristics with pathologic

- correlation. *Pediatr Radiol*. 2007, 37:549-55. [10.1007/s00247-007-0461-x](https://doi.org/10.1007/s00247-007-0461-x)
13. Shields JA, Shields CL, Eagle RC Jr, Mulvey L: Pilomatrixoma of the eyelid. *J Pediatr Ophthalmol Strabismus*. 1995, 32:260-1. [10.3928/0191-3913-19950701-15](https://doi.org/10.3928/0191-3913-19950701-15)
 14. Park J, Jeon H, Choi HY: Pilomatrixoma of the upper eyelid in a 10-month-old baby. *Int J Ophthalmol*. 2019, 12:1510-3. [10.18240/ijo.2019.09.23](https://doi.org/10.18240/ijo.2019.09.23)
 15. Hada M, Meel R, Kashyap S, Jose C: Eyelid pilomatrixoma masquerading as chalazion. *Can J Ophthalmol*. 2017, 52:e62-4. [10.1016/j.jcjo.2016.08.020](https://doi.org/10.1016/j.jcjo.2016.08.020)
 16. Rajabi MT, Aghajani A, Raffizadeh SM, Zand A, Nozarian Z, Mahmoudi F, Heidari M: Atypical and giant proliferating pilomatrixoma of the eyelid: a clinicopathological report. *BMC Ophthalmol*. 2024, 24:477. [10.1186/s12886-024-03748-4](https://doi.org/10.1186/s12886-024-03748-4)
 17. Yalcin NG, Mann N: Rare case of pilomatrixoma of the lower eyelid following blunt trauma. *ANZ J Surg*. 2019, 89:E390-1. [10.1111/ans.14566](https://doi.org/10.1111/ans.14566)
 18. Passi N, Chawala U, Jyoti A, Khurana AK: Pilomatrixoma of eyelid in a middle aged. *Nepal J Ophthalmol*. 2011, 3:88-90. [10.3126/nepjoph.v3i1.4286](https://doi.org/10.3126/nepjoph.v3i1.4286)
 19. Lloyd M, Eagle RC, Wasserman BN: Pilomatrixoma masquerading as giant chalazion. *Ophthalmology*. 2018, 125:1936. [10.1016/j.ophtha.2018.09.012](https://doi.org/10.1016/j.ophtha.2018.09.012)
 20. Falzon K, Kalantzis G, Chang B, Cullinane C, Long V: Rapidly enlarging eyelid mass. *J Pediatr*. 2014, 164:937-8. [10.1016/j.jpeds.2013.12.002](https://doi.org/10.1016/j.jpeds.2013.12.002)
 21. Rizvi SA, Naim M, Alam MS: A giant upper eyelid ossifying pilomatrixoma. *Indian J Ophthalmol*. 2008, 56:509-11. [10.4103/0301-4738.43377](https://doi.org/10.4103/0301-4738.43377)
 22. Katowitz WR, Shields CL, Shields JA, Eagle RC Jr, Mulvey LD: Pilomatrixoma of the eyelid simulating a chalazion. *J Pediatr Ophthalmol Strabismus*. 2003, 40:247-8. [10.3928/0191-3913-20030701-18](https://doi.org/10.3928/0191-3913-20030701-18)
 23. Alkatan HM, Alhothali W, Alnuhayer O, Alessa D: Pilomatrixoma in a child mimicking a ruptured epidermal cyst clinically and histopathologically: case report. *Int J Surg Case Rep*. 2021, 84:106068. [10.1016/j.ijscr.2021.106068](https://doi.org/10.1016/j.ijscr.2021.106068)
 24. Okuyama Y, Kasai K, Shimazaki J: Periorbital pilomatrixoma: a report of a case difficult to diagnose. *Nippon Ganka Gakkai Zasshi*. 2016, 120:791-6.
 25. Huerva V, Sanchez MC, Asenjo J: Large, rapidly growing pilomatrixoma of the upper eyelid. *Ophthalmic Plast Reconstr Surg*. 2006, 22:401-3. [10.1097/01.iop.0000235816.50701.ba](https://doi.org/10.1097/01.iop.0000235816.50701.ba)
 26. Mathen LC, Olver JM, Cree IA: A large rapidly growing pilomatrixoma on a lower eyelid. *Br J Ophthalmol*. 2000, 84:1203-4. [10.1136/bjo.84.10.1203a](https://doi.org/10.1136/bjo.84.10.1203a)
 27. Perez RC, Nicholson DH: Malherbe's calcifying epithelioma (pilomatrixoma) of the eyelid clinical features. *Arch Ophthalmol*. 1979, 97:314-5. [10.1001/archophth.1979.01020010160015](https://doi.org/10.1001/archophth.1979.01020010160015)
 28. O'Grady RB, Spoerl G: Pilomatrixoma (benign calcifying epithelioma of Malherbe). *Ophthalmology*. 1981, 88:1196-7. [10.1016/s0161-6420\(81\)34873-8](https://doi.org/10.1016/s0161-6420(81)34873-8)
 29. Huang YY, Tsai CC: Rapid onset of eyebrow pilomatrixoma after blunt trauma. *Orbit*. 2015, 34:234-5. [10.3109/01676830.2015.1059141](https://doi.org/10.3109/01676830.2015.1059141)
 30. D'Hermies F, Berges O, Elmaleh C, Renard G, Pouliquen Y: Pilomatrixoma of the eyelid. Apropos of a case. [Article in French]. *J Fr Ophtalmol*. 1992, 15:157-60.
