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**Reference**:

Traub, S., et al. N-Acetylcysteine Plus Intravenous Fluids Versus Intravenous Fluids Alone to Prevent Contrast-Induced Nephropathy In Emergency Computed Tomography, Annals of Emergency Medicine; Apr 2013 62(5):511-520.

**Clinical question:**

Is N-Acetylcysteine (NAC) plus normal saline more effective than normal saline alone at preventing contrast induced nephropathy?

**Introduction:**

Approximately 18 million CT scans are ordered in the ER each year. Many are done using IV contrast. Contrast induced nephropathy (CIN) is a known complication from these imaging modalities. Rates of CIN range anywhere from 2-21% depending on which studies were reviewed. There is potential significant mortality associated with application of contrast dye. This study is designed to evaluate if use NAC decreases risk of CIN in pts with at least one risk factor for CIN. This study also compared quantity of crystalloid given to the rate of CIN.

**Methods:**

Randomized, double-blind, placebo-controlled trial conducted in ED's at 2 tertiary care urban universities; Beth Israel in Boston, and Carolinas Medical Center. The treatment group was given 500mL bolus of NS with 3gram of NAC 30 minutes prior to CT scan, this was followed by a continuous administration of 67 mL/hr of a solution of 3g NAC in 1L normal saline. Patients were provided infusion for at least 2 hrs after the CT scan. In the control group the patients had the same protocol but only received normal saline.

**Definitions:**

CIN – Absolute increase in serum Cr of 0.5 or 50% increase from baseline measured 48-72 hours after administration of dye

**Participants:**

Age > 18, with 1 or more of the following – Cr 1.4 or higher, GFR<60, DM, HTN being treated with antihypertensives, CAD, use of nephrotoxic drugs, liver disease, CHF, age >65, or anemia. Pts were excluded if they had ESRD currently on dialysis, or known allergy to NAC.

**Limitations:**

Study was stopped prematurely at second interim analysis by the data and safety board for futility due to lack of a trend toward efficacy. This limited number of participants and severely decreased the power of the study. Also, the population studied ended up being low risk so results cannot be accurately applied to high risk populations.

**Results and discussion:**

6,977 participants were screened and 399 were enrolled, of which 357 completed second blood draw to determine outcome. Overall rate of CIN was 26/357 (26%). The rate of CIN in the treatment group was similar to that of the control group. 14/185 (7.6%) in NAC group versus 12/172 (7%) in control group. Both groups showed a slight decrease in Cr on re-test of approximately 0.05. As a secondary study goal, the total volume of crystalloid administered was also studied. Fluid administration was similar in both groups, but the rate of CIN decreased in those receiving at least 1L of crystalloid. In patients who received less than 1L the rate of CIN was 19/147 (12.9%), and in the patients who received at least 1L of fluid the rate was 7/210 (3.3%). This correlated to 69% risk reduction per liter of crystalloid administered. Conclusion from this study is that NAC does not reduce CIN compared to normal saline alone, but the volumes greater than 1L of crystalloid showed reduction in overall rate of CIN.