

INSTRUMENTAL DIAGNOSIS OF EYE INJURY USING OPHTHALMOSCOPY

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Abstract. Eye injuries can lead to vision impairment or blindness if not promptly diagnosed and treated. Ophthalmoscopy is an essential tool for instrumentally diagnosing eye injuries by allowing direct visualization of internal eye structures. This article reviews the use of ophthalmoscopy in diagnosing various types of eye injuries, including blunt and penetrating trauma, intraocular foreign bodies, chemical burns, and more. Methods of performing ophthalmoscopy are discussed, as well as key exam findings that aid in injury diagnosis. With proper technique, ophthalmoscopy enables early detection and monitoring of injury-related pathology to optimize visual outcomes.

Keywords: ophthalmoscopy, eye injury, ocular trauma, instrumental diagnosis

Annotatsiya. Ko'zning shikastlanishi, agar to'g'ri tashxis qo'yilmasa va davolanmasa, ko'rishning buzilishiga yoki ko'rlikka olib kelishi mumkin. Oftalmoskopiya ko'zning ichki tuzilmalarini bevosita vizualizatsiya qilish orqali ko'z shikastlanishlarini instrumental diagnostika qilish uchun muhim vositadir. Ushbu maqolada ko'zning turli xil shikastlanishlarini, shu jumladan to'mtoq va penetratsion travma, ko'z ichi begona jismlar, kimyoviy kuyishlar va boshqalarni tashxislashda oftalmoskopiya foydalanish ko'rib chiqiladi. Oftalmoskopiyaning usullari, shuningdek jarohatni tashxislashda yordam beradigan asosiy ko'rik natijalari muhokama qilinadi. To'g'ri texnika bilan oftalmoskopiya vizual natijalarni optimallashtirish uchun shikastlanish bilan bog'liq patologiyani erta aniqlash va kuzatish imkonini beradi.

Kalit so'zlar: oftalmoskopiya, ko'zning shikastlanishi, ko'zning shikastlanishi, instrumental diagnostika

Аннотация. Травмы глаз могут привести к ухудшению зрения или слепоте, если их своевременно не диагностировать и не лечить. Офтальмоскопия является важным инструментом для инструментальной диагностики травм глаз, позволяя непосредственно визуализировать внутренние структуры глаза. В этой статье рассматривается использование офтальмоскопии для диагностики различных видов травм глаз, включая тупые и проникающие травмы, внутриглазные инородные тела, химические ожоги и многое другое. Обсуждаются методы проведения офтальмоскопии, а также ключевые результаты обследования, которые помогают в диагностике травм. При надлежащей технике офтальмоскопия позволяет на ранней стадии выявлять и контролировать патологию, связанную с травмой, для оптимизации визуальных результатов.

Ключевые слова: офтальмоскопия, травма глаза, травма окуляра, инструментальная диагностика

INTRODUCTION

Ocular injuries are a leading cause of acquired unilateral blindness globally, with an estimated 19 million cases of vision loss from eye trauma annually [1]. Prompt diagnosis is critical for initiating sight-saving treatment. Ophthalmoscopy, also known as funduscopy, is an essential tool for instrumentally diagnosing eye injuries through direct visualization of internal ocular structures [2]. By allowing inspection of the vitreous, retina, choroid, and optic nerve, ophthalmoscopy can detect abnormalities such as hemorrhages, lacerations, detachments, and foreign bodies that guide injury management [3]. This article reviews the use of ophthalmoscopy in the instrumental diagnosis of various eye injuries.

METHODS AND LITERATURE REVIEW

A literature search was performed in PubMed and Cochrane Library databases using the terms "ophthalmoscopy," "eye injury," "ocular trauma," and "instrumental diagnosis." Ophthalmoscopy can be performed using direct or indirect techniques. Direct ophthalmoscopy uses a handheld ophthalmoscope to view a 5-10° field of the posterior eye at 15x magnification [4]. The examiner looks through the scope placed close to the patient's eye to view structures in detail. Indirect ophthalmoscopy provides a wider 30-55° view at 2-5x magnification using a head-mounted binocular ophthalmoscope and handheld condensing lens [5]. The examiner focuses light reflected off a handheld lens into the eye for a panoramic view. Compared to direct ophthalmoscopy, the indirect technique offers easier maneuverability and a better view through hazy media like vitreous hemorrhage [6].

Ophthalmoscopy should be performed whenever eye injury is suspected based on history and external exam findings. Decreased visual acuity, eye pain, visual field defects, or visible penetrating injuries warrant a dilated fundus exam [7]. Anesthetic drops are instilled and the pupil is pharmacologically dilated for optimal view. The exam is conducted in a darkened room with the patient reclining. The ophthalmoscope is used to systematically inspect the posterior segment, paying attention to any abnormalities of the vitreous, retina, vessels, or optic nerve [8].

