Diabetes Mellitus as a Risk Factor for Urinary Tract Infections in Kidney Transplant Recipients

Severins Krohmals[1], Christophe de Terwangne[2], Arnaud Devresse[1], Hector Rodriguez-Villalobos[3], Nada Kanaan[1]

Department of Nephrology [1], Internal Medicine [2] and Microbiology [3]

Cliniques Universitaires Saint-Luc, Brussels, Belgium

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Background

Urinary tracts infections (UTIs) are a common complication after kidney transplantation

Risk factors : traditional, urological, and related to the state of immunosuppression

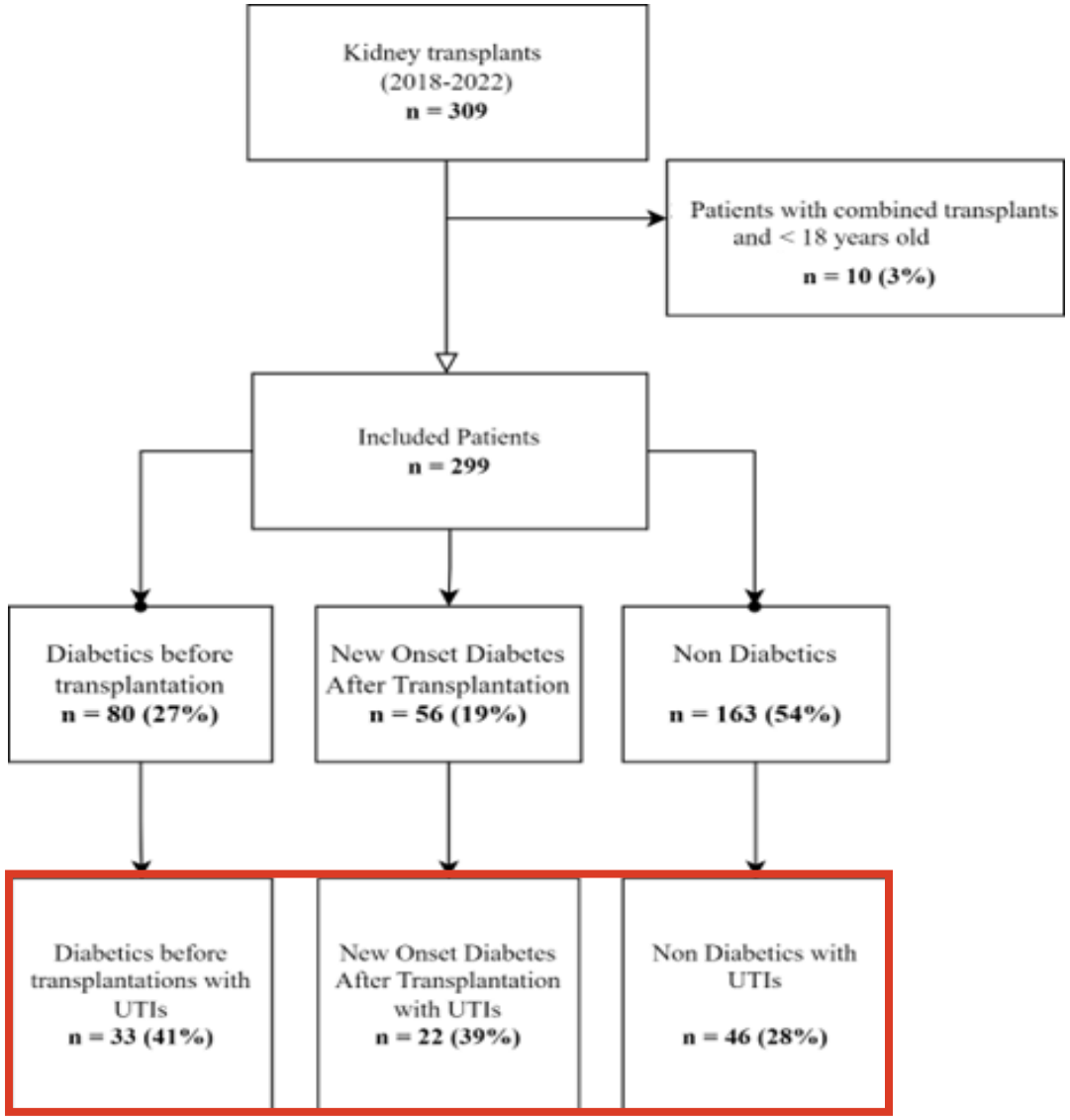
Aim

Assess the impact of diabetes (pre-transplant and NODAT) on the occurrence and severity of UTIs

