

Audit of Changing the Hydration Protocol for Head and Neck Oncology Patients Receiving Concomitant Radiotherapy and Weekly Cisplatin

Dr Claire Mortimer, Dr Rowena Cazalet, Donna Constantine and Dr Ketan Shah

Background

Nephrotoxicity is a major dose-limiting side-effect of cisplatin. Cisplatin regimens include a hydration protocol to minimise nephrotoxicity. There is no gold standard for cisplatin hydration protocols resulting in widespread variation in regimens¹. Prior to June 2021, all patients in the Thames Valley cancer network (TVCN) receiving concomitant chemoradiotherapy with weekly cisplatin 40mg/m² received 3000ml of fluid intravenously.

Intravenous hydration protocol:

Pre-hydration	Chemotherapy	Post-chemo hydration	Total fluid	Total administration time
Sodium chloride 0.9% 1000ml with KCl 20mmol and MgSO4 8mmol IV Over 2 hours	Cisplatin in Sodium chloride 0.9% 1000ml IV Over 2 hours	Sodium chloride 0.9% 1000ml with KCl 20mmol and MgSO4 8mmol IV Over 2 hours	3000ml (all IV)	6 hours

Evidence suggested that oral hydration post-cisplatin is as safe as IV hydration in patients receiving <60mg/m² cisplatin^{2,3}. To reduce time spent in the chemotherapy unit for patients and improve chemotherapy unit capacity, the TVCN weekly cisplatin hydration protocol was changed:

Oral hydration protocol:

Pre-hydration	Chemotherapy	Post-chemo hydration	Total fluid	Total administration time
Sodium chloride 0.9% 500ml IV Over 30 mins	Cisplatin in Sodium chloride 0.9% 1000ml IV Over 1 hour	Patient required to drink 500ml (orally or via PEG) before discharge	2000ml (1500ml IV and 500ml orally)	2 hours

The head and neck (H&N) team became concerned that more patients were experiencing Acute kidney Impairment (AKI) and more hospital admissions with the new protocol.

References:

- Guideline for management of hydration during systemic anti-cancer therapy containing cisplatin. Wales Cancer Network. DOI: <https://www.wales.nhs.uk/sites/default/files/000000/13/13286/wcncn-guidelines-for-management-of-hydration-during-systemic-anti-cancer-therapy-containing-cisplatin/>
- Heldraals H, et al. 2016. ESMO Open, DOI: <https://doi.org/10.1136/esmoopen-2017-002388>
- Pulver, F. et al. 2010. Journal of the Multinational Association of Supportive Care in Cancer DOI: <https://doi.org/10.1007/s00201-010-0452-2>
- KDIGO AKI guidelines 2012. DOI: <https://doi.org/10.1186/1745-7574-3-10>

Aims and Standards

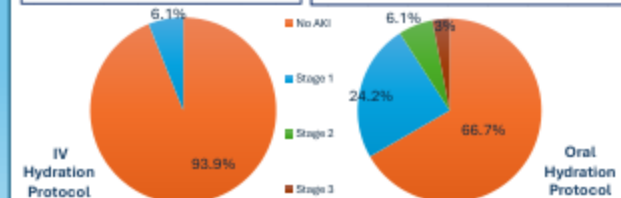
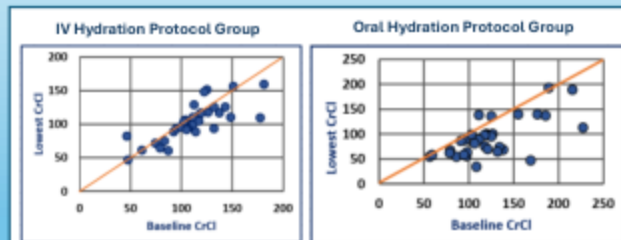
Aim: To ensure that the rate of AKIs and inpatient admissions did not increase from the baseline rate with the introduction of the oral hydration protocol.

Standard: AKI <10%, Inpatient admission <40%

Method

A retrospective single-centre audit was conducted of 33 H&N patients receiving chemoradiotherapy with cisplatin 40mg/m² from 2nd June 2021 – 1st June 2022 (oral hydration group). Electronic patient records were used to obtain data on demographics, blood test results and admission history. Creatinine clearance (CrCl) was calculated using the Cockcroft-Gault formula. The results were compared to 33 H&N patients receiving chemoradiotherapy with cisplatin 40mg/m² from 1st June 2020 – 1st June 2021 (IV hydration group).

Results of First Audit Round



IV hydration group:

- 11 hospital admissions (33.3%), 0 were due to AKI.
- Mean baseline CrCl of 111.2 (46-181)
- Mean lowest CrCl of 104.1 (47-160) during treatment.
- AKI incidence 6.1%**⁴

Oral hydration group:

- 17 hospital admissions (51.5%), 3 of the admissions were due to AKI.
- Mean baseline CrCl 123.1 (56-227)
- Mean lowest CrCl of 92.8 (36-193) during treatment
- AKI incidence 33.3%**⁴

First action plan

The Thames Valley cisplatin hydration protocol was amended due to identification of an increased AKI and hospital admission rate in the oral hydration group

Amended hydration protocol:

Pre-hydration	Chemotherapy	Post-chemo hydration	Total fluid	Total administration time in DTU
Sodium chloride 0.9% 1000ml IV with 8mmol Mg and 20mmol KCl Over 2 hours	Cisplatin in Sodium chloride 0.9% 1000ml IV Over 1 hour	Sodium chloride 0.9% 500ml IV Over 30 mins	2500ml (all IV)	3.5 hours

Results of Second Audit Round

10 patients who received the amended protocol were re-audited.

- Number of AKIs: 0
- Hospital admissions: 2

Conclusion

Oral hydration after cisplatin was not suitable for head and neck patients. An amended IV hydration protocol reduced AKIs and hospital admissions. This audit highlights the potential for unintended clinical consequences when amending protocols for logistical reasons such as chemo suite capacity.