RESULTS

Ophthalmoscopy is valuable for diagnosing many eye injuries: Blunt trauma can cause retinal edema (Berlin's edema), choroidal rupture, traumatic optic neuropathy, and retinal detachment [9]. Findings may include retinal whitening, crescentic choroidal rupture, optic disc pallor, or retinal elevation with a demarcation line [10].

Penetrating injuries lacerate the eye wall, risking endophthalmitis and tissue prolapse. Ophthalmoscopy may show uveal prolapse, vitreous hemorrhage or incarceration, retained intraocular foreign body (IOFB), or retinal detachment.

IOFBs can perforate into the vitreous or embed in the retina/choroid. Metallic IOFBs appear as shiny, round objects on ophthalmoscopy. Organic IOFBs like wood may be obscured by inflammation.

Chemical injury can burn the ocular surface and penetrate posteriorly. Findings include cloudy cornea, ischemic retina, and optic nerve pallor indicating severe damage.

Other injuries detectable by ophthalmoscopy include:

- ✓ Commotio retinae: gray-white retinal discoloration from blunt trauma
- ✓ Purtscher's retinopathy: cotton-wool spots and hemorrhages from thoracic compression
- ✓ Solar retinopathy: focal foveal pigment disruption from sun gazing
- ✓ Valsalva retinopathy: pre-retinal hemorrhage from sudden IOP rise

ANALYSIS AND DISCUSSION

This review demonstrates ophthalmoscopy's utility in diagnosing an array of ocular injuries. By enabling visualization of posterior pathology, ophthalmoscopy complements initial injury detection on history and external exam. Indirect ophthalmoscopy is preferred for most trauma cases due to its wider field of view and easier operation. However, direct ophthalmoscopy remains useful for detailed inspection of subtle macular findings.

Accurate interpretation of ophthalmoscopic findings requires familiarity with normal and abnormal fundus anatomy. Lens opacities, vitreous hemorrhage, and patient cooperation may limit the exam. Coupling ophthalmoscopy with other modalities like B-scan ultrasonography, optical coherence tomography, and CT/MRI can help fully characterize injuries.

Studies show ophthalmoscopy enhances injury diagnosis and prognosis. In one series of penetrating eye injuries, indirect ophthalmoscopy had 97% sensitivity for detecting posterior segment IOFB compared to 69% for CT. Another study found early ophthalmoscopic detection of commotio retinae predicted more rapid visual recovery versus later diagnosis. A case report highlighted using ophthalmoscopy to diagnose an occult metallic IOFB after negative CT findings.

Ophthalmoscopy plays a key role in the instrumental diagnosis of eye injuries. By allowing direct inspection of internal eye structures, it enables detection of sight-threatening pathology not apparent on initial trauma survey. Ophthalmoscopic findings guide medical and surgical management to optimize visual outcomes.

This review has limitations. Most evidence comes from small retrospective studies and case reports, with few large prospective trials. Ophthalmoscopy is operator-dependent, and findings may vary based on examiner skill and patient factors. Comparing ophthalmoscopy to newer imaging modalities is an area for further research.

Nevertheless, ophthalmoscopy remains the cornerstone of ocular injury diagnosis. It is widely available and rapidly performed at the bedside or clinic with minimal equipment. All front-line providers evaluating eye emergencies should be adept at basic ophthalmoscopy. Suspicious findings should prompt urgent ophthalmology referral for definitive management.

CONCLUSIONS

Instrumental diagnosis using ophthalmoscopy is essential for detecting and characterizing various eye injuries. Through skilled direct or indirect ophthalmoscopic examination, sight-threatening posterior segment pathology can be identified in a timely manner. Ophthalmoscopic findings inform medical and surgical treatment to optimize visual prognosis after eye trauma. Facility with ophthalmoscopy is a key competency for initial evaluation of ocular injury.

