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BKV-Associated Urothelial Carcinoma in Kidney Transplant Recipients: A Regional Cohort of Kidney Transplant Recipients

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BACKGROUND

Kidney transplant recipients (KTRs) have an increased risk of malignancy. BK virus (BKV) commonly reactivates in immunosuppressed patients. The role of BKV in urothelial carcinoma (UC) remains incompletely defined however recent evidence points to a potential causal relationship.

OBJECTIVE

To investigate the clinical features, pathological characteristics, and outcomes of BKV-associated UC in KTRs.

PATIENTS & METHODS

We performed a retrospective cohort review at a UK supra-regional transplant urology centre between November 2006 – January 2026.

KTRs with histologically confirmed UC were identified. BKV blood and / or urine status was assessed using PCR. Tumour samples were also assessed for SV40 Large T antigen as a marker of viral integration.

Tumour grade, stage and further clinicopathological features were compared between BKV and SV40 status.

Per the EAU classification, tumours were grouped into:

- Low-risk: Ta G1/G2 + T1 G1/G2
- High-risk: T1G3 + T2 + T3

RESULTS

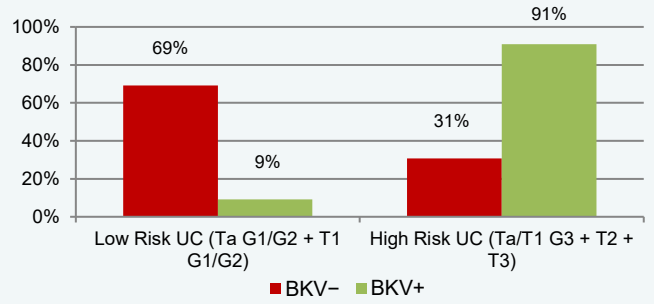
PATIENT CHARACTERISTICS

24 patients identified: 11 BKV+

79% of UC involved the bladder

7.3y median follow-up time

PATIENTS WITH BKV REACTIVATION



BKV + patients had more high-risk tumours at diagnosis. 10/11 (91%) BKV+ vs 4/13 (31%) BKV−, *p = 0.005*.

BKV + patients were also more likely to have Grade 3 tumours at diagnosis. 10/11 (91%) BKV+ vs 5/13 (39%) BKV−, *p = 0.013*.

SV40 LARGE T ANTIGEN

33.3% (6/18) tumours were SV40+ providing evidence of viral integration into the genome.

All SV40+ tumours were high-risk, compared to 58.8% of SV40- tumours, *p = 0.115*.

SV40+ tumours were more likely to have a higher stage, *p=0.05*.

SURVIVAL & FURTHER FINDINGS

Factor	BKV+	BKV−	p-value
Mean age at 1st transplant	**54.9 ± 16.9 y**	**39.5 ± 16.3 y**	**0.034**
Male	70%	84.6%	0.357
Follow-up post UC diagnosis	5.74 ± 5.80 y	8.65 ± 6.25 y	0.252
Follow-up post-transplant	14.09 ± 8.69 y	22.62 ± 13.67 y	0.088
Living donor – 1st transplant	45.5%	58.3%	0.684
Living donor – 2nd transplant	36.4%	58.3%	0.414
Age at UC diagnosis	63.8 ± 17.2 y	56.6 ± 11.8 y	0.238
1st transplant → UC	9.07 y	10.09 y	0.228
Last transplant → UC	7.15 y	10.09 y	0.150
Survival post UC	**138.7 mo**	**170.4 mo**	**0.639**

CONCLUSION

BKV infection in KTRs was associated with aggressive, high-grade UC.

KEY MESSAGE

These findings highlight the need for heightened clinical vigilance, timely immunosuppression adjustment and may warrant UC screening programs post BKV reactivation for this at-risk population.