

# STUDY OF ASSOCIATION OF ANGIOTENSIN CONVERTING ENZYME GENE POLYMORPHISMS AND TARGET ORGAN DAMAGE IN TYPE 2 DIABETES MELLITUS

Joydeep Chakraborty<sup>1</sup>, Ravindra Prabhu<sup>1</sup>, Shankar P Nagaraju<sup>1</sup>, Manohar Bairy<sup>1</sup>, K Satyamoorthy<sup>2</sup>, Srinivas Kosuru<sup>1</sup>, Rajeevalochana Parthasarathy<sup>1</sup>  
 1 Department of Nephrology, Kasturba Medical College, Manipal, Manipal University, India, 2 School of Life Sciences, Manipal University, Manipal, India

## Introduction<sup>1-3</sup>

- Insertion/Deletion polymorphisms of angiotensin converting enzyme (ACE) gene are associated with ACE levels.
- They are associated with coronary disease risk but their association with development of Diabetic nephropathy and its progression and other target organ involvement has been conflicting among different studies.

## Objective

To study the distribution and association of ACE gene polymorphisms with nephropathy, its progression and other organ involvement in type 2 Diabetes mellitus in our population.

## Methodology

**Study Design:** Prospective Observational

**Study duration** Recruitment 6 months, Follow up minimum 12 months

**Study site:** Department of Nephrology, Kasturba Hospital, Manipal

**Study subjects:**

**Inclusion criteria:**

- Adult type 2 diabetes mellitus of at least 5 years duration .
- Adult type 2 Diabetes mellitus of any duration with clinical or histologically proven nephropathy, retinopathy

**Exclusion criteria:**

- Adult type 2 Diabetes mellitus of < than 5 years duration with no nephropathy or retinopathy or having non diabetic renal disease

**Data Collection:** ACE gene polymorphism was analyzed in blood by DNA extraction, polymerase chain reaction, restriction fragment length polymorphism & DNA sequencing.

➤ Clinical, demographic, lab data from case records

**Data Analysis:** On SPSS version 15

- Pearson's chi square test for categorical & one way Anova for continuous variables

