

# Categorization of the diabetic nephropathy by Tervaert classification in clinical setting

Ana Pinho<sup>1</sup>, Filipa Moreno<sup>2</sup>, Renata Dias<sup>2</sup>, Ramon Vizcaino<sup>2</sup>, Ana Paula Silva<sup>1</sup>

<sup>1</sup> Department of Nephrology – Faro Hospital, Faro, Portugal

<sup>2</sup> Department of Anatomic Pathology – Centro Hospitalar do Porto, Oporto, Portugal

## Introduction and Aims:

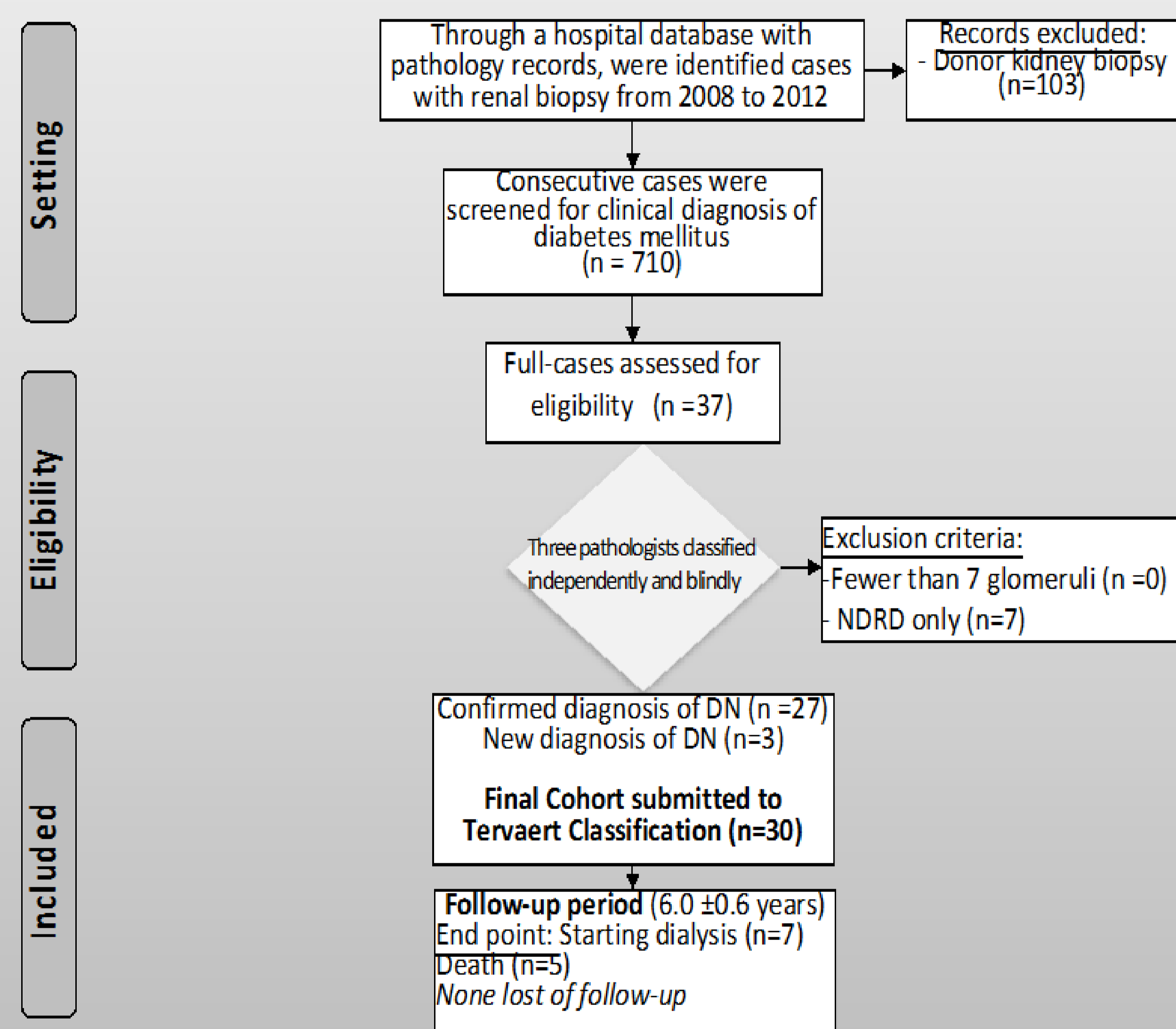
Nephropathy of diabetic patients can be diverse, occurring concomitantly with other primary glomerular diseases. Therefore, challenges remain in the diagnosis of diabetic nephropathy (DN). Our aim was to assess the diagnostic reliability and prognostic value of the Tervaert DN classification in clinical setting.

