Cost Effective Approach to Prevent Contrast Induced Nephropathy

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INTRODUCTION:

Contrast induced nephropathy (CIN) is a top leading cause to acute renal failure. CIN is defined as the impairment of kidney function measured as either a 25% increase in serum creatinine from baseline or a 0.5 mg/dl increase in the absolute serum creatinine value within 72 hours after contrast exposure. No specific recognized treatment is available for CIN thus management has been mainly focused on prevention. Isotonic IV fluid hydration has remained the mainstay in preventing CIN. Numerous studies have proven IV hydration has been effective for advanced CKD eGFR <= 30ml/min. As set from the recommendations of the CIN Consensus Working Panel as well as KIDGO found that adequate intravenous volume expansion with isotonic crystalloids 1-1.5ml/kg/hr for 3-12hrs before the procedure and continued for 6-24hrs afterward decreases the incidence of CIN in high-risk patients. Due to the increasing number of iodinated contrast CT scans in the outpatient/ED setting the administration of pre- and post- IV hydration remains both costly, and cumbersome.

PURPOSE:

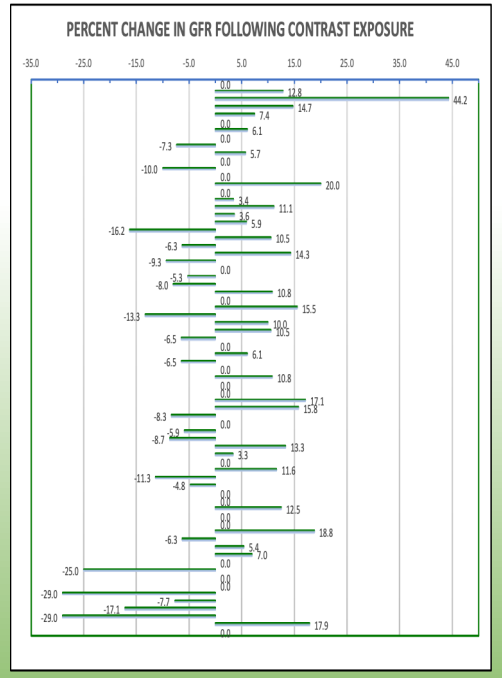
A QI project was launched to implement a peri-procedural protocol with the goal of adjusting the traditional IVF hydration protocol to a more adaptable hybrid using PO and IV hydration better suited for the ED / outpatient settings in reducing time and cost while demonstrating non-inferiority.

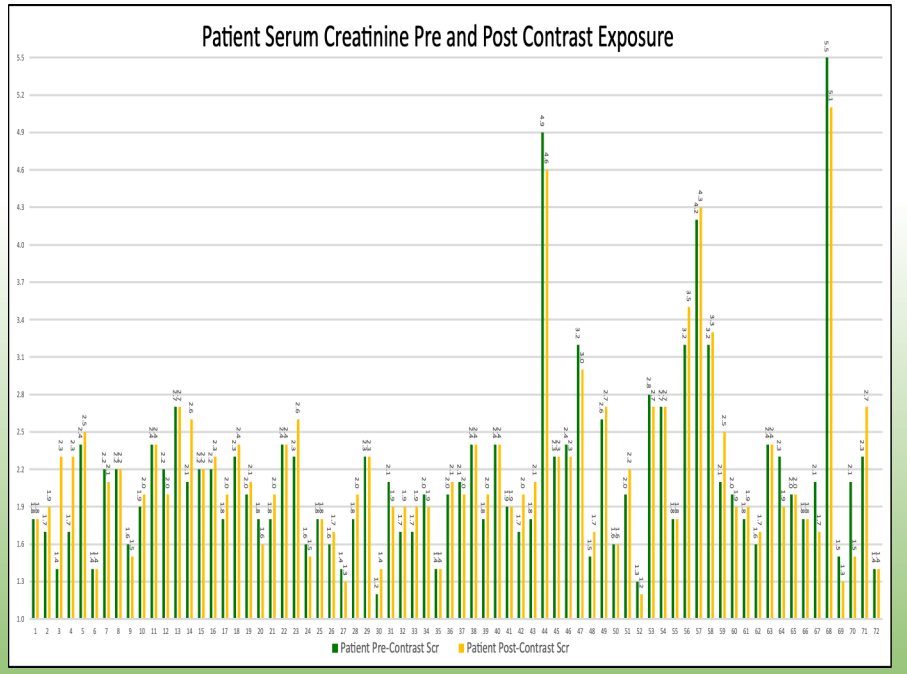
METHODS:

- Protocol instructed patients to drink 64oz of fluids the day before, the day of, and the day after the contrast exposure.
- Plain water was the fluid of choice. Patients were educated to abstain from NSAID use.
- Preceding the study, patients received a 500ml NS IVF bolus over 2 hours.
- Renal function was assessed based on steady state Serum Creatinine / Cystatin-C and GFR within 30 days prior to contrast study and within 48 hours following the contrast exposure.
- Statistical analysis included incidence of post-iodine contrast AKI defined by KDIGO criteria.

RESULTS & CONCULSIONS:

- Over 2.5 years with 70+ patients with varying degrees of CKD / CIN risks the enacted protocol produced a 4.17% (3 of 72 patients) incidence of AKI falling within acceptable ranges of 2.5% - 15% using standard CIN protocols.
- Only 3 individuals were excluded from the study because post-contrast labs were not completed within 3 days after exposure. Only 7 patients included had CKD 3a or better.
- Reduced costs and time spent in ED / outpatient setting for IV hydration with supplemented PO hydration produced noninferior incidences of CIN.
- Several patients had improvement in Scr/eGFR , thus requiring further analysis.
- Further analysis of protocol to ease of implementation, evaluation of contrast used, and cardiac status can provide insight to helping standardize further protocols for CIN prevention.





REFERENCES:

1. Kusirisin, P., Chattipakorn, S.C. & Chattipakorn, N. Contrast-induced nephropathy and oxidative stress: mechanistic insights for better interventional approaches. *J Transl Med***18,** 400 (2020)
2. Cruz DN, Goh CY, Marenzi G, Corradi V, Ronco C, Perazella MA. Renal replacement therapies for prevention of radiocontrast-induced nephropathy: a systematic review. Am J Med. 2012 Jan;125(1):66-78.e3
3. Lopez-Ruiz A, Chandrashekar K, Juncos LA. Changing Paradigms in Contrast Nephropathy. *J Am Soc Nephrol*. 2017;28(2):397-399
4. Isaka Y, Hayashi H, Aonuma K, et al. Guideline on the use of iodinated contrast media in patients with kidney disease 2018. *Clin Exp Nephrol*. 2020;24(1):1-44
5. Hossain MA, Costanzo E, Cosentino J, Patel C, Qaisar H, Singh V, Khan T, Cheng JS, Asif A. Contrast-induced nephropathy: Pathophysiology, risk factors, and prevention. Saudi J Kidney Dis Transpl. 2018 Jan-Feb;29(1):1-9