

Preoperative Hypoglycemia as a Predictor of Postoperative Vitreous Hemorrhage in PDR Patients Undergoing Vitrectomy

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Objective

This study evaluated the association between preoperative glycemic status—specifically fasting hypoglycemia—and postoperative vitreous hemorrhage (POVH) incidence and visual outcomes in patients with proliferative diabetic retinopathy (PDR) undergoing pars plana vitrectomy (PPV). While much attention has been given to hyperglycemia and its impact on post-op complications, hypoglycemia is an often-underappreciated potential risk factor.

Methods

Medical records of 144 PDR patients who underwent PPV between 2020-2024 were reviewed. Preoperative fasting blood glucose levels were recorded, and patients were categorized as hypoglycemic (<70 mg/dL), normoglycemic (70–125 mg/dL), or hyperglycemic (>125 mg/dL). Postoperative vitreous hemorrhage was assessed within three months. Visual acuity (VA), measured in LogMAR, was collected preoperatively, specifically at Postoperative Day 1 (POD1), Month 1, and Month 3. Additional demographic, systemic, and ocular variables were collected. Statistical analyses included t-tests, chi-square analysis, and ANOVA to evaluate associations between glycemic status, POVH incidence, and Visual Acuity outcomes.

Results

Preoperative hypoglycemia was not significantly associated with POVH, though a trend toward increased incidence was noted. Conversely, hyperglycemia was significantly associated with higher POVH rates within three months ($P=0.009^{**}$). In terms of VA outcomes, hypoglycemic patients demonstrated significant postoperative worsening at Month 1 ($P=0.0001^{***}$) and Month 3 ($P=0.001^{***}$). Hyperglycemic patients also experienced significantly worse VA at POD1 ($P=0.04^{*}$), Month 1 ($P=0.01^{**}$), and Month 3 ($P=0.04^{*}$) compared to normoglycemic patients. Normoglycemic patients exhibited the most favorable recovery in visual acuity across all timepoints.

Conclusion

Both preoperative hyperglycemia and hypoglycemia were associated with worse postoperative outcomes in PDR patients undergoing PPV. While hyperglycemia increased the risk of early POVH, hypoglycemia was linked to poorer visual outcomes. These findings underscore the clinical importance of perioperative glycemic control to potentially improve visual and surgical outcomes in this high-risk population. Future prospective studies are needed to establish evidence-based guidelines for perioperative glycemic management in ophthalmic surgery.