## Methods:

A single-centre study in a tertiary referral center for renal pathology was retrospectively conducted. All patients submitted to renal biopsy (RB) between 2008-2012 were evaluated. RB were revised by three pathologists (1 senior reader: >10 years of experience; 1 intermediate reader: 3 years of experience; and 1 junior reader: first year of practice) according to a low clinical threshold for DN. They categorized DN, blinded for inter-observer assessment and clinical outcome.

## Results:

### Flowchart showing setting, eligibility and follow-up



### Demographic and clinical data at time of kidney biopsy in type 2 diabetic patients, stratified according to the Tervaert classification of DN

	Class II (n=10)	Class III (n=16)	Class IV (n=4)
Age (years)	49.5 ± 2.3	51.5 ± 3.5	52.5 ± 5.2
Male (%)	84.3	92.3	86.9
Pure Diabetic nephropathy (n)	7 <sup>c</sup>	11 <sup>d</sup>	4
Diabetes duration (years)	11.1 ± 7.4	16.5 ± 3.5	14.5 ± 8.5
Insulin therapy (%)	40*	68.8*	100*
Hypertension (%)	90	100	75
Creatinine (mg/dL) <sup>a</sup>	1.53 ± 0.7	1.75 ± 0.6	2.20 ± 1.1
eGFR (ml/min/1.73 m <sup>2</sup> ) <sup>b</sup>	57.2 ± 10.4	51.1 ± 22.1	42.3 ± 15.4
Proteinuria >1gr (%)	80	87.5	75