## Results & Discussion

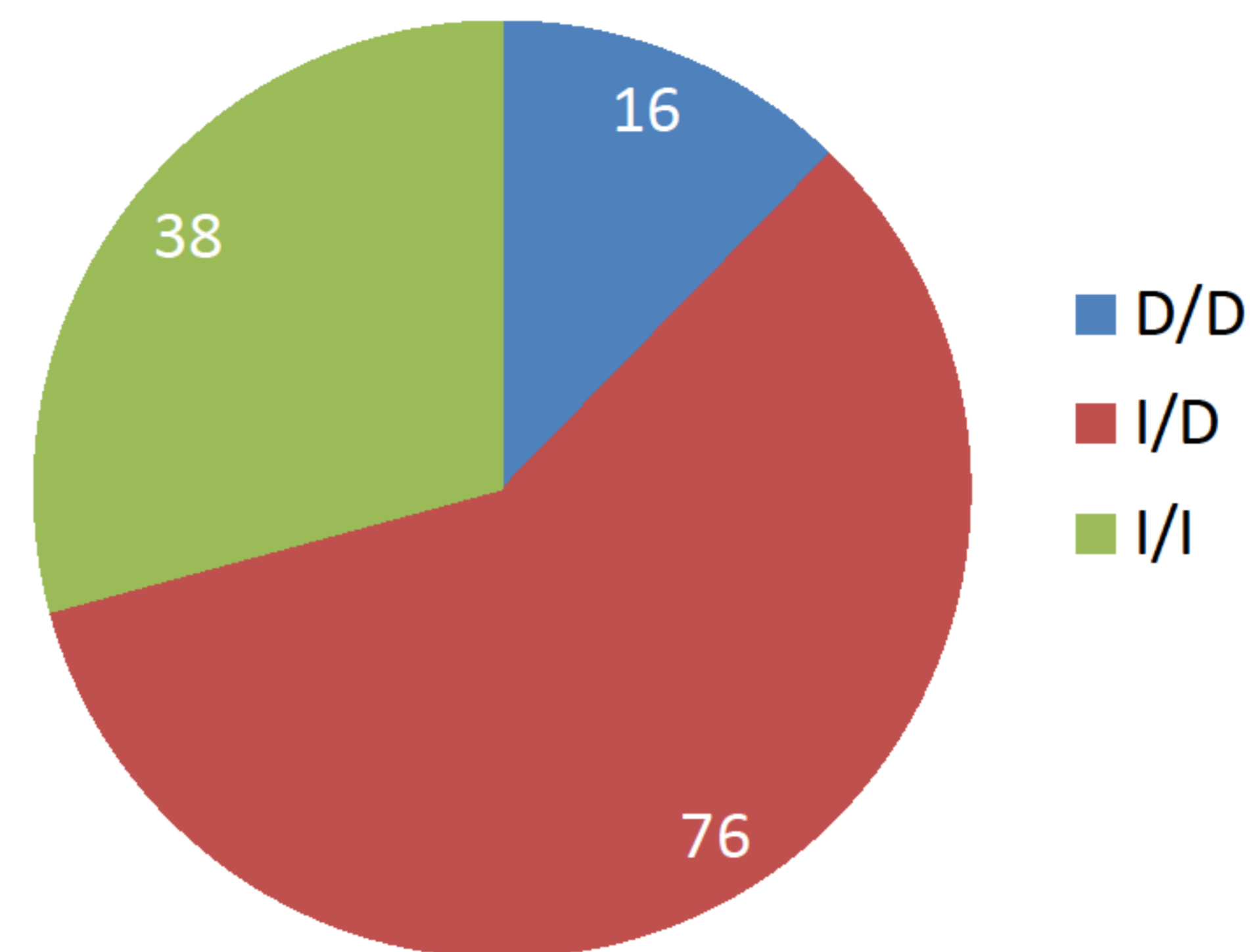
**Table 1 : Demography**

Number	130
Males	103 (79 %)
Mean age ( years )	53.9 ± 9
Mean GFR	53.88 ml/min/1.73 m <sup>2</sup>
Follow up	
Number	69
Duration ( months )	28.5 ( 12 to 44.7 )

**Table 2 : Distribution of ACE gene polymorphisms**

ACE gene polymorphisms	Number (%)
D/D	16 (12.3 %)
I/D	76 ( 58.5%)
I/I	38 ( 29.2 %)

**Distribution of ACE gene polymorphisms**



**Table 3: Distribution of complications in type 2 Diabetes mellitus among ACE gene polymorphisms**

Complications	Number (%)	ACE D/D N = 16	ACE I/D N = 76	ACE I/I N = 38	p value
Retinopathy	102( 78.5 )	14	58	30	0.61
Hypertension	101 (77.7 )	15	65	31	0.51
Neuropathy	35 ( 26.9 )	5	22	8	0.61
Proteinuria	91 ( 70 )	15	53	23	0.30
Total Cholesterol ( mg /dl )		168.16 ± 82	162.3 ± 47	178.6 ± 47	0.41
Triglycerides ( mg/dl )		134.5 ± 54	190.7 ± 23	179.57 ± 29	0.80
HDL Cholesterol ( mg/dl )		35.5 ± 12	35.37 ± 10	31.57 ± 12	0.40
Non HDL Cholesterol ( mg/dl )		109.83 ± 59	126.06 ± 51	138.63 ± 40	0.41
LDL Cholesterol (mg/dl)		87.56 ± 50.4	90.68 ± 36.15	97.65 ± 35.2	0.75
Ischemic heart disease	31 ( 23.8 )	5	16	10	0.62
Systolic dysfunction	25 (19.2 )	4	13	8	0.69
Diastolic dysfunction	59 ( 45.4 )	7	37	15	0.64
Left ventricular hypertrophy	86 ( 66.2 )	12	49	25	0.72
Ejection fraction (%)		63 ± 10	66 ± 8	66 ± 9	0.51

**Table 4 : Average fall in GFR in ml/min/month ( N= 69 )**

ACE D/D (N = 7)	ACE I/D (N = 42)	ACE I/I (N = 20)	p value
0.4 ( 0 to 0.7 )	0.4 ( 0 to 0.8)	0.2 ( 0 to 1.2 )	0.96

## Conclusion

- I/D ACE gene polymorphism is present most frequently in our population of Type 2 Diabetes mellitus.
- ACE gene polymorphisms do not influence presence of hypertension, proteinuria, retinopathy, dyslipidemia, heart disease, neuropathy or progression of nephropathy.

## References

1. Chaouxin J, Daili S, Yanxin H, Ruwei G, Chenlong W, Yaobin T The influence of angiotensin-converting enzyme gene polymorphisms on type 2 diabetes mellitus and coronary heart disease Eur Rev Med Pharmacol Sci. 2013 Oct;17(19):2654-9.
2. Ng DP, Tai BC, Koh D, Tan KW, Chia KS, Angiotensin-I converting enzyme insertion/deletion polymorphism and its association with diabetic nephropathy: a meta-analysis of studies reported between 1994 and 2004 and comprising 14,727 subjects. Diabetologia. 2005 May;48(5):1008-16.
3. Rigat B, Hubert C, Alhenc-Gelas F, Cambien F, Corvol P, Soubrier F An insertion/deletion polymorphism in the angiotensin I-converting enzyme gene accounting for half the variance of serum enzyme levels J Clin Invest. 1990 Oct;86(4):1343-6.