



Early Detection and Comprehensive Management of Ocular Hypertension Secondary to Blunt Trauma

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Abstract

Purpose: This case report discusses the early detection and comprehensive management of ocular hypertension (OHT) secondary to blunt trauma in a 28-year-old male.

Case Presentation: The patient experienced ocular pain, blurred vision, and elevated intraocular pressure (IOP) following a blunt trauma to the LE during a sports-related accident. An initial IOP reading of 31 mmHg was noted. A treatment plan involving topical antihypertensive eye drops, steroids, pain management, and lubricants was initiated, leading to significant recovery, including normalization of intraocular pressure and visual acuity.

Discussion: OHT secondary to blunt trauma poses a significant risk for progression to glaucoma. Early detection and a tailored treatment plan are essential in preventing permanent vision loss.

Conclusion: Highlighting the critical need for early detection, immediate intervention, and sustained patient education and follow-up, this case reflects on the meticulous management required to prevent OHT secondary to trauma from advancing to secondary glaucoma, a leading cause of irreversible blindness globally.

Keywords: ocular hypertension, blunt trauma, intraocular pressure, trauma management, visual acuity

Introduction

Ocular hypertension (OHT) secondary to trauma is a critical condition that poses a risk of progressing to secondary glaucoma and irreversible vision loss. It is characterized by elevated intraocular pressure (IOP) without the concurrent presence of glaucomatous optic neuropathy [1,2]. Prompt diagnosis and appropriate management are essential to prevent such outcomes. This case report presents the clinical management of OHT in a young male following a sports-related blunt ocular trauma, highlighting the importance of early intervention and continuous follow-up to safeguard vision.

Case Presentation

First visit - 15/02/2023

Mr. B, a 28-year-old Ghanaian male small-scale farmer, visited our clinic on February 15, 2023, due to persistent discomfort, pain, red eye, swollen eyelids, and reduced visual clarity in his LE following a local sports-related accident a week prior. He described experiencing a moderately strong blunt accidental impact on the LE, which led to ongoing symptoms that significantly hindered his daily functioning. The chief complaint included a constant ache in the affected eye, episodes of blurred vision, increased light sensitivity, and an inability of these symptoms to resolve with his personal choice of home remedy of using a warm wet towel on the eye, prompting him to seek professional medical attention. There was no mucous discharge, fever, chills, headache, nausea, or vomiting when questioned. Mr. B reported no medical or surgical histories. Past ocular, family ocular, and family medical histories were unremarkable. Mr. B had not been on any medications for several months except for 1 gram

of paracetamol he took 1 hour prior to his visit to the clinic. There were no known allergies, and the patient did not use corrective lenses or had any known chemical exposures that could exacerbate his ocular condition.

Clinical Evaluation

Vital signs were stable with a pulse of 72 bpm, blood pressure at 120/75 mmHg, and a temperature of 37.0°C. A comprehensive ocular examination was conducted to assess the severity of the trauma and its effects on his ocular health, comprising the following assessments:

- Visual Acuity (VA) Testing: Using a 3m Snellen chart, VA was measured, revealing 6/6 in the right eye (RE) and VA of 6/18 in the LE.
- Slit Lamp Examination (SLE): The upper and lower eyelids of the LE were mildly swollen. The examination of the anterior segment of the LE revealed mild conjunctival hyperemia, along with mild central corneal cloudiness but no corneal abrasions and no foreign bodies. The anterior chamber seemed quiet, with no signs of hyphema in the LE. There were no adhesions of the iris to any structure and no lacerations. RE angles were open with a Van Herrick estimation of grade 4 but the LE angle was not estimated due to the cloudy cornea so as to avoid inaccurate angle estimation. The pupils were both equal, round, and reactive to light and there were no lens opacities. Anterior segment exam of the RE was unremarkable.
- Ocular Motility Testing: His ocular motilities tested using the broad H test were smooth, accurate, full, and extensive. This was done to assess the integrity of the ocular motor nerves or the extraocular muscles themselves and to rule out the possibility of an orbital floor fracture.
- Intraocular Pressure (IOP) Measurement: The IOP was measured at 9 am using the Topcon CT-80 non-contact tonometer. The LE exhibited an elevated IOP of 31 mmHg, significantly higher

than the normal range. The RE's IOP was within normal limits at 15 mmHg, serving as a baseline for comparison.

- **Confrontational Visual Field (CVF):** Upon conducting the CVF examination for Mr. B, it was observed that his visual field responses were within normal limits.
- **Fluorescein Staining:** Staining of the LE with 1% fluorescein eye drop was negative both for the cornea and conjunctiva.
- **Gonioscopy:** This was postponed to the next visit due to mild cloudy cornea, and patient challenging cooperativeness.
- **Fundoscopy Examination:** Ophthalmoscopy with the Welch Allyn 3.5v direct ophthalmoscope revealed no posterior segment abnormalities, and a cup/disc (C/D) ratio of 0.3 in both eyes.

