

The Kibata protocol for management of cataract, vitreous haemorrhage, and glaucoma in diabetic patients

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Abstract

Background: Diabetes mellitus is a major cause of visual impairment worldwide, associated with cataract, diabetic retinopathy (DR), vitreous haemorrhage, and glaucoma. Cataract surgery, while often necessary, increases the risk of postoperative complications including DR progression and macular edema. Despite this burden, practical guidelines for managing these conditions in diabetic patients remain scarce.

Objective: To present the Kibata Protocol, a structured set of recommendations for the management of cataract, vitreous haemorrhage, and glaucoma in patients with diabetes.

Methods: Relevant literature and consensus statements were reviewed, and key mechanisms, risk factors, and treatment strategies were synthesized into guideline recommendations.

Results: The kibata Protocol emphasizes:

- Preoperative systemic optimization:
 - Glycaemic control: HbA1c of <8% and RBS of <10 on day of surgery is crucial in diabetic patients undergoing ophthalmic surgery, as poor control increases the risk of postoperative infection, delayed healing, and macular edema. [1-4].
 - Blood Pressure (BP) control: BP should be below 180/110 mmHg, provided the patient is otherwise stable. Avoid sudden BP reduction on the day of surgery to prevent ocular hypoperfusion. [5,6]
 - In patients with advanced retinopathy or maculopathy, maintaining BP below 160/100 mmHg is preferable to reduce the risk of retinal haemorrhage or macular edema exacerbation. [7-9]
- Careful ocular evaluation and consideration of preoperative anti-VEGF therapy.
- Minimally traumatic cataract surgery techniques to reduce inflammation.
- Early vitrectomy when indicated for vitreous haemorrhage.
- Vigilant glaucoma monitoring, with combined procedures where appropriate.

Conclusion: Adoption of the Kibata Protocol may reduce complications and improve surgical outcomes in diabetic patients.

Keywords: Diabetes mellitus, cataract, vitreous haemorrhage, glaucoma, diabetic retinopathy.

Introduction

Diabetes mellitus is a growing global health problem and a leading cause of preventable blindness [9]. Ocular complications such as cataract, vitreous haemorrhage, glaucoma, and diabetic retinopathy are common and often coexist. Cataract develops earlier and progresses faster in diabetic patients, and although surgery improves vision, it may worsen retinopathy and macular edema [10,11].

Vitreous haemorrhage and glaucoma also pose major challenges. Vitreous haemorrhage, often secondary to proliferative diabetic retinopathy, can cause sudden severe vision loss [12]. Glaucoma, including neovascular glaucoma, is more frequent in diabetic patients and further complicates surgical outcomes [13].

There is a pressing need for practical, evidence-based

guidelines to support clinicians managing diabetic patients. The Kibata Protocol aims to address this gap by providing structured recommendations.

The late Dr Amos Kibata was a leading Kenyan ophthalmologist and a vitreo-retinal Surgeon of high reputation who was passionate and committed to care for patients with diabetic eye disease. He pioneered mobile eye laser clinic, moving out of Nairobi to deliver Laser services, and later founded city eye group of hospitals. In all this his desire was to reach as many needy Kenyans, and deliver excellence in eye care [14]. Through these publications, the desires, aspirations and legacy of this Eye Health Hero continue to be realized.

Materials and Methods

A narrative review of published literature was conducted using PubMed, Cochrane Library, and ophthalmology societies guidelines. Evidence on the pathophysiology, risk factors, and management of cataract, vitreous haemorrhage, and glaucoma in diabetic patients was extracted. A series of meetings were held to generate and discuss experts' opinion from local clinical experience in day today practice over time. Findings were synthesized into a protocol framework adapted for clinical practice, discussed and adopted by the Vitreo-Retinal Society of Kenya and Ophthalmology Society of Kenya.

Results

Recommendations:

Cataract Surgery in Diabetic Patients

Risk factors for poor outcomes: poor glycaemic control [15], hypertension [16], and long diabetes duration [17].

Mechanisms: blood-retinal barrier disruption, intraocular inflammation, oxidative stress, VEGF upregulation, and pre-existing DR [18-20].

