2013 Scientific Sessions
Saturday, October 12, 2013
1:00 – 5:00 p.m.

Presenter: Matthew Davenport, M.D.

Title of Abstract: **Dose-Toxicity Relationship of Gadoxetate Disodium and Transient Post-Injection Dyspnea**

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Modality: MR

Organ System: GI

Intro: Gadoxetate disodium recently has been associated with acute transient dyspnea and arterial-phase image degradation in a single-center prospective observational trial of 198 patients. This study assesses whether the phenomenon is related to the dose of administered contrast material.

Purpose: To determine whether there is a dose-toxicity relationship between gadoxetate disodium and transient post-injection dyspnea.

Methods Used: IRB approval was obtained and patient consent waived for this retrospective, multi-institutional HIPAA-compliant study. 559 patients imaged with 559 gadoxetate disodium-enhanced magnetic resonance (MR) abdominal imaging studies at a fixed volume of either 20 mL (n=112) or 10 mL (n=447) at two distinct health systems comprised the study population. Administered doses ranged from 0.05-0.42 mL/kg (mean: 0.15 mL/kg); 479 (86%) doses were off-label. Each phase of imaging (pre-contrast, arterial, venous, late dynamic) was assigned a respiratory motion score from none (1) to nondiagnostic (5). Examinations with a pre-contrast score of 1-2, an arterial score of 4-5, and venous / late-dynamic scores of 1-3 were labeled as transient dyspnea. Stepwise multivariate logistic regression was performed on multiple covariates including dose, with transient dyspnea as the primary outcome measure.

Results of Abstract: Transient dyspnea occurred after 12% (67/559) of gadoxetate disodium administrations (Site 1: 15% [35/232], Site 2: 9.8% [32/327]). There was no dose-toxicity relationship for dose-by-weight (p=0.61, multivariate) or on- vs. off-label dosing (p=0.88 [univariate], 13% (10/80) on-label dosing vs. 12% (57/479) off-label dosing). Administered volume had a weak significant effect (20 mL incidence: 20% [22/112] vs. 10 mL incidence: 10%, [45/447], multivariate p=0.01, odds ratio [OR] 2.1 (20 mL vs. 10 mL), 95% confidence interval [CI] 1.2-3.7). Chronic obstructive pulmonary disease (COPD) was the only non-dose-related predictor of transient dyspnea in the multivariate model (p<0.0001; OR 5.1 [95% CI: 2.5-11.5]; 39% [12/31] vs. 10% [55/528]).

Discussion: Gadoxetate disodium-associated transient dyspnea occurs at a rate irrespective of dose-by-weight and on- vs. off-label dosing, but administered volume has a weak significant effect. The likelihood of it occurring is significantly greater in patients with a clinical diagnosis of COPD.

Scientific and/or Clinical Significance? 1. Gadoxetate disodium-associated transient dyspnea occurs irrespective of dose-by-weight and on- vs. off-label dosing. 2. Gadoxetate disodium-associated transient dyspnea is significantly associated with the administered volume, but the effect is weak and cannot be used to eliminate the incidence for the range of currently administered clinical volumes. 3. Patients with COPD are at particular risk of developing gadoxetate disodium-related transient dyspnea, but the majority of patients who experience transient dyspnea do not have COPD. 4. These data suggest non-allergic-like physiologic transient tachypnea as a possible mechanism for the observed artifact.

Relationship to existing work This clarifies the dose-toxicity relationship of a recently discovered relationship between gadoxetate disodium and acute transient dyspnea.