



Diabetic Retinopathy: Pathogenesis, Clinical Features and Management

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Introduction

Diabetic retinopathy (DR) is a microvascular complication of diabetes mellitus and a leading cause of preventable blindness worldwide. It results from chronic hyperglycemia-induced damage to the retinal vasculature, leading to progressive visual impairment. DR typically develops over years of uncontrolled diabetes and may remain asymptomatic in early stages, emphasizing the importance of regular retinal screening. Understanding the pathophysiology, clinical presentation, and management strategies of DR is crucial for preventing vision loss and improving patient outcomes [1,2].

Discussion

The pathogenesis of diabetic retinopathy involves multiple interrelated mechanisms. Chronic hyperglycemia triggers biochemical changes, including the accumulation of advanced glycation end products, oxidative stress, and activation of protein kinase C pathways. These processes cause endothelial dysfunction, pericyte loss, and breakdown of the blood-retinal barrier, leading to microaneurysm formation, capillary leakage, and retinal ischemia. Retinal ischemia stimulates the production of vascular endothelial growth factor (VEGF), promoting abnormal neovascularization and increasing the risk of vitreous hemorrhage and tractional retinal detachment [3,4].

Clinically, diabetic retinopathy is classified into two main stages: non-proliferative diabetic retinopathy (NPDR) and

proliferative diabetic retinopathy (PDR). NPDR is characterized by microaneurysms, dot and blot hemorrhages, hard exudates, and intraretinal microvascular abnormalities. Patients may remain asymptomatic or experience mild visual disturbances. In contrast, PDR involves the growth of fragile new blood vessels on the retina or optic disc, increasing the risk of severe vision-threatening complications such as vitreous hemorrhage and tractional retinal detachment. Diabetic macular edema (DME), which can occur at any stage, is a major cause of central vision loss and results from vascular leakage in the macula.

Diagnosis relies on comprehensive ophthalmic examination, fundus photography, fluorescein angiography, and optical coherence tomography to assess retinal structure and vascular integrity. Early detection through regular screening is essential, especially in patients with long-standing diabetes [5].

Management of diabetic retinopathy involves strict glycemic, blood pressure, and lipid control to slow disease progression. Specific ocular treatments include intravitreal anti-VEGF injections, corticosteroids, and laser photocoagulation for macular edema or proliferative disease. In advanced cases, vitrectomy may be necessary to address vitreous hemorrhage or retinal detachment.

Conclusion

Diabetic retinopathy is a common and potentially sight-threatening complication of diabetes mellitus. Its progression is closely linked to systemic metabolic control, and early detection is key to preventing irreversible vision loss. Advances in imaging, pharmacologic therapies, and surgical techniques have significantly improved outcomes, highlighting the importance of comprehensive care in patients with diabetes.

References

1. Ranjan R, Kumar M (2020) Biochemical profile of *Vinca rosea* Linn (*Catharanthus roseus* G. Don). IOSR J Biotechnology Biochem 6:13-26.
2. Ah B (2002) Antiproliferative Activity of Vietnamese Medicinal Plants, Biological Pharmaceutical Bulletin 753-60.
3. Wang L, He HP, Di YT, Zhang Y, Hao XJ, et al. (2012) Catharoseumine, A New Monoterpenoid Indole Alkaloid Possessing A Peroxy Bridge From *Catharanthus roseus*. Tetrahedron Lett 1576- 1578.
4. Wang CH, Wang GC, Wang Y, Zhang (2012) Cytotoxic Dimeric Indole Alkaloids from *Catharanthus roseus*, Phytotherapies 765-69.
5. Almagro L, Fernández-Pérez F, Pedreño M (2015) Indole Alkaloids from *Catharanthus roseus*: Bioproduction And Their Effect On Human Health, Molecules 20:2973-3000.