

Authors: Courtney Walz, Pharmacy Student, Richard J T Owen MB BCh LMCC, Lauren Bresee, BScPharm, ACPR, MSc, PhD, Micheal Guirguis BScPharm, PhD.

Title: Efforts for the de-adoption of N-acetylcysteine for prevention of contrast-induced acute kidney injury

Background: Contrast-induced acute kidney injury (CIAKI) is a significant complication of intravascular contrast medium (CM) and is associated with increased morbidity and mortality. CIAKI is defined as an acute decline in kidney function, with either a 25% increase in baseline serum creatinine (SCr) or an absolute increase of SCr $>44\mu\text{mol/L}$, 48-72 hours after intravascular injection of CM with no other identifiable cause. N-acetylcysteine (NAC) was previously advocated to reduce the incidence of CIAKI as it was thought to reduce oxidative stress and improve kidney hemodynamics. However, there is increasing evidence suggesting that NAC is not effective for this indication.

Objective: The objective of this project was to evaluate the impact of a multifaceted intervention to encourage the de-adoption of NAC use for prevention of CIAKI, by measuring utilization of NAC in targeted areas before and after the implementation of the intervention. Our secondary objective was to provide evidence-based alternatives to NAC, in the form of a targeted educational campaign surrounding the need for pre- and post-CM exposure hydration in at risk patient groups.

Methods: A multifaceted educational initiative focusing on evidence-based strategies for prevention of CIAKI and discouraging NAC use for CIAKI prevention was implemented across Alberta Health Services (AHS) in September 2013. A multidisciplinary team involving relevant stakeholders from diagnostic imaging, nephrology, cardiac sciences, and pharmacy services developed the intervention. The intervention involved care plans for prevention for CIAKI following intravenous and intra-arterial CM exposure, and these care plans were distributed to all physicians, pharmacists and nurse educators in AHS. In addition, formulary restrictions were imposed on NAC to discourage use for prevention of CIAKI. Impact was measured by pre- and post-NAC utilization in diagnostic imaging and cardiac sciences by using the pharmacy expenditure databases from Jan 2011 to Jan 2014, comparing the NAC utilization pre-implementation (Jan 2011 to Sept 2013) to post-implementation (Oct 2013 to Jan 2014).

Results: Following the implementation of our multifaceted intervention, diagnostic imaging and cardiac sciences saw a dramatic reduction in the use of NAC following the multifaceted intervention. Pre intervention usage was 68 units/month and post intervention usage 14 units/month, with no use in diagnostic imaging and a greater than 50% reduction in cardiac services within Edmonton hospitals following the intervention.

Conclusions: Engagement of stakeholders allowed for a detailed understanding of the reasons prescribers continued to use NAC for the prevention of CIAKI. Our multifaceted intervention acted to initiate a system-based dialogue on the CIAKI and the need to incorporate evidence-based therapies into practice to prevent CIAKI.

Alignment with CSHP 2015 Goals and Objectives:

This initiative aligned to Goal 3 and specifically objectives 3.1 and 3.2 as it increases the extent by which pharmacists are actively involved in the prompting evidence-based drug therapy protocols and/or order sets. Further, the initiative examined the use of NAC and educated prescribers and Allied Health on the existing clinical data around its use and prompted use of an evidence-based alternative.

Impact of the Project:

Two key impacts of the project have been:

1. To increase engagement between diagnostic imaging, interventional cardiology, nephrology and pharmacy services, departments that often have not engaged in discussion. This allowed for establishing links and understanding of process.
2. An increased awareness throughout AHS of the proven role of pre- and post-hydration in prevention of CIAKI. CIAKI is a condition that is not well understood, and this initiative promoted an evidence-based discussion of the role of hydration vs. other alternatives that have been proven ineffective, including NAC.