Methods

- **Retrospective study**
- **Adult patients transplanted with a kidney between 2018 and 2022**
- **Categorized by their diabetic status : pre-transplant diabetics/NODAT/non-diabetics**
- **UTIs defined according to American Society of Transplantation --- asymptomatic bacteriuria and lower UTIs not included**

Flow Chart



Patients characteristics

Characteristic	Patients		Stratification	
	n = 299	Pre-Transplantation Diabetics – no. – (%)	New Onset Diabetes after Transplantation – no. (%)	Non-Diabetics – no. (%)
		n = 80 (26,8)	n = 56 (18,7)	n = 163 (54,5)
Age at transplantation – Years	52 ± 13	55 ± 11	53 ± 11	49 ± 14
Female sex – no. (%)	104 (34,9)	27 (33,7)	18 (32,1)	59 (36,2)
Initial Nephropathy – no. (%):				
Diabetic nephropathy	33 (11,1)	33 (41,2)	0 (0)	0 (0)
Glomerulonephritis	45 (15,1)	2 (2,5)	5 (8,9)	38 (23,3)
Interstitial nephritis	25 (8,4)	3 (3,7)	7 (12,5)	15 (9,2)
Congenital/Hereditary	47 (15,7)	7 (8,8)	8 (14,3)	32 (19,6)
Hypertensive	13 (4,3)	3 (3,7)	5 (8,9)	5 (3,1)
Other or Unknown	136 (45,5)	34 (42,5)	29 (51,8)	73 (44,8)
Dialysis - no. (%)				
Hemodialysis	270 (90,3)	71 (88,7)	52 (92,8)	147 (90,2)
Peritoneal	29 (9,7)	9 (11,3)	4 (7,1)	16 (9,8)
Time on dialysis - Months	51 ± 57,4	52 ± 57,4	52 ± 57,5	51 ± 57,4
Donor type: Deceased – no. (%)	253 (84, 9)	67 (86,2)	48 (85,7)	138 (84,7)
Immunosuppression – no. (%)				
Induction Therapy:				
Basiliximab	39 (13,1)	10 (12,5)	5 (8,9)	24 (14,7)
Thymoglobuline	31 (10,4)	12 (15,0)	3 (5,4)	16 (9,8)
Plasmapheresis	53 (17,7)	10 (12,5)	13 (23,2)	30 (18,4)
Tri-Therapy: *Mycophenolate Mofetil + Corticosteroids + Tacrolimus*	299 (100,0)	80 (100,0)	56 (100,0)	163 (100,0)

Higher occurrence of UTIs in Pre- and Post-Transplant Diabetics vs non-diabetics (p<0.05)

