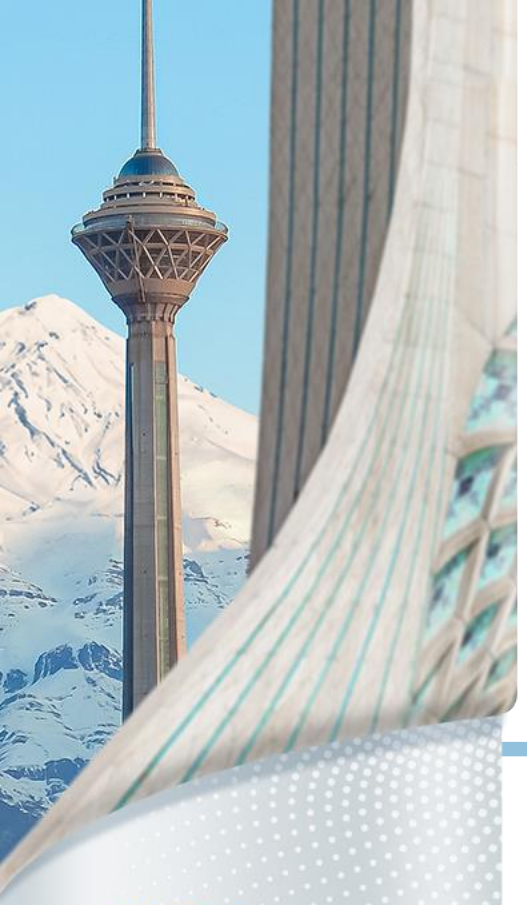

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Comparison of Viral Load of Polyomavirus among Renal Transplant Recipients and Donors

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Introduction

- ✓It is estimated that 50%-90% of adults have antibodies against both BKV and JCV as most individuals become seropositive in their childhood .
- ✓BKV and JCPyV urinary shedding is detectable in up to 10 to 30% of healthy blood donation.
- ✓Primary infection is usually asymptomatic or associated with mild upper respiratory symptoms.

- ✓After kidney transplantation, high level BK viruria (>7 log10 copies/ml, or shedding or urothelial or decoy cells) is seen in 30 to 60% of patients.
- ✓ The prevalence of BKV nephropathy (BKVN) is estimated to be 1%-10% which can result in the graft loss of renal transplantation in 40%-80% of cases.
- ✓The presence of the JC virus in the urine of renal transplant recipients, and in liver transplant recipients was 22.3%, and 22.7%, respectively.
- ✓JC virus may cause PML in immunocompromised patients. It rarely causes JCPyV- associated nephropathy.

Patients and Methods

- ✓This cross-sectional study was conducted in 40 stable kidney transplant recipients and 44 healthy donors in Montaseriyeh Organ Transplantation Hospital in Mashhad, Iran during 2018-2019.
- ✓First morning urine and blood samples from all patients and donors were collected for extraction of Polyomavirus virus DNA.
- ✓Detection and quantification of BK and JC viruses were performed utilizing the BK RQ and JC RQ kits (Novin Gene, Iran), respectively. Virus copies of more than 100 copies/mL were considered positive.

Results:

- ✓JC and BK viruses were identified in 31% and 92.3% of all subjects, respectively. The frequency of JC and BK cases was not statistically different between the recipient and donor groups (P>0.05).
- ✓ The male:female ratio was 29:15 and 24:16 in donors and kidney transplant recepients (P=0.575).
- ✓There was no statistically significant difference in terms of age between the two groups (P=0.219).

Frequency of BK, JC viruses in renal transplant recipients and donors.

Variable		Donor	Recipient	Total	P-value
BK virus	Negative	2(4.9%)	4(10.8%)	6(7.7%)	0.415§
	Positive	39(95.1%)	33(89.2%)	72(92.3%)	
JC virus	Negative	27(61.4%)	31(77.5%)	58(69.0%)	0.110*
	Positive	17(38.6%)	9(22.5%)	26(31.0%)	

Table 2. Frequency of BK and JC viruses in renal transplant recipients and donors.

Variable		Donor	Recipient	P-value*
BKV (log10 copies/ml plasma)	Mean ± SD	4.8±1.6	6.7±2.7	0.001
	Median	4.3	5.6	
JCV (log10 copies/ml plasma)	Mean ± SD	6.5±1.7	7.1±2.2	0.634
	Median	6.5	6.9	

* Mann-Whitney test.

Table 4. Relationship between presence of BK and JC viruses and hematologic indices in renal transplant recipients and donors.

Variable		Donor						Recipient					
		BK virus			JC virus			BK virus			jc virus		
		Negative	Positive	*P*	Negative	Positive	*P*	Negative	Positive	*P*	Negative	Positive	*P*
Sex	Male	1(50.0%)	27(69.2%)	0.54	15(55.6%)	14(82.4%)	0.10	4(100.0%)	18(54.5%)	0.13	20(64.5%)	4(44.4%)	0.44
	Female	1(50.0%)	12(30.8%)		12(44.4%)	3(17.6%)		0	15(45.5%)		11(35.5%)	5(55.6%)	
Age(years)		26±26.8	36.9±19.6	0.41	34.9±21.1	40.3±15.9	0.46	40.5±13.9	32.4±12.8	0.46	30.9±14.5	39.3±9.2	0.19
WBC		10.7±4.1	12.7±5.5	0.64	13.1±5.5	12.6±5.0	0.75	11.5±2.9	7.5±3.1	0.08	7.5±2.7	9.1±5.6	0.85
RBC		3.7±0.7	4.3±0.8	0.34	4.2±0.9	4.4±0.7	0.45	4.4±0.9	4.2±0.9	0.71	4.2±0.9	3.9±0.4	0.91
HB		10.8±2.9	12.7±2.5	0.41	12.1±2.2	13.5±2.7	0.08	12.4±1.1	12.4±2.4	0.80	12.6±2.5	11.6±0.8	0.63
HCT		32.7±7.7	38.3±7.0	0.31	35.2±9.0	40.1±6.7	0.09	40.2±4.9	37.5±7.0	0.46	38.7±7.3	34.2±2.4	0.18
MCV		87.2±4.1	86.8±6.0	0.85	86.1±6.1	88.9±4.6	0.14	91.5±7.1	89.5±5.5	0.87	90.3±5.6	86.9±3.9	0.25
MCH		28.8±2.3	28.4±2.1	0.97	28.2±2.2	29.2±1.6	0.18	28.2±3.0	29.5±2.4	0.64	29.4±2.6	29.1±1.3	0.50
MCHC		33.0±1.1	32.8±1.8	0.97	32.9±1.9	32.9±1.3	0.99	30.8±0.9	33±1.6	0.07	32.6±1.7	34.0±1.1	0.08
PLT		67.5±13.4	173.6±107	0.10	150.0±85	192.5±127	0.30	265±14.1	181.9±37	0.02	187.4±44.3	196.2±38	0.57

*Fisher's exact test for categorical and Mann-Whitney for quantitative variable.

Conclusion

- ✓The present study showed a relatively high shedding of BK and JC viruses in the urine of both renal transplant donors and recipients.
- ✓The viral load for BKV, but not JCV, was higher in stable kidney transplant recipients than in donors.
- ✓Routine evaluation of BKV and JCV PCR may be recommended for both transplant recipients and donors.