The use of order-based clinical decision support alerting to increase the homogeneity of premedication regimens in patients with known contrast allergies

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INTRODUCTION

Iodinated Contrast Utilization
- 62 million CT scans completed annually in the US
- 0.7-3.2% Prevalence of adverse reactions to non-iodine iodinated contrast
- Symptoms range from mild (e.g. urticaria) to life-threatening (e.g. anaphylactic shock)

Premedication
- ACR recommends corticosteroids with or without an anti-histamine
- Ideally, premedication begins 12-15 hours prior to study
- Less effective regimens can be used in emergent settings
- IV steroids may have no effect when given <4-6 hours prior to study

Objectives
1. Increase homogeneity of premedication use
2. Assess efficacy of CDS alerting intervention

METHODS

Electronic Health Record (EHR) Changes
- Clinical decision support (CDS) alert installed into Epic 4/7/2014
- Providers alerted of patient allergies to intravenous iodinated contrast
- CDS prompts providers to order a recommended premedication regimen
- Alert discontinued if patient has adequate premedications ordered

Premedication Analysis
- Patients classified by premedication regimen received:
  1. Premedication regimen, based on ACR recommendations
  2. Corticosteroids <24 hours prior to study (i.e. not following recommendations)
  3. No premedication with corticosteroid

Data Collection and Analysis
- Retrospective analysis; 11 months pre- and post-implementation
- Pre- and post-CDS patients compared
  1. Type of premedication regimen
  2. Documented allergic reactions

RESULTS

Patient Population & Alert Firing
- 200 patients with documented allergy received IV contrast for a radiology exam
- Alert fired appropriately for all premedication patients, 2/3 of non-premedicated patients
- Alert did not fire inappropriately for any patients (100% specificity)
- Non-premedicated patients where alert did not fire had no premedications meeting criteria
- Overall alert sensitivity: 94.68%

Statistical Analysis
- Proportion of patients who received preferred regimen increased (Z-score = 3.25, p = 0.001)
- No difference in proportion of patients who were not premedicated (Z-score = 0.2, p = 0.98)
- One patient had allergic reaction; occurred post-CDS in patient given premedication

Patient Population by Study Period and Premedication Criteria

DISCUSSION

Conclusion
- Homogeneity of premedication regimens significantly improved using CDS in Epic
- Alert firing is primarily associated with increased ordered usage
- Sample size sufficient to analyze number of contrast reactions
- Alert sensitivity suboptimal as premedications have other clinical indications, thus may cause alert to not fire inappropriately

Future Direction
- Additional analysis needed to see if CDS has lead to increased patient safety
- Further steps to ensure patient compliance with premedication
- Implement similar CDS designs for allergies to gadolinium
- Further optimize alert firing for all relevant studies

References

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