 31. de Azevedo ML, Milani JA, de Souza EC, Nemer RS: Pilomatrixoma. An unusual case with secondary corneal ulcer. *Arch Ophthalmol*. 1985, 103:553-4. [10.1001/archophth.1985.01050040095028](https://doi.org/10.1001/archophth.1985.01050040095028)
 32. Gündüz K, Ecel M, Erden E: Multiple pilomatrixomas affecting the eyelid and face. *J Pediatr Ophthalmol Strabismus*. 2008, 45:122-4. [10.3928/01913913-20080301-10](https://doi.org/10.3928/01913913-20080301-10)
 33. Izquierdo-Rodríguez C, Mencía-Gutiérrez E, Gutiérrez-Díaz E, Suárez-Gauthier A: An unusual presentation of a pilomatrixoma in the eyelid. [Article in Spanish]. *Arch Soc Esp Oftalmol*. 2006, 81:483-6. [10.4321/s0365-66912006000800010](https://doi.org/10.4321/s0365-66912006000800010)
 34. Gorovoy IR, Layer N, Kim HJ, Nobles SM, Stewart PJ, Vagefi MR, Kersten RC: Pilomatrixoma in a patient with bilateral retinoblastoma. *J AAPOS*. 2013, 17:103-4. [10.1016/j.jaapos.2012.09.010](https://doi.org/10.1016/j.jaapos.2012.09.010)
 35. Davies EC, Jakobiec FA, Stagner AM, Iwamoto MA: A rapidly enlarging recurrent eyebrow pilomatrixoma in a nonagenarian. *Ophthalmic Plast Reconstr Surg*. 2016, 32:e157-60. [10.1097/IOP.0000000000000355](https://doi.org/10.1097/IOP.0000000000000355)
 36. Niitsuma K, Kuwahara M, Yurugi S, Iioka H: Perforating pilomatrixoma on the upper eyelid. *J Craniofac Surg*. 2006, 17:372-3. [10.1097/00001665-200603000-00031](https://doi.org/10.1097/00001665-200603000-00031)
 37. Abalo-Lojo JM, Cameselle-Teijeiro J, Gonzalez F: Pilomatrixoma: late onset in two periocular cases. *Ophthalmic Plast Reconstr Surg*. 2008, 24:60-2. [10.1097/IOP.0b013e318160681d](https://doi.org/10.1097/IOP.0b013e318160681d)
 38. Marback EF, Cardoso C, Moitinho LM, Marback RL: Clinicopathologic study of eyelid pilomatrixoma: the experience of the "Hospital Universitário Prof. Edgard Santos". [Article in Portuguese]. *Arq Bras Oftalmol*. 2007, 70:501-3. [10.1590/s0004-27492007000300019](https://doi.org/10.1590/s0004-27492007000300019)
 39. Jang HS, Park JH, Kim MB, Kwon KS, Oh CK: Two cases of multiple giant pilomatrixoma. *J Dermatol*. 2000, 27:276-9. [10.1111/j.1346-8138.2000.tb02165.x](https://doi.org/10.1111/j.1346-8138.2000.tb02165.x)
 40. Sidhu AS, Allende A, Gal A, Tumuluri K: Pilomatrixoma of the periorbital region: a retrospective review. *Ophthalmic Plast Reconstr Surg*. 2025, 41:84-9. [10.1097/IOP.0000000000002731](https://doi.org/10.1097/IOP.0000000000002731)
 41. Zloto O, Fabian ID, Dai VV, Ben Simon GJ, Rosner M: Periocular pilomatrixoma: a retrospective analysis of 16 cases. *Ophthalmic Plast Reconstr Surg*. 2015, 31:19-22. [10.1097/IOP.0000000000000164](https://doi.org/10.1097/IOP.0000000000000164)
 42. Fu H, Shen C, Wu B, et al.: Clinical and pathological features of pilomatrixoma in children: a retrospective study. *Dermatology*. 2024, 240:543-52. [10.1159/000538802](https://doi.org/10.1159/000538802)
 43. Yap EY, Hohberger GG, Bartley GB: Pilomatrixoma of the eyelids and eyebrows in children and adolescents. *Ophthalmic Plast Reconstr Surg*. 1999, 15:185-9. [10.1097/00002341-199905000-00008](https://doi.org/10.1097/00002341-199905000-00008)
 44. Han K, Ha HJ, Kong JS, et al.: Importance of individual ghost cells in fine-needle aspiration cytology diagnosis of pilomatrixoma. *J Pathol Transl Med*. 2018, 52:45-50. [10.4132/jptm.2017.10.18](https://doi.org/10.4132/jptm.2017.10.18)
 45. Otero MN, Trujillo CP, Parra-Medina R, Morales SD: Metastatic malignant pilomatrixoma in an 8-year-old girl misdiagnosed as a recurrent pilomatrixoma. *Am J Dermatopathol*. 2017, 39:e41-3. [10.1097/DAD.0000000000000736](https://doi.org/10.1097/DAD.0000000000000736)
 46. Wang X, Ma JM, Wang N: Malignant pilomatrixoma in the upper eyelid. *BMJ Case Rep*. 2009, 2009:bcr07.2008.0410. [10.1136/bcr.07.2008.0410](https://doi.org/10.1136/bcr.07.2008.0410)

47. Hu JL, Yoo H, Kwon ST, et al.: Clinical analysis and review of literature on pilomatrixoma in pediatric patients. *Arch Craniofac Surg.* 2020, 21:288-93. [10.7181/acfs.2020.00528](https://doi.org/10.7181/acfs.2020.00528)
48. Jones CD, Ho W, Robertson BF, Gunn E, Morley S: Pilomatrixoma: a comprehensive review of the literature. *Am J Dermatopathol.* 2018, 40:631-41. [10.1097/DAD.0000000000001118](https://doi.org/10.1097/DAD.0000000000001118)