

Improving Compliance with Prophylactic Hydration for Contrast-Mediated Acute Kidney Injury Risk in Intra-Arterial Interventional Radiology Procedures: A Closed-Loop Audit

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Abstract:

Background: Patients undergoing intra-arterial contrast procedures are at increased risk of contrast-mediated acute kidney injury (CM-AKI), particularly in the presence of severe chronic kidney disease or acute kidney injury (AKI). The Royal Australian and New Zealand College of Radiologists (RANZCR) recommends prophylactic intravenous hydration in selected high-risk patients. This audit evaluated local compliance with these recommendations within an interventional radiology (IR) service.

Aim: To assess and improve compliance with prophylactic intravenous hydration for high-risk patients undergoing intra-arterial contrast procedures.

Methods: A retrospective closed-loop audit was conducted across two consecutive cycles within a tertiary IR service. Adult patients undergoing intra-arterial contrast procedures were reviewed before and after a targeted intervention comprising departmental communication and focused teaching.

Patients were classified as high risk if estimated glomerular filtration rate (eGFR) was <30 mL/min/1.73 m² or AKI was present. Patients established on hemodialysis were excluded from hydration compliance assessment. The primary outcome was compliance with indicated prophylactic intravenous hydration. Fisher's exact testing was used for comparison between audit cycles.

Results: 38 procedures were reviewed pre-intervention and 37 post-intervention. 7 patients met high-risk criteria in each cycle. Following exclusion of hemodialysis patients, 5 eligible patients remained in the pre-intervention cohort and 3 in the post-intervention cohort.

Compliance with indicated prophylactic hydration improved significantly from 0% (0/5) pre-intervention to 100% (3/3) post-intervention (absolute improvement 100 percentage points; Fisher's exact $p=0.018$). Documentation of contrast administration also improved from 84.2% (32/38) to 97.3% (36/37), although this did not reach statistical significance ($p=0.108$).

Conclusion: A simple educational and communication intervention resulted in complete compliance with prophylactic hydration standards among eligible high-risk patients undergoing intra-arterial contrast procedures.

These findings demonstrate that low-cost quality-improvement measures can rapidly improve adherence to evidence-based nephroprotection practices in interventional radiology. Integration of renal-risk assessment and hydration prompts into routine workflow may help sustain improvements and reduce variation in patient care.