Diagnosing OHT secondary to trauma presents unique challenges due to the variety of potential underlying causes and its symptom overlap with other ocular conditions. The differential diagnoses considered in this context include:

1. Traumatic Iritis
2. Angle Recession Glaucoma
3. Hyphema
4. Lens Dislocation
5. Scleral Rupture
6. Corneal Foreign body
7. Corneal Abrasion
8. Chemical Injury

In Mr. B's case, the absence of visible iris inflammation or synechiae discounted Traumatic Iritis as a primary cause. Angle recession glaucoma was a significant consideration given the trauma history; however, an initial gonioscopic evaluation could not be performed. Hyphema was ruled out due to the absence of blood in the anterior chamber. Lens dislocation and scleral rupture were unlikely, considering the intact anterior

chamber depth and SLE showed intact crystalline lens and funduscopy showed no posterior segment anomaly. Although the patient's symptoms were consistent with a corneal foreign body and corneal abrasion, the SLE did not reveal any retained foreign body or scratched cornea. Lastly, chemical injury was not supported by the patient's history.

Based on the case presentation and clinical evaluation of Mr. B, the initial diagnoses are as follows:

1. **Ocular Hypertension Secondary to Trauma:** The primary diagnosis is supported by the elevated IOP in the LE (31 mmHg), which is significantly higher than normal, and the baseline measurement of the RE (15 mmHg). This condition is likely a direct result of the blunt trauma sustained during the sports accident, causing a disruption in the aqueous humor dynamics and leading to increased intraocular pressure. This may pose a risk for glaucomatous changes if not managed promptly.
2. **Corneal Contusion:** The presence of mild central corneal cloudiness without abrasions or foreign bodies, following a blunt impact, is characteristic of a corneal contusion. The localized cloudiness and the context of trauma support a diagnosis of corneal contusion.

The following interventions were initiated:

1. **Antihypertensive Eye Drops:** Timolol 0.5% was started. Mr. B was instructed to administer one drop in the affected LE twice daily.
2. **Steroid Therapy:** To combat post-traumatic inflammation that could contribute to elevated IOP, Prednisolone acetate 1% eye drops were prescribed. Mr. B was directed to apply one drop to the LE three times daily. The therapeutic effect of steroids on reducing inflammation and

preventing the formation of synechiae was balanced against the potential risk of steroid-induced IOP elevation, warranting close monitoring.

3. Pain Management: A regimen of Acetaminophen (Paracetamol), 1g, was prescribed to be taken twice daily at 8 am and 8 pm for three days.
4. Topical Lubricants: Preservative-free artificial tears [Refresh Optive (0.5% Carboxymethylcellulose Sodium and 0.9% Glycerin as active ingredients)] were suggested to provide symptomatic relief, enhance ocular surface lubrication, and facilitate corneal healing. Mr. B was advised to apply the lubricating drops every 4 hours during waking hours.
5. Cycloplegic Agents: To reduce discomfort associated with ciliary muscle spasms and promote corneal relaxation, 1 drop of Cyclopentolate (1%), was recommended for use in the LE two times daily for 5 days (12-hour intervals between applications).
6. Patient Education: A significant focus was placed on educating Mr. B about the criticality of adhering to the medication regimen to avert complications. He was informed about recognizing signs of escalating OHT and the potential risk of developing secondary glaucoma.
7. Review: The patient was advised to visit a week later.

Follow-Up 1 - 22/02/2023

Mr. B returned for his first follow-up visit after receiving initial treatment for OHT secondary to trauma and corneal contusion. Mr. B reported significant relief from discomfort and pain in his LE, along with improved vision. Episodes of blurred vision and light sensitivity had decreased. His VA in the LE

improved from 6/18 to 6/9, indicating a positive response to the treatment, particularly in resolving the corneal contusion. Examination revealed reduced eyelid swelling, less conjunctival hyperemia, and clearer central cornea, with no signs of inflammation in the anterior chamber.

The reassessment of IOP showed a reduction from 31 to 25 mmHg in the LE. Gonioscopy confirmed an open angle with no signs of angle recession. Although financial constraints prevented automated perimetry, confrontational visual field testing revealed no defects, suggesting intact peripheral vision.

Based on the improvement, the treatment plan was adjusted by continuing Timolol 0.5%, modifying Prednisolone acetate 1% to twice daily for a week before tapering, and maintaining lubricating eye drops. Ocular hygiene and activity restrictions were emphasized. A follow-up visit was scheduled in two weeks to monitor further IOP reduction and complete corneal recovery.

