RBWH / QUT

Vancomycin therapeutic drug monitoring and acute kidney injury in haematology and bone marrow transplant patients

Shannon Pallett[1], Sheba Alex[2], Elango Subramoniapillai[3] , Midori Nakagaki[1]

1. Pharmacy Department, Royal Brisbane and Women's Hospital 2. School of Pharmacy, Queensland University of Technology

3. Cancer Care Services, Royal Brisbane and Women's Hospital

Background

Vancomycin is frequently used in haematology and bone marrow transplant (BMT), either as an empiric treatment of febrile neutropenia or as a targeted therapy. While therapeutic drug monitoring (TDM) is routinely conducted, vancomycin-related acute kidney injury (AKI) appears to be common.

Aims

- To investigate vancomycin-related AKI within haematology and BMT patients.
- To assess vancomycin use, TDM and dose adjustment.

Methods

- This was a single centre retrospective audit
- Patients in Haematology and BMT ward who had a vancomycin level available in 2021 were included
- Collected data included;
  - Patient demographics
  - Vancomycin indication, doses, time, and levels
  - Creatinine levels
  - Co-administered nephrotoxic drugs
- AKI was classified according to KDIGO clinical practice guideline

Results

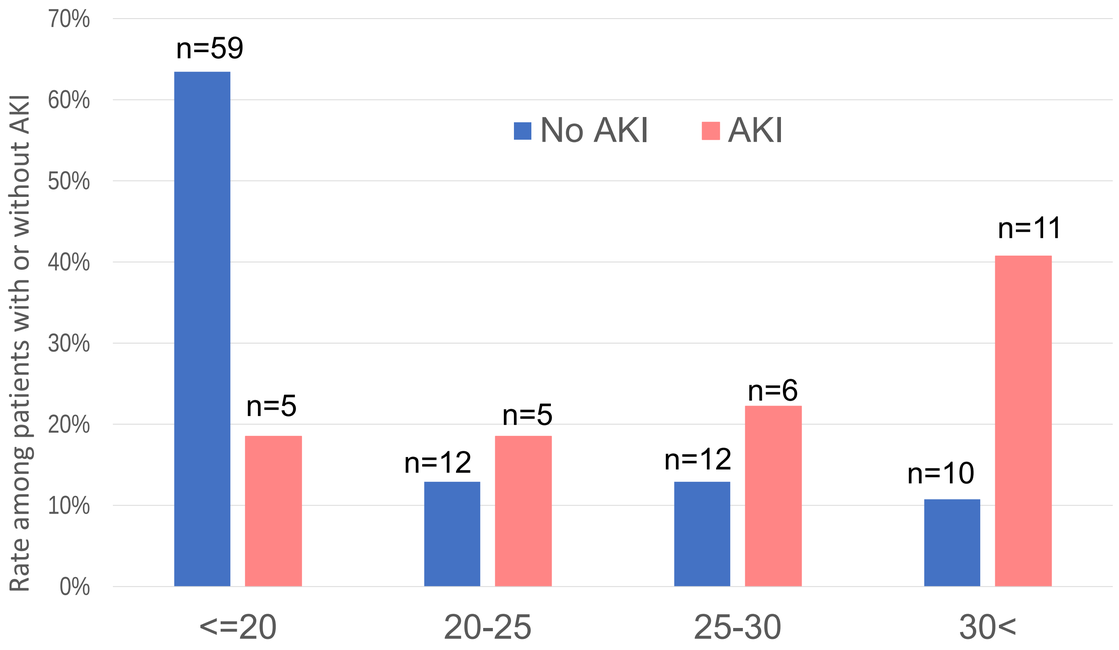
Incidence of AKI

Total patients N=120 (147 encounters)

No AKI: N=93 (77.5%)		
AKI: N=27 (22.5%)	Grade 1	N=18 (15%)
	Grade 2	N=8 (6.7%)
	Grade 3	N=1 (0.8%)

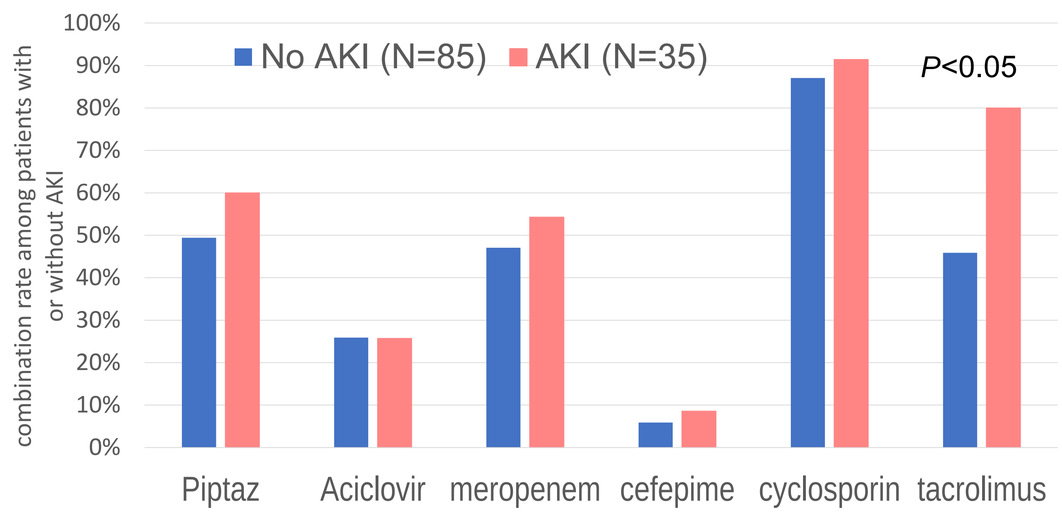
- Over 20% of patients developed AKI during vancomycin therapy

Maximum vancomycin levels in patients with / without AKI



- AKI can occur with therapeutic levels of vancomycin

Concomitant nephrotoxic drugs in patients with/ without AKI



- Concomitant use of tacrolimus significantly increased AKI→ these patients are at high risk of infection (GVHD or haploidentical BMT)

Vancomycin dose adjustment before next dose following subtherapeutic or supratherapeutic levels

	Adjustment before next dose
After levels <15	132 / 269 (49%)
After levels >20	85 / 116 (73%)

- Prompt dose adjustment was more common after supratherapeutic levels but still 73%

Empiric vs targeted vancomycin treatment : AKI and duration of treatment

	Empiric (n=56)	Targeted (n=64)
AKI	16% (n=9)	27% (n=17)
Median Duration (days) for both AKI and no AKI	6 (Range 2-37)	9.5 (Range 3-32)
Median Duration (days) No AKI	6 (Range 2-15)	8 (Range 3-30)
Median Duration (days) AKI	16 (Range 2-37)	16 (Range 3-32)

- AKI was more common with targeted therapy. Duration of empiric therapy was close to that of targeted therapy

Duration of treatment and association with AKI

Duration	AKI	No AKI
≤5 days	15% (n=4)	34% (n=32)
>5 days	85% (n=22)	66% (n=61)

- AKI was associated with the duration of vancomycin therapy

Conclusions

- Vancomycin-related AKI was common, and can occur within therapeutic levels.
- AKI was more common with concomitant use of tacrolimus, targeted therapy and prolonged therapy.
- Prompt dose adjustment and shorter empiric therapy can prevent vancomycin-related AKI.

Contact

Midori Nakagaki: midori.nakagaki@health.qld.gov.au

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