Recommendation 1

Provide elective cataract surgery for diabetic patients ONLY when blood sugar control is good.

- The minimum recommended before surgery is:
 - Random Blood Sugar (RBS) < 10 mmol/l on the day of the surgery
 - Glycosylated Haemoglobin (HbA1c) < 8% (if not available, check the Note book for daily Fasting Blood Sugar (FBS) and RBS carried by most diabetic patients to rule out poor blood sugar control. An average FBS reading of <7 mmol/l over 4 weeks, and random glucose readings average below 10mmol/l over last 4 weeks are acceptable).

Cataract and Diabetic Macula Edema

Cataract surgery before Diabetic Macular Edema (DME) treatment leads to worsening DME and you can miss DME

on fundoscopy [21-23]. DME with hard exudates can dry quickly after intra-vitreous steroid injection and lead to permanent visual Impairment [24,25].

Recommendation 2

2.1. Aspire to do Optical Coherence Tomography (OCT) for every diabetic patient with cataract before cataract surgery.

Recommendation 3

3.1. ONLY slow release intravitreal steroids (e.g. Dexamethasone intravitreal implant) should be administered in Diabetic patients with DME with hard exudates.

Vitreous Haemorrhage in Diabetic Patients

Vitreous Haemorrhage in most cases are secondary to proliferative Diabetic Retinopathy. Intra-vitreous Injection in presence of retinal membrane could lead to the membranes contracting causing Retinal Detachment. [26-28]

Recommendation 4

4.1. DO NOT administer Intra-vitreous medications/injections in cases of vitreous Haemorrhage (VH) with no Retinal View (even with cataract). Refer to Vitreo-Retinal (VR) surgeon.

High Intra-ocular Pressure (IOP) in Diabetic Patient

Prostaglandin analogue affect blood glucose metabolism and Diabetes is associated with increased risk of primary open-angle and neovascular glaucoma.

Recommendation 5

5.1 DO NOT administer Prostaglandin analogue perioperatively in diabetic patients

5.2 ALWAYS do gonioscopy to rule out neo-vascularization at the angle in diabetic patient with increased IOP.

Discussion

Diabetic patients undergoing ocular surgery present unique challenges. The KIBATA Protocol addresses systemic optimization, modern surgical techniques, and adjunctive therapies to minimize complications. By providing a structured approach, it supports ophthalmologists in improving visual outcomes and reducing blindness in this high-risk population. In addition to the Kibata Protocol, current evidence needs to be generated on the indications and role of Anti-VEGF in diabetic eye disease and included into the national guidelines, standards and protocols for the care of diabetic eye disease.