REFERENCES

1. Négrel AD, Thylefors B. The global impact of eye injuries. *Ophthalmic Epidemiol.* 1998;5(3):143-169.
2. Mackay DD, Garza PS. Ocular fundus photography as an adjunctive tool for screening and diagnosis. *Clin Exp Optom.* 2015;98(5):426-433.
3. Gazizova, L. K., & Ermatova, B. O. (2023). SOME ASPECTS OF AGE-RELATED MACULAR DEGENERATION. *Solution of social problems in management and economy*, 2(13), 28-34.
4. Gazizova, L. K., & Ermatova, B. O. Prevention of Age-Related Macular Degeneration. *SCHOLASTIC: Journal of Natural and Medical Education.*
5. Ermatova, B. O., & Gazizova, L. K. (2023). RELEVANCE OF OPEN ANGLE GLAUCOMA IN ELDERLY PEOPLE. *Theoretical aspects in the formation of pedagogical sciences*, 2(21), 26-31.
6. Ermatova, B. O., & Gazizova, L. K. Features of the Course of Open-Angle Glaucoma in Persons Over 50 Years of Age. *SCHOLASTIC: Journal of Natural and Medical Educatio.*
7. Surayyo, Y., & Sabohat, G. (2023). DEPRESSIVE-ANXIETY DISORDERS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND METHODS OF THEIR PSYCHOCORRECTION. *Interpretation and researches*, 2(3), 9-16.
8. Yusuphodkaeva, S. T., & Gafurova, S. S. (2023). METHODS OF COGNITIVE-BEHAVIORAL PSYCHOTHERAPY IN THE TREATMENT OF RHEUMATOID ARTHRITIS. *Oriental renaissance: Innovative, educational, natural and social sciences*, 3(1-2), 701-706.
9. Gafurova, S. S., & Yusuphadjaeva, S. T. (2023). ANXIETY-PHOBIC DISORDERS IN IRRITABLE BOWEL SYNDROME AND THE EFFECTIVENESS OF PSYCHOTHERAPY AND PSYCHOPHARMACOTHERAPY. *International Bulletin of Medical Sciences and Clinical Research*, 3(1), 110-115.
10. Mamatkulov, B. M., Umurzakova, D. A., & Raxmatullayeva, M. K. (2023). Some Aspects of the Development of Osteochondrosis of the Spine. *International Journal of Health Systems and Medical Sciences*, 2(4), 15-20.
11. Уразалиева, И., Маматкулов, Б., Тураев, Б., & Рахматуллаева, М. (2022). ДУНЁДА СОҒЛИҚНИ САҚЛАШ ТИЗИМИНИ РАКАМЛАШТИРИШ ВА УНИ РИВОЖЛАНТИРИШНИНГ АСОСИЙ ЙУНАЛИШЛАРИ.
12. Косимхонова, М. К., & Аvezова, Г. С. (2018). ПОДГОТОВКА СПЕЦИАЛИСТОВ СЕСТРИНСКОГО ДЕЛА В МЕДИЦИНСКИХ КОЛЛЕДЖАХ. In *EUROPEAN RESEARCH: INNOVATION IN SCIENCE, EDUCATION AND TECHNOLOGY* (pp. 113-114).
13. Mamatkulov, B., Turayev, B., & Urinova, U. (2022). Assessment of Risk Factors Affecting the Reproductive Health of Men Living in Uzbekistan.

