RISK STRATIFICATION OF DIABETIC RETINOPATHY BASED ON *ACE* I/D POLYMORPHISM AND GENETIC INHERITANCE MODELS

Angela Adamski da Silva Reis [1] ; Rodrigo Macioca Morato [2] ; **Stela Silva Nolêto Leite de Carvalho** [1]; Leandro do Prado Assunção [1]; Rodrigo da Silva Santos [1]; David Leonardo Cruvinel Isaac [2].

[1] Núcleo de Pesquisa em Neurogenética (NeuroGene), Instituto de Ciências Biológicas (ICB II), Universidade Federal de Goiás (UFG), Avenida Esperança, s/n, Campus Samambaia (Campus II), Zip Code: 74690-900, Goiânia, GO, Brazil.

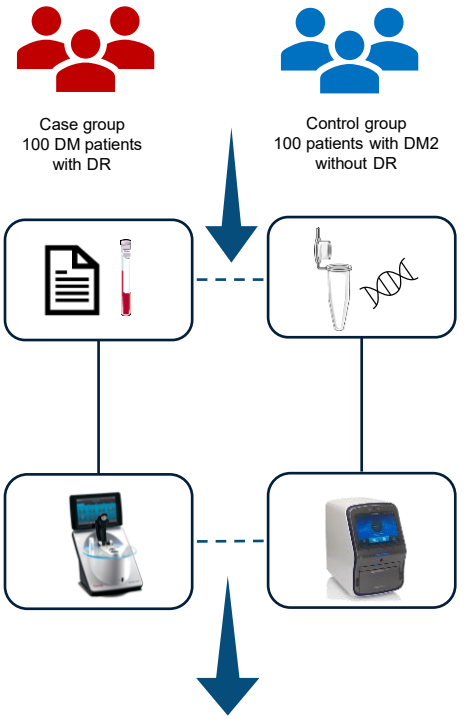
[2] Centro de Referência em Oftalmologia (CEROF), Universidade Federal de Goiás (UFG), 1ª Avenida, Nº 545, Setor Leste Universitário, Zip Code: 74605-020, Goiânia, GO, Brazil.

Corresponding author – angela@ufg.br

INTRODUCTION

Diabetic retinopathy (DR) is a leading microvascular complication of diabetes, affecting up to 80% of patients after 10 years of diabetes *mellitus* (DM). While glycemic control and diabetes duration are primary risk factors, genetic susceptibility significantly contributes to disease pathogenesis. The *angiotensin-converting enzyme* (*ACE*) gene has been implicated in DR, particularly its insertion/deletion (I/D) polymorphism, which may influence retinal microvasculature and inflammation. This study investigated the association between *ACE* I/D polymorphism and DR in the Brazilian population

METHODOLOGY



SUPPORT

UFG CAPES CNPq

RESULTS

Table 1. Distribution of genotypic frequencies for gene *ACE* for risk analysis to diabetic retinopathy.

Genotype	DR n (%)	DM without DR n (%)	OR (CI 95%)	p
I/I	22	33	Reference	
I/D	71	53	2.0094 (1.0530 to 3.83470)	0.0343*
D/D	7	14	0.7500 (0.2610 to 2.1552)	0.5932
Total	100	100		

Analysis by multiple logistic regression to obtain adjusted odds ratio values (OR) and confidence intervals (95% CI). *Significant difference between groups ($p < 0.05$).

Table 2. Distribution of *ACE* genotypes for the clinical variables: severe and proliferative DRD.

Severe DR	Yes n (%)		No n (%)		OR	95% CI	p
II	9	30	12	17,2		1 (Reference)	
ID	19	63,3	53	75,7	0.4780	(0.1740 to 1.3134)	0.1523
DD	2	6,7	5	7,1	0.5333	(0.0836 to 3.4044)	0.5063
Total	30	100	70	100			

Proliferative DR	Yes n (%)		No n (%)		OR	95% CI	p
II	3	14,3	21	26,6		1 (Reference)	
ID	16	76,2	53	67,0	2.1132	(0.5574 to 8.0116)	0.2712
DD	2	9,5	5	6,4	2.8000	(0.3649 to 21.4862)	0.3220
Total	21	100	79	100			

Analysis by multiple logistic regression to obtain adjusted odds ratio values (OR) and confidence intervals (95% CI).

Table 3. Association between II and ID +DD genotypes of *ACE* with clinical variables in RD patients.

ACE Genotype	II	ID + DD	p-valor
Systemic Arterial Hypertension	5	74	0.002*
Laser	9	44	0.048*
Vitreous Injection	7	28	0.067
Vitrectomy	0	11	0.001*
Proliferative DR	9	21	0.089
Maculopathy	12	24	0.056*

Analysis by t test or chi-square. *Significant difference between groups ($p < 0.05$).

DISCUSSION

Excessive vasoconstriction plays a crucial role in disease progression by impairing microvascular perfusion, leading to ischemia and hypoxia. This reduction in oxygen supply triggers pathological angiogenesis and vascular dysfunction, contributing to retinal edema. Additionally, oxidative stress and inflammation accelerate endothelial damage and retinal degeneration, increasing the risk of proliferative DR. Targeting vasoconstrictive pathways with *ACE* inhibitors and vasodilators may improve retinal blood flow, mitigate ischemic injury, and slow DR progression, underscoring the need for further research into vascular homeostasis in retinal disorders.

CONCLUSION

This study highlights the importance of genetic predisposition in DR, emphasizing the ID genotype's role in disease susceptibility and its vasculares implications, while also recognizing the necessity of future research to refine therapeutic strategies.

REFERENCES

References

Lattes Curriculum