Follow-Up 2 - 08/03/2023

Two weeks after the previous appointment, Mr. B returned for his second follow-up to assess recovery and monitor the healing.

Mr. B reported significant improvement, noting that discomfort, pain, and blurred vision in his LE had completely resolved. He expressed satisfaction with his recovery and the ability to resume daily activities without any ocular issues. VA in the LE improved to 6/6, matching the RE, indicating successful management of the corneal contusion. The slit-lamp examination showed complete resolution of conjunctival

hyperemia, corneal cloudiness, and swelling, with no signs of inflammation.

The IOP in the LE further decreased to 22 mmHg, while the RE remained stable. Gonioscopy revealed no angle recession, confirming that angle recession glaucoma was not a concern. Ocular motility and confrontational visual field tests showed normal, unrestricted movements and intact peripheral vision. Fundoscopy revealed no glaucomatous damage, with a consistent cup/disc ratio of 0.3 in both eyes.

Based on these improvements, the steroid dosage was tapered, and Timolol 0.5% was continued. Mr. B was counseled on ocular hygiene and the importance of protective eyewear to prevent future trauma.

Follow-Up 3 - 15/03/2023

Mr. B attended his third follow-up visit one week after the previous appointment. This visit was important to confirm the stability of his intraocular pressure (IOP) and ensure the complete resolution of OHT secondary to trauma.

Mr. B reported continued improvement with no ocular discomfort or visual disturbances. He expressed satisfaction with his progress, noting excellent visual quality and comfort since the last visit. His VA remained at 6/6 in both eyes and slit-lamp examination revealed no abnormalities. The IOP in the LE decreased to 15 mmHg, returning to normal levels, with the RE maintaining 14 mmHg. The optic nerve and retinal health were stable, with a cup/disc ratio of 0.3, indicating no complications from the OHT.

Given Mr. B's complete recovery and stable IOP, Timolol 0.5% was discontinued, and steroid tapering therapy with Prednisolone acetate 1% was concluded appropriately. Lubricating eye drops were adjusted to

"as needed" for comfort. Mr. B was advised to maintain good ocular hygiene and use protective eyewear during risky activities. No further follow-up for OHT was necessary, but annual comprehensive exams were recommended.

This visit marked the successful completion of Mr. B's treatment, ensuring long-term vision preservation and ocular health.

Discussion

The management of OHT secondary to trauma, as demonstrated in Mr. B's case, highlights the need for a comprehensive and multifaceted approach in ophthalmic care. This approach is especially crucial in managing conditions like OHT, which, if not promptly and effectively treated, can progress to secondary glaucoma and result in significant visual impairment [3]. Initiating antihypertensive therapy, specifically with Timolol 0.5%, is pivotal for controlling elevated intraocular pressure (IOP), aligning with existing literature that supports the use of beta-blockers in such clinical scenarios [4].

Incorporating steroid therapy via Prednisolone acetate 1% eye drops targets the inflammation often accompanying ocular trauma, which if left unchecked, could exacerbate IOP elevation [5]. The strategic application of steroids to mitigate inflammation, balanced against the vigilant monitoring for potential steroid-induced OHT, illustrates the nuanced nature of managing OHT secondary to trauma [2].

The use of bandage contact lenses (BCL) emerges as an innovative adjunct in the therapeutic arsenal [6]. BCLs not only serve as a protective barrier facilitating corneal healing but also play a crucial role in pain

management and in maintaining a stable ocular surface environment, which is essential for the healing process [7]. While the application of BCLs was not explicitly mentioned in Mr. B's treatment plan, their inclusion could potentially offer significant therapeutic benefits, particularly in managing corneal contusions by preserving tear film integrity and enhancing epithelial recovery [8].

However, the deployment of such advanced treatments and technologies in Ghana faces notable challenges. Financial constraints, limited availability of specialized diagnostic and treatment modalities, and the broader issue of healthcare accessibility can significantly impact the management of ophthalmic conditions [9]. The reliance on foundational diagnostic and therapeutic interventions, such as slit-lamp examination and the judicious use of pharmacological agents, becomes even more crucial in such settings. Moreover, the role of patient education and regular monitoring is amplified in importance, given the potential barriers to accessing care and the necessity of preventing complications that could lead to irreversible vision loss [10].

The case report on Mr. B provides an exemplary model of managing OHT secondary to trauma within the constraints typical of resource-limited settings, like many parts of Africa. It underscores the critical importance of a comprehensive case history and clinical evaluation in formulating a precise diagnosis and crafting a tailored management plan. This case highlights treatment and management strategies that adapt to the patient's specific needs and circumstances, particularly noting the socioeconomic

factors that might affect treatment adherence and outcomes.