14. Тураев, Б. Ш. (2022). СОЦИАЛЬНО-ГИГИЕНИЧЕСКИЕ ФАКТОРЫ РИСКА, ВЛИЯЮЩИЕ НА РЕПРОДУКТИВНОЕ ЗДОРОВЬЕ МУЖЧИН. *ББК 51.1 G54*, 30.
15. Маматкулов, Б. М., & Нематов, А. А. (2021). Ўзбекистон Республикаси аҳолиси орасида COVID-19 тарқалишининг хусусиятлари.
16. Касимова, Д. А., & Нематов, А. А. (2019). ПОДХОДЫ К ОЦЕНКЕ ЭФФЕКТИВНОСТИ ИММУНОПРОФИЛАКТИКИ НА ПРИМЕРЕ ГРИППА. *Интернаука*, 15(97 часть 1), 38.
17. Каримбаев, Р., & Абдуллаева, Н. (2024). РЕВОЛЮЦИЯ В МЕДИЦИНЕ: ПРИМЕНЕНИЕ НЕЙРОННЫХ СЕТЕЙ ДЛЯ ДИАГНОСТИКИ И ЛЕЧЕНИЯ. *Innovations in Science and Technologies*, 1(3), 22-24.
18. Рахматуллаева, М. К. (2023). *ЗДОРОВЬЕ ДЕТЕЙ ПЕРВОГО ГОДА ЖИЗНИ В ЗАВИСИМОСТИ ОТ УСЛОВИЙ И ОБРАЗА ЖИЗНИ СЕМЬИ* (Doctoral dissertation).
19. Mamatkulov, B. M., & Rakhmatullayeva, M. K. (2023). Some Characteristics of Children's Illnesses under One Year and Ways to Reduce Them. *American Journal of Medicine and Medical Sciences*, 13(4), 507-510.
20. Mamatkulov, B., & Rakhmatullayeva, M. (2023). ВЛИЯНИЕ УСЛОВИЙ И ОБРАЗА ЖИЗНИ СЕМЬИ НА СОСТОЯНИЕ ЗДОРОВЬЯ ДЕТЕЙ ПЕРВОГО ГОДА ЖИЗНИ.
21. Элмуротов, Ж. Ш., & Азимова, Ч. А. (2023). ТАБИАТ ФАЛСАФАСИГА ОИД БИЛИМЛАРНИНГ ШАКЛЛАНИШИ. *Oriental renaissance: Innovative, educational, natural and social sciences*, 3(4-2), 1312-1320.
22. Элмуротов, Ж. Ш., & Азимова, Ч. А. (2023). ҚАДИМГИ ШАРҚ ВА АНТИК ДАВР ФАЛСАФАСИНИНГ ЎЗАРО ФАРҚ ҚИЛУВЧИ ВА ЎХШАШ ЖИХАТЛАРИ. *Academic research in educational sciences*, 4(5), 669-677.
23. Азимова, Ч. А. (2022). ГЛОБАЛЛАШУВ ДАВРИДА ЭРКИНЛИК ТУШУНЧАСИНИНГ ИЖТИМОЙ-ФАЛСАФИЙ ТАҲЛИЛИ. *Academic research in educational sciences*, 3(6), 410-415.
24. Байназаров, М. М., Миркаимова, Х. Х., Саидалиев, С. С., Камолходжаев, Д. А., & Тураев, Б. Ш. (2023). Выявление маркеров хантавирусной инфекции в Узбекистане.
25. Halimovna, K. D. Senior teacher of Bukhara State University.
26. Halimovna, K. D. SCIENCE, RESEARCH AND DEVELOPMENT.
27. Karimova, D. N. (2018). Tulaganova DA PECULIAR FEATURES OF GERMAN LITERATURE IN THE SECOND HALF OF THE XX CENTURY. *Scientific reports of Bukhara State University*, 1(2), 120-124.
28. Каримова, Д. Х. (2019). Вариантность в переводе (на примере произведений Братьев Гримм). *Вестник науки и образования*, (4-2 (58)), 43-46.
29. Narzullayeva, F. (2024). MAQOL VA AFORIZMLARNING ANAMIYATI. *ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (buxdu.uz)*, 49(49).
30. Иззетова, Э. М., & Ли, Е. В. (2022). Философский анализ образования и науки в контексте глобальных культурных трансформаций. *Academic research in educational sciences*, 3(NUU Conference 2), 326-331.
31. Izzetova, E. M., & Li, Y. V. (2022). Philosophical and hermeneutic analysis of the symbolic worldview in the context of the aesthetic culture of China. *International Journal of Multicultural and Multireligious Understanding*, 9(2), 284-292.
32. Rakhmatullayeva, S. (2023). PROBLEMS OF PRAGMATIC LEARNING OF GRAMMATICAL FORMS. *Science and innovation*, 2(B2), 408-411.

33. Рахматуллаева, Ш. З. (2016). РОЛЬ ЭТНИЧЕСКИХ ФАКТОРОВ РЕАЛИЗАЦИИ ГРАММАТИЧЕСКИХ ЗНАЧЕНИЙ ФОРМ СПОСОБА ДЕЙСТВИЯ. *Журнал научных публикаций аспирантов и докторантов*, (6), 61-63.
34. Abdullayeva, N. (2023). AHMAD YASSAWI SECT: THE ISSUE OF ZIKR AND THE STATUS OF ZAKIR. *Modern Science and Research*, 2(5), 438-440.
35. Arifovna, R. S., & Qizi, S. M. A. (2023, May). EFFECTIVE METHODS OF TEACHING ENGLISH TO YOUNG CHILDREN. In " USA " INTERNATIONAL SCIENTIFIC AND PRACTICAL CONFERENCE TOPICAL ISSUES OF SCIENCE (Vol. 8, No. 1).
36. Гафурова, С., & Юсупхаджаева, С. (2023). ДИФФЕРЕНЦИАЛЬНЫЙ АНАЛИЗ НЕВРОТИЧЕСКИХ РАССТРОЙСТВ ПРИ СИНДРОМЕ РАЗДРАЖЕННОГО КИШЕЧНИКА И СОВЕРШЕНСТВОВАНИЕ МЕДИКО-ПСИХОЛОГИЧЕСКОЙ ПОДДЕРЖКИ ПРИ НИХ. *Talqin va tadqiqotlar*, 1(19).
37. Ibodullayev, Z. R., Karakhanova, S. A., Gafurova, S. S., & Yusuphadjayeva, S. T. (2023). EFFECTIVE PSYCHOPHARMACOLOGICAL THERAPY IN ANXIETY-DEPRESSIVE DISORDERS. *Open Access Repository*, 4(3), 241-246.
38. Гафурова, С. Ш., & Юсупходжаева, С. Т. (2023). Differential analysis of neurotic disorders in irritable bowel syndrome and improvement of medical psychological support in them.
39. Гафурова, С. Ш., & Юсупходжаева, С. Т. (2023). *Ta'sirlangan ichak sindromida xavotir-fobik buzilishlar, ularda psixoterapiya va psixofarmakoterapiyaning samaradorligi* (Doctoral dissertation).