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References

1. JBDS IP. Management of adults with diabetes undergoing surgery: perioperative and surgical guidelines. 2016.
2. Kumar CM, et al. Glycaemic control during cataract surgery under loco-regional anaesthesia. *Br J Anaesth*. 2016;117(6):687–94.
3. Naik M, Honavar SG. Preoperative evaluation and optimization of systemic diseases in patients undergoing ocular surgery. *Indian J Ophthalmol*. 2017;65(6):451–60.
4. The Royal College of Ophthalmologists. Ophthalmic Services Guidance: Cataract Surgery Guidelines. 2021.
5. Society for Ambulatory Anaesthesia (SAMBA). Preoperative Care for Cataract Surgery: Consensus Statement. *Anesth Analg*. 2021;132(5):1332–45.
6. Naik M, Honavar SG. Preoperative evaluation and optimization of systemic diseases in patients undergoing ocular surgery. *Indian J Ophthalmol*. 2017;65(6):451–60.
7. Voon LW, Lai TY, Lam DS. Suprachoroidal hemorrhage during cataract surgery in patients with hypertension and diabetes. *Eye*. 2004;18(3):300–3.
8. Morshidi M, Hilmi MR, Fathilah J, et al. Blood pressure and intraoperative complications during cataract surgery. *Med J Malaysia*. 2015;70(5):289–92.
9. International Diabetes Federation. IDF Diabetes Atlas, 10th edn. Brussels: IDF; 2021.
10. Klein BE, Klein R, Moss SE. Incidence of cataract surgery in diabetic patients. *Arch Ophthalmol*. 1995;113(3):325–32.
11. Shorstein NH, Haug SJ, Liu L, et al. Predictors of diabetic macular edema after cataract surgery. *Am J Ophthalmol*. 2017;176:157–66.
12. Diabetic Retinopathy Clinical Research Network (DRCR.net). Randomized clinical trial evaluating early vitrectomy for vitreous hemorrhage in diabetic retinopathy. *Ophthalmology*. 2013;120(12):2494–501.
13. Zhao D, Cho J, Kim MH, Guallar E. Diabetes, fasting glucose, and the risk of glaucoma: a meta-analysis. *Ophthalmology*. 2015;122(1):72–8.
14. Gichuhi S, A tribute to Dr. Amos Kibata Githeko, an Eye Health Hero; Kenya Eye Health journal, Nov.2024, Vol.1No.1, journals.osk.or.ke/index.php/Kenya-Eye-Health-Journal/article/view/3/12
15. Stratton IM, Kohner EM, Aldington SJ, et al. UKPDS 50: risk factors for incidence and progression of retinopathy in Type II diabetes. *Diabetologia*. 2001;44(2):156–63.
16. Chew EY, Sperduto RD, Milton RC, et al. Risk of advanced age-related macular degeneration after cataract surgery in the Age-Related Eye Disease Study: AREDS report 25. *Ophthalmology*. 2009;116(2):297–303.
17. Funatsu H, Yamashita H, Ikeda T, Mimura T, Eguchi S, Hori S. Risk evaluation of diabetic macular edema after phacoemulsification in patients with and without diabetic retinopathy. *J Cataract Refract Surg*. 2002;28(8):1355–63.
18. Lee S-H, Tseng B-Y, Wu M-C, Wang J-H, Chiu C-J. Incidence and progression of diabetic retinopathy after cataract surgery: a systematic review and meta-analysis. *Am J Ophthalmol*. 2025;269:105–15. doi:10.1016/j.ajo.2024.08.017.
19. Mittra R, et al. Retinopathy progression and visual outcomes after phacoemulsification in diabetic patients. *JAMA Ophthalmology*. 2000;118(3):340–5.
20. Loya A, Sallam A, Ahmed S, et al. Risk of progression of nonproliferative to proliferative diabetic retinopathy after cataract surgery. *Ophthalmology*. 2025; (in press). doi:10.1016/j.ophtha.2025.02.006. PMID:39956206.
21. Wang YT, Wong TY, Hughes G, et al. Comparison of prevalence of diabetic macular edema based on monocular fundus photography vs optical coherence tomography. *JAMA Ophthalmol*. 2016;134(4):1–8. JAMA Network
22. Browning DJ, McOwen MD, Bowen Jr RM, O'Marah TL. Comparison of the clinical diagnosis of diabetic macular edema with diagnosis by optical coherence tomography. *Ophthalmology*. 2004;111(4):712–715. Nature
23. Davis MD, Bressler NM, McCormick B, et al. Comparison of time-domain OCT and fundus methods for detecting macular thickening in diabetic retinopathy. *Invest Ophthalmol Vis Sci*. 2008;49(6):1–7. PMC
24. Rittiphairoj T, et al. Intravitreal steroids for macular edema in diabetes: a systematic review. *Ophthalmol Ther*. 2020;9(3): (review). PMC
25. Jenkins AJ, et al. Lipids, hyperreflective crystalline deposits and diabetic retinopathy. *Br J Ophthalmol*. 2022; (review). PMC
26. Spraul CW, Grossniklaus HE. Vitreous hemorrhage. *Ophthalmology*. 1997;104(9):1466–75.
27. ElAnnan J, Smith SD, Aaberg TM Jr. Current management of vitreous hemorrhage due to proliferative diabetic retinopathy. *Surv Ophthalmol*. 2014;59(1):88–100.
28. Zepeda Romero LC, Olson JL, Hernandez Gonzalez S, et al. Paradoxical vascular fibrotic reaction after intravitreal bevacizumab in retinopathy with extensive fibrovascular proliferation. *Eye*. 2010;24(11):1739–44.

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