\* P<0.05

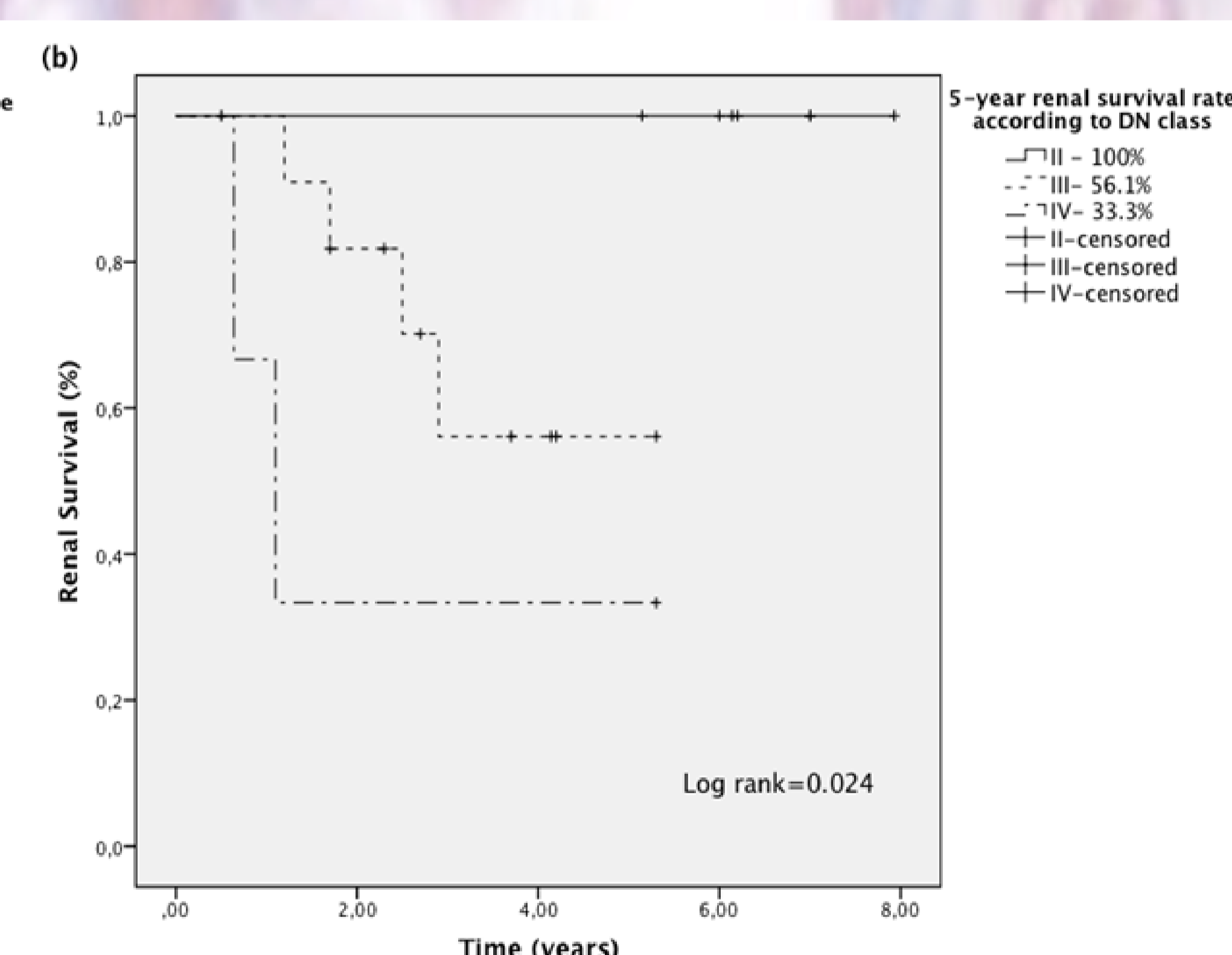
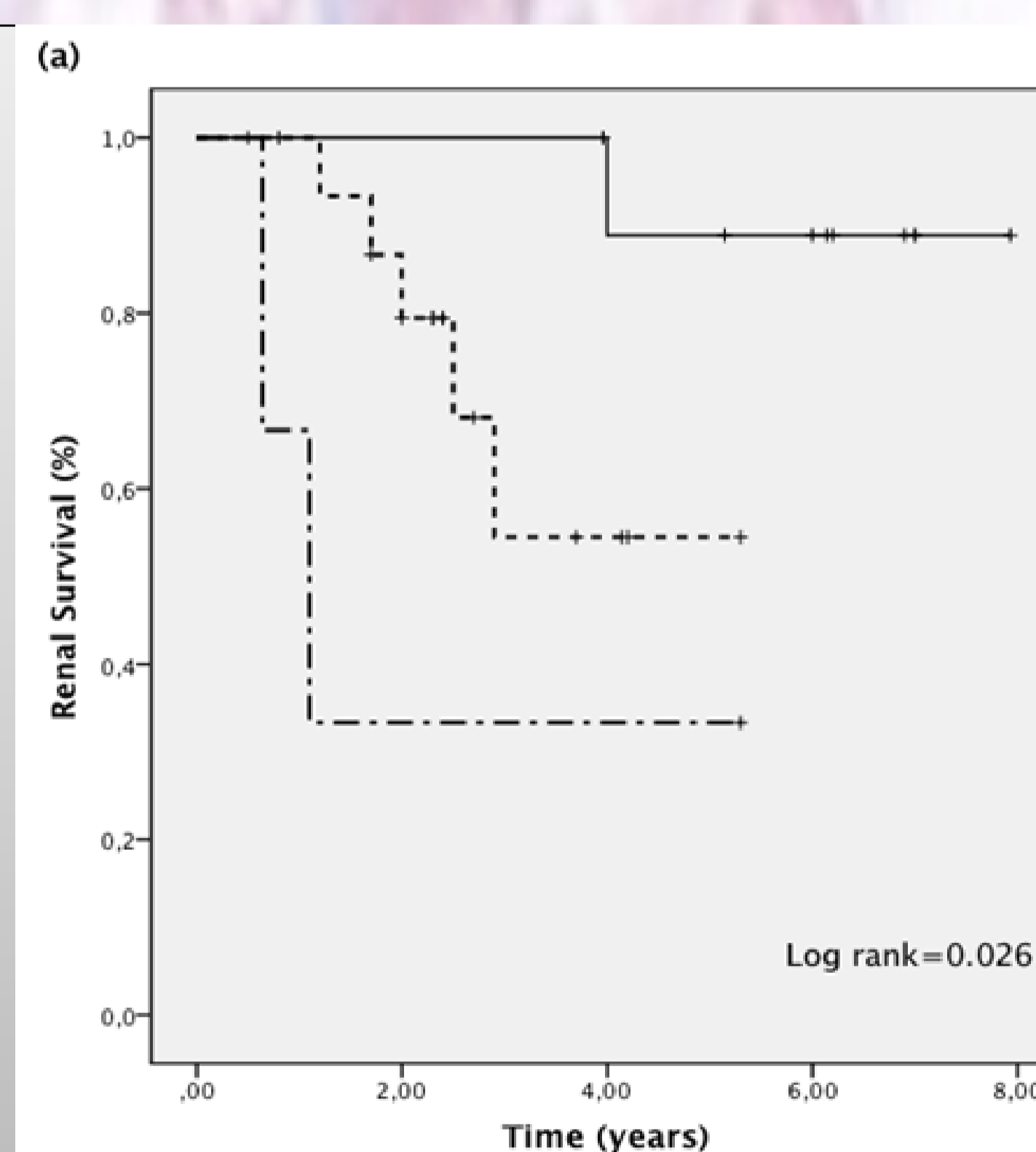
### (a) Renal survival, free of ESRD, among type 2 diabetic according to Tervaert classification of all DN cases\*

