

## Introduction

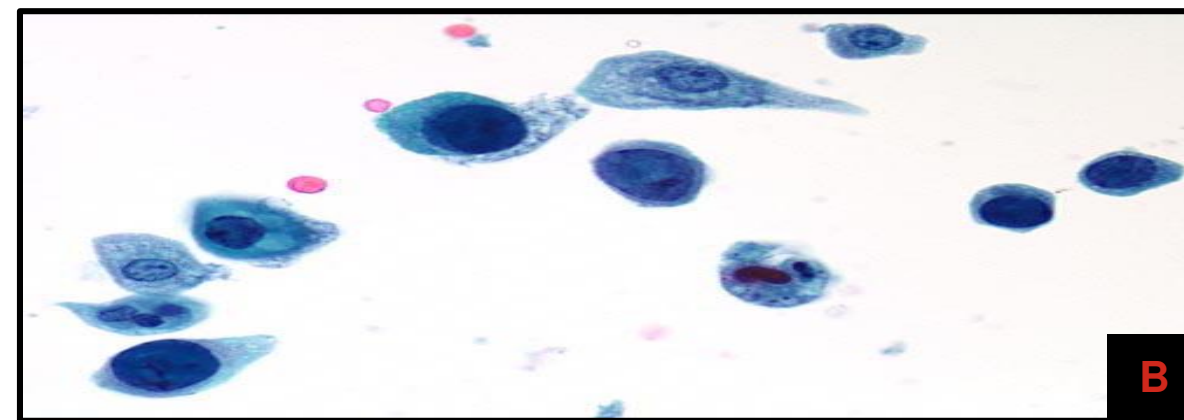
- Hemorrhagic cystitis is a life threatening form of cystitis, mainly reported in immunocompromised population with bone marrow transplantation, acquired immunodeficiency syndrome and solid organ transplantation.
- In transplanted patients, it is largely attributed to polyoma BK virus (BKV) and adenovirus infections.
- HC secondary to polyoma BK virus is unusual in non-transplanted non Hodgkin lymphoma patients.

## Case presentation

- A 45 year-old female patient, previously healthy, consulted for a relapse of her breast non Hodgkin lymphoma.
- One year prior to her presentation, she was diagnosed, in another institution, with a primary DLBCL CD20 negative, of the left breast - stage IE.
- She received 6 cycles of CHOP with complete remission.
- Six months later, she had local recurrence with inflammatory breast changes, and supra-diaphragmatic lymphadenopathies. There was no bone marrow invasion. The biopsy confirmed the DLBCL CD20 negative.
- She received a second line chemotherapy consisting of systemic ESHAP protocol associated with intrathecal chemotherapy.
- Her relapse was refractory, so we decided to intensify with the hyper-CVAD protocol.

## Results – Discussion

- After the first cycle, she presented with HC that was initially suspected to be secondary to cyclophosphamide despite aggressive hydration and administration of mesna.
- She had grade II thrombocytopenia with no coagulopathy. No identified kidney stone. No identified bacterial pathogens. The urine cytology showed decoy cells without any evidence of lymphomatous invasion. The cystoscopy showed diffuse inflamed mucosa with blood clots. We asked for a panel of urinary viral qualitative polymerase chain reaction. It came positive for **polyoma BK virus**.
- We managed her with continuous bladder irrigation and administration of intra-vesical aminocaproic acid. We wanted to try cidofovir, but it wasn't available. Unfortunately, the patient condition kept deteriorating, and she passed away after multi-organ failure secondary to septic shock.



**A: Hemorrhagic cystitis with hyperemic mucosa secondary to the re-activation of BKV**  
**B: Decoy cells: morphologic sign of BKV re-activation; typical intra-nuclear viral inclusion bearing epithelial cells (Courtesy of Dr YS Erozan and Dr DL Rosenthal)**

## Conclusion

- Polyomaviruses of the BK-strains often remain latent within the transitional cell layer of the bladder.
- Changes in the immune status → (re)activation of latent BKV along the bladder transitional cell layer → shedding of viral particles and infected cells into the urine.
- Decoy cells in the urine cytology are a useful clue to polyomavirus infection: sensitivity= 99%; specificity=95%.
- Viruria with identification of the BKV by PCR is the gold standard for diagnosis.