Key to this case report is the emphasis on patient education and empowerment, demonstrating the optometrist's role in ensuring patients understand their condition, the treatment regimen, and the importance of follow-up care. This aspect is particularly salient in African contexts, where health literacy levels may vary, and emphasizes the necessity of communication in improving healthcare outcomes [11].

Conclusion

This case showcases a holistic method that incorporates a detailed case history, thorough clinical evaluations, precise diagnosis, timely and suitable therapeutic interventions, alongside continuous patient education and regular follow-ups. Mr. B's experience demonstrates the effective management strategy in averting the potential progression of OHT secondary to trauma into secondary glaucoma. It accentuates the paramount importance of prompt detection, early intervention, and comprehensive treatment plans in safeguarding ocular health and maintaining vision after traumatic ocular events.

References

1. Ozer PA, Yalvac IS, Satana B, Eksioglu U, Duman S. Incidence and risk factors in secondary glaucomas after blunt and penetrating ocular trauma. *J Glaucoma*. 2007;16:685-90.
2. Razeghinejad R, Lin MM, Lee D, Katz LJ, Myers JS. Pathophysiology and management of glaucoma and ocular hypertension related to trauma. *Surv Ophthalmol*. 2020;65:530-47.

3. Kesav N, Palestine AG, Kahook MY, Pantcheva MB. Current management of uveitis-associated ocular hypertension and glaucoma. *Surv Ophthalmol.* 2020;65:397-407.
4. Khouri AS, Serle JB, Bacharach J, Usner DW, Lewis RA, Braswell P, Kopczynski CC, Heah T, Bacharach J, Benza R, Boyle JW, Butler M, Cacioppo LR, Cardona JF, Colborn VA, Day DG, Douglass DT, El-Harazi SM, Ghate D, Hartman C, Haverly RF, Katzman B, Kim M, Koo EY, Korenfeld MS, Kwapiszeski B, Lane L, Lin C, Logan AG, Lozier JR, McQuirter H, Mundorf TK, Olander K, Ou RJ, Panzo GJ, Peace JH, Protzko EE, Ritch R, Sall K, Schechter BA, Seltzer SE, Shah PG, Sharpe E, Lee Shettle P, Shulman DG, Singh IP, Smith SR, Smith SE, Smyth-Medina RJ, Sorenson RC, Sturm R, Sulkowski GM, Sutton JD, Tepedino M, Tsai J, Tubbs CB, Tukul DB, Walters TR, Wirta DL. Once-Daily Netarsudil Versus Twice-Daily Timolol in Patients With Elevated Intraocular Pressure: The Randomized Phase 3 ROCKET-4 Study. *Am J Ophthalmol.* 2019;204:97-104.
5. Rajendrababu S, Pallamparthi S, Arunachalam A, Uduman MS, Srinivasan S, Krishnadas SR, et al. Incidence and risk factors for postoperative intraocular pressure response to topical prednisolone eye drops in patients undergoing phacoemulsification. *Int Ophthalmol.* 2021;41:3999-4007.
6. Xiao A, Dhand C, Leung CM, Beuerman RW, Ramakrishna S, Lakshminarayanan R. Strategies to design antimicrobial contact lenses and contact lens cases. *J Mater Chem B.* 2018;6:2171-86.
7. Duru Z, Duru N, Ulusoy DM. Effects of senofilcon A and lotrafilcon B bandage contact lenses on epithelial healing and pain management after bilateral photorefractive keratectomy. *Contact Lens Anterior Eye.* 2020;43:169-72.
8. Toldi JP, Thomas JL. Evaluation and Management of Sports-Related Eye Injuries. *Curr Sports Med Rep.* 2020;19:29-34.
9. Li JPO, Liu H, Ting DSJ, Jeon S, Chan RVP, Kim JE, et al. Digital technology, tele-medicine and artificial intelligence in ophthalmology: A global perspective. *Prog Retin Eye Res.* 2021;82:100900.
10. Patibandla RSML, Rao BT, Murty MR. Revolutionizing Diabetic Retinopathy Diagnostics and Therapy Through Artificial Intelligence: A Smart Vision Initiative. In: Garcia MB, De Almeida RPP, editors. *Transformative Approaches to Patient Literacy and Healthcare Innovation.* Hershey, PA: IGI Global; 2024. p. 1-10.
11. Tavakoly Sany SB, Behzhad F, Ferns G, Peyman N. Communication skills training for physicians improves health literacy and medical outcomes among patients with hypertension: a randomized controlled trial. *BMC Health Serv Res.* 2020;20:60.

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