Urinary tract infections

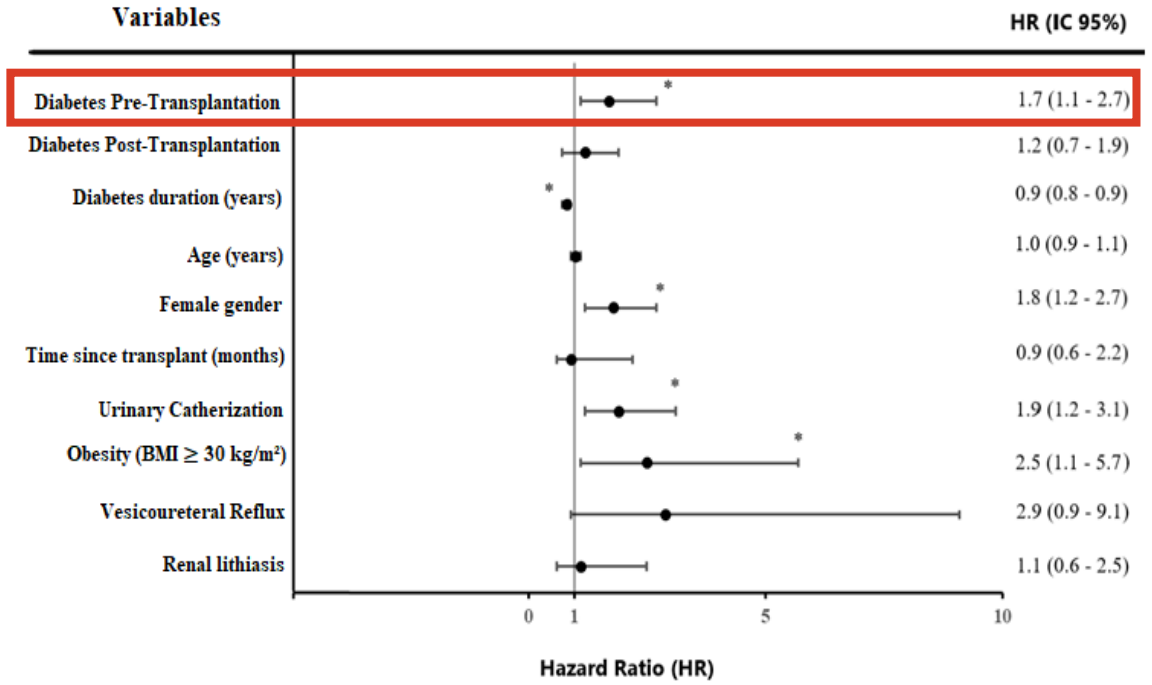
Characteristic	Patients		Stratification		
	n = 299	Pre-Transplantation Diabetics – no. – (%)	New Onset Diabetes after Transplantation – no. (%)	Non-Diabetics – no. (%)	
		n = 80 (26,8)	n = 56 (18,7)	n = 163 (54,5)	
					p-value
Urinary Tract Infections – no. (%)	101 (33,8)	33 (41,2)	22 (39,3)	46 (28,2)	**0,04**
Female gender with UTIs – no. (%)	45 (44,5)	16 (48,5)	9 (40,9)	20 (43,4)	**<0,05**
Complicated UTIs – no. (%)	67 (66.3)	23 (69.7)	12 (54.5)	32 (69.5)	0.76
Recurrent UTIs – no. (%)	16 (15.8)	5 (15.1)	2 (9.1)	9 (19.6)	0.71
Bacteremia from UTIs – *months* - no. (%)	18 (17.8)	7 (21.2)	6 (27.2)	5 (10.9)	0.07
BMI - (kg/m²)	26 ± 5	27 ± 5	26 ± 5	26 ± 4	0,29
Obesity – BMI ≥ 30 – no. (%)	73 (24.6)	26 (32.1)	14 (25.0)	34 (20.7)	0,15
Catheterization – no. (%)	49 (17,0)	12 (15,8)	10 (18,2)	27 (17,2)	0,93
Presence of renal lithiasis – no. (%)	18 (6,0)	2 (2,5)	6 (10,7)	10 (6,1)	0,15
Vesicoureteral Reflux – no. (%)	4 (1,4)	0	1 (1,8)	3 (1,9)	0,48
Glomerular Filtration Rate - ml/min/1.73 m²	57,8 ± 20,9	54,2 ± 17,5	62,3 ± 20,5	57,9 ± 22,2	0,25
Antibiotic Therapy (days)	13 ± 6	15 ± 6	12 ± 7	14 ± 4	0,24

Median follow-up time = 29 months (IQR 15-45)

Pairwise comparison of UTI occurrence

Comparison	No. – (%)	p-value
Non-Diabetics vs. Pre-Transplant Diabetics	46 (28,2) vs. 33 (41,2)	**0,02**
Non-Diabetics vs. NODAT	46 (28,2) vs. 22 (39,3)	0,05
Pre-Transplant Diabetics vs. NODAT	33 (41,2) vs. 22 (39,3)	0,68

Risk factors for UTIs –Multivariable analysis



Gender, urinary catheterization, obesity were additional risk factors

Conclusion

Pre- and Post-Transplantation Diabetes increase the risk of UTIs occurrence in kidney transplant recipients

Pre-Transplant Diabetes arises as a **significant risk factor** for UTIs after kidney transplantation