## Take Home Message

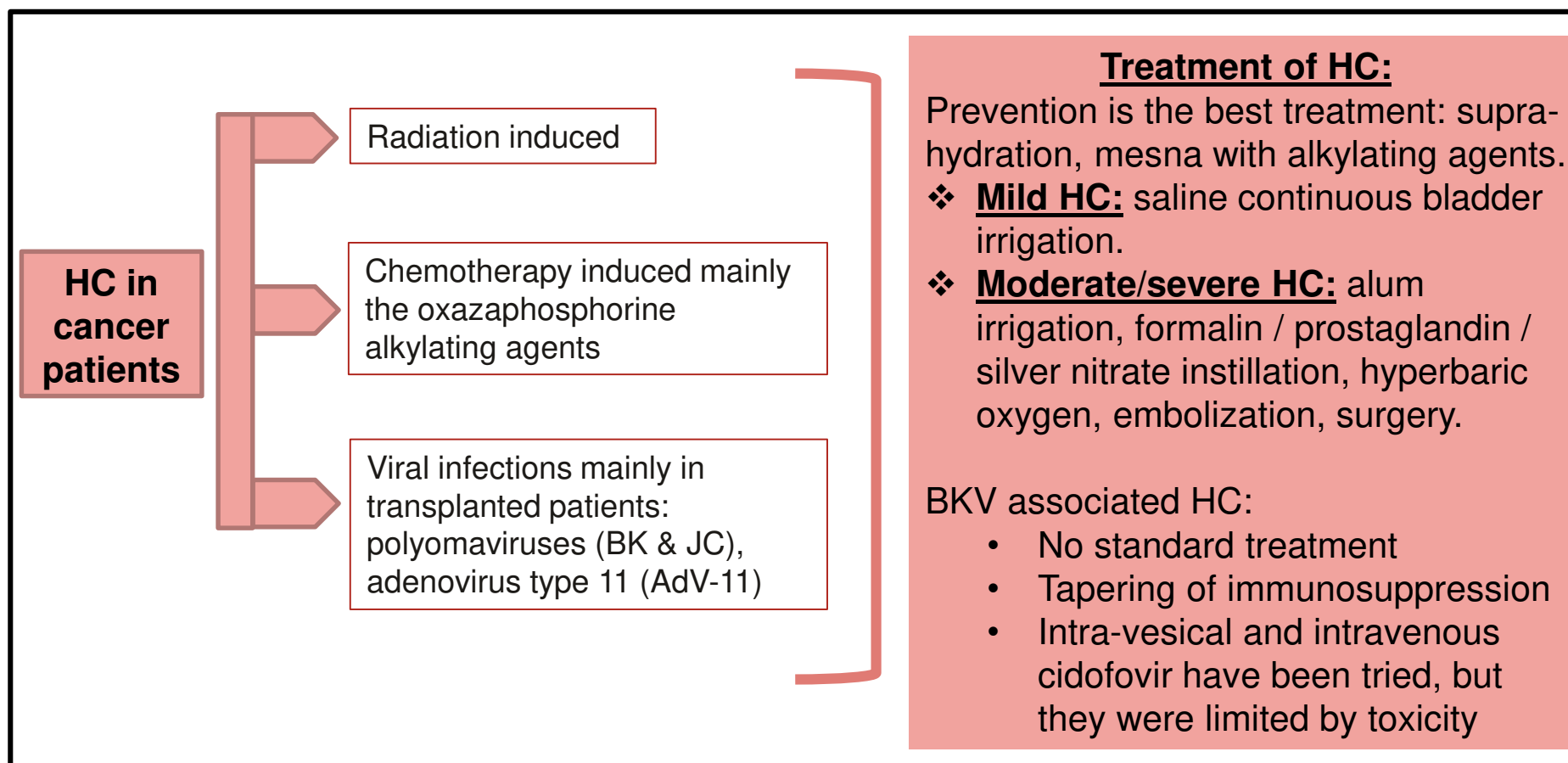
- Our case illustrates an exceptional HC caused by BKV infection in an immunocompromised, non-transplanted patient.
- BKV-HC remains a serious condition with dismal outcome. Besides the supportive measures, no antiviral treatment has been indicated as a SOC. Cidofovir may be a potentially effective therapy, but evidence supporting its use requires RCT.

## Abbreviations

BKV: Polyoma BK virus; HC: hemorrhagic cystitis; DLBCL: diffuse large B cell lymphoma; CHOP: cyclophosphamide, doxorubicin, vincristine, prednisone; ESHAP: etoposide, solumedrol, high dose cytarabine, cisplatin; PCR: polymerase chain reaction; SOC: standard of care; RCT: randomized clinical trial.

## References

1. Decoy cells in urine cytology: A useful clue to post-transplant polyoma virus infection. J Cytol. 2012
2. Cidofovir for BK virus-associated hemorrhagic cystitis: a retrospective study. Clin Infect Dis. 2009
3. Dr Yener S. Erozan, Dr Dorothy L. Rosenthal; pathology.jhu.edu; Johns Hopkins Medical Institution



**Algorithm resuming the etiologies and management of HC in cancer patients**