\*Included 8 mixed DN [IgA nephropathy (3 cases), transplant glomerulopathy (2 cases), light chain disease (1 case), amyloidosis (1 case) or HIV- Associated Nephropathy (1 case)]

### (b) Renal survival, free of ESRD, among type 2 diabetic according to Tervaert classification of pure DN cases

### Assessment of interobserver agreement

Diabetic Nephropathy Classes by		Experienced pathologist		
		Class II (n=10)	Class III (n=16)	Class IV (n=4)
Intermediate experienced pathologist	Class II (n=11)	9	1	1
	Class III (n=15)	1	14	-
	Class IV (n=4)	-	1	3
Inter-observer agreement				
Cohen's kappa (95% CI) 0.78 (0.57 to 0.98)				
Intraclass correlation coefficient (95% CI) 0.85 (0.68 to 0.93)				
Inexperienced pathologist	Class II (n=10)	8	1	1
	Class III (n=15)	2	13	-
	Class IV (n=5)	-	2	3
Inter-observer agreement				
Cohen's kappa (95% CI) 0.67 (0.43 to 0.91)				
Intraclass correlation coefficient (95% CI) 0.80 (0.58 to 0.91)				
Global Inter-observer agreement				
Cohen's kappa (95% CI) 0.72 (0.56 to 0.88)				
Intraclass correlation coefficient (95% CI) 0.82 (0.78 to 0.88)				



## Conclusions:

These findings corroborate the results from research centers: in fact, Tervaert classification seems to be user friendly and accurate in DN diagnosis. By attracting more attention to early lesions, it seems to contribute to increase diagnosis, which associated with its prognostic value, could be an important guide for future therapy decisions about DN. Future studies are therefore recommended, in order to development this clinically useful classification system.

## References:

- Diabetologia 2008; 51:1347
- J Am Soc Nephrol 2010; 21:556
- Clin J Am Soc Nephrol 2013; 8: 171
- Nephrol Dial Transplant 2014; 29:109

